

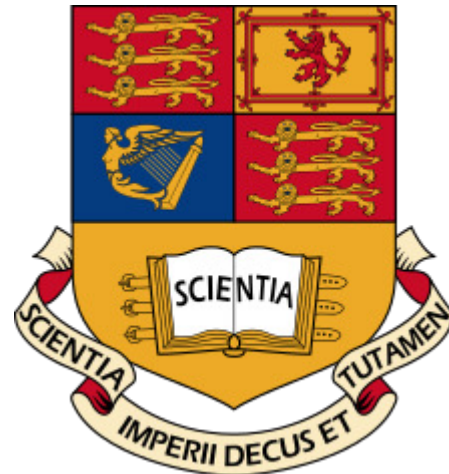
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Agricultural Science & Economics

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The Effects of Diagnostic and Interactive Performance Measurement Systems on Organisational Commitment and Job Satisfaction: The Perception of Information and Communication Technology Practitioners in Hong Kong

Abstract: The rapid and accelerating development of information and communication technology (ICT) has caused an unprecedented expansion in Hong Kong's ICT industry and a simultaneous increase in the demand for ICT practitioners. With the intention of helping ICT-related companies in Hong Kong retain valuable employees, this research identifies the effects of diagnostic and interactive use of performance measurement systems (PMS) on organisational commitment and job satisfaction. The research adapted the measurement from [1] and [2] in diagnostic and interactive performance measurement, organisational commitment were adapted from [3] whilst job satisfaction with five dimensions of compensation was adapted from [4]. With a critical review of these related literatures, two research questions and five hypotheses were formulated to explore ICT practitioners' perceptions of job satisfaction, organisational commitment and PMS. An Internet-based anonymous questionnaire, using measures adopted from previous validated research, collected the research data. Six thousand invitation emails sent to randomly selected ICT practitioners in Hong Kong provided 302 responses for statistical analysis. Findings indicate that diagnostic and interactive use of PMS positively influences the job satisfaction and organisational commitment of employees and suggest that job satisfaction and organisational commitment are correlated. The study also found that

employees' position in the organisation and the nature of the business influences both job satisfaction and commitment, but that their marital status only influences job satisfaction and not organisational commitment; other demographics have no influence on either satisfaction or commitment. Results from this study provide insights for managers and owners of companies in Hong Kong's ICT sector by suggesting how they can formulate appropriate strategies to reduce staff turnover. The research contributes to the literature related to the appropriate use of PMS in ICT organisations as a means of improving organisational commitment and job satisfaction.

Keywords: diagnostic; interactive; performance measurement; organisational commitment; job satisfaction; Hong Kong.

1. INTRODUCTION

1.1 Background of the Research

An organisation's survival depends on its operational culture and performance. Performance measurement systems (PMS) enable organisations to understand how closely their internal performance adheres to organisational objectives and strategic goals [5]. Consequently, organisational commitment and job satisfaction are associated with effective outcomes and have a positive influence on organisational performance; organisations that adopt an optimum organisational culture with a positive attitude enhance their performance [6]. Human expertise and technology have been advancing at an ever-increasing speed during the past few decades, resulting in rapid changes in human lifestyles. This is especially true of the information and communication technology (ICT) sector, which is constantly developing new and improved advanced electronic devices and applications. Due to the rapid expansion of this ICT particular sector, there has been a substantial increase in demand for ICT practitioners in most developed regions of the world including Hong Kong (United Nations Conference on Trade and Development [UNCTAD], 2010). The rapid and accelerating development of ICT technology has caused unprecedented changes in Hong Kong's society. The substantial adoption of ICT-related technologies, products and services by both the private and public sectors in Hong Kong, such as mobile phones, personal computers and the Internet, appears to be one of the major determinants for its success. Extensive use of the Internet in Hong Kong has enabled businesses and individuals to communicate,

transact and transfer knowledge and data more effectively, enhancing overall efficiency, effectiveness and productiveness [7]. Therefore, it is imperative to study the importance of performance management systems to organisational commitment and job satisfaction of employees in the ICT industry in Hong Kong.

Prior research has drawn a relationship between PMS and the behavior and attitude within an organisation, which contributes to the achievement of organisational objectives [2,8,9]. Further, prior research on the effects of diagnostic and interactive management control systems (MCS) on organisational performance produced varying results, and no empirical studies have been conducted in relation to the moderating effects of interactive PMS as a component of a MCS [1,10]. None of the relevant literature examined for this study addressed the different uses of PMS and their effects on individual employee behavior. Therefore, this research seeks to fill this gap by examining the effects of diagnostic and interactive use of PMS on organisational commitment and job satisfaction.

1.2 The Importance of Hong Kong's ICT Sector

The increased adoption of ICT technology in Hong Kong has led to a substantial increase in spending on ICT products and services from both the private and government sectors. This may be partly due to the rapid increase in local demand for ICT products and services and partly due to the resurgence of trade following the aftermath of the 2009 tsunami [7]. Organisations that want to take advantage of the increasing demand for ICT products and services should deal proactively with the corresponding increase in demand for ICT professionals, who are an essential component of an organisation's effectiveness. Findings from previous studies suggest that different components of organisational commitment positively affect organisational effectiveness and therefore performance [11,12]. Previous studies have also concluded that employees with high organisational commitment have higher expectations of their performance and thus perform better [13,14,15]. Therefore, employee commitment to an organisation is a major issue for human resource professionals in maintaining organisational sustainability [16]. Although the research studies the situation in Hong Kong, the constructs used are adapted from studies conducted in other western countries in order to increase the global implications of the findings.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In order to identify the research gap, this section reviews the literature relating to the effect of diagnostic and interactive use of performance management systems (PMS) on organisational commitment and job satisfaction.

2.1 Performance Management Systems

As used widely to evaluate organisational performance [17], Performance Management Systems (PMS) are a set of metrics used to formulate strategic plans and monitor the achievement of organisational goals [18] and help management to identify areas requiring attention and improvement, monitor project progress, improve staff communication, convey management expectations, enhance accountability and motivate employees with rewards based on individual performance [19,20,21,22].

The diagnostic and interactive uses of PMS are two management tools that balance this tension within an organisation to help attain established organisational objectives [1]. PMS assist in the identification of areas that strengthen accountability, improve communication, motivate employees through performance-based rewards, monitor progress, and communicate expectations or areas requiring attention [19,20,21,22].

2.1.1 Diagnostic and interactive use of PMS

The diagnostic use of PMS can be considered the traditional monitoring of progress toward organisational goals with a focus on exceptions and deviations from set standards of performance for corrective actions and tight controls over strategies and operations [1,2]. It is usually characterized by an extremely tight communication and information flow structure, which may hinder learning and risk-taking innovative behavior [1]. This monitoring device, which is based on pre-set standards and procedures, constrains risk-taking innovative behavior to ensure predictable organisational objectives are being met as originally planned and designed [9]. It serves to eliminate mistakes and negative variances [1].

In contrast to the diagnostic use of PMS, the interactive use of PMS facilitates risk-taking innovative behavior and promotes learning throughout an organisation [1]. When using interactive PMS, interactive processes such as top management teams interact regularly with their subordinates and engage in debates and face-to-face challenges with them during their decision-making processes [2,8]. These interactive

processes allow dialog throughout an organisation and strategic uncertainty to be resolved, making the development of new ideas and initiatives possible [2,8].

[23] concluded that organisational performance is improved through the appropriate diagnostic and interactive use of PMS. Widener's view is based on the assumption that an interactive control system is interdependent with both the diagnostic use of a PMS and the boundary system. The interactive use of a PMS affects the diagnostic use of a PMS, providing the required mechanism that makes the interactive control system effective.

[1] revealed that organisational learning, entrepreneurship, innovativeness, and market orientation can be positively enhanced by the interactive use PMS. Conversely, there is a negative effect on performance capabilities when PMS is used diagnostically. Such findings concur with those of [24] and [25]. The relationships between the diagnostic and interactive use of PMS and organisational performance are not mediated by their capabilities. However, [1] considered that performance variables in the study were restrictive and were responsible for the non-mediating effect.

The diagnostic and interactive uses of PMS can be complementary [1]. The diagnostic use of PMS can be described as a single-loop learning process, which provides the basis for the interactive use of PMS and double-loop learning, which was identified by [1]. [26] considered that the diagnostic use of PMS is only a tool for performance measurement, while the interactive use of PMS is a powerful tool for strategies and plans development [1]. In view of the thorough and highly respected PMS-related work of [1,27] and [2,8,9], their relevant models were adapted for the purpose of this study.

2.2 Organisational Commitment

Organisational commitment has attracted the attention of both researchers and practitioners over the years [11,28,29], mostly due to the consequences, correlations, and antecedents of commitment that have implications on work behavior and employee performance, including organisational effectiveness, job performance, and organisational citizenship behavior. The extent of employees' organisational commitment has a major effect on organisational performance [3,30,31,32]. Employees with strong organisational commitment tend to perform better [33,34,35].

Conversely, low organisational commitment is often associated with problematic issues such as high absenteeism and staff turnover [28].

2.2.1 Development of organisational commitment

[36] concept of commitment has been widely used by researchers studying organisational commitment. His concept is about that employees would like to continue to work in the same company until there is an opportunity of an exchange of value which would be lost if they resigned from the company. However, [37] commented that this type of commitment in terms of exchange of value is not about job satisfaction or career development but just reward to employees. The concept of [36] is known as a calculative approach to commitment. Contrary to this approach, [38] emphasized organisational commitment with attitudinal approach. Their model focuses on the employee's role and their involvement in the company they are working. Their findings also concerned about the feelings of employees. More recent work by [39] argued that employees' commitment to their company also concerned about their behavior towards other members of the company which relates to trust and group membership. Employees will have higher level of commitment to the company if they have a good relationship with their colleagues.

2.2.2 Western organisational commitment theories

[40] suggested that organisational commitment comprises three behavior and attitude factors. They contended that an employee's decision to leave or stay with an organisation is based on the relationship between the employee and the organisation, which is determined by the employee's psychological state and defined as normative commitment, continuance commitment, and affective commitment.

Normative commitment arises from agreements or sharing of norms that result in an employee's sense of obligation to an organisation. Employees that have a strong normative commitment tend to stay with a firm because they feel obliged to [41]. Continuance commitment is an accumulation of interests within an organisation. This means that an employee bonds with an organisation because of additional interests such as seniority, concerns about family, and pensions, rather than positive feelings toward an employer [42]. The commitment represents the employee's understanding of the opportunity costs related to staying or leaving an organisation; a strong commitment from employees means they stay with their employers because

they have to [41]. Affective commitment is an employee's emotional adherence to the identification with, and involvement in, an organisation [32]. That is, employees are actively involved with employers by giving something of themselves in order to enhance the wellbeing of their employers [43]. Affective commitment includes three factors that connect an employee with an employer: a strong belief in, and commitment to, an organisation's values and goals, a willingness to devote a great effort to an organisation, and a strong wish to retain membership of an organisation [43].

[44] suggested a model of commitment in terms of work attitudes which distinguishes normative and instrumental processes as behavioral determinants. He claimed that commitment could be defined as the internalized normative pressures of employees to act in a way that meets organisational interests. Employees' identification inside an organization and their values of loyalty are the critical determinants of commitment. [45] suggested commitment consists of continuance, cohesion and control types. He claimed that cohesion commitment is the attachment of an employee's fund of affectivity and emotion to their group.

2.2.3 Wang's (2004) organisational commitment model

[46] suggested that communist ideals in China could influence organisational commitment, and that her model could be broadly compared with continuance commitment in Western research. Wang also stated the possibility of a phenomenon of organisational commitment that is unique to China, meaning that Western models may not be applicable in the Chinese context. [46] model is based on suggestions by [47] and comprises five components: value commitment, normative commitment, passive continuance commitment, active continuance commitment, and affective commitment.

In [46] model, affective commitment is used to measure emotional attachment and is the same as in [40]; however, sub-dimensions of passive and active commitment are included, as recommended by other researchers [28,48,49,50]. In [46] model, active continuance commitment suggests that an employee is actively motivated within the organisation because of the availability of promotion opportunities or work-related training, which encourages the employee to stay in his or her job. This contrasts with passive continuance commitment, which applies when employees stay with their employers because they are unable to find another job. Normative commitment implies that employees feel obligated to stay in their job; Value

commitment applies when employees share the values of the organisation and, as a result, demonstrate greater effort in their work to support their employers [46].

Prior to 1997, Hong Kong had been under British administration for almost 150 years, British business practices and colonial-style administration remained unchanged in Hong Kong before 1997 [51,52]; the traditional bureaucratic approach and focus on hierarchy ensured centralized control [52]. After the handover of Hong Kong to China in 1997, British rule ended, but Western culture was deeply rooted in Hong Kong. Although [53] found that the model of [46] has a better fitness to the organizational commitment behavior of ICT employees in Hong Kong, the [3] measurements for organisational commitment, which have been commonly used [54] in the West, were adapted for this study.

2.3 Job Satisfaction

[55] was one of the earliest researchers to define job satisfaction, describing it as an employee's psychological and physical response to their work environment and the nature of their work. [56] defined job satisfaction as an employee's negative or positive attitudes in relation to their employment. Other research indicated that the measure of employees' involvement and identification with their organisation could identify job satisfaction [32] and that when an evaluation of the characteristics of a job creates positive feelings for an employee, this is defined as job satisfaction [57]. According to [58], job satisfaction is an affective or emotional response regarding different elements of work. However, other researchers asserted that job satisfaction is employees' feelings, including pleasurable or positive emotional states, toward their jobs following performance appraisals [59,60,61,62,63]. [64] suggested that job satisfaction encompasses employees' evaluative, cognitive, and affective reactions to their job, while [65] defined job satisfaction as the extent to which workers achieve a sense of fulfillment and feel gratified from their work. [66] identified the elements of employees' expectations and characteristics of jobs and defined job satisfaction as the equity of various desired and non-desired work-related experiences. A final definition suggested that workers have a mixture of feelings and beliefs about their jobs and that job satisfaction can be measured as ranging from extreme satisfaction to extreme dissatisfaction [67].

2.4 Hypotheses Development

In order to gain a better understanding of the interplay between the constructs of the diagnostic use of PMS, the interactive use of PMS, organisational commitment, and job satisfaction, a set of hypotheses was developed to help address the proposed research questions.

2.4.1 Diagnostic use of PMS and organisational commitment

[24,68,69] asserted that organisational commitment is strongly related to the effective use of PMS, including the diagnostic use of PMS. It is expected that a similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 1: The diagnostic use of PMS positively affects employees' organisation commitment in Hong Kong's ICT industry.

2.4.2 Interactive use of PMS and organisational commitment

[24,68,69] asserted that organisational commitment is strongly related to the effective use of PMS, including the interactive use of PMS. It is expected that a similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 2: The interactive use of PMS positively affects employees' organisation commitment in Hong Kong's ICT industry.

2.4.3 Diagnostic use of PMS and job satisfaction

[24,68,69] asserted that the job satisfaction of employees is strongly related to the effective use of PMS, including the diagnostic use of PMS. It is expected that a similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 3: The diagnostic use of PMS positively affects employees' job satisfaction in Hong Kong's ICT industry.

2.4.4 Interactive use of PMS and job satisfaction

[24,68,69] asserted that the job satisfaction of employees is strongly related to the effective use of PMS, including the interactive use of PMS. It is expected that a

similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 4: The interactive use of PMS positively affects employees' job satisfaction in Hong Kong's ICT industry.

2.4.5 Organisation commitment and job satisfaction

Previous studies revealed a correlation between employee commitment and job satisfaction, such as the study of hospital nurses by [70], which argued that job satisfaction can predict organisational commitment. [71] found that job satisfaction can predict whether employees intend to leave an organisation, as well as their level of organisational commitment. Organisational commitment is strongly related to job satisfaction [72,73,74,75]. The absence of job satisfaction often leads to reduced organisational commitment [76] and increased staff turnover [77,78].

[79] revealed that organisational commitment was directly correlated with intent to leave and job satisfaction. The same research confirmed that organisational commitment predicts job satisfaction, but job satisfaction is unable to predict organisational commitment. These results differ from those of studies in the West. To gain a better understanding of the interplay between these two constructs, it was hypothesized that:

Hypothesis 5: Employees' organisation commitment and job satisfaction are positively correlated in Hong Kong's ICT industry.

2.5 Research Model

Based on the literature review, the following two research questions were posed:

1. What is the relationship between the use of PMS, organisational commitment, and job satisfaction in Hong Kong's ICT sector?
2. What are the effects of different PMS (diagnostic and interactive) on organisational commitment and job satisfaction in Hong Kong's ICT sector?

Based on the research questions and the hypotheses developed in relation to the concepts of diagnostic and interactive use of PMS, organisational commitment, and job satisfaction, five hypotheses were developed. Fig. 1 shows the research model of this study.

3. METHODOLOGY

3.1 Sample and Data Collection

The chosen population of this research was all the employees of all levels in Hong Kong's ICT industry. Names and email addresses of ICT practitioners — the potential participants — were randomly selected from ICT-related public domains in Hong Kong. However, to enhance the quality of this research, a target sample size of 300 was set. In view of this target sample size and the anticipated low response rate in this kind of survey [80,81], 6,000 invitations by email were sent out to recruit research participants. Final 302 respondents were received and the response rate is 5.03%.

The data collection method for this research was an Internet-based, self-administered questionnaire to collect the perception of Hong Kong's ICT practitioners on the levels of diagnostic and interactive use of PMS within their organisations and their levels of organisational commitment and job satisfaction. Six thousand invitation letters along with a participant information statement were sent directly via email to the mailboxes of the randomly selected potential participants who were invited to complete the questionnaire online and submitted their data to the database server. Finally 302 responses were collected. Potential participants were also advised that participation in this research was entirely voluntary and that they could withdraw from the survey at any time without giving a reason. As is common practice, the return of a completed questionnaire constituted implied consent to participate in the survey.

3.2 Research Instrument

The research instrument encompasses five sections. There were four constructs in this research, which included diagnostic use of PMS, interactive use of PMS, organisational commitment, and job satisfaction. The last section collected demographic data related to the respondents.

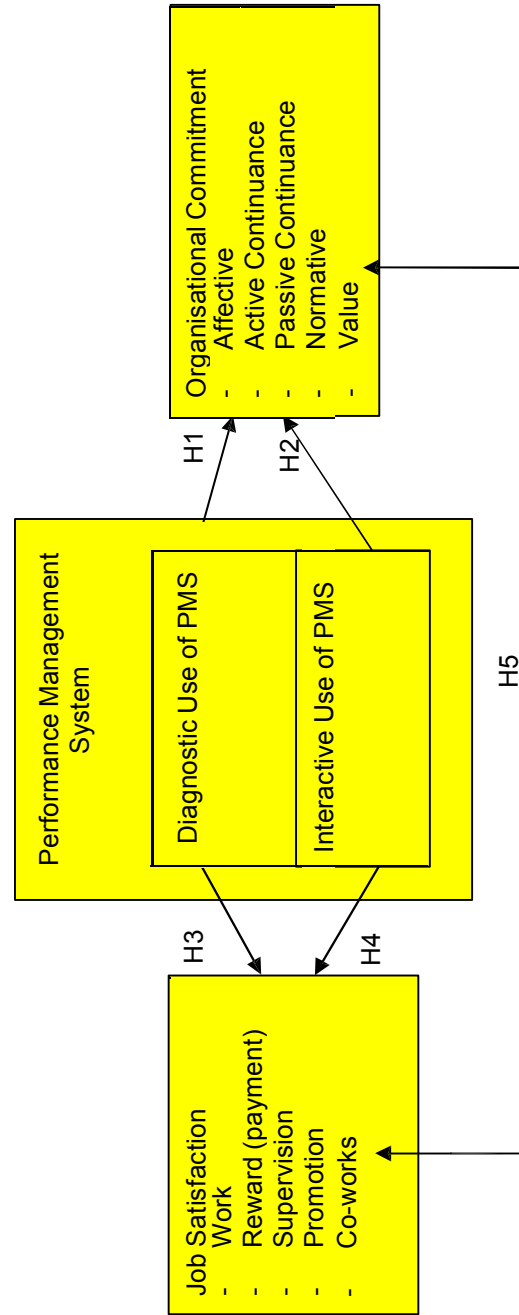


Fig. 1. Conceptual model of this research: Effects of PMS on organisational commitment and job satisfaction

The diagnostic use of PMS was the independent construct in this study. The four questionnaire items for the diagnostic use of PMS were adapted from [1]. Table 1 shows these measuring items, the question ID, and the questions relating to the diagnostic use of PMS.

Table 1. Measuring items for diagnostic use of PMS

Question ID	Questionnaire items
A1-1	My senior management team involves me in the use of performance measurements to track progress toward goals.
A1-2	My senior management team involves me in the use of performance measurements to monitor results.
A1-3	My senior management team involves me in the use of performance measurements to compare outcomes to expectation.
A1-4	My senior management team involves me in the use of performance measurements to review key measurements.

The interactive use of PMS was the mediating construct in this study. Seven out of eight questionnaire items for the interactive use of PMS were adapted from [1], while the last item was adapted from [2]. This was because of its appropriateness in the circumstances. Table 2 shows these measuring items, the question ID, and the questions relating to the interactive use of PMS.

Table 2. Measuring items for interactive use of PMS

Question ID	Questionnaire items
A2-5	My senior management team involves me in the use of performance measurements to enable discussion in meetings of superiors, subordinates, and peers.
A2-6	My senior management team involves me in the use of performance measurements to enable continual challenging and debating of underlying results, assumptions, and action plans.
A2-7	My senior management team involves me in the use of performance measurements to enable continual challenging and debating of underlying results, assumptions, and action plans.
A2-8	My senior management team involves me in the use of performance measurements to unite the organisation.
A2-9	My senior management team involves me in the use of performance measurements to enable the organisation to focus on common issues.
A2-10	My senior management team involves me in the use of performance measurements to enable the organisation to focus on critical success factors.
A2-11	My senior management team involves me in the use of performance measurements to develop a common vocabulary within the organisation.
A2-12	My senior management team involves me in the use of performance measurements to enable the organisation to focus on strategic uncertainties.

Organisational commitment was the dependent construct in this study. [3] model is described by [82] as the most widely accepted definition of commitment to organisations and how this is measured. As such, the questionnaire items for

organisational commitment were adapted from [3]. Table 3 shows these measuring items, the question ID, and the questions relating to organisational commitment.

Table 3. Measuring Items for organisational commitment

Question ID	Questionnaire items
B1-13	This organisation holds a great deal of personal meaning for me.
B1-14	I owe a great deal to my organisation.
B1-15	I would feel guilty if I left my organisation now.
B1-16	I really feel as if this organisation's problems are my own.
B1-17	I would be very happy to spend the rest of my career with this organisation.
B2-18	It would be very hard for me to leave my organisation right now, even if I wanted to.
B2-19	One of the few negative consequences of leaving this organisation would be the scarcity of other job opportunities.
B2-20	I would not leave my organisation right now because I have a sense of obligation to its people.
B2-21	Even if it were to my advantage, I do not feel it would be right to leave my organisation now.
B2-22	This organisation deserves my loyalty.
B3-23	I do not feel emotionally attached to this organisation.
B3-24	I do not feel like part of the family in my organisation.
B3-25	I do not feel a strong sense of belonging to my organisation.
B3-26	I do not feel any obligation to stay with my current employer.
B3-27	If I had not already put too much of myself into this organisation, I would leave.

Job satisfaction was the dependent construct in this study. The questionnaire items for job satisfaction, which comprised five dimensions of compensation, work, supervision, promotion, and co-workers, were adapted from [4]. Table 4 shows the measuring items, the question ID, and the job satisfaction questions.

The demographic data section collected information related to the respondents. This information included gender, age, marital status, monthly income, education level, work experience in the ICT industry, and information on their current employer.

3.3 Data Analysis

Collected data were analyzed by using Cronbach's Alpha () Reliability Test and the EFA Validity Test; AMOS was used to run CFA in order to confirm the reliability and validity of the measurements used in this study. Hypotheses relating to the relationships between the tested latent variables (i.e., interactive PMS, diagnostic PMS, organisational commitment, and job satisfaction) were analyzed using Structural Equation Model (SEM).

Table 4. Measuring items for job satisfaction

Question ID	Questionnaire items
C1-28	My benefit package.
C1-29	My most recent raise.
C1-30	Information about pay issues provided by the company.
C1-31	My current total salary package (base pay, benefits, and incentives).
C1-32	The company's pay structure.
C1-33	How the company administers pay.
C2-34	The job requires me to use a number of complex or high-level skills.
C2-35	The job denies me any chance to use my personal initiative or judgment when working.
C2-36	The job is quite simple and repetitive.
C2-37	The job gives me considerable opportunity for independence and freedom in how I work.
C3-38	My supervisor looks for opportunities to praise positive employee performance, both in private and in front of others.
C3-39	I feel undervalued by my supervisor.
C3-40	The supervisor almost never gives me feedback about how well I have completed my work.
C3-41	My supervisor rewards a good idea by implementing it and giving credit to the responsible employee(s).
C3-42	My supervisor seldom recognizes an employee for work well done.
C3-43	My supervisors often let me know how well they think I am performing.
C4-44	My chances of being promoted are good.
C4-45	There are enough career opportunities for me in this organisation.
C4-46	Job vacancies in this organisation are usually filled by people from outside the organisation.
C4-47	It would be easy to find a job in another department.

4. FINDINGS

The data collected from the 302 respondents were checked using descriptive analyses, reliability test and structural equation modeling.

4.1 Sample Characteristics

Table 5 shows the distribution of respondents' positions in their company whilst Table 6 shows the personal details of respondents.

4.2 Validity Test

Although all the measurement items are adapted from prior studies with higher validity and reliability, this research has conducted the validity and reliability test in order to ensure the same level of validity and reliability of the data collected. Exploratory factor analysis (EFA) was initially run to establish measurement assessment of latent variables. With these, EFA for PMS is as shown in Table 7. The table indicates that all but one item ("develop a common vocabulary in the organisation") of interactive use of PMS loaded highly in Component 1 (C1) and was

named “interactive”. All diagnostic use of PMS items loaded highly in Component 2 (C2) and was named “diagnostic”. This demonstrates that the factor loading for these two components discriminates and converges in support of its theoretical underpinning.

Table 5. Respondents’ company details

Position	Frequency	Percentage
Owner/CEO/Admin/Marketing/HR Director	80	26.5
General/Technical/IT/QC Manager	48	15.9
Executive/Supervisor	77	25.5
Technician/Clerical	97	32.1
Nature of business		
Manufacturing	156	51.7
Trading and Service	81	26.8
Wholesale and Retail	35	11.6
Banking Institutes	4	1.3
Construction/Engineering	4	1.3
Government sector	1	0.3
Education/Training Institute	6	2.0
Other (please specify)	15	5.0
No. of employees		
10 or fewer	42	13.9
11 to 50	48	15.9
51 to 100	59	19.5
101 to 200	50	16.6
over 200	103	34.1
Years of experience in ICT		
2 or fewer	101	33.4
3 to 5	95	31.5
6 to 10	60	19.9
11 to 20	32	10.6
more than 20	13	4.3
Missing	1	0.3
Years of working experience in current company		
2 or fewer	133	44.2
3 to 5	91	30.2
6 to 10	53	17.6
11 to 20	18	6.0
more than 20	6	2.0

EFA for organisational commitment, as shown in Table 8, indicates that when two items from 15 items are removed, organisational commitment items load highly into the three distinctive components of continuance, affective and normative, thus converging and discriminating, as indicated in theory.

Table 9 shows the rotated component matrix, where the 25 items that loaded highly into five distinctive components, compensation (C1), co-workers (C2), supervision (C3), promotion (C4), work (C5), are distinct. These five components explain a total of 73.80 percent variance in the items, whereby C1 explains 43.44

percent, C2 explains 16.19 percent, C3 explains 5.85 percent, C4 explains 4.72 percent, and C5 explains 3.60 percent.

Table 6. Respondent profile

Gender	Frequency	Percentage
Female	161	53.5
Male	140	46.5
Missing	1	
Age		
18–24	66	21.9
25–34	164	54.5
35–44	52	17.3
45–54	12	4.0
55 and above	7	2.3
Missing	1	0.3
Marital status		
Single	172	57.0
Married	130	43.0
Education level		
Secondary/High school	35	11.7
Associate degree/Higher diploma	59	19.7
Bachelor/Professional degree	167	55.7
Master degree	33	11.0
Doctorate	6	2.0
Missing	2	0.6
Monthly income level (HK\$)		
Less than \$8,000	91	30.1
\$8,000 to \$15,000	89	29.5
\$15,001 to \$28,000	62	20.5
\$28,001 to \$38,000	23	7.6
\$38,001 to \$50,000	15	5.0
More than \$50,000	22	7.3
Total	302	100

4.3 Reliability Tests

The reliability of all constructs shows Cronbach's α as being above 0.7, showing high reliability (Table 10).

4.4 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was used to verify the measurement assessment performed above. As such, measurement models of latent variables were drawn and confirmed from the findings.

Table 7. Rotated component matrix

Items for PMS	Component	
	Interactive	Diagnostic
Tie the organisation together	0.811	
Provide a common view of the organisation	0.807	
Enable the organisation to focus on common issues	0.792	
Enable continual challenge and debate underlying results, assumptions, and action plans	0.771	
Enable the organisation to focus on strategic uncertainties	0.769	
Enable discussion in meetings of superiors, subordinates, and peers	0.692	
Enable the organisation to focus on critical success factors	0.680	
Track progress toward goals		0.854
Monitor results		0.846
Compare outcomes to expectation		0.834
Review key measures		0.811

Table 8

Items for organisational commitment	Component		
	Continuance	Affective	Normative
I do not feel a strong sense of belonging to my organisation.	0.869		
I do not feel like part of the family at my organisation.	0.840		
I do not feel emotionally attached to this organisation.	0.798		
I do not feel any obligation to remain with my current employer.	0.752		
If I had not already put too much of myself into this organisation, I would leave.	0.751		
This organisation has a great deal of personal meaning for me.		0.815	
I owe a great deal to my organisation.		0.796	
I really feel as if this organisation's problems are my own.		0.641	
It would be very hard for me to leave my organisation right now, even if I wanted to.		0.628	
This organisation deserves my loyalty.		0.552	
Even if it were to my advantage, I do not feel it would be right to leave my organisation now.			0.804
I would feel guilty if I left my organisation now.			0.766
I would be very happy to spend the rest of my career with this organisation.			0.765

Table 11 indicates that $CMIN = 114.85$, $df = 43$, $p\text{-value} = 0.0001$, showing that the CFA for PMS model does not quite fit. However, $CIM/DF = 2.7 < 3$ indicates the model fit [83,84]. The results $GFI = 0.90$, $AGFI = 0.90$, and $CFI = 0.90$ all show that the model is acceptable. The result $RMSEA = 0.0075$ shows a value < 0.08 ; hence, the model is deemed acceptable and supported by $PCLOSE = 0.0007$ ($PCLOSE < 0.05$).

Table 9

Items for job satisfaction	Component				
	Compensation	Co-workers	Supervision	Promotion	Work
My current total salary package (base pay, benefits, and incentives)	0.823				
The number of benefits I receive	0.790				
Size of my current financial incentive	0.789				
The competitiveness of my total salary package (base pay, benefits, and incentives)	0.788				
The company's pay structure	0.777				
How the company administers pay	0.771				
The information about pay issues provided by the company	0.770				
My benefit package	0.770				
Consistency of the company's pay policies	0.756				
How my raises are determined	0.747				
My most recent raise	0.742				
The value of my benefits	0.718				
Co-workers are friendly		0.916			
Co-workers are honest		0.912			
Co-workers are dynamic		0.880			
Co-workers are intelligent		0.878			
Co-workers are not enemies		0.866			
Co-workers are hardworking		0.853			
My supervisor praises employee performance, both privately and in front of others.			0.741		
My supervisor often lets me know how well he or she thinks I am performing in the job.			0.729		
My supervisor rewards a good idea by implementing it and giving the responsible employee(s) credit.			0.721		
There are enough career opportunities for me in this organisation.				0.793	
My chances for being promoted are good.				0.783	
The job is quite simple and repetitive.					0.803
The job denies me any chance to use my personal initiative or judgment in carrying out the work.					0.791

One item was removed as it loaded weakly in the interactive measurement, and the final measurement model items are tabled in Table 12. This further confirms that the items representing diagnostic and interactive use of PMS load distinctively into two columns.

Table 10. Reliability

Constructs	No. of items	Cronbach's	Mean	Standard deviation
Diagnostic	4	0.95	10.77	4.13
Interactive	7	0.94	18.65	6.19
Affective Commitment	5	0.84	13.79	3.75
Normative Commitment	3	0.70	14.58	3.37
Continuance Commitment	5	0.91	13.62	3.83
Compensation	12	0.95	34.38	8.01
Work	2	0.70	5.56	1.61
Supervision	3	0.80	8.26	2.26
Promotion	2	0.81	5.81	1.60
Co-workers	6	0.97	15.98	6.14

Table 11. Summary of model fit for measurement model—PMS

	CMIN	DF	P	CIM/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default model	114.85	43	0.0001	2.67	.93	.90	.98	.08	.007
Saturated model	.000	0			1.00		1.000		
Independence model	3194.95	55	0.0001	58.09	.179	.014	.000	.438	.000

4.4.1 CFA for job satisfaction

Job satisfaction was measured using five components and a total of 35 items. The final CFA measurement model corroborates with EFA, with a model including 24 items loading into distinctive components.

Table 13 indicates that CMIN = 2864.23, df = 252, p-value = 0.0001, showing that the final measurement model of job satisfaction does not quite fit. This is supported by the result CIM/DF = 11.34, which is > 3, indicating the lack of model fit [83,84]. The results GFI = 0.42, AGFI = 0.32, and CFI = 0.56 all show the unacceptable model. RMSEA = 0.19 shows a value > 0.08; hence, the model is deemed not acceptable. Eleven items were removed as they were loading weakly in the job satisfaction measurement, and the final measurement model items are shown in Table 14, where all critical ratio (CR) values show > 1.96 [83,84]. This further confirms that the items representing job satisfaction are valid and reliable.

Table 12. Standardized total effects for default model

PMS Items	Interactive	Diagnostic
Tie the organisation together	0.883	0.000
Enable the organisation to focus on common issues	0.856	0.000
Provide a common view of the organisation	0.843	0.000
Enable continual challenge and debate underlying results, assumptions, and action plans	0.829	0.000
Enable discussion in meetings of superiors, subordinates, and peers	0.819	0.000
Enable the organisation to focus on critical success factors	0.799	0.000
Enable the organisation to focus on strategic uncertainties	0.787	0.000
Compare outcomes to expectation	0.000	0.920
Review key measures	0.000	0.899
Track progress toward goals	0.000	0.899
Monitor results	0.000	0.898

4.4.2 CFA for organisational commitment

Organisational commitment was measured using three components and 15 items. The final CFA indicates three distinct components with 13 items.

Table 13. Summary of model fit for measurement model—job satisfaction

Model	CMIN	DF	P	CMIN/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default model	2864.23	252	.000	11.37	.425	.316	.563	.19	.000
Saturated model	.000	0			1.000		1.000		
Independence model	6250.47	276	.000	22.65	.172	.100	.000	.27	.000

Table 15 indicates that CMIN = 745.25, df = 65, p-value = 0.0001, showing that the final measurement model of organisational commitment does not quite fit. This is supported by the result CIM/DF = 11.47, which is > 3, indicating the lack of model fit [83,84]. The results GFI = 0.42, AGFI = 0.35, and CFI = 0.72 all show the unacceptable model. The result RMSEA = 0.19 shows a value > 0.08; hence, the model is deemed not acceptable. Two items were removed as they loaded weakly in the organisational commitment measurement, and the final measurement model items are shown in Table 16, where all CR values show >1.96 [83,84]. This further confirms that the items representing organisational commitment are valid and reliable.

Table 14. Regression weights—default model

			Estimate	SE		
C1a	<---	J	1.000			
C1b	<---	J	.893	.066	13.613	***
C1c	<---	J	.877	.060	14.727	***
C1d	<---	J	1.070	.062	17.336	***
C1g	<---	J	.924	.057	16.189	***
C1h	<---	J	.983	.061	16.160	***
C1i	<---	J	.966	.063	15.340	***
C1j	<---	J	.957	.062	15.559	***
C1k	<---	J	.950	.062	15.397	***
C1l	<---	J	.870	.057	15.193	***
C1m	<---	J	.974	.063	15.502	***
C2b	<---	J	.152	.083	1.992	.057
C3a	<---	J	.702	.075	9.386	***
C3d	<---	J	.804	.074	10.795	***
C3f	<---	J	.618	.071	8.673	***
C4a	<---	J	.659	.070	9.392	***
C4b	<---	J	.686	.074	9.282	***
C5a	<---	J	.921	.089	10.334	***
C5b	<---	J	.856	.087	9.851	***
C5c	<---	J	1.057	.089	11.894	***
C5d	<---	J	.813	.096	8.498	***
C5e	<---	J	.853	.091	9.376	***
C5f	<---	J	.790	.095	8.348	***
C1e	<---	J	.971	.062	15.716	***

4.4.3 CFA for endogenous variable (Job satisfaction—Organisational commitment)

Theoretically, the endogenous variables of job satisfaction and organisational commitment are correlated. Hence, these were further tested for correlation using CFA.

Table 17 indicates the model fit of the correlated job satisfaction and organisational commitment measurement model. The results $CMIN = 4237.46$, $df = 628$, $p\text{-value} = 0.0001$ show that the final measurement model of job satisfaction and organisational commitment does not quite fit. This is supported by $CM/DF = 6.75$, which is > 3 , indicating the lack of model fit [83,84]. The results $GFI = 0.66$, $AGFI = 0.52$, and $CFI = 0.59$ all show the unacceptable model. The results $RMSEA = 0.14$ show a value > 0.08 ; hence, the model is deemed not acceptable. However, as this is a measurement model, the CR value in regression weights (Table 19) shows > 1.96 [83,84]. This further confirms that the items representing job satisfaction and organisational commitment are valid and reliable and are correlated ($r = 0.71$), as indicated in Table 18 below.

**Table 15. Summary of model fit for measurement model—
organisational commitment**

Model	CMIN	DF	P	CMIN/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default model	745.25	65	.000	11.47	.415	.346	.719	.187	.000
Saturated model	.000	0			1.000		1.000		
Ind. model	2496.59	78	.000	32.008	.141	.093	.000	.323	.000

Table 16. Regression weights—default model for organisational commitment

			Estimate	SE	CR	P	Label
B3e2	<---	O	1.000				
B3d2	<---	O	.912	.072	12.738	***	par_1
B3c2	<---	O	.930	.073	12.783	***	par_2
B3b2	<---	O	.890	.069	12.905	***	par_3
B3a2	<---	O	.912	.067	13.525	***	par_4
B2e	<---	O	1.040	.077	13.588	***	par_5
B2d	<---	O	.580	.079	7.326	***	par_6
B2a	<---	O	.702	.082	8.599	***	par_7
B1e	<---	O	.745	.081	9.216	***	par_8
B1d	<---	O	.836	.074	11.276	***	par_9
B1c	<---	O	.656	.076	8.693	***	par_10
B1b	<---	O	1.017	.079	12.812	***	par_11
B1a	<---	O	1.057	.080	13.223	***	par_12

**Table 17. Summary of model fit for measurement model—
organisational commitment**

Model	CMIN	DF	P	CMIN/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default model	4237.46	628	.000	6.748	.655	.517	.594	.139	.000
Saturated model	.000	0			1.000		1.000		
Ind. model	9545.53	666	.000	14.333	.270	.148	.000	.212	.000

The above EFA and CFA tests confirm the validity and reliability of the data, so the data is deemed suitable for significance tests.

4.5 Significance Tests

The postulated hypotheses were tested using an SEM. The data collected were tested for normality and homogeneity of variances, as test assumptions require the data to meet these assumptions. The model postulated for latent variables relating to Hypotheses 1 to 5 is shown in Figure 2 below.

Table 18. Covariance and correlations—default model

		Covariances					Correlation	
		Estimate	SE	CR	P	Label	Estimate	
O	<->	J	.328	.041	8.014	***	par_36	.708

Table 19. Regression weights (Group 1—default model)

			Estimate	SE	CR	P	Label
B3e2	<---	O	1.000				
B3d2	<---	O	.906	.076	11.973	***	par_1
B3c2	<---	O	.925	.077	12.034	***	par_2
B3b2	<---	O	.893	.073	12.249	***	par_3
B3a2	<---	O	.908	.071	12.699	***	par_4
B2e	<---	O	1.087	.081	13.415	***	par_5
B2d	<---	O	.626	.082	7.637	***	par_6
B2a	<---	O	.738	.085	8.688	***	par_7
B1e	<---	O	.803	.084	9.539	***	par_8
B1d	<---	O	.885	.078	11.387	***	par_9
B1c	<---	O	.701	.078	8.931	***	par_10
B1b	<---	O	1.064	.084	12.685	***	par_11
B1a	<---	O	1.119	.085	13.235	***	par_12
C1a	<---	J	1.000				
C1b	<---	J	.880	.066	13.326	***	par_13
C1c	<---	J	.875	.060	14.643	***	par_14
C1d	<---	J	1.065	.062	17.149	***	par_15
C1e	<---	J	.967	.062	15.580	***	par_16
C1g	<---	J	.918	.057	15.990	***	par_17
C1h	<---	J	.983	.061	16.113	***	par_18
C1i	<---	J	.959	.063	15.146	***	par_19
C1j	<---	J	.943	.062	15.189	***	par_20
C1k	<---	J	.938	.062	15.086	***	par_21
C1l	<---	J	.863	.058	14.984	***	par_22
C1m	<---	J	.969	.063	15.339	***	par_23
C2b	<---	J	.173	.083	2.096	.036	par_24
C3a	<---	J	.720	.075	9.647	***	par_25
C3d	<---	J	.819	.074	11.028	***	par_26
C3f	<---	J	.628	.071	8.825	***	par_27
C4a	<---	J	.654	.070	9.309	***	par_28
C4b	<---	J	.683	.074	9.218	***	par_29
C5a	<---	J	.958	.089	10.824	***	par_30
C5b	<---	J	.893	.086	10.338	***	par_31
C5c	<---	J	1.090	.088	12.338	***	par_32
C5d	<---	J	.857	.095	9.006	***	par_33
C5e	<---	J	.892	.090	9.863	***	par_34
C5f	<---	J	.825	.094	8.758	***	par_35

4.5.1 Multivariate normal distribution

This assumption is important because violation of this assumption can inflate or deflate Chi-square value, which determines model fit. However, as this study does not aim to find a fit model but to test theories, the normality assessment presented in Table 20 is observed.

Table 20. Assessment of normality

Variable	Min	Max	Skew	CR	Kurtosis	CR
A2 Interactive	7.000	34.000	.339	2.392	-.630	-2.224
A1 Diagnostic	4.000	20.000	.461	3.256	-.543	-1.916
OC	3.000	64.000	-.140	-.989	.141	.497
JS	5.000	08.000	.129	.913	-.139	-.491
Multivariate					2.520	3.394

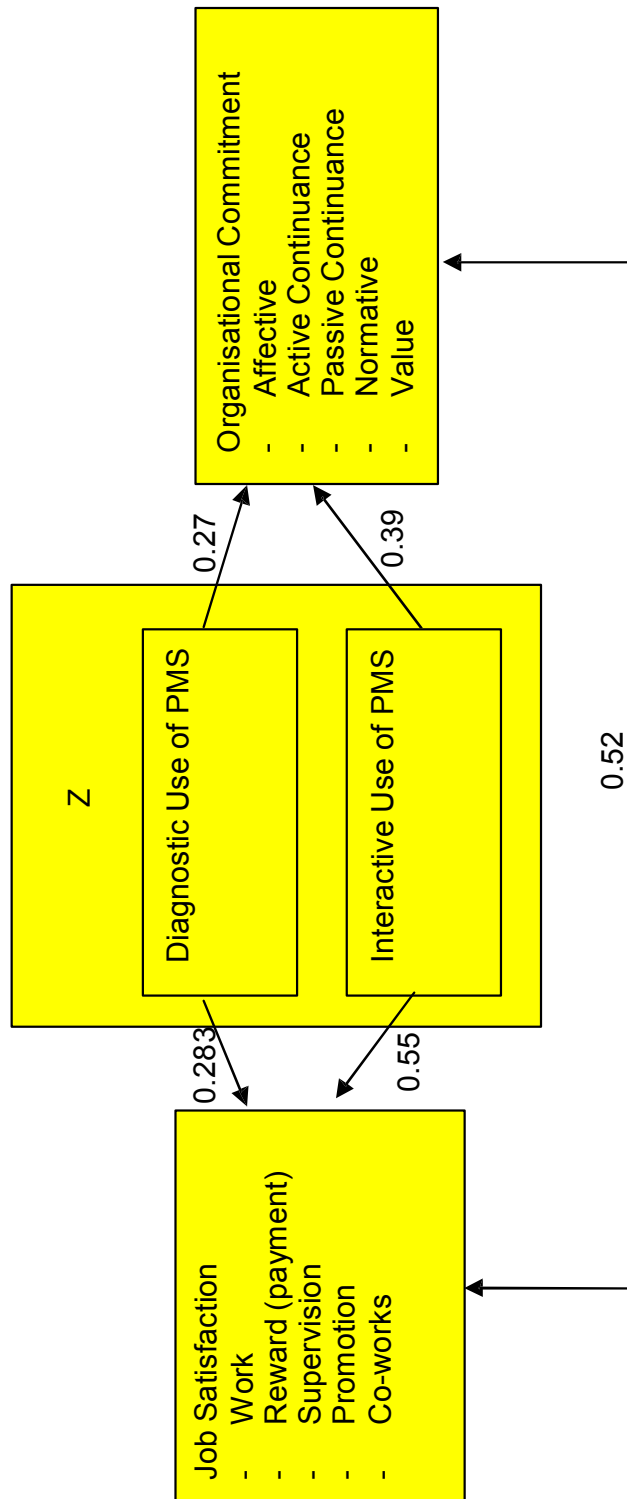


Fig. 2. Model for latent variables relating to hypotheses 1–5

Table 21. Regression weights (Group 1—Default model)

Relationship	Estimate	SE	CR	P	STD estimate
JS<---A1 Diagnostic	.885	.144	6.152	***	.280
JS<---A2 Interactive	1.166	.096	12.155	***	.553
OC<---A1 Diagnostic	.522	.100	5.237	***	.268
OC<---A2 Interactive	.504	.066	7.581	***	.387
Co-variances					
Resid1 <--> Resid2	37.446	4.729	7.919	***	
Variances					
A1 Diagnostic	16.972	1.390	12.207	***	
A2 Interactive	38.175	3.127	12.207	***	
Resid1	104.646	8.573	12.207	***	
Resid2	50.278	4.119	12.207	***	

The CR for multivariate skewness (CR = 2.52) falls within ± 2.5 , indicating normality, while CR for multivariate kurtosis (CR = 3.4) falls within ± 5 , which indicates normality [84].

With the normality assumption met, the regression weights in Table 21 indicate that all relationships are significant (C.R > 1.96; P = *** or P < 0.05), with strong standardized estimates. Moreover, the co-variances (i.e., relationship between job satisfaction and organisational commitment) are also significant (C.R = 7.92, p < 0.05). This shows that Hypotheses 1 to 4 are supported, as all standard estimate values are positive, indicating positive relationships. Table 18 and Table 21 indicate a strong positive correlation ($r = 0.701$) between job satisfaction and organisational commitment and strong positive relationships between the residuals of job satisfaction and organisational commitment, respectively; hence, Hypothesis 5 is supported.

5. DISCUSSION

The accelerating development of ICT technology has caused a rapid expansion in Hong Kong's ICT industry and a simultaneous increase in demand for ICT practitioners. The literature review revealed that there has been no previous study addressing the different use of PMS and its effect on individual employee behavior [1,2,8,9,10]. This research sought to fill the gap by examining the effects of diagnostic and interactive use of PMS on organisational commitment and job satisfaction. The research findings give implications to decision makers in Hong Kong's ICT sector by providing in-depth knowledge on how organisational commitment and job satisfaction of ICT practitioners can be enhanced through strategic planning of PMS within their organisations. This planning will ultimately lead

to the retention of valuable employees and lower staff turnover. The aim of this research was to uncover the effects of the diagnostic use of PMS on organisational commitment, the interactive use of PMS on organisational commitment, the diagnostic use of PMS on job satisfaction, the interactive use of PMS on job satisfaction, and the correlations between organisational commitment and job satisfaction in the ICT industry in Hong Kong.

In addressing the five hypotheses, it is clear that Hypotheses 1 and 2 indicate that there is a positive relationship between diagnostic and interactive use of PMS and organisational commitment. Similarly, this positive relationship is significantly seen between the diagnostic and interactive use of PMS and job satisfaction, as postulated in Hypotheses 3 and 4. Thus, contrary to arguments between Chinese scholars, the competitive ICT industry seems to show applicability of a model developed in the Western setting [46,47]. This relationship further strengthens the notion that both the diagnostic and interactive measures of PMS provide an organisation with a better view of its performance. These findings further support the use of interactive measures as part of a PMS. This integration with diagnostic measures strengthens the evaluation of the organisation's performance.

In a competitive environment such as the ICT industry, diagnostic measures alone may not suffice, as this industry is advancing at a fast pace. Therefore employees need to be on their toes and keep abreast with changes. Moreover, with a massive movement of human capital around the globe, especially in the ICT sector, organisations tend to lose their intellectual capital to higher bidders. As advocated by [1], diagnostic measures may dampen innovativeness among employees when, in this industry, innovation is a necessity to achieve a competitive edge, setting a difference in terms of company performance. The positive relationship between PMS measures and organisational commitment could be because of the ICT industry employees who are bound by all three types of commitment: normative, continuance, and affective.

As organisational commitment and job satisfaction were proven to be highly positive in relationship, job satisfaction of employees will lead to their commitment to the organisation and may transcend to their organisational citizenship behavior. In the ICT industry, which may be lacking in terms of emotional effect and soft skills, maintaining employees with high technical ability is important, as committed, efficient ICT employees are difficult and costly to recruit [85].

Organisations performing different types of jobs, such as manufacturing or servicing, tend to provide different types of experience to their employees. In relation to the nature of organisations, different organisations pose different challenges and provide employees with different work-related skills, as well as knowledge of a variety of processes and procedures unique to that industry. As such, employees' experience gained from work characteristics may determine an employee's commitment to the organisation [35,49,86,87,88].

6. LIMITATIONS AND FUTURE RESEARCH

While this research contributes to human resource knowledge related to organisational commitment and job satisfaction, it has been conducted with limitations because of various reasons, including but not limited to time and resource constraints. Firstly, this study was conducted under a cross-sectional design with weak internal validity because of time and resource constraints, a longitudinal research study that collects data on the same construct over time will enable researchers to uncover possible trends of the underlying variables [89]. Secondly, a quantitative approach was used in this study, however, it did not identify other possible antecedents that may affect the relationships between the constructs under investigation. Further research on the same topic comprising both quantitative and qualitative approaches is recommended. Thirdly, an online anonymous questionnaire was conducted to collect the research data for this investigation because of the extreme time and resource limitations, however, considering that this is the sole data collection method used in the study and despite the fact that every precautionary measure has been put in place, common method bias and variance may exist. This suggested action will certainly help to enrich research findings, identify factors and reasons behind this study's results, and further enhance the quality of the relevant research. Fourth, all data in this research were collected from Hong Kong's ICT practitioners and represent the perceptions of this particular group of people. This specific geographical, cultural, and industrial setting may limit the generalizability of the research findings. Therefore, it is recommended that further research be conducted under different geographical, cultural, and industrial settings to strengthen the generalizability of this research's results.

7. CONCLUSION

The rapid development of ICT technology has caused an unprecedented expansion in Hong Kong's ICT industry and a simultaneous increase in demand for ICT practitioners. To help managers and owners in this setting retain valuable employees, this research set out to determine whether the use of diagnostic and interactive PMS in ICT organisations would enhance job satisfaction and organisational commitment. Through an extensive and critical review of relevant literature, the research identified two research questions and developed five hypotheses. The research's five hypotheses were supported, indicating that diagnostic and interactive use of PMS positively influences job satisfaction and organisational commitment of employees, and that job satisfaction and organisational commitment are correlated to each other. The outcome of this research provides insights for managers and owners in Hong Kong's ICT that will help with formulating appropriate strategies to reduce staff turnover and retain valuable staff. The findings indicate how both organisational commitment and job satisfaction can be enhanced through the appropriate use of PMS in Hong Kong's ICT sector.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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The Influences of Corporate Social Responsibility to Customer Repurchases Intentions, Customer Word-of-Mouth Intentions and Customer Perceived Food Quality of Fast-Food Restaurants in Hong Kong and the Mediating Effects of Corporate Reputation

ABSTRACT

Aims: Market studies indicate that Hong Kong consumers are affluent and generally live a trendy, refined lifestyle. As such, besides traditional food markets, Hong Kong's free market economy has spawned various forms of food retailers, such as supermarkets, fast foods chains and fine dining restaurants, that contribute tremendously to its economy. In the face of fierce competition, companies in the food retail service industry are moving to differentiate themselves by embracing non-traditional, contemporary means of demarcation. One such means is by adopting corporate social responsibility (CSR) as a strategy for evoking positive customer behaviour towards the service. However, there is a dearth of research on CSR's contribution to corporate reputation and its direct relationship with service industry eminent marketing concepts. This research investigated the role of CSR in building a better brand through corporate reputation and its effects on word of mouth intentions, repurchase intentions and customer positively perceived food quality in Hong Kong's fast food industry.

Study Design: The research adopted a positivism paradigm and quantitative cross sectional approach.

Place and Duration of Study: The study was taken in Hong Kong between 2012 and 2013 of fast food restaurant patrons.

Methodology: Five constructs were adopted from previous studies to identify the relationships between various antecedents and to test ten hypotheses. Data were collected from 384 fast food restaurant patrons in Hong Kong.

Results: CSR is found to be directly related to corporate reputation, which is considered to be an important tool for business sustainability. Furthermore, the research revealed the partial mediating effects of corporate reputation on the relationship between CSR and customer behaviour and intentions. CSR provides a competitive advantage to fast food businesses as it plays a huge role in inducing positive word of mouth, repeat purchases, and positively perceived food quality.

Conclusion: The research has raised issues concerning the importance of CSR in changing customer behaviour and the pertinent partial mediating role played by corporate reputation in influencing CSR's impact on customer behaviour and intentions. Findings from the research provide marketing information concerning CSR initiatives as well as verifying CSR-related theories, corporate reputation and marketing concepts. As service is known to vary according to the context in which it is offered, it is best for retail managers to identify CSR activities that best reflect their particular product or service. This will make it easier for customers to comprehend and evaluate, which will ultimately benefit Hong Kong's fast food industry as a whole.

Keywords: corporate social responsibility; customer repurchases; customer word-of-mouth; food quality; Hong Kong.

1. INTRODUCTION

Service retailing contributes tremendously to the economy of most Asian countries [1,2]. Hence, the service retail industry is moving to differentiate itself in a non-traditional manner by embracing contemporary means of demarcation. The theoretical framework derived for this research from a broad perspective of relevant seminal and current literature indicates the power of corporate reputation in influencing consumers' trust in products and services [3]. The framework also describes consumers' trust in products and services purchased from retailers based on consumers' perceived quality of the products and services [1,4,5]. Other trust building factors include consumers' repeat purchases or repeat visits to retailers and dissemination of positive word of mouth [6,7,8,9]. Deeply rooted service theories revolve around quality of service as the primary contributor to a retailer's ability to attract customers, ignoring other significant issues around the globe.

One such pertinent issue is CSR and its ability to evoke positive behaviour toward the service retailers. There is a dearth of research on CSR's contribution to corporate reputation and its direct relationship with eminent marketing concepts in

the service industry [10,11]. This research therefore explores the influence of CSR on corporate reputation and the its direct influence on word of mouth (WoM) intentions, repurchase intentions (RPI) and perceived food quality (PFQ) in Hong Kong's fast food retail industry, drawing upon theories and scales established by [11,12,13,14].

1.1 Background of the Study

Hong Kong is one of the world's strongest economies with a Western influence that has stimulated the expansion of Chinese style fast food chain stores and Western fast food franchises [8]. Though not known for their loyalty, Hong Kong consumers have an affinity toward the concept of eating out [15] thereby providing fast food restaurants with ample opportunities to expand [8,16,17,18].

Conversely, the expansion of fast food chains merely creates higher competition and less recognition. Therefore, fast food retailers seek competitive advantages with concepts such as CSR incorporated into retail management. Hong Kong consumers are increasingly conscious of what they buy and where they buy, placing importance on social and environmental sustainability [19,20], forcing retailers to acknowledge societal-oriented marketing and incorporate CSR in their business strategy.

Brand image and reputation are very important in the fast food industry where consumers prefer to frequent restaurants recognized for serving good quality, tasty food that is hygienically prepared and served in clean surroundings [4]. Such restaurants must therefore have a good reputation in order to provide the recognition necessary to provoke revisits and recommendations. As competitiveness intensifies, food retailers face huge challenges in sustaining profitability and growth. Reputable fast food restaurants find positive word of mouth important for attracting new customers, and positively perceived food quality is crucial to entice return customers who are imperative for business sustainability.

1.2 Fast Food Retailing and Corporate Social Responsibility (CSR)

Retailers brand themselves to tap into consumers' need for retail uniqueness [6,21]. Brand preference is a significant antecedent of customer loyalty in Hong Kong [22]. Branding aids in developing a discernible retail business, which assists customers with recognizing and choosing a retailer to shop at. New strategies such as

business sustainability through successful CSR activities are being rapidly introduced into the retail arena [23,24,25,26].

Fast food retailers adopt CSR in their business strategy as it assists in building a brand of retail, helps recognition and provides distinction [27,28]. CSR would be particularly beneficial to fast food retailers as they are involved in a business where there is enormous concern over consumer health, supplies that affect animal rights, free range farming, pesticide-free products, and organic supplies. Word of mouth (WoM) is a free walking advertisement for an organisation. However, while a positive WoM can benefit an organisation greatly, a negative WoM can cause the organisation to collapse [29,30]. It is therefore important for organisations to develop strategies that will help build positive WoM. Studies indicate that CSR directly contributes to WoM, as customers who see CSR activities benefiting the causes that are close to their hearts will either preach positively or participate in those programmes [30,31,32].

Customers' repurchase intention is useful for retailers as it indicates the retention of customers. Peelen [33] claimed that it is five to ten times more costly to obtain a new customer than it is to retain an existing one. Repurchase intentions improve due to customers' satisfaction with something or everything that is offered by the retailer. Studies suggest that CSR's influence on repurchase intention is closely associated to customers' level of awareness [32,34,35,36]. The more aware customers are about the CSR activities conducted by the retailer, the more confident they are of the brand of retailer.

This research empirically investigated the contribution of CSR to corporate reputation, WoM intentions, repurchase intentions (RPI) and perceived food quality (PFQ). This phenomenon, coupled with the current interest in CSR, gives rise to the aim of the present research whereby the contribution of CSR activities to brand reputation and the mediating role of retail brand reputation on factors that would influence retail sustainability, namely customers' repurchase intentions or customer retention is examined. This research further explored the influence of CSR and retail reputation on perceived food quality of fast food retails, which also contributes to the retention of consumers. Finally, the research examined the influence of CSR and reputation on the direction of word of mouth that would influence the gain of new customers and returning customers.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The following provides an overview of the literature concerning the fast food retailing in Hong Kong and investigates the relationships among corporate social responsibility, corporate reputation and consumer behaviour and intentions, in particular the concepts of repurchase intention, perceived food quality and word of mouth intention in the fast food retailing industry.

2.1 Fast Food Retail in Hong Kong

Foreign fast food retailers are striving to convince consumers that their business is ethically sound, earning credibility for their responsible behaviour towards the environment, society, and its employees [37,38]. Fast food consumers in China and Hong Kong further show an inclination to brand consciousness, with the younger generation leaning towards well established brands of fast food retailers compared to local fast food restaurants that are yet to establish their brand names [8]. Therefore CSR is an excellent tool to establish a strong brand image and build a reputation that consumers will have no doubt about when selecting a fast food restaurant. The fast food retail industry is more sensitive to brand recognition as it provides psychological benefits such as hygienically prepared food that is safe for consumption if prepared and consumed at a recognizable brand of retail outlet [4].

2.2 Corporate Social Responsibility (CSR)

CSR was introduced as early as the 1950s as a simple declaration to establish a business's commitment to produce and sell in accordance with society's beliefs, values and economic expansion [39]. However, CSR is now clearly a 21st century phenomena that has initiated a variety of opportunities and complications for retailers.

CSR at fast food retails is more convoluted than at retails selling tangible products. As established earlier, retail is part of the complex service industry. Here, food poses more complexity as it carries all of the service industries' characteristics, thus the quality of the food and the service rendered can only be measured using customer perception [40]. This implies that food service retailers need to place great importance on customer satisfaction, the measures of which include nutritional, palatability and hygiene factors. The present research places CSR as a unique stimulus for fast food retailers in Hong Kong to gain a good reputation, positive word

of mouth, repeat visits and purchases, and increased positive perception of the overall food quality. Consumers are generally keen to be socially responsible and therefore seek ethical businesses to trade and build relationships with [41]. As this group of consumers grow in number, it is imperative for fast food retailers to proactively practice CSR in order to achieve a competitive advantage [27,28]. There are an increasing number of studies that suggest consumers in developed and developing countries are quickly converting to users of socially and environmentally friendly services and products [21,28].

2.3 Relationships between CSR, Reputation and Perceived Food Quality

Studies show that consumers are influenced by the CSR initiatives of a company and this influence is seen as positive in the way they perceive the quality of the service [34,42,43,44]. However, this is arguable as the sheer fact that the service characteristic is unique, indicates the difficulty one would face in evaluating service quality [35]. [45] advocated that customers do not judge service quality based on its outcome. In fact, a customer perceives quality based on several indicators depending on the type of service. The quality of service at a fast food retail can be judged based on the food, packaging, front-line service, outlet ambiance, convenience, consistency, bundled meal, and reliability [46]. This evaluation of quality includes the retailers' initiatives to serve quality food with reference to healthy ingredients, such as pesticide-free, organic, and raw material production complying with animal rights protocols. For the purpose of this research, the perceived quality indicator was taken to be customers' perception of the food quality in Hong Kong fast food restaurants. [35] affirmed that customers of fast food are fundamentally bound to a retailer when they positively perceive the quality of food, which shows that CSR activities may not directly contribute to customers' commitment to a particular retailer. Moreover, CSR is assumed to play a bigger role as a crisis management strategy rather than an influence of buying intentions [47].

2.4 Relationships between CSR, Reputation and Word of Mouth Intention

Positive WoM is a pertinent factor to measure current customers' willingness to talk positively about the product or retailer and is a free form of advertising. Customer experience with products and services experience leads to external communication, [5,48,49], primarily WoM, which can be a boon or a bane. Positive

WoM is warmly welcomed by the retailer while negative WoM is something the retailer needs to rectify, either using public relations or CSR as a crisis management tool [47]. Empirical studies show that satisfied customers disseminate positive WoM, which subsequently turns into better sales [6,30]. WoM is a pertinent evaluative tool as it helps potential buyers to purchase confidently, reducing their uncertainty due to unknown risk [50,51]; it is also an influential source of information, affecting the choice of brand and brand loyalty [51,52,53,54]. Customer satisfaction and brand preference on loyalty in Hong Kong's service industry makes a significant contribution by helping managers of the service providers better understand their customers and manage their products [22]. [48] advocated that the greatest gift a consumer can give the retailer is their unconscious deliverance of positive messages regarding the retailer. This would augment brand image, recognition and retail traffic [55]. Likewise, employees who are happy, satisfied and proud of being part of the retail will pass positive WoM to friends, family and other customers, rendering better business and, in the case of fast food retailers, better store traffic and sales [56].

2.5 Relationship between CSR, Reputation and Repurchase Intention

Sociological studies suggest that CSR programmes significantly change the willingness of managers to repeat purchase [32,34,35]. Therefore, willingness to repeat purchase in response to CSR programmes of a retailer may be linked to awareness of customers. In other words, customers who are aware of the impact of various social and environmental issues on the future of healthy living, react positively toward socially responsible organizations [36]. CSR programmes that are close to the causes that customers are keen on, can influence customers to be altruistic [57]. Furthermore, [23] and [7] found significant relationships linking CSR to positive perceptions that lead to loyalty and repeat purchases. Studies show that as affluent customers become more aware of the increasing environmental and social problems, the CSR notion could become pertinent to customers and a significant stimulus to repurchase [7]. Customers will repeat purchase at the retailers that fulfill their expectations [58]. Hence, with more businesses involving themselves in CSR activities, there is an increased customer awareness of CSR's importance that will drive them to anticipate CSR practices by all the retailers they visit.

Literatures show an indirect relationship between a business' involvement in CSR activities and on both repeat purchases and perceptions of service quality

[35,42,59]. There is a dearth of studies translating CSR directly into WoM or into increasing perceived quality and repurchase intention. There are studies looking into the contribution of WoM to the intention to purchase, mainly taking WoM as a positive attribute to purchase and more so if the business involvement in CSR activities is not immediately apparent to customers [29,60]. Studies have been undertaken using CSR as a moderating factor to enhance reputation and brand image, while others indicate that businesses use CSR simply because others are doing the same [61,62]. Similarly, literature on CSR's contribution to marketing services is complex, inconsistent and contradictory [35,63,64]. Therefore, this research set out to investigate the contribution of fast food retailers' CSR involvement to building a strong reputation that would instigate positive WoM, and increase perceived service quality (PSQ) and repurchase intention (RPI). There is little doubt that CSR significantly strengthens the reputation of a retail brand, however it is less certain if retail reputation plays a direct role in influencing positive WoM, PSQ and RPI, as reputation is developed over a long period of time based on customers' experience of various service factors.

2.6 Hypotheses Development

This research studies the theoretical relationships derived from the foregoing analysis of the relevant literature. Marketers will benefit from knowing the exact purpose of CSR in fast food retail and precisely which of the marketing variables are affected or influenced by CSR. This study aims at evaluating whether the success of CSR activities could be reflected in the positive reputation of the retailer, which results in positive WoM intentions, positive RPI and positive PFQ. This subsequently improves the retailers market positioning and ability to sustain market leadership. Hence, the following hypotheses are posited to examine the contribution of CSR to the behaviour of consumers in Hong Kong's fast food retail industry.

Hypothesis H1. CSR activities of a fast-food restaurant in Hong Kong increase customer WoM intentions.

Hypothesis H2. CSR activities of a fast-food restaurant in Hong Kong increase customer RPI.

Hypothesis H3. CSR activities of a fast food restaurant in Hong Kong increase customer PFQ.

Hypothesis H4 below postulates the direct relationship between fast food retailers' involvement in CSR activities on their reputation as a responsible and ethical retailer. This hypothesis reflects the notion that CSR practices of an organisation have the ability to build and strengthen the reputation of the organization [11,34,62]. This allows marketers to leverage CSR activities with the purpose of building their reputation and consequently choosing to participate in activities that are suitable for this objective.

Hypothesis H4. CSR activities of a fast-food restaurant in Hong Kong increase its corporate reputation as perceived by customers.

Hypotheses H5, H6 and H7 below show the direct relationships between the reputation of fast food retailers and customer WoM intentions, customer RPI and customer PFQ.

Hypothesis H5. Corporate reputation of a fast-food restaurant in Hong Kong increases customer WoM intentions.

Hypothesis H6. Corporate reputation of a fast-food restaurant in Hong Kong increases customer RPI.

Hypothesis H7. Corporate reputation of a fast-food restaurant in Hong Kong increases customer PFQ.

H5, H6 and H7 show the direct relationships between the reputation of fast food retailers and customer WoM intentions, customer RPI and customer PFQ. As in H1, H2 and H3, these hypotheses test to see if corporate reputation has more influence than CSR on the identified marketing concepts [65,66]. This comparison allows marketers to undertake CSR activities that are suitable for the purpose they propose. For most businesses, reputation is the traditional organisational concept that the entire business will work on building. However, few relate this to CSR, as in many instances CSR has been misconstrued as a crisis management tool used for public relations in the organisation rather than a tool used by marketers to build reputation [47,67].

The final hypotheses H8, H9, and H10 have been postulated to depict the partial mediating influence of fast food retailers' reputation on the relationships between CSR and customer WoM intentions, customer RPI, and customer PFQ [34,68]. These hypotheses are intended to test the importance of fast food retailers' involvement in CSR activities in order to build a reputable retail that would gain positive customer WoM intentions, positive customer RPI, and positive customer PFQ.

Hypothesis H8. Corporate reputation of a fast-food restaurant in Hong Kong partially mediates the relationship between CSR and customer WoM intentions.

Hypothesis H9. Corporate reputation of a fast-food restaurant in Hong Kong partially mediates the relationship between CSR and customer RPI.

Hypothesis H10. Corporate reputation of a fast-food restaurant in Hong Kong partially mediates the relationship between CSR and customer PFQ.

2.7 Research Model

Ten hypotheses have been developed based on the literature on the corporate social responsibility, corporate reputation, word of mouth, repurchase intention and perceived food quality.

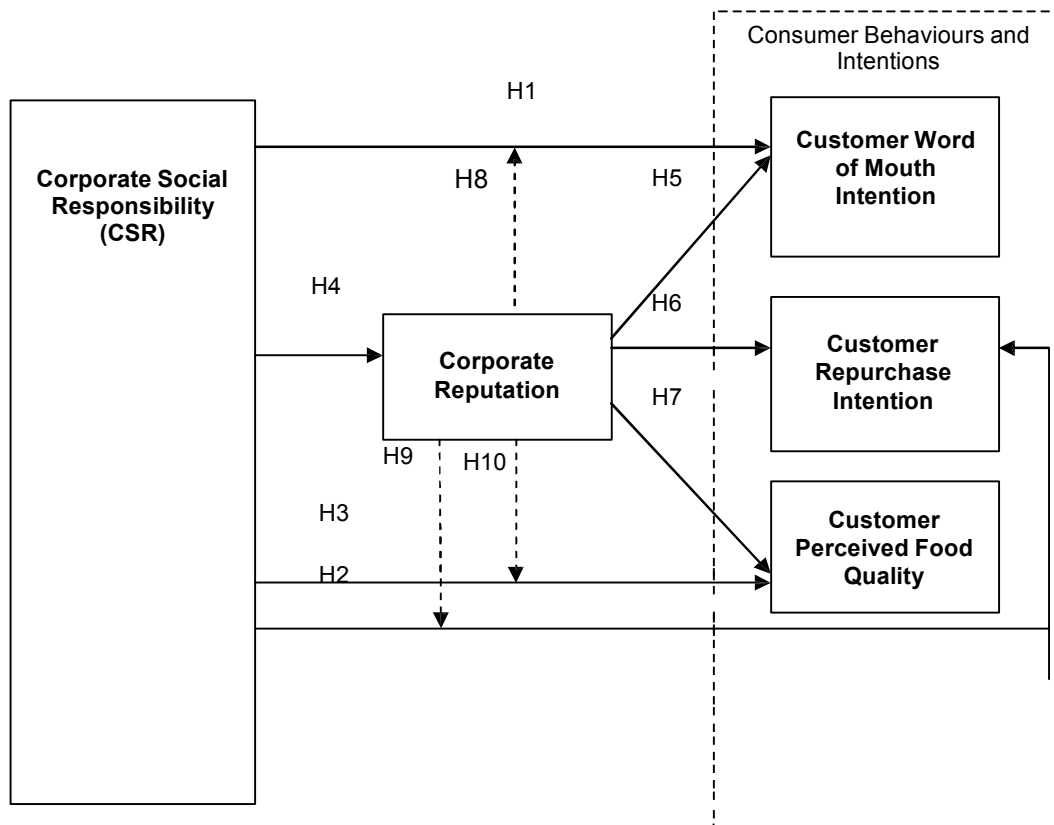


Fig. 1. Research Model

Based upon these ten hypotheses developed, a research model (Fig. 1) was devised by adapting the following sets of constructs from prior studies.

3. METHODOLOGY

3.1 Sample and Data Collection

As this research investigates the customers of fast food restaurants in Hong Kong, the unit of analysis is individuals. Therefore, questionnaires were distributed to a sample of 400 fast food customers, who were 18 years old and above. The research began by setting up a database with locations of all the fast food restaurants in Hong Kong. In order not to be bias when selecting restaurants, the researcher randomly selected several locations using a simple lottery method. In addition, in order to ensure these are fast food restaurants that have high traffic, the correct timing and days to visit the restaurants were determined from a publicly available database. The questionnaires were distributed to the restaurant patrons outside the restaurants where the restaurant owner's consent to interview patrons was not required. A total of 20 locations were selected randomly and visited by the researcher to distribute the research questionnaires. 400 self-administered, personal survey questionnaires for this study were randomly distributed to customers of fast food restaurants in the public areas of identified fast food restaurants in these 20 locations.

Ethical issues during the data collection process were considered. The information statement together with the questionnaires helped to address participants' concerns over confidentiality. Firstly, the questionnaires were distributed in a public place to customers of fast food restaurants who were given the freedom to choose to participate or not. A completed and returned questionnaire was taken as consent of the respondent to participation. Secondly, in order to address the ethical issue on anonymity, respondents' personal information was not required on the questionnaire and the places where the questionnaire was distributed remains confidential to the researcher. The researcher feels that the information statement provided to the respondents assuring them of anonymity strengthened the response rate. Thirdly, the questionnaire design took into account the sensitive nature of the research topic and avoided questions that may lead to falsification of responses or to an increase in social desirability [69]. Scaled items were adapted to accommodate self-administered survey and evoke fair responses. Finally, completed questionnaires and all other information that could link directly or indirectly to respondents will be kept securely by the researcher and disposed of after five years.

3.2 Research Instruments

This research has a total of five constructs: corporate social responsibility, corporate reputation, customer word of mouth intentions, customer repurchase intentions, and customer perceived food quality.

Table 1. Measuring items and sources

Constructs	Source of measuring items	Number of items	Format
Corporate Social Responsibility	[11]	5	Likert scale of 1 (strongly disagree) to 7 (strongly agree)
Corporate Reputation	[12]	3	Likert scale of 1 (strongly disagree) to 7 (strongly agree)
Customer Word of Mouth Intentions	[13,14,70]	6	Likert scale of 1 (strongly disagree) to 7 (strongly agree)
Customer Repurchase Intentions	[13,14]	5	Likert scale of 1 (strongly disagree) to 7 (strongly agree)
Customer Perceived Food Quality	[11,71]	3	Likert scale of 1 (strongly disagree) to 7 (strongly agree)

Table 2. A Summary of measuring items for the five constructs

Constructs	ID	Measuring items
Corporate Social Responsibility	CSR1	This fast food restaurant is very concerned with the local community.
	CSR2	This fast food restaurant is very concerned with environmental protection.
	CSR3	This fast food restaurant is very concerned with customers' benefits.
	CSR4	This fast food restaurant is very concerned with the rights of female and disabled employees.
	CSR5	This fast food restaurant actively participates in social initiatives.
Corporate Reputation	CR1	I believe that this fast food restaurant does what it promises for its customers.
	CR2	This fast food restaurant has a good reputation.
	CR3	I believe that the reputation of this fast food restaurant is better than its competitors.
Customer Repurchase Intention	RPI1	I intend to buy from this fast food restaurant next time.
	RPI2	I will continue buying from this fast food restaurant.
	RPI3	Most likely, I will buy from this fast food restaurant next time.
	RPI4	I will consider this fast food restaurant my first choice if I need to buy fast food.
	RPI5	I will buy more from this fast food restaurant in the next few months.
Perceived Food Quality	PFQ1	The food from this fast food restaurant is better than other competitors.
	PFQ2	The food quality of this fast food restaurant is higher than other competitors.
	PFQ3	The food from this fast food restaurant is more consistent and reliable in comparison with other competitors.
Word of Mouth Intention	WOM1	I would say positive things about this fast food restaurant.
	WOM2	I would recommend this fast food restaurant to anyone who seeks my advice.
	WOM3	I would encourage friends to purchase fast food from this restaurant.
	WOM4	I would recommend this fast food restaurant to my friends.
	WOM5	I would recommend this fast food restaurant to my acquaintances.
	WOM6	If my friends were looking for fast food service, I would tell them to try this restaurant.

The items chosen to measure these constructs were borrowed from various established literature as shown in Table 1 below.

Corporate social responsibility was represented by five items, corporate reputation was measured using three single dimensional item scales, six items represented customer word of mouth intentions, customer repurchase intentions was measured using five single dimensional items, and three items represented customer perceived food quality. A summary of measuring items is shown in Table 2 below.

3.3 Data Analysis

The measures used in this research were cleaned and assessed using validity and reliability tests to establish accuracy of data collected. In the current research, these assessments were performed via Exploratory Factor Analysis (EFA) which is then confirmed using Confirmatory Factory Analysis (CFA) to ensure the data is suitable to run Structural Equation Modelling (SEM). This assessment relates to ensuring that items used to measure one construct hang together or are closely related to each other.

Table 3. Demographic profile of valid respondents (n=384)

		Percentage (%)
Age	Under 20	40.9
	20 to 29	45.6
	30 to 39	7.3
	40 to 49	4.4
	50 to 59	1.6
	60 and above	0.3
Marital Status	Single	89.8
	Married	10.2
Level of Education	Primary	0.3
	Secondary	31.5
	Undergraduate	48.7
Monthly Salary (HK\$)	Postgraduate	19.5
	Below 10,000	71.9
	10,000 to 19,999	16.4
	20,000 to 40,000	8.3
Respondents' Nationality	Above 40,000	3.4
	Hong Kong Resident	92.4
	Visitor from China	5.7
	Visitor from other countries apart from China	1.8

4. FINDINGS

4.1 Characteristics of the Sample

Table 3 below shows the characteristics of respondents in respect of age, marital status, level of education, monthly salary and respondents' nationality.

4.2 Validity Test

In running Exploratory Factor Analysis (EFA) to assess the items used to measure CSR and CR, the principal component method was used, rotating the data with varimax rotation and suppressing loadings below 0.5. This research assumes the CSR and CR are nonrelated in order to draw out the actual benefit of CSR in enhancing CR. Thus a Varimax method of rotation was used. Table 4 below shows all five items for CSR loading highly in component 1 which is named CSR, while all three items for CR loaded highly into component 2, and is now named as CR. The five items measuring CSR and three items measuring CR loaded, fulfilling conditions for convergent and discriminant validity.

Table 5 below reflects that all six items used to measure customers' WoM intention loaded highly in component 1, while only three out of five items measuring customers' RPI loaded highly in component 2. Two items RPI4 and RPI5 were removed. Two items measuring PFQ loaded highly in component 3, while one item PFQ3 was removed as it did not load clearly.

Table 4. Exploratory factor analysis on CSR and CR

Questionnaire Items	Component	
	1 (CSR)	2 (CR)
Corporate Social Responsibility		
CSR1	0.810	
CSR2	0.755	
CSR3	0.645	
CSR4	0.599	
CSR5	0.559	
Corporate Reputation		
CR1		0.806
CR2		0.790
CR3		0.743

Table 5. Exploratory factor analysis on WOM, RPI and PFQ

Questionnaire items	Component		
	1 (WOM)	2 (RPI)	3 (PFQ)
Word of Mouth			
WOM1	0.851		
WOM2	0.837		
WOM3	0.829		
WOM4	0.815		
WOM5	0.786		
WOM6	0.670		
Repurchase Intention			
RPI1		0.897	
RPI2		0.843	
RPI3		0.824	
Perceived Food Quality			
PFQ1			0.835
PFQ2			0.833

4.3 Reliability Test

Table 6 below shows the findings of Cronbach's alpha test. The Cronbach's alpha values of all the latent variables of this research are above 0.7, satisfying [72] rule of thumb. Thus, the validity and reliability tests above indicate that the items used to measure the latent variables converge and discriminate.

Table 6. Reliability test output

Constructs	No of items	Cronbach's alpha	Mean	Standard deviation
CSR	5	0.78	17.79	4.73
CR	3	0.76	9.99	2.91
RPI	3	0.90	8.70	3.15
PFQ	2	0.86	11.00	3.28
WoM	6	0.94	21.48	6.96

4.4 Confirmatory Factor Analysis (CFA)

4.4.1 Measurement model and CFA for CSR and CR

Fig. 2 below shows the measurement model for CSR and CR used to assess the validity. Confirmatory factor analysis (CFA) was used to verify the measurement assessment performed above. As such, measurement models of latent variables are drawn and confirmed the findings above using structural equation modeling (SEM).

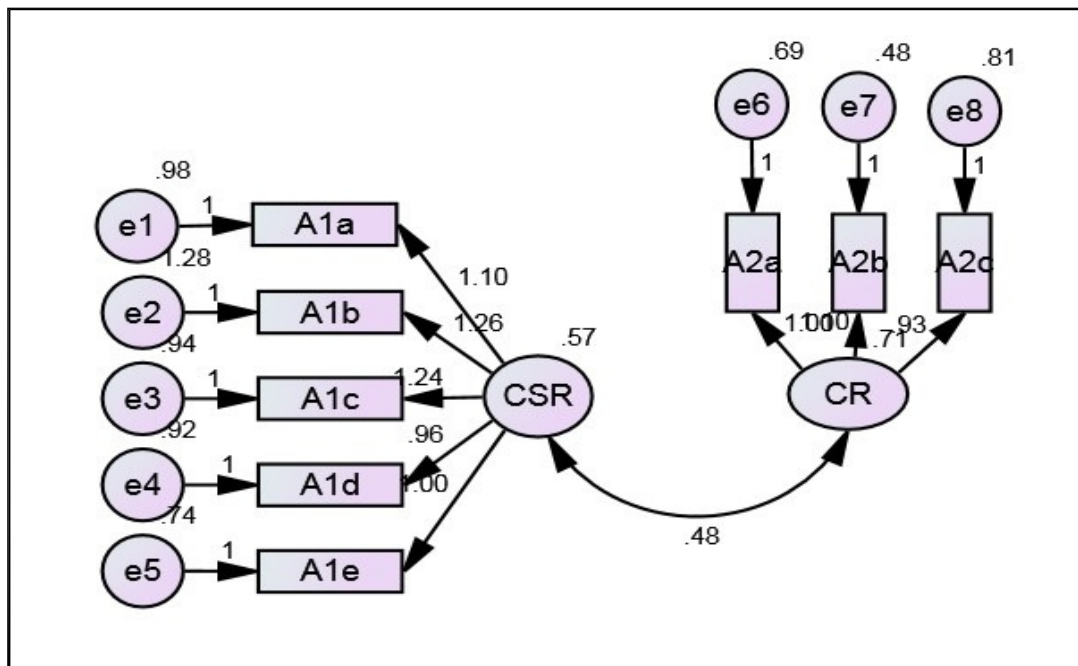


Fig. 2. Measurement Model for CSR and CR

Table 7 below shows a summary of model fit which shows that the model does not quite fit as CMIN=45.01, df=19, and p-value=0.001. However, CIM/DF=2.37 shows a model fit [73,74]. This is corroborated by the coefficients GFI=0.97, AGFI=0.95 and CFI=0.97, all of which are >0.9 indicating an acceptable model. As RMSEA<0.08 is the rule of the thumb to accept a model fit, the RMSEA=0.06 and PCLOSE=0.0021 (PCLOSE<0.05) show an acceptable model. The Factor Score Weights in Table 8 below and Standardized Total Effects in Table 9 show the clear loading of CSR items and CR items into two distinctive columns, indicating the convergent and discriminant validity of items.

Table 7. Model fit summary for measurement model – CSR and CR

	CMIN	DF	P	CIM/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default model	45.013	19	.001	2.369	.971	.945	.972	.060	.0021
Saturated model	.000	0			1.000		1.000		
Independence model	965.376	28	.000	34.478	.469	.318	.000	.296	.000

Table 8. Factor score weights (group number 1 – default model)

	A2c	A2b	A2a	A1a	A1b	A1c	A1d	A1e
CR	.151	.302	.192	.039	.034	.046	.036	.047
CSR	.040	.079	.050	.117	.102	.136	.107	.141

Note: A1c – items measuring CSR, A2c – items measuring CR

Table 9. Standardized total effects (group number 1 – default model)

Items	CR	CSR
A2c	.655	.000
A2b	.800	.000
A2a	.713	.000
A1a	.000	.643
A1b	.000	.643
A1c	.000	.692
A1d	.000	.599
A1e	.000	.660

Note: A1c – items measuring CSR, A2c – items measuring CR

4.4.2 Measurement model and CFA for WoM, RPI and PFQ

The CFA used to verify the validity of items measuring WoM, RPI and PFQ is portrayed in the measurement model displayed in Fig. 3 below. Although the model summary in Table 10 indicates that the model does not quite fit because CMIN=108.04, df=41, and p-value=0.0001, the ratio of CIM/DF=2.6 (CIM/DF<0.3) shows a model fit [73,74]. This acceptable measurement model fit is further supported by the >0.9 values of GFI=0.95, AGFI=0.92 and CFI=0.98.

Moreover, $RMSEA < 0.08$ is the rule of the thumb to accept a model fit while the RMSEA for this data shows $RMSEA = 0.065$ and $PCLOSE = 0.05$ ($PCLOSE < 0.05$) show an acceptable model. As [73] and [74] assert, at least four of the various measure are sufficient to accept a model fit. The Factor Score Weights in Table 11 and Standardized Total Effects in Table 12 show the clear loading of WoM items, RPI items and PFQ items into three distinctive columns.

Finally, the removal of two items from RPI and one item from PFQ has allowed other items to load distinctively and highly into the respective latent constructs. Thus the validity and reliability of the items concerning WoM, RPI and PFQ are confirmed with the Critical Ratio (C.R.) values as seen in Table 13, whereby all CRs are > 1.96 , [73,74,75]. The relationship between the latent variables are confirmed as seen in Table 14 whereby the covariances and correlations show strong relationships as all Critical Ratios are above 1.96 and correlations are above 0.5. Thus, the data collected is valid, reliable and now suitable to test significant of the hypotheses.

Table 10. Model fit summary for measurement model – WoM, RPI and PFQ

	CMIN	DF	P	CIM/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default model	108.037	41	.000	2.635	.951	.921	.981	.065	.050
Saturated model	.000	0			1.000		1.000		
Independence model	3568.050	55	.000	64.874	.221	.065	.000	.408	.000

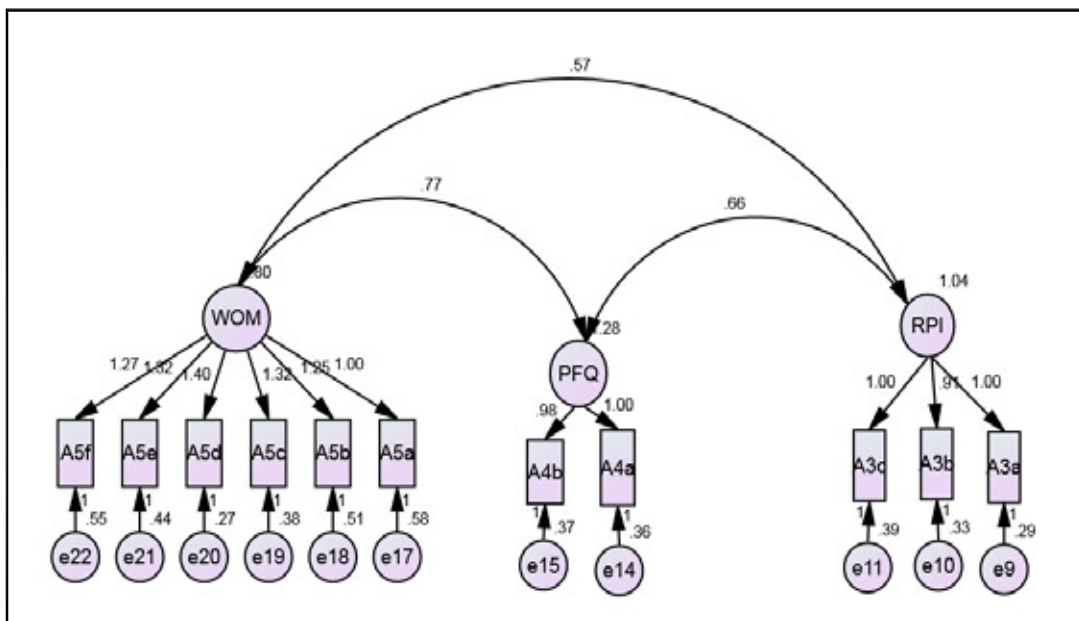


Fig. 3. Measurement model for WoM, RPI and PFQ

Table 11. Factor score weights (group number 1 – default model)

Items	A5f	A5e	A5d	A5c	A5b	A5a	A4b	A4a	A3c	A3b	A3a
PFQ	.019	.025	.043	.030	.021	.015	.366	.391	.013	.014	.018
WOM	.087	.114	.194	.133	.093	.066	.022	.024	.009	.010	.012
RPI	.008	.010	.018	.012	.009	.006	.014	.015	.251	.273	.342

Table 12. Standardized total effects (group number 1 – default model)

Items	PFQ	WOM	RPI
A5f	.000	.836	.000
A5e	.000	.872	.000
A5d	.000	.923	.000
A5c	.000	.887	.000
A5b	.000	.843	.000
A5a	.000	.762	.000
A4b	.875	.000	.000
A4a	.884	.000	.000
A3c	.000	.000	.853
A3b	.000	.000	.852
A3a	.000	.000	.885

Table 13. Regression weights (group number 1 – default model)

Relationship	Estimate	S.E.	C.R.	P	Label
A3c <--- RPI	1.001	.048	20.701	***	par_1
A5a <--- WOM	1.000				
A5b <--- WOM	1.246	.069	17.962	***	par_2
A5c <--- WOM	1.325	.070	18.936	***	par_3
A5d <--- WOM	1.396	.070	19.811	***	par_4
A5e <--- WOM	1.316	.071	18.642	***	par_5
A5f <--- WOM	1.267	.072	17.696	***	par_6
A4a <--- PFQ	1.000				
A4b <--- PFQ	.978	.051	19.200	***	par_10
A3a <--- RPI	1.000				
A3b <--- RPI	.915	.043	21.378	***	par_11

Note: *** = p -value < 0.05

Table 14. Covariances and correlations (group number 1 – default model)

Relationships	Estimate	S.E.	C.R.	P	Label	Correlation estimate
RPI <--> WOM	.573	.065	8.788	***	par_7	.627
WOM <--> PFQ	.768	.079	9.709	***	par_8	.758
RPI <--> PFQ	.659	.079	8.328	***	par_9	.570

Note: *** = p -value < 0.05

4.5 Hypotheses Testing by Structural Equation Modeling (SEM)

Testing of the hypotheses for this research is carried out by using SEM as displayed in Fig. 4 below. The research's focus is on the influence of CSR on CR,

and CR's influence on WoM intentions, RPI and PFQ. Hence, more importantly, the present study verifies the mediating role played by corporate reputation, intervening the relationship between CSR and WoM, RPI and PFQ. The research further verifies the direct influences of CSR on the three dependent latent constructs of WoM, RPI and PFQ.

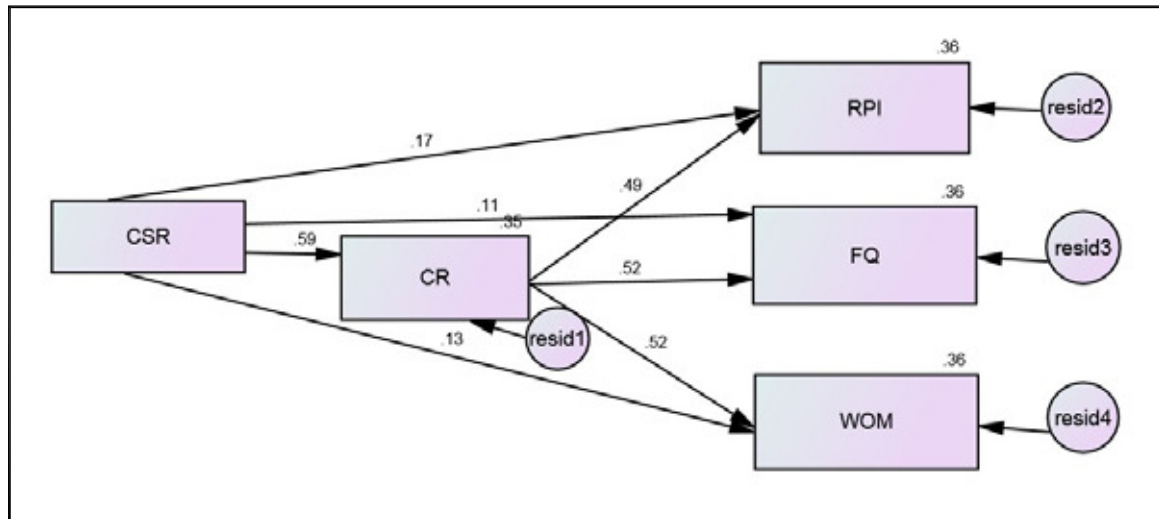


Fig. 4. Structural equation modeling portraying five latent variables

4.5.1 Significance tests

The Regression Weights displayed in Table 15 below shows that the relationships postulated in Figure 4 are significant. The influence of CSR on CR is significant as the critical ratio (C.R.)=4.34, p-value=.0001, and p-value <0.05. The direct influential relationship of CSR on WoM is significant as C.R.=2.59, p-value=0.01, and p-value<0.05. The direct influential relationship of CSR on RPI is significant as C.R. =3.42, p-value=0.0001, and p-value <0.05. The influence of the relationship of CSR on PFQ is significant as C.R.=2.25, p-value=0.025, and p-value <0.05. The influential relationship of CR on RPI is significant as C.R.=9.62, p-value =0.0001, and p-value <0.05. The influential relationship of CR on WoM is determined with C.R.=10.19, p-value=0.0001, and p-value <0.05, showing significance.

Table 15. Regression weights

Relationships		Estimate	S.E.	C.R.	P	Standard estimate
CR	<--- CSR	.364	.025	14.336	***	.591
RPI	<--- CR	.524	.055	9.615	***	.485
WoM	<--- CR	1.029	.101	10.188	***	.515
WoM	<--- CSR	.161	.062	2.588	.010	.131

RPI	<---	CSR	.115	.034	3.422	***	.173
PFQ	<---	CR	.432	.042	10.336	***	.524
PFQ	<---	CSR	.058	.026	2.249	.025	.114
Variances							
CSR			22.338	1.614	13.838	***	
resid1			5.508	.398	13.838	***	
resid4			30.148	2.179	13.838	***	
resid3			3.686	.266	13.838	***	
resid2			6.275	.453	13.838	***	

The influence of CR on PFQ is significant as C.R.=10.34 and p-value=0.0001. Furthermore, these relationships show strong standardized estimates. Hence, the hypotheses H1, H2, H3, H4, H5, H6 and H7 are supported. The positive values of Standard Estimates, show that the relationships are positive, thus when CSR involvement in a fast food restaurant increases, corporate reputation, positive WoM, RPI and PFQ increases. A similar finding is found in the relationships between CR and positive WoM, RPI and PFQ.

4.5.2 Mediation influence of CR

Table 16 below shows the application of SEM for estimation of Total Effect, Direct Effect and Indirect Effect that used to determine the mediating influence of CR between CSR and WoM, CSR and RPI, and CSR and PFQ.

Based on the results in Table 16, the following relationships must exist to allow mediation:

- CSR to WoM, RPI, PFQ relationship exists, indication of a direct relationship.
- CSR to CR relationship exists, hence mediator is related to exogenous variable.
- CR to WoM, RPI, PFQ relationship exists, indicating a relationship between the mediator and the endogenous variable.

Table 16. Total effect, direct effect and indirect effect

	Std. total effect		Std/ direct effect		Std. indirect effect	
	CSR	CR	CSR	CR	CSR	CR
CR	.591	.000	.591	.000	.000	.000
PFQ	.424	.524	.114	.524	.310	.000
WoM	.435	.515	.131	.515	.306	.000
RPI	.460	.485	.173	.485	.287	.000

The Direct Effect of CSR on WoM (0.131), on RPI (0.173), and on PFQ (0.114) indicates that the relationships in (a) above exist. The Direct Effect of CSR on CR (0.591) indicates that the relationship in (b) above exist. The Direct Effect of CR on WoM (0.515), on RPI (0.485), and on PFQ (0.524) indicates that the relationships in (c) above exist. The mediation effect of CR on the relationships suggested above is confirmed. However, in SEM, since the full model is represented, the Indirect Effect is used to suggest whether the mediation impact is full, partial or non-mediating. Therefore, using Table 16 above and the rule of the thumb suggested by [76], the following conclusion is made on the mediating effect of CR:

- a. The direct relationships between CSR and WoM, CSR and RPI, and CSR and PFQ are all significant.
- b. The indirect effect of CSR on WoM=0.306 (>0.085) and $IE \cong DE$, hence CR is a partial mediator for the relationship between CSR and WoM.
- c. The indirect effect of CSR on RPI=0.287 (>0.085) and $IE \cong DE$, hence CR is a partial mediator for the relationship between CSR and RPI.
- d. The indirect effect of CSR on PFQ=0.310 (>0.085) and $IE \cong DE$, hence CR is a partial mediator for the relationship between CSR and PFQ.
- e. The above conclusion indicates that CR is a partial mediator for the relationships between CSR and WoM, RPI and PFQ. Thus, the hypotheses H8, H9 and H10 are supported as well.

5. DISCUSSION AND IMPLICATIONS

This research was built on a strong platform of literature that produced the main research question and ten hypotheses for the purpose of verifying theories relating to the effect of CSR on consumer behaviour. The retail industry is evolving at a rapid pace, thus requiring an incessant flow of relevant new knowledge. The practical and theoretical implications of the findings from this research add such new knowledge by enriching understanding of the value of practicing CSR to build an organisation's reputation.

The impact of CSR on perceived quality [8,35], corporate reputation and RPI have traditionally been studied as direct relationships [34,77], and CSR's direct impact on WoM intentions has been discussed separately [13]. Also, much of the CSR literature has been dedicated to CSR's influence on reputation and image [40]

while neglecting the mediating role played by corporate reputation in the relationships between CSR and consumer intentions and behaviour. This research therefore adds to the existing knowledge of CSR's role in marketing by finding that a good corporate reputation together with relevant and integrated CSR provides a much stronger impact on the behaviour of consumers than CSR on its own may have.

As a partial mediator, corporate reputation plays a direct role in consumer actions. This being the case, the findings from this research indicate that nonconforming CSR activities may be a mover of certain consumer behaviour but it may not be very convincing nor is there an assurance that this will last long, as only incessant CSR activities contribute to sustainable behaviour. This suggests that in order to benefit most from CSR practices, businesses ought to develop a reputable brand using CSR as this would bring about a long term and sustainable positive impact on consumer behaviour and intentions. Therefore, this research's theoretical contribution is the introduction of corporate reputation as a long term benefit to the relationship between CSR and customer behaviour and intentions.

Retail managers and service managers in general are able to build a strong reputation for their business. However, due to competitive pressure, CSR is beginning to be recognized as a resilient tool for enhancing reputation via positive consumer behaviour and intentions [6]. As service lacks consistency, it is difficult to maintain customer interest and buying behavior [78]. This research found that CSR components that are more focused toward retailing may have either a strong direct relationship or a strong relationship that is partially mediated by reputation. Thus, managers could either build the brand name of retail or add to their corporate reputation by employing CSR activities that are found suitable for their type of retail. Therefore, managers of the fast food retail industry may need to implement CSR activities or programmes that are capable of continuance and of building corporate reputation. This may be done by carrying out CSR programmes that are generally closer to customers' interests. This research found that consumers are more likely to appreciate CSR activities that are visible to them, thus treating employees well will result in satisfied employees who will face customers with a happy disposition and a positive attitude [39].

6. LIMITATIONS AND FUTURE RESEARCH

The main limitation of this research is the sample used which is a subset of fast food restaurant customers in Hong Kong. The respondents may not have had any knowledge of CSR or may not have been aware of the CSR activities carried out by the retailer where they were interviewed. Hence generalizability may be distorted, as some of the respondents may have participated without fully knowing the reasons for CSR. The present research limited the influence of CSR and CR on three marketing concepts, however, there may be more than these concepts that may be affected by CSR and CR, such as corporate image that could mediate the abovementioned relationships.

Further related research might consider developing items for CSR that are more suitable for the type of retail being examined. Consideration might also be given to interviewing a group of visitors to Hong Kong, possibly from mainland China, in order to provide a comparison of CSR knowledge between local fast food retail customers and those from other jurisdictions. Lastly, future research might consider investigating whether new purchases are made due to customers' knowledge that the retailer is practicing CSR and how much of that knowledge is gained by WoM.

7. CONCLUSION

This research shows that Hong Kong fast food customers are young adults who have limited spending power and can only frequently consume fast food. CSR is found to be directly related to corporate reputation, which is considered to be an important tool for sustainable business. Furthermore, the research revealed the partial mediating power of corporate reputation between the relationship of CSR and customer behaviour and intentions. CSR provides a competitive advantage to many businesses and should not be taken for granted as it plays a huge role in inducing positive word of mouth, repeat purchases, and positively perceived food quality. This research has undertaken a quantitative approach to evaluating the contribution of CSR to customer behaviour and intentions. In doing so, the research added the corporate reputation of the retailer as partial mediator in the relationship between CSR and customer behaviour and intentions. It has raised issues concerning the importance of CSR in changing customer behaviour and the pertinent partially mediating role played by corporate reputation in influencing CSRs' impact on customer behaviour and intentions. As service is known to vary according to the

context in which it is offered, it is best for retail managers to identify CSR activities that best reflect their particular product or service. This will make it easier for customers to comprehend and evaluate, which will ultimately benefit the retailer.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Social Accounting Matrix Balanced Based on Mathematical Optimization Method and General Algebraic Modeling System

ABSTRACT

Aims: Social accounting matrix (SAM) is a kind of important form in the national accounts calculation. The requisite data are typically collected from a number of different sources. Therefore, much of data used will not be immediately consistent. The aim of this paper present the various methods of balancing applied to social accounting matrix.

Design: These methods (RAS, Cross-entropy (CE), least square, linear programming with L_1 and linear programming with L_∞ method) are applied widely for develop and keep and time consistent multi-sector datasets.

Methodology: This paper solves the social accounting matrix balanced problem using iterative method (in RAS approach) and using the computer program about General Algebraic Modeling system (GAMS) (in other approach). The sum square error of the estimated table from the initial table is used as the main instrument to measure deviation of the updated matrices from the matrix.

Results: We found that CE method is more accurate than the other methods.

1. INTRODUCTION

SAM is simply defined as a single entry accounting system whereby each account or transactor is represented by a column for recording outgoings and a corresponding row for recording incomings [1]. It is a framework for organization and reconciliation of data or economic flows in a country with a particular period (usually a year). SAM database is used for a descriptive analysis of economy and provides statistical basis for construction of general equilibrium models that can be used to

answer various economic policy questions [2,3] and for analysis of both income distribution and growth issues. A SAM extends the national accounts by classifying institutions according to their socio-economic backgrounds instead of their functional or economic activities [4]. Lahr and Mesnard [5] discuss the RAS algorithm and the various formal formulations of other biproportional approaches as well as discuss what defines an algorithm as “biproportional”. Bellu [6] offers a methodological introduction to SAM for analyzing socio-economic impact of agricultural and rural development policies. Schneider and Zenios [7] describe five applications of matrix balancing and compare the algorithmic and computational performance of balancing procedures that represent the two primary approaches for matrix balancing—matrix scaling and nonlinear optimization. The five applications of matrix balancing are the RAS algorithm, a diagonal similarity scaling algorithm and a truncated Newton algorithm for network optimization.

The contribution of this paper is in extending the work of [8 and 9] who assessed the performance of only two – the RAS and Cross entropy methods. This paper reports the results obtained by balancing a SAM using 5 different methods that are implemented using an iteration program and GAMS software. It explains that why the CE method is the best method (See section 5.2, 5.3 and 5.4).

SAM is constructed using a large number of statistical data sets that comes different sources, such as national accounts, trade data, input-output tables or supply-use tables, the data are not consistent [10]. The data from the different sources is inconsistent. Therefore, the data has to be rendered consistent. This is an important and difficult task. When the data from different sources is compiled the resultant imbalanced, i. e. the column sum and row sum will not equal and hence, will not satisfy one of the defining features of a SAM, i. e. income must equal expenditure for each account. Table 1 is shown a schematic Macro Social Accounting Matrix.

Table 1. An example of the Macro Social Accounting Matrices

Receipts	1	2	3	4	5	Total
1. Suppliers		C	G	I	X	Demand
2. Households	Y					Income
3. Government		T				Receipts
4. Capital Acc.		S _h	S _g		S _r	Savings
5. Rest of world	Z					Imports
Total	Supply	Expenditure	Expenditure	Investment	Row	

$$Y + Z = C + G + I + X \text{ (GNP)}$$

$$C + T + S_h = Y \text{ (Income)}$$

$$G + S_g = T \text{ (Government, Budget)}$$

$$I = S_h + S_g + S_f \text{ (Savings-Investment)}$$

$$X + S_f = Z \text{ (Trade Balance)}$$

Estimates from primary or disparate secondary source are often inconsistent. There are several alternative matrix balancing methods used to adjust the initial estimates in order to achieve consistency [9,12,13]. This paper uses mathematical optimization method and GAMS software to estimate and balance a SAM.

2. SOCIAL ACCOUNTING MATRIX AND SYSTEM OF NATIONAL ACCOUNTS

2.1 Constructing a SAM

The main features of a SAM are threefold. First, it is a square *matrix* in that each account has a both row and corresponding column of the matrix. The transactions are shown in the cells, so the matrix displays the interconnections between agents in an explicit way. Second, it is *comprehensive*, in the sense that it portrays all the economic activities of the system (consumption, production, accumulation and distribution), although not necessarily in equivalent detail. Thirdly, the SAM is *flexible*, in that, although it is usually set up in a standard, basic framework there is a large measure of flexibility both in the degree of desegregation and in the emphasis placed on different parts of the economic system. As it is an accounting framework not only is the SAM square but also the corresponding row and column totals must be equal. Clearly, at one extreme, any set of macroeconomic aggregates can be set out in a matrix format. Therefore, Keuning [14] suggested that SAM is a basis of new system national accounts (SNA). In an open macroeconomic system, any of the implementation of the policy will have an impact on economic activity at all levels. Social Accounting Matrix has become a standard data structure of the computable general equilibrium (CGE) model.

The construction of a SAM with any significant degree of disaggregation of the principle accounts includes: (1) Supply and use tables (input-output tables), or the necessary principle survey data to compile them. (2) Household survey incorporating

a labor force survey (a multi-purpose, integrated household survey). (3) Government budget accounts, trade statistics and balance of payments statistics.

Many compilers begin by assembling a macro SAM from the national accounts. This defines a set of control totals for the subsequent disaggregation and means that the SAM is consistent with any macro analysis. Often macro SAMs available for a more recent year than the detailed datasets are input-output tables, household survey. Gallardo and Mardones [15] uses information from I-O table 2008, national account household survey and environmental pollutant emissions to elaborate an environmentally extended SAM for Chile. Payatt et al. [16] have pointed out that compiling detailed SAMs can be part of a process to improve the national accounts estimates. Many countries now re-base their national accounts periodically in accordance with a set of commodity balances (input-output table such as a Ugandan social accounting matrix [17]. Otherwise, household survey data is not always fully in estimating the national accounts (e.g. consumer expenditure is obtained as a residual in the commodity balances), so there might be a case of adjusting the macro SAM in some circumstances.

2.2 Basic Social Accounting Matrix Structure

A simple, stylized SAM framework is shown in Table 2. It is a square matrix that represents the transactions taking place in economy during an accounting period, usually one year. Table 2 shows clearly the three basic forms of economic activity, production (accounts, 1, 2, and 3), consumption (accounts 4, 5 and 6), accumulation (account 7) and the transactions with the rest of the world (account 8).

Table 2. A Basic Social Accounting Matrix (SAM)

Account		(1)	(2)	(3)	(4)	
Production	Commodities	(1)		Intermediate consumption	Household consumption	
	Activities	(2)	Domestic sale			
Factors of production		(3)		Gross value added payments to factors		
Institution	Households	(4)		Labor and mixed income	Inter- household transfers	
	Corporate enterprise	(5)		Operating surplus		
	Government	(6)	Net taxes on product		Direct Taxes	
Combined capital accounts		(7)			Enterprise savings	
Rest of World (RoW)		(8)	Imports			
Total			Supply of products	Cost of production activities	Factor income payments	Current household outlays

Table 2. A Basic Social Accounting Matrix (SAM) (continuous)

Account		(5)	(6)	(7)	(8)	Total	
Production	Commodities	(1)		Government consumption	Fixed capital formation and change in stocks	Exports	Demand for products
	Activities	(2)					Sales of commodities
	Factors of production	(3)				Net factor incomes from RoW	Factor income receipts
Institution	Households	(4)	Distributed profits to household	Current transfers to household	Labor and mixed income	Net current transfers from RoW	Current household receipts
	Corporate enterprise	(5)		Current transfers to enterprise	Operating surplus	Net current transfers from RoW	Current enterprise receipts
	Government	(6)	Direct Taxes			Net current transfers from RoW	Current government receipts
	Combined capital accounts	(7)	Enterprise savings	Government savings	Capital transfers	Net capital transfers from RoW	Capital receipts
	Rest of World (RoW)	(8)			Current external balanced		Aggregate outlays from RoW
Total			Current enterprise outlays	Current government outlays	Capital outlays	Aggregate outlays to RoW	

Source: Round [1]

3. VARIOUS METHODS OF BALACING SAM

3.1 The RAS Method [18]

RAS is a widely used methodology to balance SAMs. The RAS method is an iterative method of biproportional adjustment of rows and column that has been independently developed by various researches.

Each element in matrix T is indicated t_{ij} , where $i = 1, 2, 3, n$; is the row index, $j = 1, 2, 3, n$; is the column index.

Column sums $y_j \sum_{i=1}^n t_{ij}$ are the column totals. Row sums $x_i \sum_{j=1}^n t_{ij}$ are the row totals. As already mentioned, for a given k account, expenditure is equal to receipts and is shown by the fact the sum of row is equal to the sum of the column.

$$\sum_{j=1}^n t_{ij} = x_i \quad \sum_{i=1}^n t_{ij} = y_j \quad (1)$$

$$A = (a_{ij})_{n \times n} \text{ is a SAM matrix, } a_{ij} = \frac{t_{ij}}{y_j} \quad (2)$$

$$\sum_i a_{ij} = 1 \quad (3)$$

$$\text{and } Y = AY, \text{ that is } \sum_{j=1}^n a_{ij} y_j = y_i \quad (4)$$

A classic approach to solve this problem is to generate a new matrix A , from the old matrix A by means of “biproportional” row and column operations:

$$a_{ij} = r_i a_{ij} s_j \text{ in matrix notation: } \tilde{A} = \tilde{R} A S \quad (5)$$

Where (\sim) indicate a diagonal matrix of elements r_i and s_j

$$\tilde{R} = \text{diag}[r_1, r_2, \dots, r_n], \tilde{S} = \text{diag}[s_1, s_2, \dots, s_n], a_{ij}^1 = r_1 a_{ij} s_j \quad (6)$$

The iterative process is as follows and can be seen below [1]. The original matrix of coefficients is multiplied by the row of column total y_j^* to obtain the matrix f_{ij}

$$f_{ij} = a_{ij} y_j \quad (7)$$

The row totals of this matrix are represented in the vector x_i . Let the ration of x_j^* to x_i be the multiplier r_i . Multiplying r_i and f_{ij} we obtain a new f_{ij} . Row vector y_j of column totals is obtained and used to calculate the multiplier s_j . f_{ij} and s_j are then multiplied. The entire sequence of operations can be seen in EQ. 8.

$$\begin{aligned} x_i &= \sum_j f_{ij} & r_i &= x_i^*/x_i & f_{ij} &= r_i f_{ij} \\ y_i &= \sum_j f_{ij} & s_j &= y_j^*/y_j & f_{ij} &= s_j f_{ij} \end{aligned} \quad (8)$$

The iterative process in equation (8) then continuous until the conditions $s_i^* = s_i$ and $y_j^* = y_j$ are met.

The RAS method has advantage of being simple to apply iteration steps. The advantages and disadvantages of RAS method described in section 5.4. In the following section, we introduce the cross-entropy method.

3.2 Cross-entropy (CE) Method

Some researcher used cross-entropy approach to SAM balancing, such as [9,19,20,21]. The estimation procedure is to minimize the [22] cross-entropy measure of the distance between the new and the prior estimated probability. Golan et al. [23] use cross-entropy method to balance an I-O table.

Applied to the procedure of updating a SAM, the problem is to find a new SAM $A^* = a_{ij}^*$, close to an existing SAM $A=(a_{ij})$

The formulas are:

$$\text{Min}^n a^* \log \frac{a_{ij}^*}{a_{ij}} = \text{Min}^n a^* (\log a^* - \log a) \quad (9)$$

$$\sum_{i,j=1} ij \quad \sum_{i,j=1} ij \quad ij = ij$$

$$s. t. \begin{cases} \sum_{j=1}^n a_{ij}^* y_j^* = y_j^* \\ \sum_{i=1}^n a_{ij}^* = 1 \end{cases}$$

The solution is obtained by setting the Lagrange for the above problem and solving it. The outcome combines the information from the data and the prior.

$$a_{ij}^* = \frac{a_{ij} \exp(\lambda_i y_{ij}^*)}{\sum_{i,j} a_{ij} \exp(\lambda_i y_{ij}^*)}$$

Where is the Lagrange is multiplies λ_i is associated with the information on row and column sums and the denomination is a normalization factors.

From the comparison of these two methods, they found that if the focus is on column coefficients, then the CE method appears to be superior to RAS. However, if the focus is on SAM flows, then the two methods are very similar, with RAS performing slightly better than CE [8]. The advantages and disadvantages of CE method described in section 5.4.

3.3 Method of Least Squares (LS)

The method is to find a new matrix A^* from an existing matrix A , by minimizing the sum of square of deviations between the new values and the prior value in percentage terms.

Suppose that the elements a_{ij} and a_{ij}^* are the value of the initial SAM and the values of the estimated SAM respectively. The formula is:

$$\begin{aligned} \text{Min} \quad & \sum_{i,j=1}^n \left(\frac{a_{ij}}{a_{ij}^*} - 1 \right)^2 \\ \text{s. t.} \quad & \sum_{i=1}^n \sum_{j=1}^n a_{ij}^* = \sum_{j=1}^n a^* \end{aligned} \quad (10)$$

By least squares method, this approach assumes that there is a linear relationship between the dependent variables a_{ij} and the explanatory variables a_{ij}^* .

3.4 Method of Linear Programming by Minimizing with Norm L_1 (LP- L_1)

We define that d_{ij}^- is negative difference between a_{ij} and a_{ij}^* , d_{ij}^+ is positive difference between a_{ij} and a_{ij}^* .

Where $d_{ij}^+ = \max[(a_{ij} - a_{ij}^*), 0]$, $d_{ij}^- = \max[-(a_{ij} - a_{ij}^*), 0]$.

The formulas are:

$$\begin{aligned} & \text{Min} \sum_{i,j=1}^n [(d_{ij}^+ + d_{ij}^-)/a_{ij}] \\ & \text{s. t.} \begin{cases} \sum_{j=1}^n a_{ij}^* = \sum_{i=1}^n a_{ij}^* \\ d_{ij}^+ - d_{ij}^- = a_{ij} - a_{ij}^* \end{cases} \end{aligned} \quad (11)$$

3.5 Method of Linear Programming by Minimizing with Norm L_∞ (LP- L_∞)

$$\begin{aligned} & \text{Min} \sum_{i,j=1}^n (d_{ij}^+ + d_{ij}^-) \\ & \begin{cases} \sum_{j=1}^n a_{ij}^* = \sum_{i=1}^n a_{ij}^* \\ d_{ij}^+ - d_{ij}^- = a_{ij} - a_{ij}^* \end{cases} \end{aligned} \quad (12)$$

4. GAMS SOFTWARE AND PROGRAM FOR BALACING A SAM

4.1 GAMS for Balancing a SAM

General Algebraic Modeling System (GAMS) is a high-level modeling system for mathematical programming and optimization [24]. GAMS is designed for modeling and solving linear, nonlinear and mixed-integer optimization problems. The system is tailored for complex, large-scale modeling applications and allows the user to build large maintainable models that can be adapted to new situations.

There are ten steps to balance an unbalanced SAM [18].

Step 1: Define matrix accounts.

Step 2: Input data.

Step 3: Normalize initial matrix cell value.

Step 4: Treatment of negative values.

Step 5: Treatment of zero values.

Step 6: Definition of variables used in optimization process.

Step 7: Definition and initialization of model estimations.

Step 8: Initialization of Variables.

Step 9: Model solving.

Step 10: Results copied to a new matrix.

4.2 Choose the Appropriate Method

In order to choose the best optimization method, we carry out an approach between the four methods (EQ 8~EQ 12). This approach is:

(1) This approach consists in calculating the value D for each method. Sum of squared errors (SSE) is defined as:

$$D = \sum_{i=1}^n \sum_{j=1}^n 2(a_{ij}^* - a_{ij}). \quad (13)$$

(2) We exclude the condition. The value of element cell (i, j) in A (initial SAM) is not null, but the value of element cell (i, j) in A* (final SAM) is null.

(3) We choose best method according to the minimum value of D.

5. ILLUSTRATION

We use the following IO tables to compare the accuracy of the RAS, CE, LS, LP- L_1 and LP- L_∞ method. We use iterative program to solve the social accounting matrix balanced problem (in RAS approach) and use the computer programmer about General Algebraic Modeling system (GAMS) to solve the social accounting matrix balanced problem (in CE, LS, LP- L_1 and LP- L_∞ approach).

5.1 Define Matrix Accounts and Input Data Matrix

(1) Define matrix accounts

PRO Production

ACT Activities

ALAB Labor value added
 ACAP Capital value added
 ENT Enterprise
 HS Household
 GOV Government
 GGOV Government grants
 CAP Capital
 DEP Depreciation
 ROW Rest of World
 TOT Total

(2) Input data matrix

Use Zhou [25] social account matrix data as the input data matrix in this research (see Table 3).

Table 3. Input data matrix

	PRO	ACT	ALAB	ACAP	ENT	HS	GOV
PRO		329.85				207.18	21.30
ACT	629.23						
ALAB		155.96				3.6	50.91
ACAP		134.04	208.28	131.24	76.95		2.08
ENT				128.61			20.28
HS				277.64	0.23	3.46	16.37
GOV	3.28	14.37		6.14	12.49	60.45	47.56
GGOV					0.20	0.28	8.25
CAP					21.76	12.79	
INV							
DEP					37.64	12.39	4.08
ROW	72.87		2.29	9.42	0.20	0.18	0.71
TOTAL	705.38	634.22	210.57	553.05	149.47	300.33	171.54
+	GGOV	CAP	INV	DEP	ROW	TOTAL	
PRO	2.21	53.11	3.41		90.54	707.60	
ACT	2.79					632.02	
ALAB						210.47	
ACAP		3.02			2.25	557.86	
ENT						148.89	
HS	3.15				0.60	301.45	
GOV	0.81	28.48	1.15		0.47	175.2	
GGOV					0.33	9.06	
CAP				54.11		88.66	
INV		4.56				4.56	
DEP						54.11	
ROW		6.05				91.72	
TOTAL	8.96	95.22	4.56	54.11	94.19		

6. RESULTS

6.1 GAMS Program

The estimated table may have zero elements where the initial SAM has no zero elements. It is possible that we will get final results that are very inaccurate, especially if the initial table's values for the corresponding zero cell, the estimated table is very large [8]. But GAMS program has been specially treated the initial table's values for the corresponding zero cell and the corresponding negative cell.

GAMS program have ten steps to balance an unbalanced SAM. Only steps 1, 2 and 10 require modifications by the user, although modifications are also possible at step 8 [18]. The balanced SAM does not allow negative values. To solve this problem, GAMS program simply transpose these values to their counterpart cell before balancing the SAM. Indeed, as the SAM represents flows from one account to another, a negative flow from account A to account B is equivalent to an equal positive flow from account B to account A. For example, if $a(6,5)$ is negative, an equal account is added to cell $a(5,6)$ and set cell $a(6,5)$ to zero.

To avoid having to take the log of zero in the CE method, the GAMS program adds a small amount to each cell value. In GAMS program, matrix cell values are limited between 0 and infinity and empty cells remain empty. No user modifications are necessary, but the user can fix any cell values, as desired. Be careful not be fix too many values, as the program may not find an optimal solution. GAMS solve the optimization using a non linear algorithm in CE method. GAMS solve the optimization using a linear algorithm in LS method, LP - L_1 method and LP - L_∞ method. The values of element in balanced matrix may have zero. Therefore, we recommend using of CE method and also saying that GAMS program is easy use than Mat Lab software.

6.1.1 The balanced SAM by RAS method

We use an iteration program to obtain the balanced SAM. The balanced SAM by RAS method denoted as Table 4.

Table 4. The balanced SAM by RAS method

	PRO	ACT	ALAB	ACAP	ENT	HS	GOV
PRO		331.52				207.15	21.71
ACT	630.55						
ALAB		155.45				3.6	51.53
ACAP		133.79	207.92	126.46	75.71		2.15

ENT				129.45			19.73
HS				278.35	0.21	3.15	15.9
GOV	3.14	12.59		7.16	12.35	60.21	47.54
GGOV					0.2	0.28	8.26
CAP					23.06	15.05	
INV							
DEP					37.42	11.5	5.12
R0W	73.05		2.66	10.03	0.22	0.34	0.78
TOTAL	706.74	633.35	210.58	551.45	149.17	301.28	172.72
+	GGOV	CAP	INV	DEP	R0W	TOTAL	
PRO	2.22	51.2	3.43		89.51	706.74	
ACT	2.8					633.35	
ALAB						210.58	
ACAP		3.2			2.22	551.45	
ENT						149.17	
HS	3.12				0.55	300.28	
GOV	0.81	27.31	1.15		0.46	172.72	
GGOV					0.32	9.07	
CAP	0.12			54.04		92.27	
INV		4.58				4.58	
DEP						54.04	
R0W		5.98				93.06	
TOTAL	9.07	92.27	4.58	54.04	93.06		

6.1.2 The balanced SAM by Cross-entropy (CE) method

We use GAMS program to obtain the balanced SAM. The balanced SAM by CE method denoted as Table 5.

Table 5. The balanced SAM by Cross-entropy (CE) method

	PRO	ACT	ALAB	ACAP	ENT	HS	GOV
PRO		330.18				208.15	20.64
ACT	628.25						
ALAB		155.45				3.6	51.53
ACAP		133.52	207.92	126.42	75.9		2.18
ENT				129.45			19.88
HS				278.27	0.21	3.18	15.9
GOV	3.18	12.59		7.18	12.32	60.2	46.51
GGOV					0.2	0.28	8.86
CAP					23.06	13.85	
INV							
DEP					37.42	11.64	5.14
R0W	72.87		2.66	10.03	0.22	0.34	0.82
TOTAL	704.48	631.74	210.58	551.35	149.33	301.24	171.46
+	GGOV	CAP	INV	DEP	R0W	TOTAL	
PRO	2.35	51.2	3.45		88.51	704.48	
ACT	3.5					631.74	
ALAB						210.58	
ACAP		3.2			2.21	551.35	
ENT						149.33	
HS	3.2				0.48	302.24	
GOV	0.81	27.15	1.07		0.46	171.46	
GGOV					0.64	9.98	

CAP	0.12			54.22		91.25	
INV		4.52				4.52	
DEP						54.22	
R0W		5.18				92.30	
TOTAL	9.98	91.25	4.52	54.22	92.30		

6.1.3 The balanced SAM by least squares (LS) method

We use GAMS program to obtain the balanced SAM. The balanced SAM by least squares (LS) method denoted as Table 6. We find that cell (8, 5) = cell (GGOV, ENT) = 0 in final matrix, but cell (8, 5) = cell (GGOV, ENT) = 0.20 in initial SAM.

Table 6. The balanced SAM by least squares (LS) method

	PRO	ACT	ALAB	ACAP	ENT	HS	GOV
PRO		331.24				208.3	20.64
ACT	629.64						
ALAB		155.45				3.6	51.53
ACAP		133.52	207.9	126.42	75.85		2.18
ENT				129.45			19.88
HS				278.1	0.32	3.18	15.9
GOV	3.12	12.59		7.28	12.32	60.2	46.44
GGOV					0	0.28	8.86
CAP					25.58	13.74	
INV							
DEP					35.04	11.64	5.19
R0W	72.93		2.68	10.03	0.22	0.24	0.88
TOTAL	705.69	632.80	210.58	551.28	149.33	301.18	171.50
+	GGOV	CAP	INV	DEP	R0W	TOTAL	
PRO	2.35	51.2	3.45		88.51	705.69	
ACT	3.16					632.80	
ALAB						210.58	
ACAP		3.2			2.21	551.28	
ENT						149.33	
HS	3.2				0.48	301.18	
GOV	0.81	27.15	1.07		0.52	171.50	
GGOV					0.51	9.64	
CAP	0.12			51.88		91.32	
INV		4.52				4.52	
DEP						51.88	
R0W		5.25				92.23	
TOTAL	9.64	91.32	4.52	51.88	92.23		

6.1.4 The balanced SAM by minimizing with norm L_1

We use GAMS program to obtain the balanced SAM. The balanced SAM by minimizing with norm L_1 denoted as Table 7.

Table 7. The balanced SAM by minimizing with norm L_1 method

	PRO	ACT	ALAB	ACAP	ENT	HS	GOV
PRO		331.34				207.39	2160
ACT	630.33						
ALAB		155.40		130.79		3.59	51.53
ACAP		133.79	207.92	129.45	75.71		2.10
ENT				227.91			19.73
HS				7.07	0.21	3.12	15.907
GOV	3.28	12.59			12.35	59.03	47.54
GGOV					0.20	0.28	8.26
CAP					23.06	14.72	
INV							
DEP					37.42	12.53	4.16
R0W	72.87		2.60	10.23	0.22	0.21	0.78
TOTAL	706.48	633.12	210.52	555.45	149.17	300.82	171.60
+	GGOV	CAP	INV	DEP	R0W	TOTAL	
PRO	2.22	51.15	3.41		89.37	706.48	
ACT	2.80					633.13	
ALAB						210.52	
ACAP		2.91			2.22	555.44	
ENT						149.18	
HS	3.15					300.787	
GOV	0.81	27.31	1.15		0.58	171.59	
GGOV					0.46	9.07	
CAP				54.11		91.98	
INV		4.56				4.56	
DEP						54.11	
R0W		6.05				92.96	
TOTAL	8.07	91.98	4.56	54.11	92.96		

6.1.5 The balanced SAM by minimizing with norm L_∞

We use GAMS program to obtain the balanced SAM. The balanced SAM by minimizing with norm L_∞ denoted as Table 8. We find that cell (8, 5) = cell (GGOV, ENT) = 0 in final matrix, but cell (8, 5) = cell (ENT, GGOV) = 0.20 in initial SAM. The cell (8, 6) = cell (GGOV, HS) = 0 in final matrix, but cell (8, 6) = cell (GGOV, HS) = 0.28 in initial SAM.

Table 8. The balanced SAM by minimizing with norm L_∞ method

	PRO	ACT	ALAB	ACAP	ENT	HS	GOV
PRO		331.44				208.3	20.64
ACT	630.34						
ALAB		155.45				3.6	51.53

ACAP		133.52	207.9	126.3	75.85		2.18
ENT				129.45			19.88
HS				278.1	0.32	3.18	15.9
GOV	2.95	13.04		7.28	12.32	60.23	45.24
GGOV					0	0	6.85
CAP					25.58	13.13	
INV							
DEP					35.04	9.29	5.65
R0W	72.8		2.68	10.03	0.22	0.24	0.69
TOTAL	706.09	633.45	210.58	551.16	149.33	297.97	168.56
+							
PRO	GGOV	CAP	INV	DEP	R0W	TOTAL	
PRO	2.35	51.2	3.55		88.61	706.09	
ACT	3.11					633.45	
ALAB						210.58	
ACAP		3.2			2.21	551.16	
ENT						149.33	
HS					0.48	297.97	
GOV	2.81	23.15	1.07		0.47	168.56	
GGOV					1.65	8.51	
CAP	0.24			49.98		88.93	
INV		4.62				4.62	
DEP						49.98	
R0W		6.76				93.42	
TOTAL	8.51	88.93	4.62	49.98	93.42		

6.2 Result

The five final matrices of coefficients are compared. These matrices are basically the full matrices with the cell in a column divided by the column total. Table 9 is denoted as the comparison of SSE values from matrices coefficient for each method.

Table 9. Comparison of SSE values from matrices coefficient for each method

Methods	Root mean square error (D)	Zero cell
RAS	1.146	
CE	1.017	
LS	0.895	Cell (8,5)
LP- L_1	1.021	
LP- L_∞	0.917	Cell (8,5) and cell (8,6)

Compare of SSE value of matrices of coefficients for each estimation methods.

The choice of the best method, we use method of "choose the appropriate method" (section 4.2). We obtain the following inequality between the five values of D.

$$D_{LS} < D_{LP-L_\infty} < D_{CE} < D_{LP-L_1} < D_{RAS}$$

From the final matrix of SAM through the LS and LP - L_∞ , we notice the values of the elements are null: Cell (8, 5) in LS method, Cell (8, 5) and cell (8, 6) in LP - L_∞ method.

Where as these values is not null in initial matrix of SAM. The LS and LP - L_∞ method do not reflect the latter. Therefore, the value of D is very low in the method of CE.

6.3 Discussion

The disadvantages of RAS method are: (1) a lack of economic foundations, (2) inability to accommodate other sources of data than those on row and column table, e. g. we can not fix new cell values that we suppose are accurately measured ([9], [18]). (3) We must write an iteration program. The advantages of RAS method are: (1) the value of element cell (i, j) in final SAM A^* is not null, if the value of element cell (i, j) in initial SAM A is not null. (2) The $(2n-1)$ unknown multipliers are determined by the $(2n-1)$ independent row and column restrictions using iterative adjustment procedure. It is easily use RAS method.

The advantages of CE method are: (1) we can fix cell values in addition to row and column tables. (2) the value of element cell (i, j) in final SAM A^* is positive, if the value of element cell (i, j) in initial SAM A is positive [13]. Fofana et al. [18] argued that because of the above disadvantages, many researchers prefer use the CE method.

Since LS method, LP - L_1 method and LP - L_∞ method are linear relationship between the dependent variables a_{ij} and the explanatory variables a_{ij}^- . In 10 step of GAMP program, the negative values are re-transposed to their original position to the new matrix. For example, cell (5, 6) is negative value; GAMP program set cell (5, 6) to zero and set cell (6, 5) to cell (6, 5) + cell (5, 6). Therefore, the element value in the final SAM A^* may have zero.

7. CONCLUSION

A SAM is a single accounting framework with the rows and columns, arranging income and expenditure accounts of various economic agents in a country. A SAM framework is not only a statistical tool but also a framework for macroeconomic analysis. It provides a framework for the organization of information about economic and social structure of a country and a service as dataset for a model of the

economy. Since estimating cell value from primary or disparate secondary source are often inconsistent. There are several alternative matrix balancing methods are available to adjust the initial estimates for consistency. We detail describe five types the matrix balancing methods. The RAS method is an iterative method of “biproportional” adjustment of rows and column that has been independently developed by various researches.

In this paper, we present a GAMS code and CE, LS, LP - L_1 and LP - L_∞ to balance an unbalanced SAM in ten steps. We obtained the five results (see section 5.2.1 to 5.2.5). We present a comparison of SSE values from matrices coefficient for each method. According to section 5.3 and section 5.4, we also explain that the CE method is the best method in five types the matrix balancing methods.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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***Cotton Lint Export Trade in the Midst of Distortion:
What are the Competitiveness Statuses of Major Players
in the Industry? Case of 12 Selected Countries***

Abstract: The world's cotton production and export industry has for some time now witnessed protests from various producers and exporters on distortionary measures (notably subsidies) instilled by some major players (including the United States, India and China) and the downward pressure such measures induce on world cotton prices. To complement research efforts made and findings so far following such protests, we sourced assessment of the competitiveness statuses of twelve major players in the industry amidst such distortions. In so doing, we made use of the logarithmic form of the comparative export performance index ($\ln(\text{CEP})$), basing our decisions on newly introduced thresholds founded on seven-year-mean performance indices. In addition, we used mean deviation for the last four of the seven years covered to identify recessions and improvements in export performance for the respective countries. The results show that, although such distortionary measures (specifically production and export subsidies) are instilled with a purpose of protecting respective local industries, they sometimes turn-out not only harming players from other economies, but also "push-out" extra revenues that may have been earned by some of the countries (primarily larger exporters like United States) that instill them. Based on seven-year mean index values used for the period 2005-2011 and new thresholds employed, we found Burkina Faso, Uzbekistan, Mali, Chad, Benin, Cameroon, and India to be "Highly Competitive". The United States (US), Australia, and Côte d'Ivoire were found "Competitive". Upon the index

values observed (limited however by our inability to incorporate economic prices and account for differences in domestic resource costs and market structure), Brazil and China were respectively found “Weakly Competitive” and “Uncompetitive”. In spite of these statuses however, we discovered that export performances for the United States, Uzbekistan, and all the WCA countries (except Burkina Faso) have receded in recent years. Performances for India, Australia, China and Brazil have however improved, with the latter two witnessing relatively higher improvements. By this, we conclude that distortions do not only harm countries from the WCA and other developing nations, but also adversely affect performance of the United States. In countries like India, China and Brazil however, subsidies have yielded beneficial implications for export performance. These differences in effect of subsidies for the four subsidy-levying economies could be due to differences in resource, cost of production and exports, and market share.

Keywords: Competitive advantage; market share; nominal rate of assistance; thresholds.

1. INTRODUCTION

Agriculture as an activity and sector is not only sensitive to climatic conditions, but it is as well steered by forces operating in the marketing, economic and policy environments. This makes agricultural production and trade fragile. Upon this claim, governments in several countries worldwide have in diverse ways intervened in food and agricultural markets with a purpose of enhancing food security, reducing poverty and increasing foreign exchange earnings. In as much as attempts have been made since the early 1960s to justify such interventions, the instilled measures have been generally welfare reducing both within and beyond the respective economies in which such interventions are witnessed. Revelations along this line of argument can be found in studies such as [1-9]. Other studies including [10] and [11] have however refuted the welfare reducing claims of such interventions (specifically production and export subsidies), arguing that subsidies are primarily instilled as a response to declining world prices to shield farmers and exporters from economic losses. A commodity that has been subjected to such interventions worldwide and has for some time now attracted much research attention is cotton. Its attraction of research attention is justified on the grounds that, in most of the developing economies where the commodity is produced, it is widely regarded a strategic crop for reducing poverty, enhancing food security and founding economic development [12]. In West and Central Africa for example, specifically the C-4 economies (Burkina Faso, Benin, Mali

and Chad), the cotton industry is believed to have as of the year 2005 employed about 16 million people who were engaged in production, processing and trading of the commodity [13]. The industry as revealed by [12] remains second-largest employer after the national governments in the C-4 economies. In these economies, cotton companies are noted to employ at least 4,000 permanent staff and 8,000 seasonal employees. In as much as there are annual variations in these figures, about 900,000 farm units are reportedly engaged in cotton farming [12]. This, according to [12] implies that, the industry provides employment to at least seven million actively farming adults in those units and provides livelihoods to about 13 million people (including children and non-farming adults) that comprise these farming units. In these countries, besides farmers and cotton exporting companies facing various financial, managerial and technological challenges, the farmers (who primarily depend on cotton production for sustenance) are as well subjected to significant production taxes, thereby reducing the share of world price that reach them [14].

In contrast to this observation however, production in the relatively better-off economies have been mostly subsidized. As shown in Fig. 1, cotton production in West and Central African countries has over the period 1980 to 2008 been generally subjected to production tax, whiles completely the opposite was observed for the United States and India. In as much as farmers in Brazil and China were subjected to production tax during the period 1980 to 1995, production in Brazil has since the year 1996 been subjected to some subsidy (although below percentages for India and the United States), with same being noted in China after the year 2004. Besides potentially creating inefficiency in production, through encouraging overproduction, subsidies are believed to create a glut that lowers world prices of the commodity [3,7-9,15]. This adversely affects over 10 million farmers and export companies in the relatively poorer countries (who are rather taxed). In a country like Australia, however, the government has almost been neutral in this case as the annual nominal rate of assistance figures¹ as shown in Fig. 1 lie generally on the zero line.

¹*Nominal rate of assistance (NRA) refers to the percentage by which government policies (subsidies or taxes) have raised (or decreased in case of taxation of farm incomes) gross returns to farmers above (or below) what they would be without such intervention.*

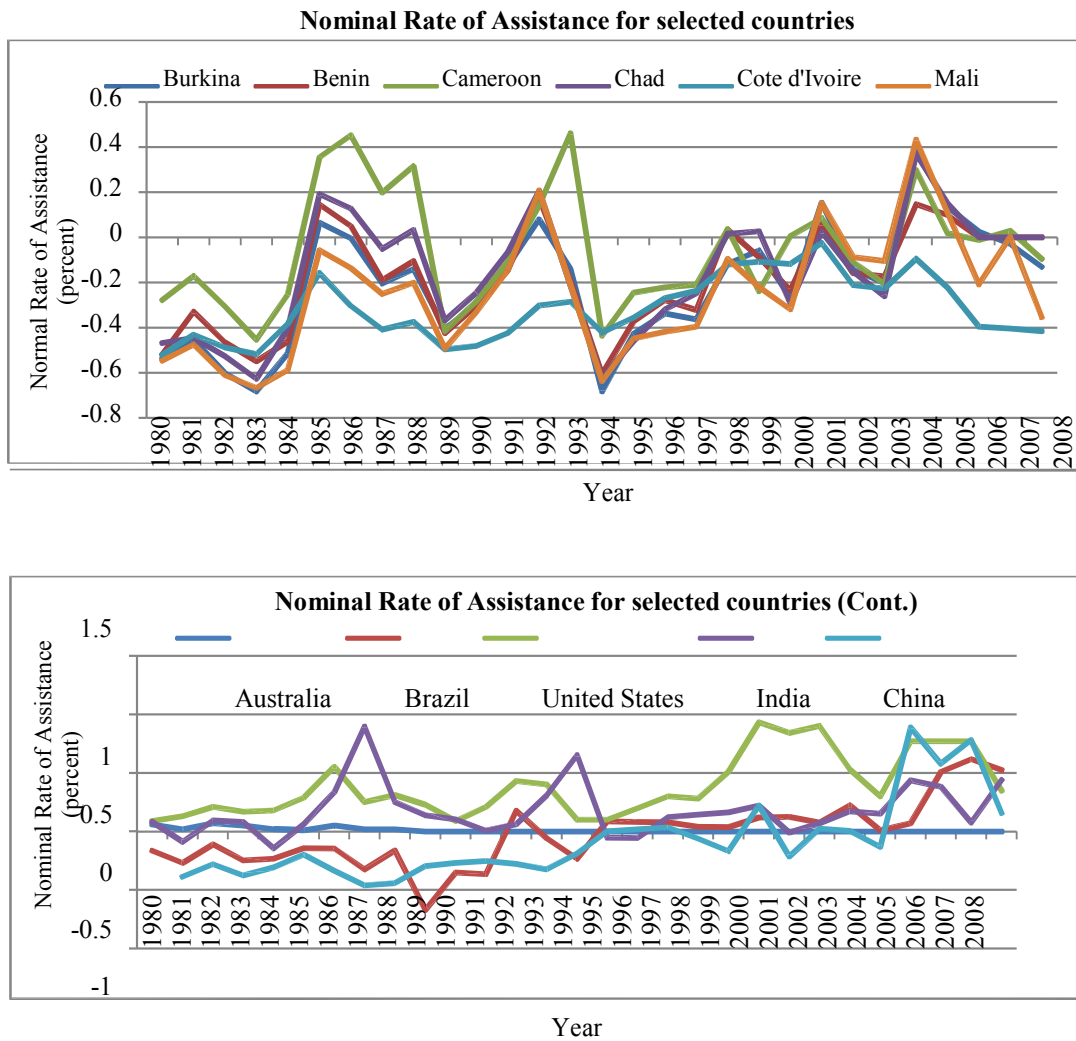


Fig. 1. Nominal rate of assistance for cotton output

Data source: Anderson and Nelgen [16]

Following protests by various countries, most importantly the C-4, that subsidies and other trade distortionary measures be abolished, several dimensions of cotton export trade have been researched to help inform policy decisions on the way forward. Among the studies that have investigated various dimensions of cotton export trade are [3, 7, 17-19]. To complement research efforts made and findings so far, we source assessment of the competitiveness statuses of 12 major players in the industry amidst prevailing distortions. The twelve countries covered in this study are the United States, India, Australia, Uzbekistan, Brazil, China, Burkina Faso, Benin, Cameroon, Côte d'Ivoire, Chad and Mali. Selection of these countries is based on the roles they play in world cotton production and trade. With exports of cotton being mostly in the form of lint (e.g. over 83% for C-4 countries), emphasis on cotton exports in this study would solely be placed on the lint component. In assessing the competitiveness of these countries in export of cotton lint, we make use of the logarithmic form of the

comparative performance measure of competitiveness, basing our decisions on new thresholds proposed by [20].

2. DEVELOPMENTS IN WORLD COTTON LINT EXPORTS

Amongst all the known fibres in the world, cotton is the most important with a share of about 40% of production [6] and represents an essential contributor to development in many developed and developing economies around the globe. Cotton as an important cash crop has for over three decades now in its export dimension undergone some major developments at the world, regional and national levels. Both the volume and value of world cotton lint exports have increased tremendously over the period 1980 to 2009, primarily due to overproduction by major players. As shown in Table 1, the volume of cotton lint exports at the global level is noted to have increased from a decadal average of 4,694,604 tonnes in 1980-1989 to 7,166,301 tonnes in 2000-2009 (representing a 1.42% annual growth rate in volume of exports). This development was enhanced possibly by exports from the Americas and Asia, as these two regions are as well noted to have witnessed major increases in volume and value of exports. With volume of world exports increasing by about 52.65% between the two aforementioned periods, volumes from the Americas and Asia increased respectively by 71.59% and 84.76%. These two countries also observed respective annual growth rates of 1.82% and 2.07% in volume of exports. The volume of cotton exports from.

Africa increased continuously in absolute terms over the three decades between the years 1980 and 2009 (thus 1980-1989, 1990-1999 and 2000-2009), although it fluctuated share-wise. Annual growth rate of 1.62% for volume of exports from Africa was observed over the period. In as much as export volumes from Europe have decreased continuously over the three decades between the years 1980 and 2009, entirely the opposite is observed for Oceania. With volume of exports from Europe decreasing by 61.41% between 1980-1989 and 2000-2009, volumes from Oceania increased by 245.49%. Exports from Europe decreased at a rate of 3.12% per annum over the period, while Oceania witnessed a 4.22% annual growth rate in volume of exports.

At country level, the United States remains leading exporter of the commodity over three decades within the period 1980 to 2009. For the respective decades, the United States held shares of 26.71%, 27.39% and 37.50%. Taking a closer look at

figures in Table 1, it is quite evident that the countries outside West and Central Africa (WCA) region are generally major exporters of cotton lint, and this did not happen by chance. Most of the increases observed in export volumes for these countries have been enhanced through government interventions (distortions) in the form of subsidies purported on facilitating increased cotton production [6]. Due to decades of development efforts however, cotton became a dominant cash crop in WCA during the periods 1990-1999 and 2000-2009. Historically, cotton production has two characteristics in Sub-Saharan Africa: vertical coordination and the fact that cotton has been a major export cash crop for decades [21]. These two characteristics led to a strong government intervention in cotton supply chains. With the exception of Chad that witnessed a decrease in export share between the periods 1980-1989 and 2000-2009, all the other WCA countries covered in this study witnessed an increase in share between the two aforementioned periods. In absolute terms however, volumes of export from all the WCA countries increased between the two periods.

Table 1. Regional (and country) shares in volume (tones) of world cotton lint exports

Region	1980 - 1989	1990-1999	2000-2009	Annual growth rate ^a , (%)
World	4,694,604	5,466,826	7,166,301.	1.42
Americas	1,806,247(38.47)	1,953,860(35.74)	3,099,353 (43.25)	1.82
Asia	1,096,385(23.35)	1,779,857(32.56)	2,025,718 (28.27)	2.07
Africa	721,886(15.38)	822,330 (15.04)	1,170,418 (16.33)	1.62
Europe	920,903(19.62)	464,511 (8.50)	355,401 (4.96)	-3.12
Oceania	149,183 (3.18)	446,269(8.16)	515,412 (7.19)	4.22
Sub-Region				
West Africa	209,186 (4.56)	423,248 (7.74)	651,957 (9.10)	3.86
Middle Africa	78,430 (1.67)	120,806 (2.21)	129,698 (1.81)	1.69
Countries				
United States	1,254,106(26.71)	1,497,526 (27.39)	2,687,170 (37.50)	2.57
India	66,831 (1.42)	124,389(2.28)	529,804(7.39)	7.14
Australia	149,182 (3.18)	446,269 (8.16)	515,411(7.19)	4.22
Uzbekistan	-	*719,207(13.16)	727,985(10.16)	N/A
Brazil	81,456 (1.74)	32,926 (0.60)	294,467(4.11)	5.88
China	310,695 (6.62)	136,569 (2.50)	82,271 (1.15)	-4.33
Burkina Faso	35,254 (0.75)	44,587 (0.82)	162,072 (2.26)	5.22
Benin	23,086 (0.49)	86,757 (1.59)	128,137 (1.79)	5.88
Cameroon	29,210 (0.62)	51,947(0.95)	82,818 (1.16)	3.53
Côte d'Ivoire	59,484 (1.27)	95,932 (1.75)	106,877 (1.49)	1.97
Chad	37,370 (0.80)	59,000 (1.08)	43,500 (0.61)	0.51
Mali	61,220 (1.30)	121,543 (2.22)	178,688 (2.49)	3.64

*Numbers in bracket are representative shares (percentages), - Data not available, * Decadal average but with missing values for 1990-1991, N/A: cannot be computed due to missing data for the initial value (1980-1989), Source: Authors computation with data from FAO (FAOSTAT-Agricultural Trade Data)*

Among the 12 countries covered in this study, annual growth rates in volumes of export were relatively higher for India, Brazil, Benin, Burkina Faso and Australia. As the largest market share holder, the United States observed annual growth rate of

2.57% in volume of exports, while China (as the largest producer) observed a 4.33% annual decrease in volume of exports over the period 1980-2009. This could be due to increasing domestic demand for the commodity, as most of the lint produced in China is consumed.

As shown below, Table 2 displays the distribution of export earnings from cotton lint at global, regional and national scales. Globally, earnings from cotton lint exports is noted to have increased from \$6,936,064 (thousand) to \$8,964,869 (thousand) between the periods 1980-1989 and 2000-2009, representing an increase of 29.25% and annual growth rate of 0.86%. As per the table, the Americas held the largest share of earnings from cotton lint over the three decades between 1980 and 2009. Comparatively, shares in value of exports were significantly higher in non-WCA countries than in WCA countries. West and Central Africa jointly accounted for 10.27% of global export earnings for the period 2000-2009, while Africa as a continent/region accounted for 16.53%. By this, West and Central Africa accounted for 62.17% of total earnings from cotton lint exports for Africa.

Table 2. Regional (and country) shares in value (\$1000) of world cotton lint exports

Region	1980-1989	1990-1999	2000-2009	Annual growth rate, (%)
World	6,936,064	8,030,049	8,964,869	0.86
Americas	2,677,418(38.60)	3,015,909(37.56)	3,983,130(44.43)	1.33
Asia	1,396,768(20.14)	2,398,208(29.87)	2,386,746 (26.62)	1.80
Africa	1,170,422(16.87)	1,233,388(15.36)	1,481,620(16.53)	0.79
Europe	1,495,956(21.57)	702,977(8.75)	441,146 (4.92)	-3.99
Oceania	195,501(2.82)	679,567(8.46)	672,227(7.50)	4.20
Sub-region				
West Africa	271,444(3.91)	606,063(7.55)	765,651(8.54)	3.52
Middle Africa	105,436(1.52)	173,586(2.16)	155,524(1.73)	1.30
Countries				
United States	1,962,283(28.29)	2,407,539(29.98)	3,499,019(39.03)	1.95
India	88,855(1.28)	159,845(1.99)	693,545(7.74)	7.09
Australia	195,496(2.82)	679,566(8.46)	672,217(7.50)	4.20
Uzbekistan	-	*972,565(12.11)	808,791(9.02)	N/A
Brazil	78,738(1.14)	41,612(0.52)	355,014 (3.96)	5.78
China	387,828(5.59)	206,554(2.57)	101,966(1.14)	-4.36
Burkina Faso	40,142(0.58)	58,861(0.73)	190,414(2.12)	5.33
Benin	27,964(0.40)	124,777(1.55)	151,016(1.68)	5.78
Cameroon	38,164(0.55)	69,268(0.86)	100,681(1.12)	3.29
Côte d'Ivoire	84,036(1.21)	139,714(1.74)	123,738(1.38)	1.30
Chad	52,771(0.76)	89,061(1.11)	51,679 (0.58)	-0.07
Mali	80,080(1.15)	166,054(2.07)	214,715(2.40)	3.34

*Numbers in bracket are representative shares (percentages), - Data not available, *Decadal average but with missing data for 1990-1991, N/A: cannot be computed due to missing data for the initial value (1980-1989), Source: Authors computation with data from FAO (FAOSTAT-Agricultural Trade Data)*

This comparatively smaller joint share of WCA sub-region in global exports may be attributed partly to unfavorable conditions in the world cotton lint markets and

domestic institutional and structural constraints, mostly with poor price transmission (which discourages farmers from expanding and intensifying production of the commodity). In support of this attribution, [6] revealed that, even though cotton production has expanded rapidly in the WCA sub-region, the share of the international price paid to producers in WCA has been relatively low. In addition, inefficiencies have been noted in other cotton related activities like ginning, marketing and input distribution.

Just as was observed for volume of exports, annual growth rates for value of exports were relatively higher for India, Brazil, Benin, Burkina Faso, and Australia. The United States observed an annual growth rate of 1.95%, while China observed a 4.36% annual decrease in value of exports over the period 1980-2009.

3. METHODOLOGY

In this section, we discuss the basic foundations for the measure of competitiveness employed in our analysis and the data used. We begin the section with discussion on the relevant foundations and thereafter provide brief information on data used and sources.

3.1 Measuring Competitiveness

Diverse opinions have been expressed in business and trade literature by experts on the definition of competitiveness and how best the concept can be measured. In this study however, we stick to the definition proposed by [22], who defines competitiveness as the ability of a country (a firm/or an entity) to offer products and services that meet local and international quality standards, worth domestic and global market prices and provide adequate returns on the resources used in producing them. By this definition, the term competitiveness covers four important aspects of trade and production; quantity (through offering of adequate volumes of a commodity), quality, price and efficiency. To be competitive in a commodity, a country (firm/entity) is expected to offer adequate quantity of that commodity in high quality (which attracts higher demand). This consequently sets ground for higher prices (and possibly premium³). In as much as the quality and price aspects are important, the concept by the definition above tries to draw the reader's attention to the fact that achieving anticipated quality standards and high prices involves efficient production, processing and marketing in the first place. These four dimensions *should* hold for a country/firm to be deemed competitive in a commodity both at the local and global

scales. As a relative measure of performance, the most important index amongst the lot that comes to mind in expressing competitiveness is the Balassa index. Since the proposition of this index by [23], its definition has been revised and modified in several ways, leading to a plethora of measures [24]. By its original definition however, the Balassa index (also dubbed 'Revealed Comparative Advantage' (RCA)) is expressed as follows:

Where X represents exports, i is a country, j is a commodity, t is a set of commodities and n is a set of countries. Blurrily perceived by most trade analysts and experts as a measure of comparative advantage, the definition of this index reflects success or failure of countries in exports of a commodity relative to world-wide norms [25]. Such successes and failures are mostly induced through subsidies and other distortionary measures or incentives. Thus, the index better reflects competitive advantage than comparative advantage. By the original definition as proposed by [23], the index is therefore more of a measure of competitive advantage than comparative advantage. Further derivations from this index will henceforth be a reflection of competitive advantage. In spite of being the foundation for development of various indices of competitiveness, the Balassa index is foremost flawed by deviation in index value observed as the set of countries used as reference changes. This makes the outcomes context and reference specific and sensitive to reference definition. The asymmetric nature of the index poses another flaw in its use. Should a country be found uncompetitive, the index value for such country ranges between zero and value less than 1. For competitive countries, the index ranges from one to infinity. The index is as well susceptible to double counting between pairs of countries. It is as well criticized for ignoring the import side of trade.

In building on this index and addressing identified flaws in the process, [26] offered three alternative specifications. The first among the alternative is the logarithm of relative export advantage ($\ln(RXA)$, which holds a definition similar to the original Balassa index but uses the world as a reference to avoid double counting between pairs of countries and addresses the asymmetry problem of the Balassa index). The other two alternatives are relative trade advantage ((RTA), which incorporates both the export and import (relative import advantage (RMA)) dimensions of trade) and revealed competitiveness ((RC), which holds a definition similar to the RTA but uses the logarithms of relative export and import advantages). The respective alternatives are expressed as follows:

Where X represents export, M represents import, i represents country, j stands for commodity, n represents world and t stands for all product groups.

Following the proposition by [26] of these alternatives however, claims have been made in trade literature on the failure of either alternatives to appropriately correct for/capture the effect of government intervention and other distortionary measures on trade. Prior to proposition of these alternatives, [27] found that a country's performance in exports of a commodity is more affected by economic fundamentals than by government intervention, whereas the reverse holds for import behavior. Along this argument, [26] recommended the use of the $\ln(RXA)$ and RXA in preference to the RTA and RC as appropriate measures for assessing exports performance. This recommendation is backed by a suggestion that the $\ln(RXA)$ and RXA are less susceptible to policy-induced distortions. In addition to this suggestion, considering a single commodity, it is noted that most countries engage either in inter-industry trading (thus complete exports or imports) or irregularly/weakly engage in intra-industry trading. This could to a greater extent preclude the use of the RTA and RC as these measures may automatically converge to either RXA , RMA , $\ln(RXA)$ or $\ln(RMA)$ when there are zero imports or exports.

Along this line, our analysis is founded primarily on the $\ln(RXA)$ measure (which addresses the asymmetry problem of the RCA) of competitiveness. Although $\ln(RXA)$ is deemed more appropriate among the two alternatives recommended by [26], cross-sectorial distortions stand determining the outcome of the final index values observed. This could lead to misleading outcome for the index values observed. This claim is made on the grounds that, by the definition in eq. (2), in determining the performance of a country in exports of a commodity, use is made of "all product groups" as a divisor both at the national and world levels. To avoid such cross-sectorial influence, we make use of a more sector bound version of the $\ln(RXA)$ measure of competitiveness. By this, we use the logarithmic form of the Comparative Export Performance Index ($\ln(CEP)$). This measure is expressed as follows:

Where conceptually X represents value of exports, i represents country, j stands for cotton lint, n represents world and t stands for value of total agricultural exports. Like the $\ln(RXA)$, $\ln(CEP)$ yields values that are symmetric through the origin. In addition, the $\ln(CEP)$ measure holds a similar index interpretation as the $\ln(RXA)$, where index value ≥ 0 reveal competitiveness. Noted in trade literature, in informing decision on the competitiveness status of a country in export of commo-

dities, use has been made by several researchers of fewer randomly selected years (usually two or three years including [28]). In their study on “Market analysis and revealed comparative advantage”, [28] had an RCA value of 1.0 in Kiwifruit for Iran in the year 2000, 23.3 in the year 2005 and N/A for the year 2009. Should the value for 2009 have turned out to be for example a value less than 1, what interpretation would analysts attach to such outcome? We believe, as usual, they would suggest the country is no more competitive based on the annual figures on which they base their decision. There could have been a possibility that values for the years between 2001-2004 and 2006-2008 were all above 1 or possibly below 1. Ignoring all these possibilities as we inform decision on the competitiveness statuses of countries could be misleading. Along this line, we make use of mean index values for the last seven continuous years (for which data is available) (2005-2011 for this study) in informing competitiveness statuses of the respective countries instead of using random years. This helps capture extremes (which usually mislead analysts who use annual figures for random periods) and their effect on preceding and subsequent years. Use of the $< \geq 0$ bounds of the $\ln(\text{CEP})$ in interpreting outcomes is deemed less informative and provides no room for accessing the effectiveness of policy measures purported on enhancing or depressing exports. Accordingly we make use of seven-year-mean index thresholds proposed by [20] for informing decisions in this study.

Table 3. Seven-year-mean index thresholds for assessing competitive advantage

Classes	CEP	Ln (CEP)	SCEP
Highly competitive	≥ 4.20	≥ 1.44	0.62-1.00
Competitive	1.73–4.19	0.55-1.43	0.27–0.61
Weakly competitive	1.00–1.72	0.00–0.54	0.00-0.26
Uncompetitive	< 1.00	< 0.00	< 0.00

Source: [20]

Having been used already by [20] in assessing the performance of exports for seven agricultural commodities during and after the agricultural diversification project in Ghana, these thresholds were not just randomly selected. The bounds were set at the respective upper and lower limits after several rotations for robustness. By this, for a country to move from one class to another would require some efforts in the form of efficient policy instruments, reduction of existing inefficiencies, improvement in trade (including appropriate liberalization of internal and external marketing) and minimization of distortionary measures which according to [29] reduces competitiveness. Although applied to the agricultural sector, these thresholds are valid for other

sectors as long as definition for the measure used conforms to that in eq. (6) and is sector bound. When used in policy analysis, the thresholds could serve as useful guide in evaluating the effectiveness of various policy instruments purposed on enhancing export growth. Besides being quite effective in reflecting fragileness of export trade, these thresholds could be used to identify inefficiencies in export trade in less diversified and highly trade distorting environments and sectors.

To however assess improvements or recessions in performance of the respective countries over the seven year period, we use mean deviation for the four latter years of the seven. Employed in this study, the mean deviation in performance is defined as follows:

$$\text{eq. (6)} \quad \frac{\sum_{t=2008}^{2011} (X_{it} - \bar{X}_i)}{4}$$

The number “4” in the denominator reflects the fact that, we are considering only the four current annual performance figures (2008-2011). This number is deemed appropriate because it does not only cover more than 50% of the entire period (7 years), but also reflects performance for the four recent years for which data is available.

3.2 Data and Sources

In this study, use is made primarily of secondary data on national and world values for cotton lint and total agricultural exports. Data on these variables were gathered from the agricultural trade database of FAO (FAOSTAT). A total of 12 countries are covered in our analysis and these are the United States (US), India, Australia, Uzbekistan, Brazil, China, Burkina Faso, Benin, Cameroon, Côte d'Ivoire, Chad and Mali. The mean index for the respective countries covers all years from 2005 to 2011.

4. RESULTS AND DISCUSSION

By the thresholds employed in this study, and the mean performance indices observed, the twelve countries are placed in four distinct classes. The classes used are “Highly Competitive”, “Competitive”, “Weakly Competitive” and “Uncompetitive”. In as much as these classes provide indications for the competitiveness statuses of the respective countries, they give no further information on any improvement or recession in performance over the period. To provide a clearer picture on both the competitiveness statuses of the countries and how they have performed in recent years, use is made of both the thresholds for classification and a four-year mean deviation to inform decisions on improvements or recessions in performance. Given the classes, countries with mean index values of ≥ 1.44 are deemed “Highly Competitive”. Those

with mean values between 0.55-1.43 are deemed “Competitive”, between 0.00-0.54 deemed “Weakly Competitive” and <0.00 deemed “Uncompetitive”. The use of the term “Weakly Competitive” is to reflect the fragileness of being in this category. Inappropriate policy interventions, shocks from the market, inefficiencies in fiscal and marketing environment and other socio-economic, financial and structural constraints on the part of producers and exporters could pull a country into the “Uncompetitive” class.

Favorable conditions can as well push a country into a higher class (Possibly the “Competitive” class or “Highly Competitive” class if such conditions are extremely favorable). The use of “Competitive” for the next class is to reflect the fact that, although countries in this category are by the original bounds of the RCA (of Balassa) deemed competitive, there exists room for improvement by addressing some existing inefficiencies in their respective industries and lending more attention to the industry in a non-distorting way. Although such countries are usually less centered on the cotton industry, addressing prevailing inhibition to export growth and performance could lead to their movement into the “Highly Competitive” class. Countries in the “Highly Competitive” class are usually more dependent on cotton industry for sustenance, income generation, poverty reduction and foreign exchange earnings, and are potentially low cost producers due to abundance of relevant resources needed and low wage rates, the latter of which violates national labor law prescriptions.

Table 4. Performance of selected countries in cotton lint exports

Countries	Log of comparative export performance index, ln(CEP)							
	2005	2006	2007	2008	2009	2010	2011	Mean
United States	1.36	1.39	1.33	1.49	1.26	1.30	1.33	1.35
India	1.53	2.02	2.27	1.39	2.57	2.42	1.96	2.02
Australia	0.91	0.84	0.53	0.55	0.73	1.00	1.56	0.87
Uzbekistan	3.91	3.82	3.98	4.20	3.75	3.86	3.39	3.85
Brazil	-0.05	-0.47	-0.1	0.31	0.31	0.00	0.23	0.03
China	-2.67	-2.07	-1.93	-1.85	-1.86	-1.94	-1.90	-2.03
Burkina Faso	3.91	3.92	4.10	4.44	4.28	3.84	3.55	4.01
Benin	3.74	3.01	3.41	3.56	3.21	2.52	2.57	3.14
Cameroon	2.66	2.40	2.52	2.09	2.27	1.70	1.87	2.22
Côte d'Ivoire	1.10	0.83	0.77	0.69	0.34	0.52	0.27	0.65
Chad	3.46	3.54	3.59	3.70	3.42	2.98	3.49	3.46
Mali	3.98	3.84	3.88	4.15	3.70	3.55	3.70	3.83

Source: Authors computation with data from FAOSTAT

In interpreting the results as shown in Table 4, we note relatively higher mean index values in countries like Burkina Faso, Uzbekistan, Mali, Chad, Benin, Cameroon and India. By this, all the “Cotton-Four” countries, in spite of the current challenges

faced by their respective cotton industries are noted to have higher competitive advantage over countries like United States (which holds a market share of over 3 times that of West and Central Africa together), Australia, Côte d'Ivoire, Brazil and China. The higher competitiveness indices observed for the C-4 countries can be attributed to their relatively lower cost of production (due to abundance of labor/farm hands and low wage rates) and exports compared to the US and other countries (like China) which have relatively higher cost of production and exports. In as much as cotton may be subsidized in the US and other major exporting nations like India, reduction in world prices as a result of such intervention does not only harm producers and exporters in developing economies, but also, it reduces potential earnings to the major exporters that levy such subsidies. Given the fact that China remains the major export destination for majority of the countries considered in this study and it being among the leading producers, stockholders and consumers, flooding the Chinese market with "cheap cotton" further lowers prices on the world market and reduces any potential gains that could have accrued to the US and India (who respectively accounted for 35.3% and 30.7% of cotton imports in China for the year 2010 [17]) in the absence of such interventions.

Flooding major destination markets with cheap cotton also yield detrimental implications on earnings for other competing nations especially countries from WCA and Uzbekistan.

Taking a closer look at the detailed world trade flows in Appendix 1, the US is noted to have had about 46 export destinations during the period 2006-2010 compared to about 17 on average for West and Central African cotton exports. Consequently, flooding the market with "cheap cotton" due to overproduction could harm competing nations who share common destination markets with the US, and also preclude the US from realizing any potential gains from increment in prices and export earnings. By the definition of the competitiveness measure employed (as specified in eq. 6), competitive advantage is measured by the value of cotton lint exports in total agricultural exports for the country compared to that for the world (the latter being a divisor). Upon this definition, putting in place measures to increase the national value (and not volume) for exports of the commodity, may induce a relatively higher effect at the national level than at the world level, thereby increasing the numerator in the equation for the US and cotton market distorting nations. Subsidizing cotton production and exports for major exporters could induce an inverse association

between exports and competitiveness for the countries that initiates such intervention and has as well adverse implications for other economically-constrained and cotton production-and-export-dependent countries. Allowing the world cotton market to work things out by itself with reduced government interference could make the US and other cotton market distorting countries better off than they actually now are. For example, in simulating the effect of full liberalization of textile trade, [2] revealed that elimination of subsidies could raise cotton prices by 10.7 percent. Although such realization could to some extent reduce cotton production, the general welfare effect may be positive for majority of the exporting nations including the US. Although the primary goal for use of such interventions is to protect producers and exporters in the country that instills them, in comparing market shares and the index values for the US and other countries, we believe such interventions rather “push-out” extra revenue the country may have earned in their absence.

Using the seven-year-mean index values and bounds from Table 3, in a descending order as shown in Table 5, Burkina Faso, Uzbekistan, Mali, Chad, Benin, Cameroon, and India are found “Highly Competitive”. The United States, Australia and Côte d’Ivoire are found “Competitive”. Although limited by our inability to incorporate economic prices and account for differences in domestic resource costs and market structure, the output obtained from computation of eq (6) reveals that Brazil is “Weakly Competitive” and China “Uncompetitive” in cotton lint exports. The later observation is in part attributed to the relatively lower engagement of China in cotton lint exports. As shown in Appendix 2, cotton lint exports accounted for only 0.17% of value for total agricultural exports from China.

Table 5. Competitiveness statuses of major players in world cotton industry based on new thresholds

Classes	Thresholds	Countries
Highly Competitive	(≥ 1.44)	Burkina Faso, Uzbekistan, Mali, Chad, Benin, Cameroon, India,
Competitive	(0.55-1.43)	United States, Australia, Côte d’Ivoire
Weakly competitive	(0.00–0.54)	Brazil
Uncompetitive	(<0.00)	China

Source: Authors classification based on thresholds proposed by [20]

In spite of these statuses however, as shown in Table 6, we note that although “Weakly Competitive” and “Uncompetitive” by status (based on the thresholds), Brazil and China respectively observed the highest improvement in performance over the period 2008-2011, with deviations from the mean being all positive for China, and

positive in three out of four occasions for Brazil. In as much as the mean deviation in performance for Brazil was 0.18 during the aforementioned period, that for China was 0.14. Countries like India and Australia also observed respective positive mean deviations of 0.07 and 0.09. Although mostly within the “Highly Competitive” class, with the exception of Burkina Faso which observed a positive mean deviation of 0.02 (reflecting an improvement in export performance over the period 2008-2011), all the other countries from West and Central Africa covered in this study witnessed recession in performance over the period 2008-2011. Cameroon, Côte d’Ivoire and Benin performed poorer than countries like Mali and Chad. Having held over 37% by volume and 39% by value of world market share, the US is as well noted to have observed a recession in export performance. This outcome reflects inefficiencies in the international market and in current production and exports for most of the countries in the “Competitive” and “Highly Competitive” classes. Although initially poor performers (based on annual $\ln(\text{CEP})$ figures for the years 2005, 2006 and 2007), Brazil and China have since the global commodities crisis of the year 2008 witnessed some major improvements in their cotton lint export performance. Being the most fragile amongst the lot based on the seven-year-mean $\ln(\text{CEP})$ index however, Brazil needs to firmly anchor, sustain and/or improve upon measures that have ensured current improvements in the country’s performance and address any existing inefficiencies. Such initiative could shield the Brazilian cotton lint industry from future shocks which may counter the positive paths the industry has been set on since the year 2008.

Table 6. Current improvements and recessions in export performance

Countries	2008	2009	2010	2011	Mean
United States	0.14	-0.09	-0.05	-0.02	-0.01
India	-0.63	0.55	0.40	-0.06	0.07
Australia	-0.32	-0.14	0.13	0.69	0.09
Uzbekistan	0.35	-0.10	0.01	-0.46	-0.05
Brazil	0.28	0.28	-0.03	0.20	0.18
China	0.18	0.17	0.09	0.13	0.14
Burkina Faso	0.43	0.27	-0.17	-0.46	0.02
Benin	0.42	0.07	-0.62	-0.57	-0.18
Cameroon	-0.13	0.05	-0.52	-0.35	-0.24
Côte d’Ivoire	0.04	-0.31	-0.13	-0.38	-0.20
Chad	0.24	-0.04	-0.48	0.03	-0.06
Mali	0.32	-0.13	-0.28	-0.13	-0.06

Shades: Grey—positive annual deviation from mean, Orange—recession in performance, Blue—improvement in performance

5. LIMITATION OF STUDY

As advised by [3], the structure of world market for cotton lint is a key determinant of growth in production and export of the commodity. In addition, the analysis of developments in the industry is guided by several assumptions, with each having potentially different implications for export growth and performance. In assuming a perfectly fragmented market as against the rigid homogeneous global market for cotton assumption, [3] place a proposition that countries only stand benefiting from reductions in subsidies if they are already competing in segments of the market where production is currently subsidized (as is the case in this study), adding that, this has relevant implications for developments in cotton price and for the distribution of benefits. Determination of the ability of countries to respond to developments in global trade and the influence of such responses on their performance to a greater extent requires effective consideration of their production and export structure including issues with domestic resource costs, market structure, economic prices and existing government policies on production and trade. In using the logarithmic form of the comparative export performance index and deviations from mean index in this study however, we are unable to appropriately account for influences from these development and trade indicators.

6. CONCLUSION

Following recent debates in economic and trade literature on distortions in world cotton industry and their impacts on producers and exporters in developing economies, we sourced assessment of the competitiveness statuses of twelve major players in the global cotton industry. Along this line, we made use of seven-year-mean index values as against the fewer randomly selected years used by various analysts in trade literature. Our ultimate decision on the respective statuses was however based on new thresholds proposed by [20], and according to the four unique classes therein. In addition, we used mean deviation for the last four of the seven years covered to identify recessions and improvements in export performance for the respective countries. The results show that, although such distortionary measures (specifically production and export subsidies) are instilled with a purpose of protecting respective local industries, they sometimes turn-out not only harming players from other economies, but also “push-out” extra revenues that may have been earned by some of the countries (primarily larger exporters like United States) that instill them. Based on seven-

year-mean index values used for the period 2005-2011 and new thresholds employed, we found Burkina Faso, Uzbekistan, Mali, Chad, Benin, Cameroon, and India to be “Highly Competitive”. The United States (US), Australia, and Côte d’Ivoire were found “Competitive”. Upon the index values observed (limited however by our inability to incorporate economic prices and account for differences in domestic resource costs and market structure), Brazil and China were respectively found “Weakly Competitive” and “Uncompetitive”. In spite of these statuses however, we discovered that export performances for the United States, Uzbekistan, and all the WCA countries (except Burkina Faso) have receded in recent years. Performances for India, Australia, China and Brazil have however improved, with the latter two witnessing relatively higher improvements. By this, we conclude that distortions do not only harm countries from the WCA and other developing nations, but also adversely affect performance of the United States. In countries like India, China and Brazil however, subsidies have yielded beneficial implications for export performance. These differences in effect of subsidies for the four subsidy-levying economies could be due to differences in resource, cost of production and exports, and market share.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Issues in the Management of the Supply-Side Financing of Micro, Small and Medium Enterprises (MSMEs) in Nigeria

ABSTRACT

Access to financial credit facilities remains top on the list of constraints affecting the development of MSMEs in Nigeria. This state of affairs subsists despite the nation's robust financial sector. Commercial banks loans portfolio to MSMEs as percentage of total credit to the private sector has been dwindling over time, from 27.04 percent in 1992 to less than one percent in 2012. Driven by the desire to effect a positive change, government has initiated policies and programmes which have produced unsatisfactory results. International best practices identify interventions which can substantially contribute to effective and greater efficiency in financial credit system delivery. Such interventions, modified along the line of a developing economy environment are needed as integral part of efforts to initiate, develop and sustain MSMEs in Nigeria.

Keywords: supply-side financing; MSMEs; credit constrains; collateral; interventions.

1. INTRODUCTION

The working definitions of micro, small and medium enterprises (MSMEs) will be as provided by Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), which coordinates and facilitates the enabling environment in the country. A micro enterprise is one which employs a maximum of 10 persons with a turnover of not more than N10 million (circa US\$ 65,000) and an asset base excluding land and building, not exceeding N5 million (circa US\$ 32,000). A small enterprise employs between 10-49 persons with a turnover of between N10-100 million (circa 65,000-650,000) and an asset base (excluding land and building) of between N5-50 million

(circa US\$ 32,000-320,000), while the medium enterprise's turnover hovers in the region between N100-500 million (circa US\$ 650,000-3.2 million) with assets excluding land and building of between N50-199 million (circa US\$320,000-1.2 million) and having the capacity to employ 50-199 persons. In the MSMEs sector composition, the micro enterprises occupy the lion share of 98 percent and one percent each shared between the small and medium enterprises [1].

The benefits of MSMEs to the national economy are enormous hence the huge interest among practitioners, researchers, policy makers and advocates. Their relevance to the national economy includes the ease of start which has propped up an amazing population of 17.3 million enterprises in Nigeria employing about 32.5 million persons [2]. These figures may be conservative considering the large Nigerian underground economy. Evidence indicates increasing percentage points of underground economy to the official Nigerian GDP of 57.9; 58.6 and 59.4 percentage points in 2000, 2002 and 2003 respectively [3].

Other benefits of MSMEs include the assurance of a competitive business environment, mobilising local resources, creation of new industries, being a platform for industrialisation, poverty reduction, mitigation of rural-urban migration and the provision of intermediate goods for larger industry use. Indeed, MSMEs represent a nation's economic strength. Advantageously too, the Nigerian MSMEs are known to be distributed along sector lines within the regions therefore creating potential operating and cost synergies. Specifically, MSMEs accounted for 46 percent of Nigeria's GDP in 2010 [2].

However, as assuring as their relevance is, they are endemic hiccups which hinder their development. Frequently mentioned hiccups include weak infrastructures, difficulty in acquiring space, machinery and spares; corruption, low capacity utilisation and lack of capacity building [4]. But, the lack of access to financial credit remains top on the list of operational challenges affecting MSMEs [5,6]. Finance availability for industry use has been categorised by [7] into demand and supply sides. The demand side perspective explains expectation. The supply-side concept emphasises provision but its constraints in financial parlance explains misallocation outside the control of the firm. It portrays an imperfect condition which hinders access to funds in a well-defined environment. The supply-side explanation seems to typify the Nigerian situation hence our interest. Our major objective therefore is to expand the literature

in examining the major interventions in the management of the supply-side financing of MSMEs in Nigeria.

According to various publications including [8], the country boasts of a vibrant financial sector with 22 commercial, 5 development, 2 merchant, 871 micro finance and one non-interest banking institutions which post huge annual profits. Added to this list are 82 Primary Mortgage institutions, 62 finance companies and many other allied institutions. Interestingly, despite a sizeable bank loan portfolio, there is a negligible support to the MSME sector. Remarkably too, there has been a dwindling commercial banks loan portfolio to small scale enterprises as percentage of total credits from 27.04 percent in 1992 to less than one percent in 2012 [9]. For these two decades, the overall performance has not shown any appreciable improvement despite many interventions. Table 1 shows the ratio of commercial banks' loan to MSMEs as a percentage of total loans for the said period.

Table 1. Ratio of Commercial Banks' Loan to MSMEs, 1992-2012

Period	Commercial Banks Loans to small scale Enterprises (₦ million)	Commercial Banks Total Credit to private sector (₦ million)	Commercial Banks Loans to Small Scale Enterprises as percent of Total Credit (%)
1992	20,400.0	75,456.3	27.04
1993	15,462.9	88,821.0	17.41
1994	20,552.5	143,516.8	14.32
1995	32,374.5	204,090.6	15.86
1996	42,302.1	254,853.1	16.60
1997	40,844.3	311,358.4	13.12
1998	42,260.7	366,544.1	11.53
1999	46,824.0	449,054.3	10.43
2000	44,542.3	587,999.9	7.58
2001	52,428.4	844,486.2	6.21
2002	82,368.4	948,464.1	8.68
2003	90,176.5	1,203,199.0	7.49
2004	54,981.2	1,519,242.7	3.62
2005	50,672.6	1,991,146.4	2.54
2006	25,713.7	2,609,289.4	0.99
2007	41,100.4	4,820,695.7	0.85
2008	13,512.2	7,799,400.1	0.17
2009	16,366.5	9,667,876.7	0.17
2010	12,550.3	9,198,173.1	0.14
2011	153,284.6	38095845.6	0.40
2012 Q1	14,875.1	9,520,552.0	0.16
Q2	15,065.4	10,048,406.5	0.15
Q3	14,995.8	10,274,095.4	0.15
Q4	13,863.5	10,440,956.3	0.13

*Source: CBN statistical bulletin 2013

This Nigerian MSMEs situation is further compounded by the fact that the vital role of government in providing an enabling environment (finance, infrastructure, knowledge and policy) is low when compared to fellow African countries like South Africa and Egypt. The total loans as percentage of GDP for example are equally not impressive. The 2006 figure was 19.7 percent compared to Egypt's 53.3 percent and 94 percent of South Africa [10].

Apparently, financial credit constraint is a global phenomenon. This has resulted in credit rationing [11], a situation where borrowers are denied access to financial credit even where such borrowers are ready to pay higher interest rates. Government constraints, imperfect market conditions, difficulty in identifying the good borrower and rising risk with interest rates are some of the identifiable reasons for credit rationing. Certainly, these are common features in all economies. Other reasons alluded include collateral issues, in-explainable exogenous shocks; behavior, distribution and size of borrowers. [12] Have indicated that, the small size firms are the most vulnerably in issues of financial constraints. Larger firms seem to fare better.

It is worth mentioning that certain characteristics, apart from size separate the small from the large businesses in credit rationing. The differences include management and ownership unification in both economic and emotional levels, lack of professional attention to issues, short life expectancy and the fact that private equity affects the risk positioning of the owners [13]. These differences consequently impact on the finance functions and the overall organizational performance.

2. POOR FUNDING EFFECTS ON MSMEs

The business process from conception, the coming forth, growth, maturity and even failure revolve around finance [14]. Researchers have shown that capital requirement and the availability of finance resources affect entrepreneurial propensity [15,16]. Access to this important resource according to [17] is the absence of price and non-price barrier in the use of its services. This does not mean financial availability to all and sundry but that such is based on credit worthiness of the applicant. While finance comes in various forms, types and structures, the two main easily available for most businesses are debts and equity. Whether externally or internally generated, finance goes a long way in the process of accomplishing business objectives [18].

Studies including [19,20,21] have identified constrained financial credit as negatively affecting new firm entry into the market and the consequent decreased post-entry growth. Relaxing the constraints on the other hand is believed to positively affect small firms more than they do to larger ones. In their own opinion, [11,22] posit that collateral provision which is the asset pledged to borrow until payback time; long term exclusive relationships and repeat borrowing which are non-common features of MSMEs are some of the fundamentals that tilt the proportion of finance credit in favor of the larger firms. [23,24] have successfully associated lack of finance to firm's growth and innovation impediment, even as [25] have identified its adverse contribution towards firm survival. Equally, lack of funds limit the firm's capacity to replace low quality employees [26,27] have emphasized low firm performance as fall-out of external funds dislocation.

Internally generated funds from profits of MSMEs take long time to accumulate and they have dire consequences on long term plans if they serve as the only source of financing. The inability to capitalize on business opportunities due to paucity of funds has the capacity to hinder competition and thwart growth tendencies. This is because businesses require working capital and long term funds to operationalise activities. Modernisation process will be slow, transition to larger enterprises will be affected and inter-firm and industry linkages will be frustrated. Certainly, the overall effects of MSMEs on national economy will be negatively impacted.

3. BUT, WHAT WERE THE INTERVENTIONS?

Government has played a proactive role in broad areas of regulatory and supervisory frameworks. This role involves licensing requirements, identification and classification of institutions for the promotion of competition, financial infrastructure for the introduction and development of credit reforms and bureaux, registries and business registration procedures. Others are equity investment, direct public intervention like credit guarantee schemes, apex and wholesale funding facilities as well as value-chain organization projects. There is also the informal sector whose role includes money lending between friends, money lenders, family foundations and credit associations. It is however difficult to get information from the informal sector

due to weak credit skills and practice. However, some specific public interventions include:

- I. National policy on MSMEs which was launched in 2007 by SMEDAN to facilitate the promotion and development of efficient supportive environment. The policy identifies seven key areas of institutional; legal and regulatory framework; human capital development; research and development; extension and support services; marketing; infrastructure and finance. Each identified framework has plans for actualising specific objectives within a time frame. The policy streamlined definitions of MSMEs from a plethora of definitions that bedevil the sector.
- II. Micro-finance policy. The existence of a huge market not serviced by financial institutions; poor banking culture and low level of financial literacy; and the need to empower the poor were some of the justifications for this policy which was launched in 2005 and modified in 2011 [28]. The policy objectives include:
 - a. A 10 percent annual increase of access to financial services of the economically poor.
 - b. Increase of micro credit share as percentage of GDP from 0.2 percent in 2005 to at least 5 percent in 2020.
 - c. Participation of all federating States and FCT as well as two thirds (516) of all Local Government Areas in micro finance activities by 2015.

Nigeria has 871 single-branched microfinance banks (MFBs) which are not evenly distributed across the country with most of them privately owned. Of the number, 82 MFBs service the North-West and North-East geo-political zones which has the highest unbanked rate when compared to the over 500 in the South-West and South-East geo-political zones. The entire MFB network according to [29] serves 3.8 percent of the adult population (3.2 million clients) of which only 14 percent use credit products.
- III. Small and Medium Enterprises Equity Investment Scheme (SMEEIS) was an initiative of the Bankers Committee [30] which required all banks to set aside 10 percent of Profit After Tax for investment and promotion of small and medium enterprises (SME). For the purpose of the scheme, an SME was defined as one with a maximum asset base of N1.5 billion with no lower or

upper staff limit. Trading and financial activities were not covered by the scheme. With a single digit interest rate, benefiting enterprises were to surrender part of their ownership structure to the financing bank with a provision of financial and technical services from the bank. Seven years after its inauguration, the scheme was discontinued in 2008.

- IV. Bank of Industry (BOI) is the largest project and industrial financing establishment in Nigeria. It commenced operations from the reconstruction of Nigeria's foremost development bank, Nigerian Industrial and Development Bank. It has the mandate to provide assistance to the establishment of large, small and medium enterprises as well as rehabilitation of ailing industries. As a development fund administrator, it receives funds from official entities, developing agencies and State governments. These include N5 billion Dangote's small business development fund, UNDP's USD 4 million access to renewal energy project, N3 billion micro enterprise fund for 9 States; CBN's N500 billion intervention fund; N100 billion cotton, textile and garment industries revival scheme, N10 billion Rice Processing Fund and State government dedicated funds for the benefit of indigenous entrepreneurs in respective States. In fulfillment of its paradigm shift of committing 85 percent of its resources in support of SMEs while 15 percent goes to large enterprises, statistics shows disbursed funds to SMEs increased by 35 percent, 85 percent and 96 percent in 2001, 2006 and 2010 respectively in proportion of 65 percent 15 percent and 4 percent to large enterprises in the same period [31].
- V. National Economic Reconstruction Fund (NERFUND) was set up in 1989 to provide needed medium to long term credit facility to viable SMEs, especially those of the manufacturing, mining and agro-allied sectors. Loan facility is in two categories; the less than N5 million micro loans and the over N5 million SME loan. The agency's treasury was boosted in 2010 with a stimulation package of N200 billion. Information from the agency's website [32] showed that between March, 2010 and May 2013, of the 8215 loan applications valued at N25.7 billion, only 1497 projects valued at N5 billion were approved.
- VI. Commercial Agricultural Credit Scheme (CACCS). The objectives include:
 - a. To develop the agricultural sector by providing credit facilities to agro-allied entrepreneurs at a single digit interest rate.

- b. To enhance national food security.
- c. To reduce cost of credit in agricultural production.
- d. To produce input for industrial sector on a sustainable basis.

4. INTERVENTION OUTCOMES AND CONSTRAINTS

Despite the afore-mentioned interventions and many other public sector initiatives, the overall penetration level is exceedingly low. According to [33], 73 percent of Nigerians expressed concerns about getting a loan [31] identified some fundamental flaws in past and existing intervention programmes in the supply-side management. Finance lending institutions were known not to be favourably disposed to advancing financial resources to micro enterprises despite apparent clarity in the definitions of MSMEs. The definitions are often used loosely enthrone different eligibility criteria for enterprises applying for financing. Larger enterprises and the high yielding government debts are preferred for their high returns and as risk avoiding mechanism than lending to MSMEs. Supporting the above claim is the high cost of lending to MSMEs since the administrative costs are relatively constant to the small loans. Additionally, Nigeria has a weak capital market and a few development banks. Most other banks rely on short term liabilities for lending to avoid mismatch in maturities of assets and liabilities. The global financial crises with corresponding international finance architectural redesigning caused lesser linkages in the flow of long term funds.

Negatively too, Nigeria has a weak data base resulting from the poor data collection, storage, analysis and retrieval [34]. The country lacks a reliable identification system, has no developed collateral administration system and operates a nascent credit documentation databank. It is worth adding that some of the operating enterprises are not officially registered and many also without audited and recorded financial history. These challenges inhibit the potential for lending based on financial records. Equally identified as worrisome was the mentality of micro finance institutions behaving as 'mini' commercial banks awaiting full commercial banking operating license. This mentality has therefore disenfranchised many in the target group. But, the biggest challenges of MFBs are high refinancing costs compounded by low focus on deposits, high operating expenses and low staff capacity, leading to

poor asset portfolio. Certainly, the vast majority of MFBs lack the scale and operating capacity to have a strong impact on the target group.

The venture capital and private equity industry is novel and almost not in existence, perhaps the foundation for SMEEIS' failure. SMEEIS failed to meet its objectives hence its discontinuance [30]. Enterprises were not willing to accept banks as equity partners as the latter were seen as not having the skills in equity investment. Besides, the programme was against the prevailing culture of absolute ownership of business by their owners [35]. This resulted in the clash of confidence as social perceptions and administrative attitudes did not align. In all cases of banks providing credit, stringent collateral conditions were paramount. The lack of collateral would therefore naturally compound lending possibilities as it remained a major drawback preventing banks from lending. In [36], 80 percent of banks were known to have difficulties in this regard. Moreover, the operative environment of weak property rights and poor contract enforcement processes remain unattended to and legal issues take long time to incomplete resolve at the courts of law.

Consequently, [37] as represented in Fig. 1 identified specific constraints and the levels of effect on the overall finance supply side environment. Collateral conditions occupied an enviable 42 percent. Collateral is an asset pledged to borrow, redeemable when repayments are completed. It gives banks a fall-back position in times of loan default. Most MSMEs couldnot afford it and banks were hindered from financing their projects. Loan Applications occupied 13 percent, poor credit history 10 percent, insufficient profitability 6 percent and other objections, 29 percent. From the above, the constraints can broadly be categorised as collateral-based; financial illiteracy, information gap and insufficient profitability.

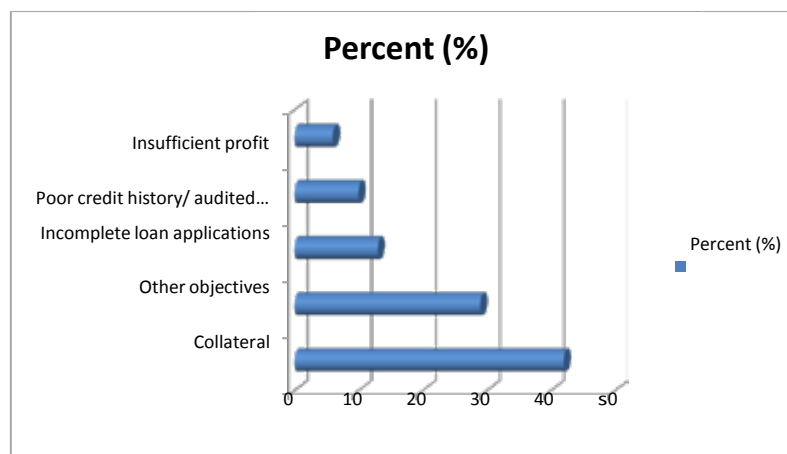


Fig. 1. Supply-side loan constraints

**Source: World Bank (2012b)*

5. THE WAY OUT

The malaise of finance to MSMEs is not peculiar to developing economies. The need for recalibration of strategies for better outcome can better be captured in the words of the European Commission Vice President Antonio Tajani, who is Commissioner for Entrepreneurship [38]. While acknowledging the finance capital insufficiency and industry for European SMEs, definite plans capable of shrinking the finance gulf for remarkable and measurable results were suggested.

Access to finance of SMEs remains difficult and is one of the main reasons for the current economic downturn. Therefore we intend to enlarge our loan guarantees to SMEs under the new COSME programme as of 2014. Each euro dedicated to our guarantees has the power to stimulate - on average - 30 Euros in bank loans. This is crucial to help Europe's jobs engine, our small enterprises, to run smoothly again. It is they who create 85 percent of all new jobs.

Bridging the 'financing gap' is so important to national economies considering the vital role of MSMEs. It is even more important for the developing economies with a very high poverty profile without social safety nets with the attendant consequences. Such 'redemption plans must appraise existing programmes and policies to identify loose links for necessary attention in line with the weak structures. Information dissemination plays a vital role and activities of financing institutions must be highlighted. Studies have shown exceeding Nigerian banks interest in the less risky government bonds at the expense of loaning to the MSMEs. Indicators of domestic credit to the private sector as a percentage of GDP have not shown tremendous improvement. There was a yearly average of about 13.4 percent between 2000 and 2006, which grew to 25.33 percent in 2007; 33.91 percent in 2008 and reached its peak of 38.59 percent in 2009 but dropped precipitously to 20.9 percent by January 2011 [39]. Based on the above, we have made the following recommendations:

1. There should be legalised and enforceable definitions of MSMEs as these will help in better planning and standardisation of funding criteria and programmes.
2. The informal and private sectors-driven lending institutions should be encouraged and integrated into the mainstream MSMEs funding programmes.
3. MSMEs unit should be established in banks with staffs adequately and specifically trained in the core-functional area.
4. There should be more information on financial opportunities to MSMEs.

5. Incentives should be given to commercial banks as motivation for lending to the MSMEs sector.

6. Banks should allocate certain percentage of their domestic credits to MSMEs. A policy encouraging banks to apportion a specified yearly allocation to MSMEs as loans should be envisaged.

7. There should be a review of collateral requirements in favour of credit scoring [40] where the information from tax authorities could be relied upon. Credit scoring is a statistical method used in analyzing historical data on borrowers to predict possible loan default in future.

8. An accounting standard specific to MSMEs should be developed in line with International Finance Reporting Standards. The conventional accounting methods appear to be specified to the large corporate organizations.

9. The development of a functional and reliable data base for easy information retrieval is of great essence.

10. Efforts should be made towards simplifying loan procedures and documentations.

11. The use of Mutual Guarantee Institution, a form of group lending in which banks lend to a group rather than a individual should be encouraged. Such lending promises a joint responsibility of honouring the liability. This will mitigate informational asymmetries as the members can easily screen, monitor and relate with each other than as would be done by the lending institutions.

12. Disputes resolution process should reflect the peculiar needs of the sector. This is because conventional courts take longer time to resolve issues; this does not auger well for a firm's health.

6. SUMMARY AND CONCLUSION

We have placed on record the ubiquitous nature of constrained finance credit as a global concern [11,20] and paid particular attention to its supply-side management within the Nigerian MSMEs sub sector [37,31,10,2]. Though a universal problem, the Nigerian situation is unacceptable given the available resources, opportunities and inherent potentials. The various policies and programmes having not yielded the expected beneficial results suggest a wide gap between their formulation and implementation. Government, organisations and agencies must take responsibility. Fundamental issues like collateral and loan application challenges are

areas that banks can deal with. Banks have a role to play. They should re-strategise, enlarge the markets and simplify rules of engagement. But, these must be done in collaboration with others since some of the associated issues are outside the banks' control. They include weak public structures [31], poor data management [34] and issues relating to culture [35]. These known fundamentals play a big role in bringing out the negative symptoms. Addressing the abysmal performance along the line of peculiar environmental issues raised would certainly promise a future. Our suggestions which are specific can positively alter and deepen the loan penetration within the studied sub-sector. The result will be a better national economy. Certainly, it is worth mentioning that, the vividly noticeable exponential fall in credit provision to MSMEs in Nigeria suggests a robust research thrust to interested scientists.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Environmental assessment phytodiversity steppe areas of Bald Mountain (Odessa region) – an element of regional ecological network in Ukraine

Abstract: Presented to evaluate the ecological role of the steppe tracts Bald Mountain, on environmental indicators: species richness, abundance and occurrence fitobioty. A typological assessment of phytodiversity. Definitely that phytodiversity steppe tracts of 220 species of vascular plants, which belong to 125 genera and 39 families.

It was established that the steppe land Bald Mountain is part of a regional ecological network, which comprises a large number of species in need of special protection, and this site is the source of the spread of natural phytodiversity in the studied agricultural landscapes.

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Экологическая оценка состояния фиторазнообразия степного участка Лысая гора (Одесская область) – элемента региональной экологической сети Украины

Аннотация: Представленная оценка экологической роли степного урочища Лысая гора, по экологическим показателям: видовое богатство, встречаемость и обилие фитобиоты. Проведено типологическую оценку состояния фиторазнообразия. Определенно, что фиторазнообразие степного урочища составляет 220 видов высших сосудистых растений, которые

относятся к 125 родам и 39 семействам. Установлено, что степной участок Лысая гора является составной частью региональной экосети, где сосредоточено значительное количество видов, нуждающихся в особой охране, и этот участок есть источником распространения природного фиторазнообразия в исследуемых агроландшафтах.

При чрезмерном использовании природного биологического разнообразия нарушается экологическая устойчивость, что приводит к обеднению и потере видов биоты. Не менее значительной угрозой для биоразнообразия есть также нерациональное использование ее ресурсов. Это приводит к истощению ресурсов многих видов, а в некоторых случаях до полного их уничтожения. Вследствие этого нарушается экологическая стабильность экосистем, что приводит к деградации природных ландшафтов и до развития катастрофических явлений. На сегодня состояние биоразнообразия равнинной части Украины (степей, лесов, лугов, болот) очень неудовлетворительное. Эти территории подвергаются постоянным изменениям и с каждым годом их площадь сокращается.

Это приводит к усилению эксплуатационной нагрузки, происходят постепенное истощение и деградация фитоценозов, и в конечном итоге формируются синантропные растительные сообщества. Состояние биоразнообразия Украины не отвечает современным требованиям сбалансированного природопользования. Современное использование растительности направлено лишь на потребительскую стоимость биоразнообразия при этом не учитываются экологическая и социальная ценность этих ресурсов [5].

Для разработки экологической стратегии в Украине важная роль принадлежит формированию национальной экологической экосети Украины, которая является частью Всеевропейской экосети. Принятие и соблюдение норм Закона Украины "Об экологической сети Украины" позволит улучшить общее состояние окружающей среды, уменьшить и замедлить деградацию природных экосистем, предупредить экспансию сорняков в агроландшафт и в полуестественные сообщества, сохранить место произрастания редких и исчезающих видов растений и обитания животных, привести к минимизации загрязнения водных ресурсов, воздуха и почв.

Как указано в Законе Украины "Об экологической сети Украины" кроме основных ядер экосети (ландшафтов, подлежащих особой охране) и буферных зон, есть еще полуестественные территории составляют каркас экосети. И всестороннее изучение экосети не может быть полным, когда без внимания останутся территории, которые соединяют основные составляющие [2].

В структуре агроландшафта Украины кроме естественно-антропогенных и антропогенно-промышленных территорий выделяются линейные элементы ландшафта, которые меньше по размерам чем основные составляющие, и хотя не имеют ключевое значение в агроландшафтах, но функционируют как очень важные второстепенные элементы. К таким территориям относятся долины рек, лесополосы, участки степной растительности, экотоны, которые расположены между основными составляющими, объединяя их в единую сеть. Кроме того, они являются одним из важных источников биологического разнообразия фитобиоты, однако пронизывая общий фон деградированных территорий, как никакие другие элементы ландшафта образуют тем самым инфраструктуру устойчивости агроландшафтов [4].

В агроландшафтах Правобережной Лесостепи к участкам, которые выполняют ту же функцию, относятся изолированные степные урочища. Оценка состояния растительного биоразнообразия этих территорий дает возможность оценить реальное состояние полу естественных территорий района исследования, а изучение и исследование фитобиоты степных урочищ является основой для прогнозирования оптимального разнообразия данного региона и зоны.

Нами предпринята попытка оценить экологическую роль степного урочища, которое в системе изучения экосети является связующей территорией региональной экосети. Потому что именно с фитобиоты Лысой горы будет возможным прогнозирование видового разнообразия, исследуемого агроландшафта.

Методы и условия исследований

Исследование фитобиоты степного урочища Лысая гора проводили в 2011-15 г. Полевые обследования заключались в учете фитобиоты урочища методом Уиттекера [7], а именно определение видового разнообразия, частоты встречаемости и обильности видов. Кроме того, провели таксономический и типологический анализ фитобиоты по показателям жизненной формы по продолжительности жизни и габитусом и экобиоморф К. Раункиера [6].

Ключевой фитобиоой в Одесской области (Любашевский р-н, с. Бобрик Второй), избрана фитобиота степного урочища Лысая гора, объединяющая систему балок, яров и останцев между ними, покрытых разнотравно-тыпчаково-ковыльными степями и небольшими участками дубово-белоокациевыми и белоокациево-гледичиевыми насаждениями, с луговой и сегетально-рудеральной растительностью - по балкам и по обочине дороги. Эта территория имеет достаточно большую площадь, около 50 га и объединяет участки растений с разной дигрессией. После изучения и исследования биологического разнообразия данного урочища можно прогнозировать, которая фитобиота будет преобладать в других составляющих агроландшафта, например, экотонах.

Результаты исследования

За период исследования было обнаружено на ключевом участке 220 видов, из 125 родов и 39 семейств. Л.И. Крицкая [3] исследуя Правобережную злаковую степь обнаружила 916 видов сосудистых растений. По нашим данным около 20% этих растений обнаружены в степном урочище. Большинство видов фитобиоты принадлежит к семействам *Asteraceae* - 48 видов (22%), *Fabaceae* и *Lamiaceae* по 26 видов (12%), *Poaceae* - 18 видов (8%). В десятку родового спектра также вошли такие семейства *Rosaceae*, *Scrophulariaceae*, *Rubiaceae*, *Brassicaceae*, *Boraginaceae*, *Plantaginaceae*. Именно они входят в спектр ведущих семей Правобережной злаковой степи [3]. Следует отметить, что наибольшее количество видов Лысой горы принадлежит к многолетним травянистым растениям - 129 видов или 58,6% от общей численности, малолетникам - 75 или 34,1%, собственно малолетники – 7 видов, двулетников – 25 и однолетников – 43 видов. Так как на исследуемой территории были небольшие участки с древесной растительности то обнаружено 8 видов деревьев (3,6%) и 8 видов кустов и кустиков. Виды растений степного урочища распределяли по показателю экобиоморф и выяснилось, что к фанерофитам принадлежат 11 видов растений (или 5% от общей численности), к хамефитам - 4 (1,8%) видов, а именно *Rosa canina* L., *Rubus caesius* L., *Trifolium fragiferum* L., к гемикриптофитам - 123 (55,9%) видов, к геофитам – 7 (3%), к терофитам - 75 (34,1%) видов. И хотя доля гемикриптофитов на Лысой горе не большая, но при дальнейшем исследовании и сохранении данной территории, ее можно приблизить к состоянию естественного участка.

Таким образом, по результатам анализа биологического разнообразия исследуемой территории, этот участок можно отнести к полу естественному, который является эталонным для данного района исследования. Кроме того, это является основанием определить экологическую роль урочища для сохранения и распространения биоразнообразия фитобиоты агроландшафтов.

В Красную книгу Украины занесено 439 видов растений, среди них 136 растут в агроландшафтах, а 33 из них никак не охраняется [1]. На Лысой горе обнаружено на данный момент виды – *Stipa capillata* L., *S. lessingiana* Trin. & Rupr., *S. pulcherrima* K.Koch, *S. dasyphylla* (Czern. Ex Lindem.) Trautv. и *Platanthera bifolia* (L.) Rich., что убедительно свидетельствует о роли полуестественных территорий, которые являются источниками распространения видов в другие типы экосетевых коридоров как лесополосы, экотоны, долины рек и др.

Виды ковыля в этом урочище случаются только на отдельных участках. И если еще несколько лет их сообщества можно было встретить часто, то сейчас они встречаются очень редко. Для того чтобы сохранить разнообразие степного урочища, нужно следить за состоянием тех видов, которые входят в состав именно этой экосистемы, и сохранить те виды, которые составляют растительный покров данной территории.

Виды *Campanula cervicaria* L., *Carlina biebersteinii* Bernh. ex Hornem., *Centaurea pseudocoriacea* Dobroc., *Chamaecytisus lindemaniae* (V. Krecz.) Klaskova, *Euphorbia stepposa* Zoz, *Salvia aethiopsis* L., *Scabiosa ochroleuca* L., *Serratula brasteifolia* (Iljin. ex Grossh) Stank., *Stipa capillata* L., *Teucrium polium* L., *Veronica spicata* L. на участке встречаются в тех частях, которые почти не нарушены ни выпасанием, ни сенокосом, потому что большинство из них не являются питательными для скот. Становятся частыми компонентами *Achillea millefolium* L., *Arctium lappa* L., *Chondrilla juncea* L., *Cichorium intybus* L., *Hieracium pilosella* L., *Senecio vernalis* Waldst. et Kit., *S. vulgaris* L., *Tanacetum vulgare* L., *Taraxacum officinale* Web. ex Wigg. и др.

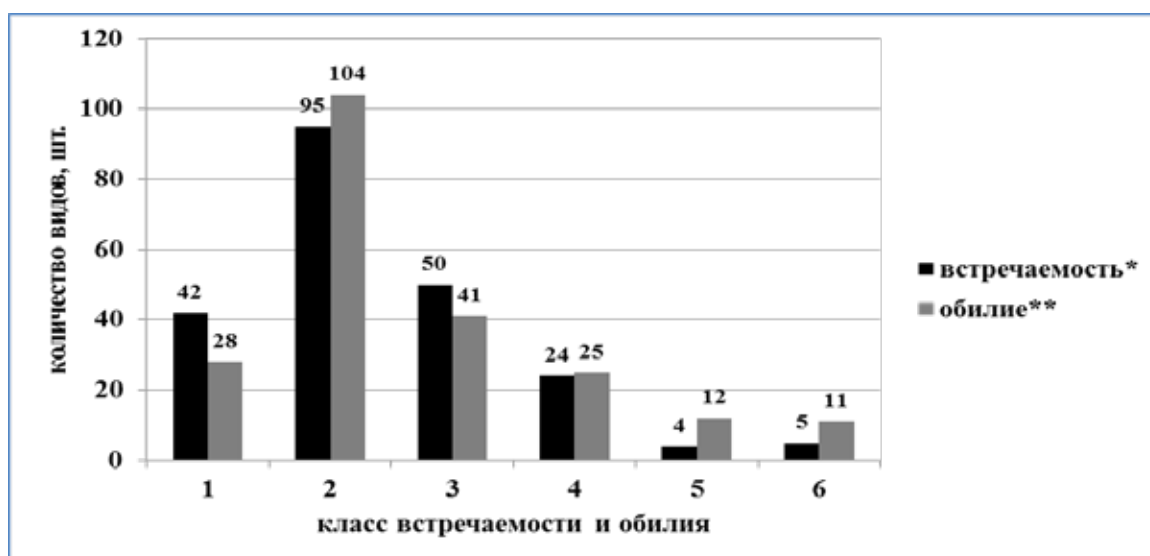
Эти виды встречаются вблизи дорог, в середине урочища имеются лишь единичные особи или куртины. Видовое богатство степного урочища пополняется еще и представителями рудерально-сегетальной фитобиоты, к ним относятся *Artemisia vulgaris* L., *Conyza canadensis* (L.) Cronq., *Convulvulus arvensis* L., *Onobrychis arenaria* (Kit.) DC., *Phalacrolooma annuum* (L.) Dumort., *Setaria glauca*

(L.) P. Beauv. Хотя этих видов не много, а их встречаемость и обильность низкая, они нарушают гармоничность степного сообщества.

Раннецветущие виды фитобиоты Лысой горы страдают больше всего, так как во время их цветения урочище часто охвачено пожаром. При этом уменьшились площади *Stipa capillata*, *S. lessingiana*, а также некоторые виды раннецветущих совсем исчезли, например, *Muscaria neglectum* Guss. ex Ten.

Кроме видового богатства равномерность и интенсивность распространения фитобиоты отражают такие экологические показатели как встречаемость и обильность.

Встречаемость определяется отношением численности описаний, в которых есть вид, к общей их численности в процентах. Среди исследованной фитобиоты 95 видов составляют самую высокую частоту встречаемости в степном урочище и относятся ко 2 классу встречаемости или 43,1% от общей численности (рис. 1).



Примечание: Класс встречаемости* 1 клас - < 5%; 2 – 5-20%, 3 - 21-40%, 4 - 41-60%, 5 - 61-80%, 6 клас - 81-100%. Класс обилия**: 1 – единичные растения на 1м², 2 - очень слабая (2-4 особей на 1м²), 3 – слабая (5-8 особей на 1м²), 4 – средняя (9-16 особей на 1м²), 5 – сильная (17-32 особей на 1м²), 6 – очень сильная (> 32 особей на 1 м²)

Рис. 1. Частота встречаемости и обилия видов фитобиоты в степном урочище Лысая гора

По классам обилия меньше видов относятся к 5 и 6 классам обилия. В основном это виды фитобиоты, которые образуют дернины. Больше всего видов во втором классе обилия 104 (или 47,3% от общей численности). Основная часть видов в этом классе относится в основном к малолетникам.

Таким образом, исследование состояния фиторазнообразия степного участка указывает на его роль, которая заключается: в сохранении фитобиотического разнообразия Правобережной Лесостепи; составе и улучшении состояния видового богатства степного урочища; распространении видов растений, относящихся к Красной книге Украины; урочище является путем миграции видов с одной среды в другую.

Проанализированы сведения дают возможность правильно оценить ту роль, которую степное урочище имеет, а именно как элементарной части региональной экосети так и основной источник биоразнообразия данному агроландшафту вообще.

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The Role of Leasing for Engineering Enterprises

Abstract: The paper studies the role and importance of leasing for engineering enterprises. The features of state support of leasing transactions considered, and the directions of government support of leasing for engineering enterprises products proposed.

Keywords: leasing, leasing transactions, enterprises, engineering industry, government financial support, industrial leasing fund.

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Роль лізингу для підприємств машинобудівної галузі

Анотація: Стаття присвячена дослідженню ролі та значення лізингу для підприємств машинобудівної галузі. У публікації розглянуті особливості державної підтримки лізингових операцій та запропоновано напрями державної підтримки лізингу для продукції підприємств машинобудування.

Ключові слова: лізинг, лізингові операції, підприємства, машинобудування, державна фінансова підтримка, промисловий лізинговий фонд.

Фінансовий стан багатьох вітчизняних промислових підприємств такий, що вони в більшості випадків не можуть придбати нове обладнання за рахунок власних коштів або одержати кредит під таку покупку. Одним із варіантів вирішення даної проблеми може служити лізинг. Згідно із Законом України № 723/97-ВР «Про фінансовий лізинг» від 16.12.1997 р. (ред. від 16.01.2004 р.) під лізингом розуміють вид цивільно-правових відносин, що виникають із договору фінансового лізингу, за яким лізингодавець зобов'язується набути у власність

річ у продавця (постачальника) відповідно до встановлених лізингоодержувачем специфікацій та розумів і передати її в користування лізингоодержувачу на визначений рядків не менше одного долі за встановлену плату (лізингові платежі) [1].

Дослідженням лізингового інвестування підприємств займались відомі зарубіжні (Х.-Й. Шпіттлер, Т. Кларк, Р. Брейлі, Л.-Дж. Гітман, В. Газман, Н. Адамова) та вітчизняні (М. Пастернак, І. Покотило, Б. Луців, А. Пересада) вчені. Проте досі недостатньо дослідженим залишається питання лізингового фінансування продукції інноваційних галузей промисловості, зокрема машинобудування.

Метою статті є визначення ролі лізингу для підприємств машинобудівної галузі.

Відповідно до світового досвіду лізингові операції цікаві саме тим, що вони стимулюють розширення виробництва, створення нових робочих місць, впровадження передових технологій. При лізингу різко підвищується попит на обладнання, тому його виробники зацікавлені у застосуванні подібного механізму, що дозволяє їм збільшити збут техніки з обмеженою ліквідністю. Отже, лізинг сприяє структурним перетворенням технологічної бази підприємств машинобудівної галузі.

Лізингові компанії в Україні, як правило, створюються: вітчизняними та іноземними банками; великими промисловими компаніями; державними структурами (національними, регіональними); виробниками обладнання та приватними особами.

Наприклад, ПАТ «Лізингова компанія «Украгромашінвест» утворено за участю 18 машинобудівних підприємств та одного дослідного інституту як акціонерів. Вона працює з 25 постачальниками обладнання й 20 лізингоодержувачами [2].

Механізм державної підтримки лізингових операцій у вигляді надання податкових й амортизаційних пільг має такі особливості:

- можливість пред'являти до вирахування з бюджету ПДВ з усієї суми лізингового платежу, до якого входить сума банківських відсотків, а також сума страховки обладнання;

- можливість уникнення податкового контролю при сплаті податку на прибуток у розмірі банківських відсотків, що сплачуються в складі лізингового платежу, у порівнянні з прямим банківським кредитуванням;
- можливість додаткової оптимізації оподаткування по податку на прибуток і ПДВ за умови обліку лізингового майна на балансі лізингоодержувача;
- лізинг вирішує проблему використання морально й фізично зношеного обладнання за рахунок застосування коефіцієнта прискореної амортизації. Багато видів металообробного обладнання включено до 4-ї групи класифікації груп основних засобів та інших необоротних активів і мінімально допустимих строків їх амортизації [3]. Майно, включене в цю групу, амортизується від 2 до 5 років. Тоді у договорі лізингу між лізинговою компанією й виробничим підприємством у розділі «Термін договору» буде зазначатись від 13 до 21 місяця. Це пов'язано з тим, що саме за цей строк лізингодавець має право повністю списати з балансу лізингове майно за рахунок його прискореної амортизації, та, зазвичай, саме це визначає тривалість договірних взаємовідносин. Механізм прискореної амортизації надає право списати в якості амортизаційних відрахувань до 35% первісної вартості основних фондів, термін служби яких більше ніж два роки, у перший рік експлуатації зазначених фондів. Це дозволяє, наприклад, при строку лізингу два роки й один день списувати на витрати в перший рік майже до 2/3 вартості лізингового майна. Таким чином, підприємство через 13 місяців одержує на баланс майже повністю амортизоване обладнання з мінімально можливою балансовою вартістю. Природно, що з верстатом для поперечно клинового вальцювання або з вертикально-кувальним пресом за 13 місяців нічого страшного не відбудеться, отже у розділі «Основні засоби» буде зазначатись майже новий виробничий засіб. Відповідно, податок на майно з вартості цієї групи обладнання підприємство платити не буде. Отже, лізинг металообробного обладнання є досить вигідною угодою для вирішення завдань по відновленню основних фондів і впровадження конкурентоспроможних технологій при виробництві затребуваного на ринку товару.

Лізингові операції вигідні для держави, тому що в умовах дефіциту бюджету вона зацікавлена в усьому, що стимулює економічний розвиток і при цьому не вимагає відвернення бюджетних ресурсів, та їх можна розглядати як ефективний інструмент легалізації доходів у галузі: лізингова компанія за легальною

ціною закупає обладнання, бере його на баланс і передає для роботи лізингоодержувачу. Лізингоодержувач може легально створювати прибуток і при цьому платити на нього податок.

Відповідно до закону України від 6 вересня 2012 р. № 5205-VI «Про стимулювання інвестиційної діяльності у пріоритетних галузях економіки з метою створення нових робочих місць» передбачається державна підтримка інвестиційних проектів, зокрема лізингових, які відповідають таким критеріям [4]:

1) загальна кошторисна вартість перевищує суму, еквівалентну: 3 млн євро – для суб'єктів великого підприємництва; 1 млн євро – для суб'єктів середнього підприємництва; 500 тис. євро – для суб'єктів малого підприємництва;

2) кількість створених нових робочих місць для працівників, які безпосередньо задіяні у виробничих процесах, перевищує: 150 – для суб'єктів великого підприємництва; 50 – для суб'єктів середнього підприємництва; 25 – для суб'єктів малого підприємництва;

3) середня заробітна плата працівників не менш як у 2,5 раза перевищує розмір мінімальної заробітної плати, встановленої законом на 1 січня звітного (податкового) року.

На наш погляд, державна позиція відносно лізингу має передбачати оптимальну комбінацію фіскальної та кредитної політики при розробці умов отримання державних кредитів з урахуванням інтересів усіх учасників лізингової угоди. Проте лізингових компаній, які працюють за схемами державного лізингу або реально користуються державною підтримкою, на даний момент небагато – вони присутні тільки в АПК (ПАТ «Національна акціонерна компанія «Укграгролізинг», ПАТ «Лізингова компанія «Укграгромашінвест»), в авіаційній галузі (ПАТ «Укртранслізинг»), в автомобільній галузі (ДП «Автомобільна лізингова компанія», ДП «Надра-Сервіс») та в енергетиці (ДП «Променерголізинг»).

Державна підтримка лізингу для машинобудівної продукції може здійснюватися в такий спосіб:

- розробка державної цільової програми розвитку лізингової діяльності як частини програми середньострокового й довгострокового соціально-економічного розвитку України;

- участь держави або уповноважених нею організацій у статутних капіталах лізингових компаній;

- пайова участь державного капіталу у створенні інфраструктури лізингової діяльності в окремих цільових інвестиційно-лізингових проектах;
- компенсація лізингоодержувачу частини платежів, наприклад, відсоткових ставок по залучених позикових коштах;
- надання інвестиційних кредитів для реалізації лізингових процесів;
- виділення цільових кредитних коштів споживачам техніки через мережу державних банків на умовах лізингу; при цьому споживач одержує право вибору постачальника техніки та обладнання.

Однією з форм реальної державної підтримки розвитку лізингових відносин у машинобудуванні слід розглядати створення промислового лізингового фонду державного (регіонального, міського) рівнів, а також вважається перспективним формування галузевого промислового лізингового фонду. Головним завданням промислового лізингового фонду є створення умов у галузі, місті, регіоні, державі, за яких кожне підприємство зможе вирішувати питання технологічного переозброєння.

Основними функціями промислового лізингового фонду мають бути:

- створення інформаційної бази даних прогресивного машинобудівного обладнання;
- консультування лізингоодержувачів щодо вибору конкурентоспроможного обладнання (у той час як лізингові компанії просто закуповують обладнання відповідно до замовлення клієнта);
- захист інтересів вітчизняних виробників обладнання, надаючи більш вигідні умови лізингової угоди при купівлі продукції вітчизняних машинобудівних підприємств;
- сприяння розвитку кооперації вищих навчальних закладів, галузевих інститутів і промислових підприємств при розробці інноваційного обладнання відповідно до потреб замовника;
- оптимізація фінансових умов лізингових операцій: регіональний промисловий лізинговий фонд може взяти на себе компенсацію різниці між величиною процентних ставок державних й регіональних (місцевих) кредитів, що дозволить активізувати ще дуже пасивний регіональний ринок промислового обладнання.

При реалізації заходів щодо підтримки лізингової діяльності слід зазначити, що в сучасних умовах надходження безповоротних коштів бюджету безпосе-

редньо у державні лізингові організації необхідно поступово згортати, здійснюючи перехід до використання коштів бюджету для наповнення фондів (лізингових), які працюють на комерційній основі, приносять прибуток у бюджет.

Основним за значущістю питанням розвитку лізингу в Україні є наявність надійних гарантій, що скорочують фінансові ризики, на які можуть наражатись учасники лізингових операцій. Для лізингодавців важливе одержання гарантій своєчасного повернення лізингових платежів, страхового захисту від втрат у результаті невиконання зобов'язань, які виникли внаслідок тимчасової або повної неплатоспроможності лізингоодержувачів.

У більшості випадків необхідним є залучення гарантів лізингових угод, які за свою частку ризику одержують відповідну винагороду. Можливий такий склад гарантів лізингової угоди: продавець обладнання; лізингодавець; банк-гарант; банк-кредитор; страхова компанія; державний та регіональні фонди сприяння розвитку лізингу; державний та регіональні органи виконавчої влади.

Механізм державного забезпечення ризиків слід розглядати на двох рівнях: регіональний та державний.

При регіональному механізмі гарантими інвестицій є регіональні органи влади та агентства із страхування інвестицій. Джерелами надання гарантій при регіональному механізмі виступають бюджет розвитку регіону, кошти регіональних організацій із страхування й гарантування інвестицій, регіональні заставні фонди.

При державному механізмі гарантування роль страхувальника мають взяти на себе органи державної влади за посередництвом державного органу із страхування інвестиційних ризиків, яким може стати, наприклад, Державне агентство із страхування інвестиційних ризиків. Крім того, при державному механізмі страхування можлива участь іноземних держав, різних міжнародних фінансових інститутів. Серед державних агентств, що здійснюють страхування фінансових ризиків лізингових операцій за участю іноземних партнерів, можна виділити COFACE (Франція), ECGD (Великобританія), Eximbank (США, Японія), OPIC (США), Euler Hermes (Німеччина), SACE (Італія).

Отже, у цілому темпи розвитку лізингових послуг в Україні досить високі та це дає підставу вважати, що лізингові угоди припинили бути пробним, експериментальним видом інвестування, як це було ще кілька років тому. У даний час лізинг стає потужним засобом довгострокового фінансування технологічного ро-

звітку промислових підприємств машинобудування, а також інструментом активізації товарного ринку. Стабілізація економіки України, нарощування обсягів промислового виробництва, значне зниження темпів інфляції сприятиме створенню об'єктивних передумов для розширення сфери застосування лізингу.

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Centro-peripheral mechanisms of territorial differentiation of innovation processes and development of small and medium enterprises

Abstract: Centro-peripheral mechanisms of territorial differentiation of regional systems to promote innovation and entrepreneurial processes are considered in article. The features of the formation of their place and role in the process of generating and using knowledge and technology are identified. The role of regional factors of innovation development, radically transforming the nature and mechanisms of increase the territories competitiveness is shows.

Keywords: centro-peripheral mechanisms, territorial differentiation, innovation and business processes, small and medium enterprises.

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Центро-периферийные механизмы территориальной дифференциации инновационных процессов и развития малого и среднего предпринимательства

Аннотация: В статье рассмотрены центро-периферийные механизмы дифференциации региональных инновационных систем. Определены особенности формирования их места и роли в процессе генерирования, трансфера и использования знаний и технологий. Показана роль региональных факторов инновационного развития, кардинально трансформирующих природу и механизмы повышения конкурентоспособности малого и среднего бизнеса.

Ключевые слова: центро-периферийные механизмы, территориальная дифференциация, инновационные процессы, малое и среднее предпринимательство.

Постановка научной проблемы и ее значение. Происходящее в настоящее время качественные перемены в территориальных образованиях вызываются глубокими изменениями в условиях развития малого и среднего предпринимательства, его природе и механизмах осуществления. Данные процессы сопровождаются формированием новой системы взаимосвязанных драйверов, вызванной резким расширением возможностей инновационного развития предпринимательских структур и территорий в результате все возрастающей значимости знаний и инноваций в повышении производительности экономической деятельности и создании устойчивых конкурентных преимуществ.

В настоящее время, несмотря на большое число работ, посвященных проблеме развития инновационных процессов и предпринимательских фирм в регионах, ее исследование остается актуальным, данный процесс является весьма сложным и противоречивым; многие аспекты недостаточно разработаны.

Анализ исследований проблемы. Теоретические основы механизмов территориального развития предпринимательства одним из первых рассмотрел А. Маршалл, который показал наличие агломерационных эффектов [1]. На про-

тяжении XX в. наблюдается значительный рост исследований в этой области. Для понимания процессов формирования территориальных механизмов инновационного развития малого и среднего бизнеса важными являются работы, в которых исследованы закономерности и современные изменения в организации инновационных процессов в регионах.

Для анализа циклических механизмов взаимодействия технологических и институциональных изменений в рамках теорий длинных волн важное значение имели работы Г. Менша, разделившего нововведения на базисные и улучшающие [2], Дж. Доси, исследовавшего процессы формирования технологических траекторий [3] и К. Переса, который ввел понятие технико-экономической парадигмы [4]. Формирование современных механизмов инновационного развития предпринимательства в регионах связано с переходом от линейной модели к нелинейной, предложенной К. Фрименом [5], С. Клайном и Н. Розенбергом [6], Лундвеллом [7] и др. Трансформацию и новые функции университетов, бизнеса и государства, а также изменяющийся характер их взаимодействий при формировании инновационной деятельности в регионах описывает модель тройной спирали [8].

Для уяснения механизмов формирования конкурентных преимуществ малого и среднего предпринимательства в регионе важными являются исследования, выполненные Й. Шумпетером [9], И. Кирцнером [10], П. Друкером [11] и др. В настоящее время среди теорий менеджмента, различным образом интерпретирующих формирования устойчивых конкурентных преимуществ предпринимательских фирм, особую значимость имеет концепция динамических способностей, предложенная Д. Тисом, Г. Пизано, Э. Шуеном [12].

Однако в настоящее время малое и среднее предпринимательство ещё не превратилось в целевой объект управления при определении механизмов достижения конкурентных преимуществ региона. В связи с этим требуется разработка теоретико-методического инструментария, позволяющего реалистично описывать механизмы инновационного развития малоразмерного предпринимательства в регионах с учетом его отличительных особенностей.

Цели и задачи статьи. Цель статьи – на основе анализа и систематизации сложившихся теорий разработать уточненную методологию, позволяющую предложить целостное видение решения проблемы формирования центрально-периферийных механизмов дифференциации территорий и инновационного

развития предпринимательских фирм. В соответствии с представленным в статье подходом будут показаны основные эффекты (экстерналии) территориальной концентрации экономической деятельности, типы региональных моделей инновационного развития малого и среднего бизнеса, а также особенности детерминации территориальных факторов.

Изложение основного материала и обоснование полученных результатов исследования. Для конструирования целостного видения процесса формирования механизмов развития малого и среднего предпринимательства в регионах важно исходить из того, что особенности региональных систем обуславливаются их делением на разные типы под влиянием различий во внешних и внутренних условиях, отражающих характер участия территории в генерировании и тиражировании инноваций, а также своеобразие места и роли малого и среднего бизнеса в экономическом развитии.

В зависимости от особенностей взаимодействия формального и неявного знания в рамках нелинейных инновационных процессов возникают географические центры, в которых бизнес обладает высоким инновационным потенциалом и динамично развивается в силу благоприятных условий, а также периферийные и полупериферийные территории, которые трансформируются во многом благодаря диффузии нововведений в бизнес-процессы.

Формирование конкурентных преимуществ предпринимательских структур в регионе складывается под влиянием эффектов масштаба территориальной концентрации экономической деятельности, выступающих проявлением кумулятивных и синергетических эффектов. Свообразие детерминации территориальных факторов реализуется в трех типах экстерналиев: 1) эффекте, вызванном природно-географическими факторами; 2) агломерационном эффекте, включающим в себя эффекты локализации и урбанизации; 3) инновационно-территориальном эффекте, обусловленном влиянием нематериальных факторов и интеллектуализации территориального развития на генерирование, диффузию и использование знаний и технологий [13]. Как свидетельствует мировой опыт, в ходе эволюции индустриальных экономик в формировании конкурентных преимуществ территорий усиливается роль региональных факторов инновационного развития, кардинально трансформирующих природу и механизмы повышения конкурентоспособности территорий, утрачивают свою прежнюю значимость эффекты масштаба крупных предприятий и важным становятся ак-

тивное взаимодействие бизнеса с государственных, научными и образовательными организациями.

В результате центрo-периферийной дифференциации инновационных процессов возникают три типа региональных моделей. Модель первого типа – это регионально ориентированная модель инновационного развития территории. Она предполагает удовлетворение преимущественно региональных потребностей в инновациях при незначительном участии университетов как производителей знаний. Модель второго типа – национально ориентированная модель предусматривает удовлетворение национальных потребностей и потребностей международных рынков в инновациях. В этой модели особую значимость приобретают фундаментальные исследования в университетах и организациях, которые активно взаимодействуют с производителями знаний и инновационных фирмами других регионов. Модель третьего типа – регионально-национальная модель – ориентирована на удовлетворение региональных и национальных потребностей в инновациях; основными производителями инноваций являются как фирмы, так и университеты. Для этой модели характерно развитие исследований и разработок, обеспечивающих создание радикальных и улучшающих инноваций, инновационные фирмы активно взаимодействуют с университетами и фирмами этого региона.

Общий коридор траекторий территориального развития предпринимательства задается неравномерными технико-экономическими процессами, жизненный цикл которых имеет внутреннюю логику и объективные границы. Возникающие при этом колебания инновационной активности предпринимательских фирм генерируются особенностями территориальной комбинацией технологических, культурно-ценностных, институционально-организационных и цикло-темпоральных факторов и сопровождаются соответствующей трансформацией территориальной структуры экономики, состава и соотношений факторов экономического роста.

Сегодня переход к новой фазе технологического развития и формирование конкурентных преимуществ в странах Запада напрямую связывается с неoиндустриальной парадигмой обновления экономики [14]. Реиндустриализация становится ключевым трендом, предусматривающим интеллектуализацию производства, поддержку приоритетных направлений развития науки и техники, системы подготовки кадров, а также стимулирование инноваций и процессов воз-

ращения в страну рабочих мест, активного включения в эти процессы малых и средних предприятий.

Выводы и перспективы дальнейшего исследования. Бурный рост активности малого и среднего предпринимательства практически во всех отраслях реального сектора и его перемещение с периферии экономического развития потребовали качественной переоценки значимости малых и средних форм хозяйствования, переосмысления их роли и функций. Исследование проблем формирования территориальных механизмов инновационного развития малого и среднего предпринимательства в регионах позволяет сделать вывод о том, при выборе территориальной системы важно использовать подходы, позволяющие адекватно оценивать место и роль региона в процессе генерирования, трансфера и тиражирования знаний и технологий.

Положения, выдвинутые в статье, могут быть использованы для разработки и реализации комплекс мер, обеспечивающих инновационное развитие малого и среднего предпринимательства региона и его эффективную интеграцию в региональную, национальную и глобальную экономику.

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The organization of PR-process in sphere of education: foreign and Ukrainian practice

Abstract: The article has been researched the structural elements of PR-process in leading US universities (Harvard, MIT, Princeton University, Columbia University). It was found that measures of public relations are subordinated to the unified strategy that meets the overall strategy of the university development. Based on the analysis of international experience it has been determined the direction of improving the PR-communications in Ukraine.

Keywords: PR-process, PR-technology, communication, image, reputation, media relations.

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Організація PR-процесу в освітній сфері: зарубіжний та вітчизняний досвід

Анотація: У статті досліджено структурні елементи PR-процесу в провідних ВНЗ США (Гарвардський університет, Массачусетський технологічний інститут, Принстонський університет, Колумбійський університет). З'ясовано, що заходи зі зв'язків із громадськістю підпорядковані єдиній стратегії, яка відповідає загальній стратегії розвитку університету. На основі аналізу закордонного досвіду визначено напрямки покращення PR-комунікації в Україні.

Ключові слова: PR-процес, PR-технології, комунікація, імідж, репутація, медіарилейшнз.

Виділення PR як окремого напрямку діяльності вищих навчальних закладів історично було обумовлено тими ж причинами, що і формування паблік рилейшнз як окремої функції будь-якої організації загалом. Перші приклади діяльності ВНЗ, яку можна розцінювати як таку, що відноситься до сфери паблік рилейшнз, можна виявити ще в 1641 р., коли Гарвардським університетом був виданий памфлет під назвою *New England's First Fruits*, метою якого був збір коштів в Англії [1]. У США Мічиганський університет вже в 1897 р. заснував окремий відділ з PR. У 1900 р. Гарвардський університет використовував для набору студентів бюро пабліситі, а в університеті штату Пенсільванія в 1904 р. з цією метою був створений власний офіс пабліситі. Вже з 1930-х рр. паблік рилейшнз склалася в США як самостійна функція менеджменту. У великих університетах з'явилися посадові позиції віце-президента (проректора) зі зв'язків із громадськістю. У 1974 р. відбулося значуща подія – злиття Асоціації PR американських коледжів та Американської ради випускників. У результаті було утворено Раду з розвитку та підтримки освіти, яка об'єднує близько 3200 коледжів, університетів та інших освітніх установ. Через десять років, в 1986 р., аналогічне об'єднання з'явилося і в Європі – Європейська асоціація університетських фахівців з PR та інформації; загальна кількість її членів в грудні 1999 р. склала 224 ВНЗ [2].

Менеджмент ВНЗ за кордоном сьогодні немислимий без управлінської функції PR. Так, на веб-сторінці офісу віце-президента з комунікацій Мічиганського університету перераховано напрямки діяльності, яка «спрямована на зміц-

нення репутації Університету Мічиган» («all designed to enhance the reputation of the University of Michigan»): брендування та підтримка бренду; планування комунікацій; розробка креативних концепцій; кризові комунікації та вирішення проблем; виробництво відео і фільмів; графічний дизайн та ілюстрації; внутрішні комунікації; маркетингові кампанії і матеріали; тренінги із зв'язків з медіа; новинні релізи, ролики і соціальні медіа; підготовка та редагування письмових матеріалів [3].

У навчальних закладах США PR-діяльність розглядається як частина маркетингової стратегії організації. Дослідники відзначають, що ця галузь вимагає розвитку й нового розуміння з боку керівництва самих навчальних закладів. Так, Річард Хізел (Richard A. Hesel), співробітник компанії, що спеціалізується на маркетингу та стратегічному плануванні для коледжів, зазначає, що тільки близько 40% учасників конференції, організованої Радою з розвитку та підтримки освіти (Council for Advancement and Support of Education), що займаються зв'язками з громадськістю й маркетингом, відзначили, що в їхніх організаціях є стратегічний план, або, принаймні, сукупність стратегічних цілей, які можуть служити орієнтиром у здійсненні маркетингової діяльності закладу [4]. Для створення ж ефективною моделі PR-процесу у сфері освітніх послуг в Україні вважаємо необхідним розглянути особливості його організації у провідних ВНЗ США: Гарвардському університеті, Массачусетському технологічному інституті, Принстонському університеті, Колумбійському університеті. Ці ВНЗ займають провідні позиції в міжнародному рейтингу Webometrics [5].

Гарвардський університет (перше місце в рейтингу Webometrics) – найстаріший з усіх північноамериканських університетів, заснований в 1636 р. Гарвардський відділ зі зв'язків з громадськістю і комунікацій (Harvard Public Affairs & Communications, HPAC) є сполучною ланкою між університетом і його аудиторіями, партнерами та зацікавленими сторонами. HPAC також управляє Центром інформації та публікує Гарвардський бюлетень. Структура гарвардського відділу комунікацій відрізняється від багатьох інших американських ВНЗ – тут кожен факультет має власний PR-відділ. Крім факультетських Communication Offices функціонує 30 підрозділів із комунікацій та зв'язків із громадськістю, основні серед яких: Media Relations; Harvard Gazette); Photo Services; Digital Strategy; Harvard Information Center; Federal Relations; Community Affairs; Harvard Library; Harvard Art Museums; University Departments of Athletics; Harvard Museum of

Natural History; External Relations; Nieman Foundations for Journalism at Harvard. Взаємодія між цими відділами дозволяє всій структурі діяти ефективно й цілеспрямовано [6].

Массачусетський технологічний інститут (MIT) – один із найпрестижніших технічних навчальних закладів не тільки в США, але й у світі; заснований у 1861 р. (друге місце рейтингу). Управління комунікаціями складається з 10 підрозділів, кожен із яких за обсягами й сферою діяльності має міжнародне значення. Місія Audio Visual Services Central полягає у забезпеченні технічної підтримки й презентації всіх видів діяльності інституту. Центр проводить більше 11 тисяч заходів на рік. Communications Advising надає послуги із: консультування зі стратегій маркетингових комунікацій і соціальних медіа, електронний маркетинг і дизайн, а також планування для веб- і друкованих проєктів. MIT Copytech займається цифровим друком, графічним дизайном, інтернет-рекламою, онлайн-сервісами. Reference Publications займається публікаціями книг і каталогів MIT, комунікаційними форумами, факультетською розсилкою, новинними агентствами. MIT Press – великий центр в університеті, якому вже понад 50 років, публікує близько 200 нових книг і більше 30 журналів на рік із різної тематики, активно використовуючи нові технології. MIT Technology Review – інноваційна, онлайн-орієнтована глобальна медіакомпанія, завдання якої полягає в визначенні новітніх технологій для практичного застосування; включає також видавничий центр і службу з виробництва контенту [7].

Прінстонський університет – приватний дослідницький навчальний заклад, четвертий за віком у США, був заснований у 1746 р. Місією Прінстонського управління комунікаціями є підвищення репутації університету шляхом розробки і реалізації чіткої, послідовної і привабливої стратегії, підвищення суспільного розуміння цінностей університету, створення і публікації матеріалів про заклад. Управління складається з чотирьох відділів: керівний відділ забезпечує стратегічне планування комунікаційних процесів; відділ PR займається громадськими відносинами, включаючи місцеві, національні та міжнародні ЗМІ; редакційно-новинний відділ генерує контент для всіх ЗМІ університету, включаючи соціальні мережі і сайт; відділ веб- і візуальної комунікації займається дизайном, відео, мультимедіа, електронними виданнями і фото [8].

Колумбійський університет – заснований у 1754 р, як Королівський коледж. Це найстаріший університет у штаті Нью-Йорк і п'ятий за віком у США. До Управління комунікаціями й громадськими відносинами (The Office of Communications and Public Affairs) входять: прес-центр (включаючи віртуальні прес-кімнати); підрозділи стратегічних комунікацій, фотовідділ, веб-підрозділи, креативний відділ (відповідає за всю рекламну продукцію, друк і дизайн), експертний відділ і центр відвідувань, що займається прийомами голів держав, чиновників, вчених, а також керівників галузей для обговорення широкого кола питань [9].

PR-діяльність навчальних закладів розглядається як частина маркетингової стратегії організації. Ми проаналізували структурну організацію PR-діяльності провідних університетів США (Гарвардський університет, Массачусетський технологічний університет, Прістонський університет, Колумбійський університет). За словами PR-фахівців цих ВНЗ, спектр завдань, що стоять перед ними, дуже широкий, і розгалужена структура PR-відділів відповідає цим завданням. Всі заходи зі зв'язків із громадськістю підпорядковані єдиній стратегії, яка відповідає загальній стратегії розвитку університету загалом. Усі заходи з розвитку університету знаходять відображення в стратегії і планах відділу, що займається зв'язками з громадськістю. Закордонні ВНЗ велику увагу приділяють веб-присутності закладу. Обов'язком PR-відділів є представлення всіх сильних аспектів університету в мережі Інтернет, зокрема на веб-сайті закладу. Відзначаємо високу активність ВНЗ у соціальних медіа. В університетах є окремі команди з цифрової присутності (digital engagement teams), що займаються менеджментом інформації в соціальних медіа й керуються у своїй роботі окремим планом роботи в соціальних медіа.

У нашій країні також все більш актуальним у контексті конкурентної ситуації на ринку освітніх послуг стає розвиток зв'язків із громадськістю в сфері освіти. У системі вищої освіти України сьогодні склалася конкурентна ситуація боротьби за абітурієнтів між 803 вищими навчальними закладами усіх рівнів акредитації та форм власності. Посилення конкурентних тенденцій на освітньому ринку зумовлює необхідність перманентної інноваційної діяльності навчального закладу, підвищення якості надання ним освітніх послуг, постійного підтвердження власного права на існування. Аналогічність навчальних програм у закладах освіти зумовлює те, що вони мають знаходити можливості проявити власну ін-

дивідуальність щодо надання освітніх послуг іншими шляхами. Використання в управлінні життєдіяльністю ВНЗ маркетингового підходу, однією зі складових якого є формування сприятливої громадської думки, може стати виходом у такій ситуації.

Враховуючи ефективні моделі PR у сфері освіти за кордоном, ми виявили певні вимоги до організації PR-процесу у ВНЗ: необхідність наявності в організаційній структурі ВНЗ спеціального адміністративного підрозділу, укомплектованого кваліфікованими фахівцями, які здатні креативно, грамотно й ефективно здійснювати відповідну діяльність; наявність у ВНЗ чітко визначеної маркетингової та PR-стратегії, що відповідає стратегічному плану з довгострокового розвитку університету, а також критеріїв оцінки успішності реалізації даної стратегії; наявність відповідного фінансування для реалізації PR-проектів.

Вивчення закордонного досвіду структурування PR-процесу є цінним для створення ефективної моделі PR у сфері освітніх послуг в Україні та окреслює перспективні напрямки подальших досліджень.

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Urine therapy

Abstract: Not render on an organism any harm, and on the contrary is of use only. Urine therapy not news, and, on the contrary a method of treatment which passes from generation in generation since ancient times.

Keywords: urine distillate, an urine, urine therapy, bi distillate, three distillate.

A great comedian Ed Uinn (USA, state Philadelphia, 1886-1966) said: "If there is not a health that your riches are nothing. The great feasancess of people - does not mean that he is healthy and happy. The value and place have money and property in our life, but to the large account of know - nobody will be able you will return the lost health. Illness, dirt is accumulated in our organism will plunge you in the ocean depth of endless illnesses yet more cruel, than previous, and it results in death "It is needed to understand simple truth, that human organism - the system is self-restoring. And, cured, and move away death, will clean an organism from exhaust and sickly energy that constantly appears and creates terms, for sickly processes, violations in an organism - it is needed to engage urine therapy. Urine therapy yet known from ancient times and uses a mass appeal and till today.

In medicine there is such gold rule: "not can- do not harm".

On this urine therapy: it is possible and needed to use as urine distillate (inward!) and urine oil (outwardly!) without what or harm for an organism. At distillation - there is intensive vaporization of urine, but different admixtures: of salt, metals, microorganisms remain. After this steam goes across through a cool tube condenses.

Now this clean urine, free of different radicals, and admixtures. Urine turning out by condensation going to the special capacity tiny - this process is named distillation.

Distilled urine is named by urine distilled. This urine an in 99.5 % is purged from different salts, of organic substances, of microorganisms, proteins and bacteria.

It is possible to use redistillate, three - distillate. These methods are considered yet more effective. It is known, that when we distil urine through a distiller, a boiling temperature arrives at 110-120° With, and when evaporated of urine it closes in a capacity remains 3-5 % liquids, that does not evaporate even at a temperature 160° With, is this Urine oil. Use of urinedistillate, urine oil does not render on an organism no harm, and vice versa is of only the use.

Urinatherapéia not news, and, vice versa the method of treatment, that goes across from generation in a generation from ancient times.

The roots of this methodology leave in a depth millenniums. A valuable source was 5000 ago written on urinatherapéia "Shivabucalp, that means in translation, "Practice of the use of urine for renewal of body". This book is included in famous "Damar Tantru". In her in form a dialogue between God Shiva and His wife Pārbati conversation is conducted about that as correct to use of urine therapy.

He describes a vessel that is suitable for Shiva (ambo-water of God of Shiva).

A vessel must be made from gold, silver, copper, bronze, composition-metal, zinc, clay of glass, bamboo, forest apple-tree, shell, bones, skins, and leaves. Further talked, that for the achievement of success practicing Shivambu, must be to restrain from salt, bitter and sharp food, eat light digestible food in a small amount, must not get tired physically, must own feelings and to sleep on naked earth.

Occupying of urine therapy must get up between of 3-4 o'clock of morning; turn a person east to urinate. The initial and last stream (portion) of urine is thrown out thus, and the middle gathers for drink.

Shiva recommends further, that tableware was clean, and here make a speech mantra: "Om Aum hreem amritodvheb amrita varshimy amrita kuru but matchmaker" - 7 times and, only after to have a drink [2].

Necessarily urine must be proper - it is a law of Shivabuthara, "Oh, Pārbati! That who drinks urine one time per a day and rubs her in a body in the flow of 3, finds a body complete force and brilliance, knowledge in art and sciences, finds skill in speech, and lives until exist on sky of star and Moon". Foremost, clearing and correct technique of the use of Shivambu, in the flow of 1 month results in elimination of innate illnesses and clearing of all organism. After 2 months, feelings are intensified.

After three months fully and finally destroys all illnesses. After five months the Devoted becomes a clairvoyant. Six months of continuous application of this

technique do a man reasonable and knowing Shastry (knowledge about the narrow area of science). After seven months a man becomes extraordinarily mighty, and after eight - he shines, as gold. After nine months the Devoted is forever freed from kshaya and kushtha. After ten months he becomes the depository of light. After eleven months all parts of his body becomes purely clean and brilliant. After a year he shines as a sun. After two years he urinates the element "of Earth"; after three years - by the element "of Water"; after four - "Fire"; after five - "Air"; after seven year - "Akhamkar" ("sense I") and after eight years - by the element "of Butthi" (Makhat), and all becomes subject to him in this order.

After nine years of the use of Shivambu he is released from birth and death. After ten years he gets possibility to move in skies without every effort. After twelve years he becomes immortal. A snake and other poisonous creatures cannot injure to him. Poison does not operate on him. He never can kill him. Afire he does not burn and in water does not sink".

In a past century a book "The Thousand remarkable things" went out in England, Scotland, Ireland in light, where recommendation of urinatherapéia is given from all illnesses.

Some fragments from this book [2]:

"Universal and excellent means from all external and internal disorders of health: at mornings to drink own urine in a flow 9 days. And she will cure scurvy, will do a body easy and glad. She well helps from hydropsy and icterus. By warm urine my the ears, she is good against a hearing loss and sonitus. Massage my by her ears, she takes off numbness, deletes cracks, scratches, straightens joints. Wash eyes own urine, she will cure illnesses of eyes, will fix sight.

Wash by her fresh wounds, helps surprisingly well. Wash the underbody of body; she well helps from piles, and other sores.

Not only humanity but also animals on the own instinct is cured, using the urine. Auved (Indian doctors) widely apply urine of cows and bulls at treatment of heavy diseases of liver [3].

They consider that human urine is considered the best antidote. In the indium of yoga systematic use the own urine. Therefore they look on many years younger. Urine stops bleeding well, diminishes a spleen (at splenomegaly). Also helps at the bites of Scorpio, hydrophobia, to the scab, psoriasis. In the urine therapy was the special place occupies labors of Armstrong.

From this book "Living water". Labors of Radjibkhay Manibkhay Patel are also known.

And very new information about urine therapy: it was proclaimed on a 1 international congress of vegetarians in Estonia. Specialist on starvation of G. A. Voitovich, spared the special attention to combination of starvation with urine therapy. It is needed to mark large labors of G.P. inlaid on urine therapy of Malakhov G. P. and Mijjan G. Z.

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Origin and Development of Accounting in Bulgaria

Abstract: This paper is dedicated to the problem of the origin and development of accounting and accounting legislation. The process of origin and development of accounting as a practical activity is examined of historical point of view. Special attention has been paid to the development of accounting legislation in line with trends in the regulation of accounting globally. Discussed are issues related to annual accounting statements, capital and reserves, evaluation of assets and liabilities and the relationship between accounting and tax legislation when determining the corporation tax due.

Keywords: accounting, accounting legislation, taxation, annual financial statement.

Similarly to other European countries, in Bulgarian lands initially simple accounting was applied. There is evidence, that such type of accounting, meeting the needs of ordinary traders (craftsman was applicable throughout the period of the Ottoman rule. It was made by keeping books (notebooks) by individual traders thus complying with the Turkish Commercial Law and following the experience and traditions existing in terms of keeping trade books [1].

Currently it is difficult to establish the point of time when double (systemic) accounting has been implemented in Bulgaria. It is assumed that this happened in the late XVIII and early XIX century. This is the period immediately after the Liberation from the Ottoman rule when simultaneously with the development of trade and crafts, the inquisitive Bulgarian merchant showed increasingly growing interest to double accounting. First, Bulgarian traders mastered double accounting using foreign literature because of the lack of specialized literature in Bulgaria. It is assumed that the first accounting book translated from a Bulgarian is a translation of the Guide to

Commercial Double Accounting issued in Vienna in 1843. This book, though being translated from a Bulgarian was issued in Greek, which during that time was widespread not only between Greek but also in large part of Bulgarian traders. The latter was done by purely commercial motives in order to ensure the faster marketing of the book.

The unusually great interest Bulgarian traders showed to the issues of double accounting created the need for issuing an accounting guide in Bulgarian. For such a guide is accepted Diplography or How to Keep the Trade Books of Stoyan and Hristo Karaminkovi Brothers, printed in 185 in Constantinople. It is believed that this was the first well-formulated Bulgarian book on the issues of double accounting. To write it they used mostly foreign literature as it can be argued that its printing marks the beginning of the literature period in Bulgarian accounting theory [2].

After the Liberation the first attempt at codification of accounting in Bulgaria started. The first Bulgarian Commerce Act and then some special laws regulating the keeping of trade books of Bulgarian entities were passed. At this stage of the legislative framework of accounting in Bulgaria largely reproduces the German legal system and offers solutions that match the level of development of the national economy. During this period, Bulgarian accounting was primarily aimed at meeting the information needs of the owner of capital, because in our country there was no clearly defined shareholding.

At the end 40s and the yearly 50s of the last century new societal relations based on the state ownership of the means of production were established Bulgaria. Public ownership on these means changed the nature of industrial relations in line with the development of productive forces. All this predetermines the change in the role and significance of accounting within the conditions of planned economic development. The information created by accounting means was not used for decision-making of different groups of users, but is focused to controlling and protection of socialist property, plan implementation and reducing the cost of production. In this stage of the development of the accounting in Bulgaria, accounting information was mostly used to make plans and forecasting future development of entities from various industries and supervising state entities within the national economy. The socialist state is the major user of the information from the financial statements, which often requires accountants in entities except for the elements of the financial statements, to compile many statistical and other statements which

necessarily had to be submitted to the relevant state authorities. This in turn led to reducing the role and importance of accounting, viewed in terms of its modern aspects as a source of information for making certain, and most often – investment decisions. When analyzing the development of accounting in Bulgaria during this period it should be noted that the accounting system in our country was fully consistent with the public relations of state property.

During the period since the early nineties, three stages of development of accounting in Bulgaria could be formulated.

The first stage, covering the period from early 1991 to the end of 1997. At this stage Bulgarian accounting legislation was closer the provisions of EU directives than the IAS. And this is quite natural, given the fact that until the fifties of the last century the Bulgarian trade (incl. accounting) legislation was strongly influenced by the German legal system. The practical implementation of the Accounting Act and the National Accounting Standards was accompanied by difficulties caused by many reasons such as:

1. Due to still prevailing state property, real users of the information from the financial statements were practically missing. The elements of the annual financial statements were still perceived as mere statistical forms which had to be completed at the end of the accounting period and submitted to tax administration and national statistics. The tradition of the past - the balance to be prepared according to a type balance scheme with previously indicated items where the accounting information had to be presented, was observed.

2. With the adoption of the new accounting legislation in our country, we passed from a more detailed regulation of all activities related to accounting to the implementation of the National Accounting Standards, which are too concise and mark only the main principles that must be followed when preparing financial statements. Everything else is decided by the professional judgment, experience and traditions existing in the accounting interpretation of commercial transactions.

The second stage covering the period from the early 1998 to the end of 2001. During this stage, a very important change in the national accounting legislation was made. This was a significant change which again was aimed at its harmonization with the requirements of IAS rather than those of the European directives. Although this was not done completely it could be said that since early 1998 a major step in this

direction was made. This change was necessitated due to the action of a number of reasons as the most notable of them are:

1. By the end of 1997, in Bulgaria there were already operating foreign companies and banks that required the accounting information to be presented on the basis of the principles set out in IAS not these set out in the European directives.

2. Significant number of privatizations were carried out in our country resulted in substantial changes in the ownership structure.

3. Capital market occurred and started to develop (though very weakly). The relevant normative regulations were adopted regulating its operation.

At this stage a number of accounting principles were regulated legislatively: true and fair representation, advantage to economic content over the legal form, operating entity, materiality, possible keeping of accounting policies (principle of consistency) and others. An opportunity was given the balance and profit and loss statement to be prepared in a bilateral or unilateral form (at the discretion of the entity), while maintaining the requirement their compilation to be performed by a type scheme, regulated by accounting legislation.

The third stage of reforming the accounting legislation in Bulgaria started in the early 2002 and continues today. With the changes in the effective legislation at the end of 2001, a decisive step towards adoption of IAS to be implemented in our country was made. A new Accountancy Act was developed as the issues of independent financial audit were regulated in a separate legislation. All national accounting standards were generally revised and were aligned with the requirements of IAS to maximum extent. This created prerequisites for the preparation of accounting practices to compile and submit financial statements of entities on the basis of IAS from the beginning of 2005. [3]. Subsequently (since yearly 2007), the formulation that only large entities should prepare financial statements according to international accounting standards and all others is to prepare their statements based on the National Financial Reporting Standards for Small and Medium-Sized Entities was accepted. The mandatory nature of the National Chart of Accounts dropped out. The later already has a purely advisory role. Thus entities were enabled to independently determine the system of accounts through which to implement their ongoing book-keeping.

Forms and content of annual financial statements. The annual financial statements of Bulgarian entities include the following elements: Balance Sheet, Profit

and Loss Statement, Cash Flow Statement, Statement of Changes in Equity and appendix [4] the balance sheet is drawn up in bilateral form. The bilateral form is based on the European concept of balance equation and has the form $\text{Assets} = \text{Liabilities} + \text{Equity}$. The profit and loss statement can be drawn in a bilateral form based on aggregate/expenditure (gross) one. The cash flow statement includes cash in receipts and payments for operating activities, investing activities and financing activities. It is used to assess the entity's ability to receive funds and use them in the most rational way. The statement of changes in equity is drawn up to examine the changes in the equity occurring as a result of the transactions and operation with the owners of the entity. It is drawn up in staggered pattern consisting with current accounting standards. The appendices to the statement contain: explanation of accounting policies; fixed assets statement, receivables and payables statement, securities statement, statement for participation in other entity's capital, interests' income and expense statement, financial results statement, statement of profit tax on temporary differences.

Accounting principles. With the Accountancy Act (effective since 01.01.2002) the accounting principles applied in the preparation of the annual financial statement and these in the current accounting were differentiated in accordance with the concept underlying in the IAS, the principles relating to the preparation of the annual statements and classified as essential (operating entity and current accrual). The current accounting should be conducted in accordance with the following principles: prudence; comparability between profit and loss; advantage of economic content over the legal form and possible retention of accounting policy (principle of continuity).

Valuation of assets. The valuation of assets can be examined from several perspectives: 1) evaluation of assets at their initial recognition; 2) evaluation of assets from their incorporation in use (mainly for inventories) and 3) potential for revaluation of assets in connection with the presentation of the annual financial statement. According to current legislation the entity's assets should be valued at their acquisition at their historical cost or another valuation under the accounting standards. Types of manifestation of the historical cost are the cost of acquisition, the prime cost and fair value. The acquisition cost is used in cases when the assets are acquired through the purchase of external enterprises. It can be defined as the sum of the purchase price and all necessary incremental costs incurred to bring the asset

to a normal condition for use. The prime cost is used to evaluate those assets which are created (produced) within the entity. It included all basic production costs without which the respective product would not be produced. The fair value is used for the valuation of assets that have been received by the entity for free.

With respect to the write-off of inventories at their incorporation into usage, effective accounting standards allow two approaches – recommended and alternative. The recommended approach allows the entity to choose one of the three possible ways for evaluation – specified costs, first in, first out cost and weighted average cost. The specified value method is to be considered major. This method is used mainly in cases where the consumption of inventories affects specific lots of production, projects or clients. When there are no conditions the method of specified value to be applied, the first in, first out or the weighted average cost methods are to be applied. In the first in, first out method (FIFO) inventories are written-off in the order of their entry in the entity. The weighted average cost method may requires to determine the weighted average value of each unit of inventory separately. This weighted average cost may be calculated at a certain period of time or after each new receipt of the corresponding inventory according to the accounting policies implemented by the entity.

When there are no conditions to apply the methods regulated with the recommended approach an alternative method to evaluate inventories in consumption is to be applied, i.e. the last in, first out method (LIFO). This method is usually used in an inflation economy and is characterized with this that the last delivered quantities of any inventory are used first in the production.

Tangible fixed assets of an entity are presented in the annual financial statement by their historical cost less accumulated depreciation (wear) and the accumulated impairment losses.

Regarding the evaluation of inventories, there are some characteristics related to their presentation in the financial statements according to the principle of prudence. Assets are to be recorded at the lower of cost than the purchase value (historical cost) or the net realizable value [5]. In cases where the net realizable value is lower than the purchase value, the measure is made according to this value as the difference is reflected in the composition of the current expenses of the entity. Otherwise, inventories are presented in the annual financial statement according to their purchase price.

Equity and reserves. The equity of the entity includes share capital, reserves and financial result. The equity is the capital formed in the incorporation of the enterprise and for capital companies (joint stock, limited liability companies and limited partnerships) it is subject to registration in court. In general, reserves are divided into those formed at the expense of the company's profit or otherwise, determined by legislation. The main purpose of the reserves formed at the expense of the company's profit is to cover losses from previous years. Reserves that are not covered at the expense of the profit are mostly formed in a subsequent measurement of long-term investment in the company.

The financial result may be profit or loss. Of interest is the negative financial result (loss). In the balance sheet it is presented with a negative sign in the capital section and shows how much a company's equity has been decreased during the reporting period.

Goodwill. Goodwill arises when the subject of the transaction is the purchase/sale of an entire company. It represents the difference between the price paid by the investor and the fair value of individual identifiable assets of the company subject to purchase. The goodwill can be positive or negative. A positive goodwill arises when the investor has paid a price higher than the fair value of the individual identifiable assets of the company acquired. A negative goodwill arises when the investor has paid a price lower than the fair value of the individual identifiable assets of the company acquired. It is represented in the asset of the balance sheet as a negative value.

Taxation. In Bulgaria there is a close relation between accounting and taxation. During the last years, the fact that bookkeeping should be done mainly with the purpose of protecting the interests of the owner of the capital rather than taxation is increasingly begun to be understood. In this meaning it should be noted that since the beginning of 1998 a separate Corporate Income Taxation Act regulating corporate tax liabilities of companies has been in effect. For tax purposes, the accounting financial result is subject to tax transformation resulting in a tax financial result, based on which the corporate tax due is determined.

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3. For some entities – banks, insurance, investment and social security entities and entities – issuers under the Public Offering of Securities Act, the obligation to apply IAS came into force on 01.01.2003.
4. Businesses which annual financial statements are subject to audit and certification by a chartered accountant (certified auditor) also draw out a management report including: credible statement about the activity and status of the entity; Important events after the annual closing of accounts; anticipated development of the entity; activities in the field of research and studies; the movement of shares in accordance with applicable law; other information at the discretion of the entity.
5. Net realizable value should be understood as the estimated selling price less costs necessary to complete the production cycle and costs necessary to make the sale.

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Conflictology of outsourcing

Abstract: Provides the other side of outsourcing interaction – the one of conflictology. The focus is on the relationship outsourcing process, inconsistencies, contradictions and conflicts.

Keywords: outsourcing, contradictions, conflicts.

Outsourcing has established itself as a successful form of interaction between big and small businesses [1]. In practice, along with the positive aspects of this cooperation arise certain risks [4]. Organization wishing to receive outsourcing services [2] establishes which suppliers are suitable partners and exchange information with them. Negotiate specific parameters. By creating competition between candidates contracting authority made its choice and outsource activities. A plan for the main sections and stages for implementation of outsourcing. Evaluate and verify the requirements specified in outsourcing projects [6] to specify the terms and penalties. The fact [3] that more than a third of outsourcing contracts are not renewed indicates the presence of frustration. Concept of interests and outsourcing [5]. The refusal of the organization from undertaking the relevant activity determines the demand of a contractor for its quality implementation - specialized organizations offer appropriate quality. Formed total outsourcing interest that determines the rapprochement between the client organization and the candidates take over. A common interest redirect the negotiations towards presenting the opportunities for potential contractors and detailed specification of outsourcing options. Any particular agreement jointly reached by compromise or consensus outsourcing enhances

cohesion between the customer and the supplier. Form is specific correlations between different but compatible interests - are forming mutual particular interest. Respectively any disagreement on specific parameters provoke the appearance of conflicting interests that cause misunderstanding and separation with most candidates. The organization selects customer service. The resulting agreement on the details of the transfer of the activity determines the consolidation between the parties regulated by the outsourcing contract [6].

Subjects of outsourcing controversy [3] outsourcing developer and contractor. According outsourcing process they proevyavat in case of contractual relations, vatreorganizatsionni contradictions of outsourcing client in relation to service delivery and performance of the contract.

1) The contradictions in the event of a contractual relationship between outsourcing customer and performers: only internal departments will deal with determining the need for service award their coordination and control of their implementation on the one hand and on the other, will be assigned an external organization which will play a greater part of these activities in collaboration with internal departments; expectations of economic organization on attractive offers to perform the services of external entities and possibilities of external organizations to meet expectations; expectations of candidates bidding proposals and actual offers. Dilemmas: Interior department has partial rights coordination and control in execution of specific activities - have full rights; when selecting candidates to use competitive form of selection - directly offer proven organization; in particular need of services to seek only one contractor - at least two; conducted the selection of outsourcing provider is objective - it is subjective; the interests of outsourcing customer / contractor in connection with the subject of the eventual contract are protected - they are not.

2) Intra-organizational contradictions of the client in connection with the operation of the services of the contractor occur mostly in the filing of structural units and accepting requests from internal department in collaboration with the outsourcing contractor. They are tied with the specifics of the particular application. Can be synthesized in the following total contradiction: The requirements of the contractor to the agreed regulations for the submission of requests for services, and the sponsor to meet these requirements on the one hand and on the other, the requirements of the contracting authority according to the agreed regulations on the adoption of

applications and opportunities contractor to accept these requests. Dilemmas: the application is filed on time - is not filed on time; Application procedure is followed - not complied with; application is made professionally - is not.

3) The contradictions in the performance of the contract are summarized in the following general: between the expectations of the contracting authority to operate the service on the one hand and on the other, the expectations of the performer to receive an appropriate reward. Dilemmas: the obligation is fulfilled on time - no; access to production provided adequate - not provided; payment is made on time - no.

In the process [6] on the implementation of the outsourcing agreement sooner or later arise discrepancies. They reflect the specific irregularities predetermining changes in pre-established arrangements. The very dynamics of outsourcing is perceived as a source of discrepancies. Arise outsourcing controversy related to the specific problematic inconsistencies. Outsourcing contradiction goes into degrees of conflict [7]: the occurrence of differences in interests and views on how to address the finding that there is unity in the views of the parties on the necessity of solving the problem; in polarization are separated extremely opposing views on the methods to resolve the discrepancy, but the unity of opinion about the necessity of solving it remains; clash is characterized by extreme disparity not only funds and bridging the gap, but also on mutual benefits. Destroyed specific mutual interest; antagonism - irreconcilability between the parties, leading to the breakdown of total outsourcing interest to the collapse of outsourcing relationships. The unity of opposites outsourcing and struggle of opposites in outsourcing odds are (relatively) balance, while outsourcing conflict struggle of opposites dominates outsourcing to outsourcing unity of opposites. Outsourcing conflict is certain socio-economic process, at its base lie outsourcing controversy. Outsourcing conflict incorporates the crisis in outsourcing relationships. It is inherent in its levels of confrontation and antagonism.

Outsourcing conflicts as a form of manifestation of the contradictions between outsourcing contracting and outsourcing contractor of a separate function or business process caused by different interests, goals and needs arise and are an integral part of the outsourcing relationship. Outsourcing conflicts [3] the type of controversy are three groups.

1) Conflicts in case of contractual relations. Conflicts arising based on the subject matter of the contract - basic conflictological areas are: the way of assignment by the contracting authority and consent of the contractor agree to perform all activities related to the provision of services; volume requested by the contracting authority and capabilities of the contractor to bear; requested by the contracting authority minimum turnaround time and service capabilities of the contractor to fit the demands interval. Conflicts arising on procedures for the award of activities - basic conflictological areas are: whether to be a monthly service plan and working hours; or forward plan on volume; or forward plan on the amount the contractor must develop; or accurate monthly plan amount means which the contracting authority must pay either the minimum or maximum for specified services under the contract. Conflicts arising on contract term. High prices of the services the purpose of contracting is the term of the contract to be as short options termination of his country and the desire of the artist is at a maximum. Conflicts arising from price fixing - the sponsor wants lower prices for certain services, but the other side is the opposite. Conflicts regarding the method of payment - for the contracting authority seeks to later payment, the contractor for the opposite. Disputes arise on how to pay and determine price changes to climate, exchange rate, changes in legislation, leading to an increase in tax payments, changes in the cost of consumables. Conflicts arising from the negotiation of rights and obligations of the parties. Arising in connection with the pursuit of information from side to side for access and control of the service; the right to commission and perform additional services; the right to reserve appropriate equipment necessary for the provision of the service; authorizing third parties regarding the ordering and implementation of service; for issuing the necessary documents for proper rendering service; compliance with the rules of industrial safety and labor protection; control and compliance with statutory requirements to ensure healthy and safe working conditions; for any emergency, as well as violations of third parties, hindering the provision of the service. Conflicts arising in determining liability for breach of any provision for contractual obligations. Conflicts arising from pressure from senior managers or structures to contract despite unfavorable conditions in the country.

2) Conflicts in the performance of the contract on the quality of service; the timely implementation of the task; by untimely filing of the service; conflicts based on internal conflicts in one of the contracting parties (strikes, etc.); Conflict of force

majeure requiring urgent provision of service and inability to perform by the contractor.

3) Organizational internal conflicts of outsourcing client in connection with the delivery of services by outsourcing contractor. These are conflicts caused by inefficient coordination of the work of providing service between IAD and outsourcing contractor, on the one hand and on the other, the individual structural units of the outsourcing company.

Outsourcing conflict is a clash occurring when the behavior of outsourcing contracting or outsourcing contractor blocking behavior outsourcing contractor or outsourcing entity regarding outsourcing a function or process. Participation outsourcing partner in conflict is determined by the importance to him of goals and on how emerging obstacles preventing them realized.

Reasons [3]: finiteness of resources; differences in objectives, values, methods of conduct skill levels; misallocation of responsibilities; poor communications; failure of arrangements.

General theory of conflict [9] to answer the traditional questions of strategy and tactics in solving conflicts. It clearly identified the stages of the analytical process (revealing the nature of the unmet needs, mutual search of acceptable structures in the relationship satisfying these needs) and the end result, ie the timing of completion of the conflict, when achieving mutual satisfaction of the respective needs of the parties and creating a new relationship of partnership.

Disregarding predkonfliktniya stage of the subjects of management in most cases leads to a late managerial impact, impossible to control and regulation. Managerial impact on the conflict process should take into account not only the stage of its development, but also to contribute to the effective transformation of the conflict. The regulation of the conflict only returned in opposition predkonfliktniya stage. It does not solve the conflict, but only postpones the time of its re-occurrence.

Conflicting calls for the transformation of cooperation in the aspect of reconciling differences between countries by opening new mutual advantage. Outsourcing conflict as a sort of interagency conflict can be interpreted as a social process outsourcing, consisting of the respective periods and phases of development. Such an examination allows you to create various models [8] management related korektsiya behavior of participants in the conflict outsourcing and timely intervention of management, staging of disputes and discussions, if the

conflict has pozitivna focus. This allows you to specify the stages in which the conflict can be mitigated and adjusted to prevent its deployment.

Conclusion: The development of outsourcing the conflict goes through certain stages. Each of them is able to provoke a change in the behavior of conflicting, it can satisfy the claims and consensus, and may deepen the rift. Understanding and reflection characteristics of each conflict outsourcing and analysis of their specific characteristics are the way to their master and solve [7]. The opening of constructive countries **predkonfliktnite** situations is a key competence **konfliktologichna** giving heuristic information arising outsourcing issues and aspects of their solution.

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Humanities & Social Sciences

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How Teachers Perceive Their Classroom Environments and Student Goal Orientation: a Look into High School Biology Classrooms in Kenya

ABSTRACT

Aims: To examine teachers' and observers' perceptions of classroom climate and goal orientation in high school biology classrooms in Kenya.

Study Design: A mixed design utilizing quantitative and qualitative approach.

Place and Duration of Study: A boys' and girls' boarding high schools in Kenya, observed between May and July of 2010.

Methodology: Participants included 12 biology teachers from two same sex boarding high schools (5 females, 7 males).

Results: Tests of means and t-tests showed that male teachers perceived themselves to be supportive, $t(10) = 3.76$, $p = .01$, $d = 2.201$ and innovative, $t(10) = 2.93$, $p = .05$, $d = 1.882$. Male teachers also reported greater school and classroom performance goals. Observers reported significant differences in the classroom climate and goal orientation, where they saw the girls' classrooms to be more innovative, $t(10) = 5.10$, $p = .01$, $d = 2.125$, high in order and organization, $t(10) = 3.10$, $p = .01$, $d = 2.200$ and affiliation. They also found teachers in the boys' school to be more supportive, $t(10) = 2.41$, $p = .02$, $d = 1.809$.

Conclusion: Male teachers perceive themselves to be more supportive and innovative. Observers see girls' classrooms to be more innovative and well organized.

Keywords: biology classrooms; classroom climate; goal orientation.

1. INTRODUCTION

Teachers do not choose their classrooms. However, they do have control over the kind of classroom climate they construct with their students and the kinds of instructional practices they utilize. The classroom environment shapes teachers' relationships with their students, and students' relationships with each other and with classroom concepts. Teachers often speak of a classroom's atmosphere, tone, ethos or ambience and its importance for student learning [1,2,3,4]. Typically, teachers concentrate almost exclusively on the assessment of academic achievement, and devote little attention to factors which might be related to their students' patterns of adaptive learning and performance. There is research evidence indicating classroom climate to be a factor in the types of goals students establish [5,3,6].

1.1 Classroom Climate

Although classroom environment is a somewhat subtle concept, remarkable progress has been made over the last three decades in conceptualizing, assessing and researching it [7,8,9]. This research has attempted to answer many questions of interest to educators, such as does a classroom's environment affect goal orientation? Can teachers conveniently assess the climates of their own classrooms? Questions such as these represent the thrust of the work on classroom environments over the past three decades.

Teachers play a vital role in the conceptualization of the classroom climate. They create both the social and physical environments for learning. The very nature of classes, teaching, and students makes a positive classroom climate a critical ingredient of student success [10]. Teachers who are successful in establishing effective classroom climates create more time for learning, involve more students, and help students to become self-managing [11,12]. A positive learning environment must be established and maintained throughout the year. One of the best ways teachers accomplish this goal is by having a good classroom management plan which includes ways to prevent problems from occurring, having clear rules and procedures, a physical environment that is well organized, ways in which to communicate effectively with students, and how students can interact with each other [10]. According to Doyle [10] classrooms are particular kinds of environments. They have distinctive features that influence their inhabitants no matter how the students or the desks are organized or what the teacher believes about education. Furthermore, classrooms are

multidimensional, they are crowded with people, tasks, and time pressures, have people with differing goals, preferences and abilities, inhabitants must share resources, and actions can have multiple effects and influence student participation [10].

The social and physical environment of a classroom can support or interfere with student learning and well-being. Therefore, teachers carefully plan and create appropriate and effective classroom climates. There is empirical evidence that shows teachers' perceptions of classroom climate differ based on subject matter [1,7,13]. Teachers' perceptions of science classrooms have produced mixed results in terms of classroom climate, with some studies finding teachers' perceptions of science classrooms to be high in competition and low in affiliation [14,8], whereas other studies show teachers' perceptions of science classrooms to be low in cooperation and cohesion [15,2]. However, recent research has revealed a wide variety of science classroom climates, with this diversity based on the teacher's teaching style [16, 4,17].

1.2 Goal Orientation

Does a subject-specific climate influence the learning goals that teachers structure in their classrooms? Recent research on classroom climate has focused on the classroom instructional goals that teachers establish. Teachers' perceptions of the fit between their classroom environment and their goal orientation are important for the learning outcomes. A goal is an outcome or attainment an individual is striving to accomplish [18]. Goal orientation refers to a pattern of beliefs about goals related to achievement in school. Goal orientations include the reasons teachers pursue goals and the standards they use to evaluate progress toward those goals. There are four main goal orientations: mastery (learning), performance, work-avoidance, and social [19]. For the purposes of this research, only three goal orientations will be utilized. Mastery-approach goal orientation refers to the need to improve and focuses on learning, understanding, and developing competence in academic situations [20, 21, 22, 19]. Students with a mastery goal are concerned about the task itself instead of their self-presentation compared to others. Their evaluation for goal progress is intrapersonal in that their success is based on the improvement of competence and the mastery of the material. For these students setbacks or even failures are not threatening [22].

Performance-approach goal orientation refers to both the need for improvement and a fear of failure, and a focus on demonstrating and validating one's competence [23, 24]. Performance approach goal orientated individuals, are mainly concerned about their self-presentation compared to others. They use interpersonal standard to evaluate their performance in that their success is determined with other people as referents. Demonstrating competence, outperforming others and garnering favorable judgments are signs of success and meeting goals. For these students, their ability is constantly on the line. Setbacks and especially failures are threatening and suggest a lack of ability [25]. Performance approach goals may sound quite negative. Earlier research indicated performance goals generally were detrimental to learning, but current research suggests that a performance goal orientation may not be all negative. In fact some research indicates that both mastery and performance goals are associated with using active learning strategies and high self-efficacy [20, 26, 25]. Performance-avoidance goal orientation refers to a fear of failure and a focus on masking incompetence; in other words, performance-avoidance oriented students try to avoid being seen as incompetent [24, 27]. Students with performance avoidance goals are typically characterized as having a high fear of failure and low competence expectancies [24]. Thus, they are likely to orient themselves towards the possibility of failure and are highly sensitive to information suggesting anticipated failure [24,19].

1.3 Classroom Climate and Goal Orientation

Goal theory researchers have found a relationship between teachers' goal orientation and their classroom climate [28,29,17]. Furthermore, goal theory leads us to expect that instructional practices and the nature of educational tasks and assignments that teachers design can pull for either mastery or helpless motivational patterns that have profound influence on student achievement. In other words, the goal orientation of classrooms influences whether students will pursue learning goals (mastery orientation) or performance goals (ego orientation). Mastery goals, in the United States, are associated with achievement, better academic coping, and positive affect towards school while performance goals are associated with deterioration of performance, impaired academic coping, negative affect and disaffection from school [30, 31, 14, 5, 32, 33, 34, 35]. However, recent research indicates that performance goals may not be bad all the time. This research indicates that both performance and mastery goals are associated with high achievement and efficacy [20,25].

Dweck and Leggett [36] defined two major kinds of goal orientations: performance goals and learning goals. Individuals with a performance goal orientation seek to maximize favorable evaluations of their ability and minimize negative evaluations of ability. Questions like, "Will I look smart?" and "Can I beat others?" reflect performance goals. In contrast, with a learning goal orientation, individuals focus on mastering tasks and increasing competence at different tasks. Questions such as "How can I do this task?" and "What will I learn?" reflect learning goals. Nicholls and his colleagues [37] described two similar achievement goal orientations; they used the terms ego-involved goals and task-involved goals, e.g. [37]. Classroom environments that were high on task involvement and innovation had students with mastery goal orientations, whereas classroom environments that were high on competition had students with performance goal orientations [38]. Teachers who embrace mastery goals are more likely to maintain positive learning environments [39, 40, 17].

Researchers studying goal orientation have focused primarily on academic outcomes. Recently, however, scholars have become interested in ethno racial differences. In their study of eighth grade African American and White students, Freedman, Gutman and Midgley [41] found that African American students espoused personal mastery goals and extrinsic goals significantly more than did White students, suggesting cultural differences in student goal orientation. Similar studies have established an interaction between performance-approach goals and race in predicting the use of self-handicapping [42,43,21], and the role of academic self-efficacy in mediating the relations between performance-approach outcomes [17, 44]. These studies indicate the importance of conducting studies in other cultures before reaching concrete conclusions.

Whereas a vast research literature exists on the influence of classroom climate on goal orientation and learning outcomes, these studies have been largely conducted in the United States and Europe. Indeed few studies have investigated the nature and influence of classroom climate and goal orientation in African cultures [45,46]. Research in the United States and Europe has established that teachers' perceptions of classroom climates and students' patterns of adaptive learning vary between urban and rural schools [47, 48, 49, 35, 50, 51]. Gender and ethnic differences have also been established, suggesting a possibility of cultural differences in classroom environments and goal orientation [32,40]. However, these findings cannot be generalized to other cultures.

Teacher practices most likely reflect the values and beliefs of the larger culture they live in. Glover and Law [52] found a strong link between school culture, teacher practices, and the learning experiences of students. As revealed in the macrosystem, the uttermost level of Bronfenbrenner's model, society's cultural values, laws, customs and resources significantly affect the activities and interactions of its members [53]. For example, studies on child rearing practices reveal that even though authoritative child rearing has advantages across cultures, ethnic groups often have distinct child-rearing beliefs and practices. Some involve variations in warmth and making demands that are adaptive when viewed in light of cultural values and family circumstances [54]. These cultural variations remind us that just like parenting practices, teacher practices such as the conceptualization of their classroom environments and goal orientation can be fully understood only in their larger ecological context.

This study investigated teachers' and observers' perceptions of the nature of classroom climates and goal orientation in biology high school classrooms in Kenya. The following research questions were addressed: How do teachers perceive the classroom climate in their biology classes? Are there school and gender differences in the teachers' perceptions of the classroom climate and goal orientation? Do teachers and observers perceive the classroom climate and goal orientation in biology classes similarly?

2. METHODOLOGY

2.1 Participants

Participants included 12 teachers who taught tenth- and eleventh-grade biology classes of two boarding high schools in Kenya. Five of the teachers were from a boys' school (2 females and 3 males) and 7 from a girls' school (3 females and 4 males). Professional experience ranged from 2 to 12 years. Both schools are national schools, admit only high ranking students -those who score 350+ out of 500 points on the eighth grade national examination [55]. Teachers in both schools are all graduates from either one of the two main teacher-training national universities in the country. (Note: Except for few cases, majority of the high schools in Kenya that admit students who pass the eighth grade national examination are same sex boarding schools. This is typical of the Kenyan education system). The average class size for both schools was 45. The size of the schools ranged from 980 to 1,120 students. Biology was chosen for this study because it is a required course for all high school students.

2.2 Procedures

Participation in this study was voluntary; research information and purpose was sent to all biology teachers in both schools requesting their participation prior to data collection. Data was collected from multiple sources using self-report and direct observation measures during the second term (May–July) of the school year.

2.2.1 Construct validity

Prior to the visit, the Classroom Climate Questionnaire (CCQ; [9,56] and Patterns of Adaptive Learning Scales (PALS; [43,42] were sent to two volunteer teachers from each of the schools where the project was conducted. The teachers (4) were asked to examine the validity of the items by pointing out any terms that might be confusing or misunderstood. The volunteer teachers were recruited via e-mail and personal phone calls. All four teachers identified two terms that may mean something different in the Kenyan context on the PALS and gave suggestions for changes. In their view, “smart” meant dressed up, and “dumb” meant hard of hearing. Therefore, “smart” was replaced with “bright” and “dumb” was replaced with “stupid”. To control for possible bias, these four teachers did not participate in the final study.

2.3 Measures

2.3.1 Teacher surveys

All of the teachers completed the two surveys (CCQ and PALS). The surveys were administered in English. (Note: English is the main language of instruction in the Kenyan schools, starting in third grade). The teachers responded to the surveys in their free time and returned them to the researcher upon completion. It took approximately 10–15 minutes to complete each survey.

2.3.2 The classroom climate questionnaire (CCQ)

This 54-item instrument adapted from the student survey [57] was developed by Trickett and Moos [9,56] to assess three underlying sets of classroom dimensions in junior high school classrooms: Relationship, Personal Growth, and System Maintenance and Change. The Relationship dimension identifies the nature and intensity of personal relationships within the environment and assesses the extent to which teachers and students are involved in the environment and support and help each other. The Personal Growth dimension assesses basic directions along which personal growth and self-enhancement tend to occur. The System Maintenance and Change

dimension assesses the extent to which the environment is orderly, clear in expectations, maintains control, and is responsive to change.

Under these three dimensions are nine specific subscales (the original alphas from Trickett and Moos' study of [9] appear here): (a) Involvement (e.g., "Students put a lot of energy into what they do in this class", $\alpha = .60$); (b) Affiliation (e.g., "Students enjoy helping each other with homework in this class", $\alpha = .59$); (c) Teacher Support (e.g., "I take a personal interest in students in this class", $\alpha = .72$); (d) Task Orientation (e.g., "Students sometimes spent extra time on activities in this class", $\alpha = .36$); (e) Competition (e.g., "Some students try to see who can answer the questions first", $\alpha = .65$); (f) Order and Organization (e.g., "Activities in this class are clearly and carefully planned", $\alpha = .54$); (g) Rule Clarity (e.g., "There is a clear set of rules for students to follow", $\alpha = .49$); (h) Rule Strictness (e.g., "I make it a point of sticking to the rules I make", $\alpha = .45$); and (i) Innovation (e.g., "I like for students to try new projects", $\alpha = .39$). All items are presented in a four-step Likert continuum (e.g., never happens to often happens), with higher scores representing the high end of the scale. This survey has been used in classroom climate studies [57,3,9,56,58] and has proven to be reliable and valid. A test-retest reliability of individual scores on scales, when administered twice with a 6-week interval between occasions, ranged from .83 for Rule Clarity to .95 for Innovation [56].

Traditionally, this survey has been used to assess learning environments mostly in the United States. Therefore, there was a need to determine if the internal consistency reliabilities of the scales in the present study were comparable to the original survey. To this end, the Cronbach's alpha values were calculated for the nine subscales. Reliabilities are presented in Table 1. As seen in Table 1, most of the current study scales' reliabilities were comparable to the original survey. Rule Clarity, Rule Strictness, and Innovation had relatively high reliabilities compared to the original subscales. However, Competition ($\alpha = .36$) and Order and Organization ($\alpha = .34$) had low reliabilities. Teachers had several questions regarding these subscales that could be attributed to cultural differences. For examples, most teachers put question marks or asked the researcher to explain the meaning of the following items: (a) "A student's grade is lowered if he/she gets homework in late" (Note: Because the schools are boarding schools, homework is usually completed during class time.); (b) "Students have to work hard for a good grade in this class"; (c) "I hardly ever have to tell students to get back in their seats"; and (d) "Students don't interrupt when I am talking". As several teachers commented, "Isn't that common sense...".

Table 1. Reliabilities for the original and the current study classroom climate subscales

Subscale	Original	Current
Involvement	.60	.86
Affiliation	.59	.58
Teacher support	.72	.63
Task focus	.36	.49
Competition	.65	.36
Order & organization	.54	.34
Rule clarity	.49	.79
Rule strictness	.45	.80
Innovation	.39	.60

Note. Number of items per subscale = 6

2.3.3 Patterns of adaptive learning scales (PALS)

This 22-items survey was developed and used by Midgley et al. [42,43] to assess teachers' perceptions of various constructs associated with students' goal structures. It assesses mastery and performance-approach goal structures at the school and classroom levels. The School Mastery Goals scale (seven items) assesses individual teachers' agreement that the purpose of academic work in the school is to gain mastery over content and to demonstrate student improvement (e.g., "In this school, the emphasis is on really understanding schoolwork, not just memorizing it", $\alpha = .81$). Note: the attached Cronbach's alpha values are from the original scale [42]. The School Performance-Approach Goals scale (six items) assesses teachers' perception of their school's desire for students to appear able and outperform others (e.g., "In this school, students hear a lot about the importance to getting high test scores", $\alpha = .70$).

The Classroom Mastery Goal scale (four items) assesses teachers' perceptions of whether the purpose and meaning of academic tasks and achievement emphasized in their classes focuses on student improvement and mastery (e.g., "In my classroom, I consider how much students have improved when I give them report card grades", $\alpha = .69$). The Classroom Performance-Approach Goal scale (five items) assesses teachers' perceptions of whether their classroom academic tasks focus on competition and ability (e.g., "In my classroom, I display the work of the highest achieving students as an example", $\alpha = .69$). All items are presented in a five-point Likert-type format (strongly disagree to strongly agree), with higher scores representing the high end of the scale. The scale has been used in several studies [48]; [43]; [42] which have proven its reliability and validity. Reliabilities of the subscales in the present study were reasonable (Table 2).

Table 2. Reliabilities for the original and current study patterns of adaptive learning scales

Scale	# of Items	Original	Current
<u>Perceived School Goals:</u>			
Mastery	7	.81	.53
Performance- Approach	6	.70	.51
<u>Perceived Classroom Goals:</u>			
Mastery	4	.69	.61
Performance-Approach	5	.69	.60

2.3.4 Classroom observations

Prior to data collection, a team of graduate students received a 2-day mandatory training of classroom observations. Several observations (ranging from 6–8) were made for each of the twelve teachers, with approximately six observations per teacher, spread over the second term (May–July) of the school year. At least two graduate students observed each classroom at the same time for all the observations used in this analysis. Observation time ranged from 40–80 minutes. Observers used two observation forms: the Classroom Climate Observation Form [57] and the Patterns of Adaptive Learning: Classroom Observation Form [43,42]. Both observation forms tapped into similar concepts as those of the teachers' surveys. The classroom climate form was developed by the researcher and has been used in previous research with reasonable reliability [57,3], and the patterns of adaptive learning was developed and used by Midgley et al. [42,43]. They were on a four-point Likert-type format, with space provided at the bottom for observer comments. Using Cohen's Kappa statistic, an inter-rater agreement beyond chance was established at 0.95.

3. RESULTS

3.1 Teacher Survey Data

A preliminary analysis was conducted to determine if there were differences among dependent measures by the length of teaching experience. No significant differences were found. Some of the teachers taught more than one class and grade. There were a total of twenty classes (11 from the boys' school and 9 from the girls' school). Some teachers taught both grades 10 and 11. Therefore, a second preliminary analysis was conducted on the teachers' data to determine if there were differences among the dependent variables by class and grade. No class and grade differences were evident. Consequently all the classes and the two grades were combined in subsequent analyses.

Note: Cohen's *d* was used to calculate effect sizes.

3.1.1 How do teachers perceive their classroom climate?

Two t-tests were conducted on the classroom climate variables to examine how teachers perceived their classrooms. The first test examined the nine classroom climate variables with school as the independent variable. No significant effects were found. The second analysis examined the classroom climate measures with gender as the independent variable. This test revealed significant effects between male and female teachers on Teacher Support, $t(10) = 3.76$, $p = .01$, $d = 2.201$ indicating that the male teachers perceived themselves as being more supportive of their students compared to the female teachers. In addition, male teachers saw their classrooms as being more innovative compared to female teachers, $t(10) = 2.93$, $p = .05$, $d = 1.882$. There was no significant interaction effect between school and gender on classroom climate variables. See Table 3 for all the means and standard deviations for the classroom climate measures.

Table 3. Overall means and standard deviations for classroom climate for male and female teachers

Subscales	Females		Males		Sig.
	Mean	SD	Mean	SD	
Involvement	3.17	.66	3.45	.52	n.s
Affiliation	3.43	.32	3.69	.35	n.s
Teacher support	3.17	.24	3.64	.20	.01
Task focus	3.57	.25	3.59	.36	n.s
Competition	3.03	.14	3.31	.42	n.s
Order & Organization	3.17	.39	3.31	.24	n.s
Rule clarity	3.30	.96	3.59	.33	n.s
Rule strictness	2.70	.83	3.29	.38	n.s
Innovation	2.60	.56	3.36	.49	.05

Note. Mean range: Low=1.0, High=4.0; Males: N= 7, Females: N=5

3.1.2 What are teachers perceptions of their school and classroom goal orientation?

Descriptive statistics were conducted to determine what types of goals teachers report on the PALS subscales. Overall, teachers reported greater school and classroom structured performance-approach goals. Tests of means revealed a significant difference between male and female teachers' perceptions of their school performance goals, $t(10) = 2.98$, $p = .05$, $d = 1.874$ and classroom performance goals, $t(10) = 3.12$, $p = .05$, $d = 1.964$. Compared to female teachers, male teachers perceived their school to be encouraging performance approach goals. Similarly, they perceived their classrooms to be encouraging performance approach goals. See Table 4 for all means and standard deviations. Tests of means revealed no statistical difference

between the two schools. In addition, there was no significant interaction between school and gender on goal orientation.

Table 4. Overall means and standard deviations for goal orientation based on gender

Scales	Females		Males		Sig.
	Mean	SD	Mean	SD	
School Performance Approach	4.13	.36	4.82	.37	.05
School Mastery goals	4.26	.27	4.29	.61	n.s
Classroom Performance Approach	3.64	.26	4.46	.70	.05
Classroom Mastery goals	3.45	.62	3.62	.72	n.s

Note. Mean range: Low=1.0, High=5.0; Males: N= 7, Females: N=5

3.2 Classroom Observations

Only observations that were made by two observers at the same time were used for analysis. After establishing an inter-rater reliability at 0.95, only one observer's ratings for all the twelve teachers were used for analysis. Seventy-two observations were analyzed, with six observations per teacher. All observations conducted by the same observer were combined to provide multiple samples of data for each teacher which could then be averaged as a general profile of the teacher's classroom climate and goal orientation according to the subscale ratings. Descriptive statistics and independent t-tests comparing schools, gender and grades were conducted on the data.

3.2.1 What are observers' perceptions of the classroom climate in biology classes?

Preliminary analyses exploring class and grade-level differences in observers' survey reports revealed no statistically significant effects. Therefore, class and grade were not included in subsequent analyses.

From the overall descriptive statistics, observers saw classroom climates conducive to high student involvement and task focus and with highly supportive teachers. Teachers were also observed to make clear rules and to be strict in enforcing these rules. See Table 5 for all means and standard deviations.

Table 5. Overall means and standard deviations for classroom climate based on observation data

	Overall		Boys' School		Girls' School		
	Mean	SD	Mean	SD	Mean	SD	Sig.
Task Focus	3.63	.27	3.55	.27	3.70	.24	n.s
Teacher Support	3.45	.32	3.60	.31	3.30	.25	.05
Rule Strictness	2.50	.00	2.50	.00	2.50	.00	n.s

Rule Clarity	2.50	.00	2.50	.00	2.50	.00	n.s
Innovation	2.22	.52	1.83	.18	2.60	.31	.01
Student Involvement	2.01	.29	1.90	.16	2.21	.35	n.s
Affiliation	1.85	.73	1.50	.40	2.20	.82	.05
Order and Organization	1.55	.53	1.25	.42	1.85	.47	.01

Note. Mean range: Low=1.0, High=4.0; boys' school: N=5, girls' school: N=7. Values are based on 6 observations per teachers (total = 72 observations)

Tests of means were conducted to examine whether observers reported significant differences in the classroom climate between the schools and the teachers' gender. The first t-test revealed significant school differences in the classroom climate on Innovation, $t(10) = 5.10$, $p = .01$, $d = 2.125$ with the boys' school teachers' classrooms being perceived as more innovative; Order and Organization, $t(10) = 3.10$, $p = .01$, $d = 2.200$ with the girls' school teachers' classrooms being reported as more organized; Teacher Support, $t(10) = 2.32$, $p = .03$, $d = 1.988$ with the boys' school teachers being perceived by observers as more supportive of their students; Affiliation, $t(10) = 2.41$, $p = .02$, $d = 1.809$ with the girls' school classrooms being perceived as more friendly compared to the boys' school's classrooms. No significant gender differences were found.

3.2.2 What are observers' perceptions of goal orientation in biology classrooms?

Descriptive statistics conducted on the patterns of adaptive learning classroom observations showed class activities to be carefully planned. Observers noted that teachers stayed on task and covered the amount of material intended to be covered during class time, and they (teachers) also checked to see if students understood the material being covered. Rarely did observers see students being recognized for their work or emphasis being placed on trying hard and making learning fun. Observers reported few incidences where students worked in collaborative groups. All observers marked "N/O-Not Observed" against the items examining the teacher's authority. The items were (a) "The teacher is consistent in dealing with students who break rules", and (b) "The teacher explains what the rules are and enforces them if necessary". Table 6 reports all means and standard deviations.

Table 6. Overall means and standard deviations for goal orientation based on observations

Subscales	Overall		Boys' School		Girls' School		Sig.
	Mean	SD	Mean	SD	Mean	SD	
Task	3.21	.33	2.78	.35	3.60	.24	.01
Time	2.50	.14	2.50	.00	2.50	.19	n.s
Evaluation	2.16	.43	2.11	.27	2.20	.50	n.s
Social	1.71	.26	1.50	.22	1.85	.27	.05
Grouping	1.67	.23	1.00	.34	1.05	.25	n.s
Help-seeking	1.60	.56	1.61	.57	1.60	.58	n.s
Messages	1.38	.31	1.61	.22	1.65	.38	n.s
Recognition	1.25	.39	1.22	.45	1.20	.39	n.s
Authority	1.00	.00	1.00	.00	1.00	.00	n.s

Note. Mean range: Low=1.0, High=4.0; boys' school: N=5, girls' school: N=7. Values are based on 6 observations per teachers (total = 72 observations)

To examine whether the means were significantly different, tests of means were conducted with the goal orientation measures as dependent variables and school and the teacher's gender as independent variables. The first test of analysis examined the four goal orientation measures with school as the independent variable. Significant effects were found for Task Focus, $t(10) = 4.29$, $p = .01$, $d = 2.210$ with the teachers in the girls' school's classrooms being perceived by observers as more task oriented. The classrooms of the teachers in the boys' school were perceived as significantly social, $t(10) = 2.54$, $p = .02$, $d = 2.005$ compared to the girls' classrooms. The test of means by gender did not reveal any significant effects for the goal orientation as reported by observers.

4. DISCUSSION

The aim of this study was to examine teachers' perceptions of their classroom climate and goal orientation in high school biology classes. Teachers from the two schools did not differ significantly in their perception of their classroom climate. All the teachers saw their classes as being high in task focus, student involvement, affiliation, and order and organization. This perceived similarity could be due to the fact that the two schools are boarding, all the teachers are trained at either one of the two main teacher training universities, the curriculum is centralized across schools in the country, and all students wear uniforms [55]. For example, during the second term of the school year (the period of observations), all the tenth grade teachers in both schools were teaching about "pollination" and "human reproduction", while all the eleventh grade teachers were teaching about "gaseous exchange" and "immunity and the immune response in humans".

However, when the classroom climate was assessed by the teachers' gender, a significant difference emerged. The male teachers from both schools saw themselves as being more supportive of their students compared to the female teachers. This finding was surprising. Since the two schools are boarding, students are away from their parents for nine months per year and teachers act as "surrogate parents" we expected no significant difference in the teachers' perceptions of their support for their students. More research is needed to further explain and understand this finding. Male teachers also perceived their classroom climate to be high in innovation.

Results on goal orientation revealed all teachers perceive their schools' and classrooms' practices as more performance focused. However, male teachers reported significantly high school and classroom performance-focused practices. The fact that male teachers perceived their classrooms to be high in teacher support and innovation and also reported high performance-focused practices is contrary to the findings from [36] and [38] studies which found that classroom climates that were high in task involvement and innovation led only to mastery-focused practices and goals. It is likely that teachers' perceptions of environmental goal structures are partially influenced by their existing goal orientations. As Pintrich [33] study in the United States found, if teachers believe that there is an emphasis on competition and demonstrating ability, these beliefs should affect their own motivation and classroom practices.

The other possible reason for these teachers' inclination to performance-focused practices could be the nature of the education system in the country. The Kenyan education system is examination oriented. The centralized national examinations for twelfth graders are quite intense. Eleventh-grade students start preparing for the national examination in January, the beginning of the year. Eleventh-grade teachers spent a considerable amount of time reviewing past examination questions with their students. Bear in mind that all but two of the teachers participating in this study taught at least one eleventh grade class. Teachers whose students perform well are publicly recognized by the school and sometimes given awards. In addition, the government, through the Ministry of Education, publicly announces and publishes the top ten schools. Plus, this national examination is the single determinant to college or university [55]. It is therefore safe to say that the academic practices that these teachers report are emphasized within the societal context and also relate to their own perceptions of the academic goal orientation emphasized in the school context. As Ames [30] and Midgley et al. [29] reported, practices such as public honor rolls or special

privileges based upon academic standing send important messages to teachers and students regarding what constitutes success in a given school. Likewise, the results from this study support classroom climates being a reflection of cultural contexts.

In the past, research has found that those in positions of power, in this case teachers, perceive environments they are in more positively than those not in positions of power [56,57,3]. Contrary to these findings, teachers and observers in the present study viewed the classroom climate similarly. Like the teachers, observers reported more student involvement, high teacher support, positive student-student interactions, clear classroom rules, and hardly any disruptive incidences. The observed classroom environment enabled teachers more time to devote to student learning. However, when the two schools were compared statistically on classroom climate, significant differences emerged on innovation, order and organization, teacher support, and affiliation. Observers noted that in the girls' school, the teachers were more innovative and organized, and students were friendly towards each other. On the other hand, teachers in the boys' school were observed to be more supportive of their students. This finding was quite unexpected. Further research investigating teachers' perceptions of their support for their students in same-sex schools is warranted. In addition, future research conducted with students and teachers to assess their perception of classroom climate would be helpful.

On the patterns of adaptive learning, observers just like the teachers, reported high task focus; teachers stayed on task and made sure that the amount of material to be covered was covered during the allotted class time. Teachers consistently checked to make sure their students understood the material being completed. However, significant differences regarding task focus were found between the two schools. In the girls' school, observers reported significantly more task focus in the classrooms compared to the boys' classrooms. In addition, observers noted high positive student-student interactions in the girls' school. It appears that students engage in more positive interactions in the girls' classrooms.

In both schools, observers noted that teachers rarely recognized students for their work or class participation. In the same vein, hardly any emphasis was placed on making learning fun. The only work displayed in the classrooms were science related posters, a class time table, and a schedule of after-class activities. In addition, there were few incidences of collaborative group work during class. This is interesting since science classrooms in the US and Europe have been shown to regularly have

small group-based experiments [1,8]. It appears as though the teachers in this study emphasize mastery of content more than critical thinking skills and inquiry learning that is usually embedded in active student-student interactions or small groups' activities.

The teacher's authority was apparent. Students sat in rows facing the teacher, did not get out of their seats nor talk without the teacher's permission. All classrooms appeared to be well-managed with clear rules and the greatest emphasis placed on covering the material intended to be covered during class time. The overriding element was task focus regardless of the grade, gender, class, or school. It was no wonder that observers consistently checked "N/O-Not Observed" on items inquiring about the teacher's authority.

This study had some limitations. The sample of teachers included in this study was limited to 12 teachers and thus restricted higher level statistical analyses. This calls for caution in interpreting the findings. In addition, these teachers were in same-sex boarding schools, therefore, the results may not generalize to all high school biology teachers. Furthermore, this study did not collect data on the students in these teachers' classrooms to examine their perceptions of classroom climate and goal orientation. In addition, the reliabilities, particularly those of the classroom climate scale, were generally low. This could be attributed to the cultural differences where some of the items might have been interpreted differently.

5. CONCLUSION

In conclusion, the study findings from teachers and observers reveal positive classroom environments that are high on task focus and high performance-focused practices at both the classroom and school level. Previous research in the United States examining classroom climates and goal orientations has reported a positive correlation between positive classroom climates and mastery goals [30,31,38,17]. Kaplan and Maehr [32] for example, found mastery-focused practices to be associated with positive outcomes, whereas performance-focused practices were associated with negative outcomes. Importantly, these studies do not explicitly include aspects of culture or perhaps the interpretation of goal orientations by different cultures. Given that the definition of a mastery goal centers on learning, understanding, and improvement, it is likely that culturally valued activities that reflect this goal are necessary, if not sufficient, for the creation of a meaningful goal orientation. The two schools in the present study are among the top national schools in the country

[55]. If the primary objective of students, teachers, and administrators is to perform better on the national examination, it is unlikely that they would focus on activities that do not meet this end. In this study, performance-approach goals could be defined as “learning” due to the nature of Kenya’s national testing protocol. This finding supports current research in goal orientation that indicates performance goals to be associated with high achievement and self-efficacy [20,26 25].

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COMPETING INTERESTS

We, the authors have no competing interests that could potentially bias our work.

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Teaching Thinking: Using a Creativity Technique for the Eradication of Truancy among Students to Enhance the Success of Universal Basic Education in Nigeria

ABSTRACT

Truancy is an antisocial behavior perpetrated by many students in the lower secondary school, and which is specifically rampant in Osun State of Nigeria public schools, which if not properly addressed could abort the laudable objectives of the Universal Basic Education (U.B.E.) in Nigeria. Therefore, this study explored how Lateral Thinking Creativity technique could be utilized to teach the truants to think right and take rational decisions that would make them jettison truancy for the success of the U.B.E. in Nigeria. A pre-test-post-test quasi experimental group design was adopted. A sample of 100 Junior Secondary School II students playing truancy randomly selected from Ila and Iwo Local Government areas of Osun state were used for the study. Their ages ranged from 10-16 years with a mean of 13 years. Fifty students from Ila formed the experimental while the other fifty from Iwo made the control group. The experimental group was subjected to six weeks of training in Lateral Thinking Creativity technique for one hour twice a week while the control group was asked to wait a little time for attention. A validated instrument, Animasahun (2008) truancy scale was administered on all the participants in both groups at both the pre and post test situations. The result showed that there was a significant difference in the post-test truancy behavior scores between the experimental and the control groups ($F(1,97) = 24.795 < 0.05$). The significant difference in their adjusted mean scores (41.516) and (47.864) also prove that there was a significant difference in the post-test scores of the participants as the experimental group scored significantly lower than the control on truancy scale. It should be noted that the lower the score on truancy scale the better for the person. It was therefore recommended that any student playing truancy should undergo training in Lateral thinking creativity technique so as to be able to think rationally and have a change of attitude in order to reduce truancy and consequent dropping out of school.

Keywords: creativity; lateral thinking; truancy; universal basic education.

1. INTRODUCTION

Thinking has been found to be the basis of all human actions [1] because it leads to a kind of decision that prompts a consequent action. There is no decision without thinking whereby various alternatives are considered.

The cerebrum in the human fore-brain is autonomously concerned with thinking. It is the largest part of the brain made up of hemispheres and coordinates all the body's voluntary and some of its involuntary actions. This function includes: receiving sensory information, processing it, and sending out the necessary instructions along motor neurons to effectors to take appropriate action. The cerebrum is therefore the seat of consciousness, learning, memory, imagination, reasoning, intelligence and creativity – higher mental functions [2, 3, 4].

Therefore, the significance of this level is manifested in the fact that if anything is wrong at this perceptual thinking and decision-making stage, the consequent action would also be in the wrong direction. If properly done, rational, constructive, creative, realistic, productive and responsible behavior will be the outcome; otherwise, muddled, illogical, irrational, subjective, unrealistic, unproductive, foolish and irresponsible behaviours would be the result of poor thinking [5]. It has been discovered in the recent time that pinging has replaced thinking among the school-going adolescents. The young ones spend much time on their cell phones pinging rather than engaging in creative thinking [6]. Perhaps, what Nigerian society lacks is productive thinking which accounts for the aggravated negative life skills and high crime rate in the society. One of those negative skills is truancy, which eventually gives birth to dropping out of school.

The inadequacies of the Universal Primary Education (UPE) which began in Nigeria in 1976, which include emergence of special interest groups which were not initially provided for; problems of funding and management; lack of sustained political will; and the problem of harnessing the goodwill and sustained financial input from stakeholders; gave birth to the introduction of the nine-year Universal Basic Education, launched by President Olusegun Obasanjo at Sokoto on 30th September, 1999 [7]. The nine year academic programme is meant to be free and compulsory for children from Primary 1 (Basic 1) to Junior Secondary School III (Basic 9).

The UBE is intended to remove all the obstacles to lifelong education for millions of Nigerian citizens who otherwise would be denied the opportunity of education. It includes an estimated 2.1 million six-year olds who have had no access to early

childhood education and a large number of school-age children who labour for their parents or simply roam the street as Almajarai [8]. Nigeria is a signatory to the 1990 Jomtien Declaration of Education for All by the year 2000 and also a member of the Group E-9 nations committed to the total eradication of illiteracy. In spite of this, the nation's literacy rate was estimated to be 52%. Education statistics for 1996 shows that only 14.1 million children are enrolled in primary schools out of the 21 million children of school-going age while the completion rate was 64% [9].

Records further show that the transition rate from primary school to junior secondary school is 43.7%. By implication, 56.3% of those in the nation's primary school are likely to grow into adulthood as illiterates and this would further compound the problems of an estimated 43% adults who have missed their opportunities of a sound education. It is for these categories that the present UBE programme intends to provide a second chance [8]. Therefore, basic education, which is the foundation for sustained lifelong learning that provides reading, writing and numeracy skills comprises a wide variety of formal and non-formal educational activities and programmes designed to enable learners acquire functional literacy; which in Nigeria context, includes primary, junior secondary and nomadic education is aimed at equipping individuals with such knowledge, skills and attitudes that will enable them to live meaningful and fulfilling lives; contribute to the development of society; derive maximum social, economic and cultural benefits from society; and discharge their civic obligations competently [9,10].

The goals of the Universal Basic Education (UBE) scheme are to universalize access to basic education, engender a conducive learning environment and eradicate illiteracy in Nigeria within the shortest possible time; while the specific objectives of the scheme include:

- Developing in the entire citizenry a strong consciousness for education and a strong commitment to its vigorous promotions.
- The provision of free, universal basic education for every Nigerian child of school-age.
- Reducing drastically the incidence of dropout from the formal school system (through improved relevance, quality and efficiency).
- Catering for school dropouts, and out-of-school children/adolescents, through appropriate forms of complementary approaches to the provision and promotion of basic education.

- Ensuring the acquisition of the appropriate levels of literacy, numeracy, manipulative, communicative and life skills (as well as the ethical, moral and civic values) needed for laying a solid foundation for lifelong learning [9].

However, despite the fact that the above goals and objectives of the UBE are laudable, truancy could abort everything, reducing all labour, expenses and time incurred to nothing as a result of poor attendance in school, non-challant attitude towards education and consequent dropping out.

Truancy, simply defined, is an irregular attendance in school. While [11] defined school truancy as absence from school for no legitimate reason, [12,13,14] defined it as a situation where the student has neither the permission of his parents nor the consent of the school authorities to keep away from school. However, [15] contended that any absence from school without an acceptable reason would be termed truancy, whether or not the student's parent know and appraise it. Yet, [16] submitted that absence from the school must be without a reason before being considered valid by the school and referred to as truancy. Similarly, [17] submitted that absence in school is regarded as truancy if it is persistent, habitual and unexplained; and which can occur with parental knowledge and sometimes consent. Nevertheless, [18,19] maintained that only the failure of the absentee to obtain permission to be absent from the school should be considered as truancy. Wisconsin [20], however, concluded that a case of truancy could only be established if the parents failed to provide the valid reasons for student absence. The above scenario of definitions lent credence to [21] who submitted that a uniform definition of truancy does not exist.

However, for the purpose of this paper, truancy is considered from the point of view of [22] who opined that truancy occurs when a student is not present at a school, or a condition whereby students who are required to attend school chose not to do so. It is a condition of being absent at a place where a student is expected to be and being at a place where he is not expected to be during school hours. Animasahun [23] referred to such students as area boys and girls in school uniform.

1.1 Characteristics of a School Truant

Animasahun [23] identified the following as the basic characteristics of a school truant. They include: laziness, excessive sleeping at home, sluggishness, lack of interest in morning/home duties, non-challant attitude, rudeness, cunning, always eating something and preferring to buy ready-made food rather than cooking. Other characteristics include lack of interest in academics, lack of readiness to

learn, never studying at home, sees no reason for studying, always in the company of hoodlums, always wearing slippers and other wears not acceptable in school. Further still are the following: having extravagant and strange hairdo, dirty, lacking required textbooks; the males, having no school bags but carrying only one or two exercise books by hand or in uniform pockets while their female counterparts carry fashion bags meant for one or two notebooks and spare clothes as well as cosmetics, walking majestically to school after 8:00 a.m. They also have special jungles to school, leaving home by 7.30 a.m. but never getting to school or sneaking to school around 9:00 a.m. and leaving by break time but returning home between 2.45 and 4:00 p.m. just like regular students. They roam about during school hours, never found at the assembly grounds, always leaving their shirts untouched in, sometimes having something to sell, armed with electrical gadgets such as video clips, C.D. and audio cassettes, watching films during school hours, spending more times watching films and can recite the content of any cassette any time. Other characteristics include: having at least a cell phone as regular companion and always using it for non-sensical purposes, never attending extra lessons, playing table tennis, snookers and other games during school hours. They are always found at barbing/hairdressing salon, tailoring, mechanic and spare parts workshops during school hours; and never participate in school agric/manual labour. They consume alcohol and smoke for fun; moving in gangs; breaking into homes and stealing for sustenance. They are always feeling tired at home after school hours; restless and preferring to go out all the time, wandering about aimlessly and copying notes when exam is near. They have no special private timetable, no particular life set-goal to pursue; failing and repeating classes or looking for other schools; dropping out of school and possibly taking to crime.

1.2 Outcome of Truancy

Various authorities that have worked on truancy concluded that the outcome is dropping out of school [24,20,25,26,13,23,14]. Animasahun [23], specifically found that 68% of school truants end up being Motorcycle riders popularly called (okada riders), bus conductors, sex hawkers and possibly take to crime. He concluded that they become a burden to their parents or significant others and remain dependent throughout their lifetime.

1.3 Factors Responsible for Truancy

In her discovery, [24] reported that manifestation of poverty, ignorance, cultural perception of work and schools, and changing social values are responsible for truancy. More specifically, she identified peer influence, unemployment, poor remuneration for educated persons, capacity for illiterate men to have educated spouse including Ph.D. holders, poor learning conditions, household poverty, inability of education to bring riches, parental inability to pay school fees, capacity to make petty cash to augment family income and finding trading more satisfying than schooling.

Animasahun [23] identified lack of readiness to learn in school, lack of motivation, the fear of unknown, poor parenting, misplaced priority, peer group influence, bad role models, overindulgence, excessive homework, excessive demand by the home to make quick money for support and spiritual factors as responsible for truancy.

Gesinde [13] and other literature grouped the factors responsible for truancy into five categories as factors resident in the child, family, school, society and government. Among the factors resident in the child are: psychiatric disturbance; indifferent or irresponsible attitude towards education; being ill-equipped to tackle normal pressure of school [27], lack of adjustment to school life [28]; love of immediate earning from employment [29]; incompatible age [30]; lack of willingness to learn [31]; peer group influence [32,18]; lack of self-esteem and social skills confidence; poor peer relations, lack of concentration, lack of self management skill, and lack of academics ability [33,34].

Factors that are family centred include; inadequacies in the home background [35,36,25], unfavourable home circumstances e.g. poor physical home condition; poor parent-child relationship characterized by hostility; lack of affection, underinvolvement in the child's welfare; overtly harsh and authoritarian methods of discipline, high degree of family conflict and disorganization [37,18]. The Project Stay-in [38] identified parental lack of appreciation for value of education; parental high school dropouts; parental financial difficulties; ineffective parenting; family instability; parental discord; inappropriate role models; child abuse and/or neglect; substance abuse, alcoholic parents; and parental convenience where older sibling is kept home to babysit for younger siblings. Other family-based factors include parental neglect [25]; parental carefree attitude [39,40]. Animasahun [41] identified marital discord, separation, divorce and single-parenthood as parental factors responsible for truancy.

School-based factors which in the opinion of [42] and [43], are stronger than other factors, they include: unmet education needs; placement problems; hostile atmosphere of the school [44,18], poor school organization [27], teachers' professional misconduct; teachers' non-challant attitude towards truancy [45,46]; teachers' discriminative and harsh behavior, teachers with inadequate lesson plan; teachers strike actions [18]; teachers' absenteeism; poor working condition; scarce opportunities for professional advancement; poor supervision [47]; teachers' high handedness, excessive corporal punishment, mass failure, victimization, preferential treatment, sexual harassment, poor quality of teaching, academic failure, humiliation, discouragement [48,22]; uninteresting and irrelevant curriculum; improper class placement; failure to identify and provide services for problem students; poor pupil-teacher relationships; insufficient counseling and guidance staff; high student-teacher ratio; low teacher expectations; lack of parent-school communication and involvement; and too weak or too rigid administrative policies [38]; escape routes in school; poor teacher-student relationship; and irrelevant curriculum [33] as well as general school climate [22,49].

Societal-based factors, according to [18] include the moral bankruptcy and general indiscipline, which are constantly manifested by adults in the society send signals to the students that there is good measure of acceptance in such behavior, hence, they emulate. Along with this is inconsistencies [48,50]; corrupt society [51] anti-intellectual posture of society; placing more value on immediate financial gratification and power at the expense of academics [52]; condoning truancy; society ravaged by civil disobedience, riots or wars etc. and lack of social amenities [13]; lack of support for school; unresponsive community service agencies; community upheavals and social change; loss of neighborhood schools and lack of sense of "ownership" of schools; negative peer influence; high incidence of substance abuse; criminal activities; gang activities; and inadequate provision for transportation [38].

The government-based factors include; government laxity with education manifested in the absence of moral and religion education; shortage of teachers; failure to motivate teachers who in turn should motivate students; and absence of vocational education that will make school leavers employable; and non-implementation of existing policies [51,53,54,55].

1.4 Effects/Consequences and Implications of Truancy

Truancy ranks highly among deviant behavior manifested by Nigerian school children and has devastating implications for the individual, family, society and the nation at large. It culminates in missed opportunities and deprives the nation of the ability to make the most efficient use of her scarce resources in the younger generation of human supply for the nation resulting in educational wastage and human power development [56,23,24]. Most truants eventually become dropouts, wanderers and terror to the society. It has been noted that early school truancy was a good predictor of various forms of antisocial or deviant behaviours [41]. Furthermore, while it is evident that a truant put himself at a long term disadvantage in becoming productive citizens, [36] concluded that absenteeism is detrimental to students' achievement, promotion, graduation, self-esteem and employment potential. Adeyemi [14] found truancy to be the first sign of trouble, the indication that the young person is losing his/her way, and that truancy is a gateway to crime evident in rampant substance abuse, daytime burglary rate and high vandalism.

The above implications are enough to retard the growth and development of a nation. Hence, something must be done urgently to eradicate truancy otherwise the labour and huge investment on the success of UBE programme would be in vain. The decision to boycott school as a result of any of the factors earlier mentioned is definitely a wrong decision emanating from poor thinking that leads to poor and irrational decisions. Hence, the art of thinking rationally should be taught in school for students to take wise decisions all the time. A substantial number of researchers have advocated for the adoption of creativity techniques for effective thinking leading to sound decision-making and productive actions. Evidence abound that people who engage in systematic creativity thinking training exercise succeeded in their capacity for creative thinking in a variety of fields [57,58,5,59]. UBE programme should also involve creativity training programme leading to effective thinking through which the problem of truancy could be nipped in the bud.

Creativity is mainly concerned with bringing about new ideas to solve some specific life problems [60,58,5]. One of the techniques of creativity useful in teaching thinking is the Lateral thinking technique, developed by [60]. It facilitates effective thinking leading to rational and effective decision. Lateral thinking creativity technique purports to ameliorate thinking errors. It aims at simplifying thinking, providing alternative forms of behavior and making an individual take decisions leading to respon-

sible actions highly rewarding to the thinker and beneficial to the society [1]. According to [61], a good and effective decision follows a careful process of searching for alternatives and weighing the consequences such decisions might have on people.

Lateral thinking is a pattern breaking creativity technique which provides a new direction of thinking, solve difficult problems and look for alternative ways of doing things. While [58] defined Lateral thinking as the strategies of seeking to solve problems by apparently illogical means, [62] describes it as an attempt to move sideways to generate parallel ideas, alternative approaches, and different point of view to solve certain problems. The true technical description of lateral thinking is based on a consideration of the self-organising pattern breaking information system: cutting across patterns in a self organizing information system. Instead of moving on the normal asymmetric patterning system, we seek to move and cut across patterns in our thinking. Lateral thinking is generally concerned with thinking differently with the purpose of escaping from old ideas and with the generation of new ideas and new approaches to solve problems. Hence, the old pattern of life such as that of laziness, unplanned life, lack of set goals, aimless wandering, poor time management, negative peer influence, destructive tendencies and all other negative behaviours of truants must be jettisoned and replaced with new ideas of hardwork, goal-setting, effective time management, associating with well-behaved peers and acquisition of positive life skills.

The programme of Lateral thinking technique involves the following:

1. Current issue, idea or problematic situation. This essentially means that this technique can not just work in a vacuum; there must be a definite issue to trash. This may be a moribund idea, problematic issue or a threatening situation. As far as a truant is concerned, this refers to the major cause of his/her truancy.

2. Alternatives. This is a process of generating several other ways of doing a particular thing, which in turn can generate new ideas or other alternatives. Truants would be exposed to myriads of positive life skills, and alternative ways of handling challenges of life.

3. Focus. Out of several alternatives an individual is expected to focus and stick to a particular idea suitable to solve his personal challenges which must be carefully executed so as not to be controversial, problematic or confusing.

4. Challenge. This is willingness to explore the reasons why we do things the way we do and whether there are any other ways by which it could be done. It enables an individual to break free from the limits of the accepted ways of operating. The truant

has an opportunity of challenging his former ways of life and see reasons why new ways of life must be adopted.

5. Random Entry. This is a process of using unconnected input to open up new lines of thinking.

6. Provocation. This is the process of generating provocative statements and then using them to build new ideas. This is specifically designed to challenge the limitations of human perception.

7. Movement. This is a mental operation that we can use as an alternative to judgment. It allows an individual to develop a provocative idea into one that is workable and realistic.

8. Harvesting. This is the process of taking note of specific ideas that seem practical and valuable.

9. Treatment of Ideas. This is the process of developing choice ideas and shape them to fit the current demand of reality.

10. Implementation of outcome [60,63,58,62]. At this juncture, a truant is monitored into practicalising his new positive life skills, develop academic resiliency skills, and make efforts to be punctual in school in spite of all odds.

Some of the researchers who have successfully used Lateral thinking to teach thinking and decision-making include [60,63,58,5,1,62]. This study specifically investigated the effectiveness of Lateral thinking creativity technique in the eradication of truancy behaviours among Universal Basic Education (U.B.E.) students in Ila and Iwo Local Government areas of Osun State, Nigeria.

2. MATERIALS AND METHODS

2.1 Hypothesis

There will be no significant difference in the truancy behavior of U.B.E. students exposed to Lateral thinking creativity technique and their counterparts in the control group.

2.2 Design

A pre-test, post-test quasi-experimental group design using the pretest scores as covariates was adopted for the study.

2.3 Participants

One hundred (100) Junior Secondary School II (JSS II) students who were consistently playing truancy were randomly selected from Ila and Iwo Local Government areas of Osun state. Cases of truancy have been reported to be rampant in many parts of Osun state. However, these Local Governments were purposively selected because they have been identified to be part of the areas notoriously known for high rate of truancy among junior students in public secondary schools. The ages of the randomly selected students ranged between 10 and 16 years with a mean of 13 years. They were categorised into the treatment and control groups based on simple balloting with (50) students in each of the groups. The students in Ila Local Government formed the experimental group while those in Iwo Local Government formed the control.

2.4 Instrumentation

The truancy behavior scale, test 1 in [64] Academic Success Barrier Battery was adopted for the study. The instrument contains 30 items developed on 5-point Likert scale whereby 1 indicates Strongly disagree and 5 indicates Strongly agree. Minimum score is 30 while the maximum score is 150. The Norm is 67 whereby any score above the norm is a strong indication of truancy behavior. The scale has a Cronbach alpha of 0.85 while the Guttman Split half reliability is 0.72.

2.5 Procedure

The researcher went round all secondary schools in the two Local Governments to discuss the purpose of the research with their Principals who all promised to cooperate. Hence, their Vice principals with the assistance of class teachers compiled the lists of truant students in JSS II (Basic 8). The researcher was permitted to meet with them in their various schools where he sensitized and motivated them towards a life-changing programme. Those who agreed to participate in the programme were given consent forms to fill and which should be countersigned by their parents to make them committed to the programme. Only those who returned the duly signed consent forms by both students and parents were invited to the Local Government Town Hall for final selection and commencement of the programme. They balloted for the available spaces in the programme whereby fifty (50) students were selected in each of the Local Governments. The initial rapport and introduction took place, and all participants in each group responded to the truancy behavior scale so as to determine their pre-

test scores. After this, students in Ila Local Government were exposed to six weeks training in Lateral thinking creativity skills of 1 hour twice a week while those in Iwo Local Government were told to go about their normal business until when they would be called upon for their own training. At the end of six weeks, the truancy behavior scale was administered on the experimental group to collect their post-test scores. The control group members in Iwo Local Government were also invited to their Local Government Town Hall whereby they also responded to the truancy behavior scale so as to collect their post-test scores as well. It was after this that they were also taught the importance of Formal education and reasons for punctuality in schools. After this, the two groups were appreciated. The Principals and staff as well as parents of the participants were all appreciated. That was the end of the programme.

2.6 Data Analysis

The collected data was subjected to a one-way fixed analysis of covariance (ANCOVA) to determine the effectiveness of Lateral thinking creativity training technique on truancy behavior of the participants.

3. RESULTS AND DISCUSSION

To test the hypothesis which states that there will be no significant difference in the truancy behaviour of experimental and control group, the analysis of covariance (ANCOVA) was employed to analyse the post-test scores of participants on their truancy behaviour, using the pre-tests cores as covariates to find out if post-test difference was significant.

Table 1. Summary of Analysis of Covariance (ANCOVA) showing the effect of treatment on participants' truancy behaviour tests scores of experimental and control group

Source	Type III sum of squares	df	Mean square	F	Sig.	Partial Eta squared
Corrected Model	1007.137 ^a	2	503.569	12.403	.000	.204
Intercept	3691.294	1	3691.294	90.917	.000	.484
pre-test2	2.247	1	2.247	.055	.814	.001
group2	1006.705	1	1006.705	24.795	.000	.204
Error	3938.253	97	40.601			
Total	204665.000	100				
Corrected Total	4945.390	99				

The result presented in Table 1 above shows that there was a significant difference in the truancy behavior post-test scores of participants in the experimental and control groups ($F_{(1,97)} = 24.795 < 0.05$). Based on this, the null hypothesis was rejected. Therefore, there is a significant difference in truancy behavior post-test scores of experimental and control group. This invariably means that the Lateral thinking creativity technique has large effect on the post-test scores of the treated group. In order to provide more details on the variation in post-test mean score of participants in treatment and control group, the pair-wise comparison was computed as revealed in Table 2.

Table 2. Summary of pair-wise comparison analysis showing the effect of treatment (lateral thinking creativity technique) on truancy behaviour test scores of experimental and control groups

Group	Adjusted mean	Mean difference	Standard error	Sig.
Experimental	41.516	6.348	1.275	.000
Control	47.864	-6.348	1.275	.000

Table 2 shows that the difference in the adjusted mean value of the participants was significant. The participants in the control group has the highest adjusted mean score ($X = 47.864$), while the participants exposed to treatment obtained the lowest adjusted mean score ($X = 41.516$). It should be noted that since truancy behavior is an undesirable behavior, therefore the lower the score the better for the student. Hence, the control group has higher mean score which is an indication of manifestation of undesirable behavior. This is an evidence that the intervention (Lateral thinking creativity technique) was effective. This, therefore, implies that the control group possesses a higher tendency to exhibit truancy behaviour than the treatment group.

4. DISCUSSION AND IMPLICATIONS

This study has clearly demonstrated that the Lateral thinking creativity techniques is effective in teaching thinking leading to rational, effective and enhanced positive behavior towards attending school and jettisoning truancy behavior. The findings corroborated the earlier findings of [60,63,58,65,59] that certain creativity techniques could be used to teach thinking leading to rational and effective decision-making.

The study has revealed that poor thinking and irrational decisions have engulfed the lives of the young secondary school students leading to high rate of truancy among them. However, this study has shown that the students could be taught

how to think and make wise decisions through the use of Lateral thinking creativity technique whereby all aspects of an issue would be considered before the final decision is made. Therefore, the finding would enable those who are involved in truancy behaviour as a result of poor thinking and irrational decisions to uphold positive life skill of attending school regularly and becoming better students.

It is therefore, recommended that any student of UBE found to be playing truancy should undergo training in Lateral thinking creativity technique so as to know how to think effectively and invariably nip truancy and dropping-out behaviours in the bud. Thinking should be included in the curriculum of the Universal Basic Education students so that all of them can be vigorously taught about how to think effectively and make rational decisions. This would lead to a total eradication of criminal tendencies including truancy-a time bomb to the success of UBE in Nigeria.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Application of Knowledge Management Skills in University Administration in Nigeria: Evidence from Heads of Departments

ABSTRACT

This study examined heads of departments' application of knowledge management skills in university administration. One research question and one hypothesis were posed along the dimensions of knowledge management skills namely knowledge sharing, knowledge capturing, knowledge mapping and knowledge storing to guide the study. A descriptive survey design was adopted and a proportionate sample of 200 was drawn from a population of 274 HODs in the 4 federal Nigerian universities. Data were collected using a researcher-constructed questionnaire titled "Knowledge Management Skills and University Administration Questionnaire (KMSUAQ)". Data collected were analysed using descriptive statistics (Mean, X and Standard Deviation, SD) and Independent t-test. Results of the study revealed that HODs were effective in their applications of knowledge sharing and knowledge capturing, but were not effective in their applications of knowledge mapping and knowledge storing aspects of knowledge management skills in university administration. HODs apply knowledge sharing skill most and knowledge mapping skill least in university administration. Gender does not significantly influence HODs' application of knowledge management skills in university administration. In the light of these findings, it was recommended among others, that HODs should intensify efforts towards ensuring that measures are adopted whereby knowledge mapping and storing are explored always in their administration at the departmental level.

Keywords: application; heads of departments; knowledge management skills; university administration.

1. INTRODUCTION

University education in countries like Nigeria has become a complex, challenging and arduous task in recent time. This emanated from the pressures occasioned by the changes in technology and globalization which have become the hallmark in world affairs. As a result, there are greater expectations from the universities as training points for high level manpower.

Education today is subject to the pressures of the market, where profound changes in competition have made institutions think like business organisations and behave like educational markets [1,2]. This underscores the need for proactive administration in universities where institutional leaders adopt measures aimed at adjusting themselves in developing strategies for the purpose of benchmarking and internationalizing their curricula. However, universities in Nigeria appear to be far behind their peers elsewhere in meeting the challenges posed by the present realities in global scheme of things. Perhaps, this accounts for their low ranking among other universities in the world. For instance, University of Benin, Nigeria ranked 1639 in the world in the year 2012 [3], while no Nigerian university ranked among the top 400 universities in the world in 2012 – 2013 as at June, 2013 [4]. University education has been bedeviled by institutional inadequacies engendered by poor governmental support, curricula that fall short of the expectations of the labour market, dilapidated infrastructure, administration that is more interested in pleasing the powers that appointed them than fulfilling the mission of the university, poor staff morale and weak academic culture [5]. Thus, the universities seem to be operating in such a way that their core missions, which are knowledge generation, dissemination and management, are not pursued appropriately. The consequence is that universities exist in name other than in quality.

However, there is a paradigm shift in university administration with the advent of information and communication technology (ICT) twelve years ago in Nigeria. Universities are today making substantial investments in ICT to meet their goals with a view to increasing the effectiveness of their operations. They are striving to, if not to meet up with their peers in other parts of the world, but at least, to stay not too far away from them. Even at that, the emphasis on change in the global environment puts knowledge management at the heart of what universities need to do to cope with today's fast changing environment [6].

Knowledge management, according to Kanagasabapathy, Radhakrishnan and Balasubramanian [7], is a managerial activity which develops, transfers, transmits,

stores and applies knowledge, as well as providing the members of the organisation with real information to react and make the right decisions in order to attain the organisation's goals. To Horwitch and Armacost [8] it is the creation, extraction, transformation and storage of the correct knowledge and information in order to design better policy, modify action and deliver results. The subject matter of knowledge management in organisations such as universities is not only about managing knowledge, but also extends to changing their entire academic cultures and strategies to approaches that value learning and sharing knowledge. Therefore, knowledge management tends to concern people, processes, culture and technology [9]. The knowledge to be managed includes both explicit, which is documented knowledge and tacit, which is subjective knowledge. Knowledge management skills including knowledge sharing, capturing, mapping and storing are required in the administration of organisations [10]. Knowledge sharing is a means by which an organisation obtains access to its own, and other organisation's knowledge. It involves primarily the processes through which knowledge is channeled between a source and recipient [11]. Knowledge capturing has to do with extracting knowledge or information from knowledge bases such as databases, filing cabinets and people's heads for future reuse. Knowledge mapping has to do with giving form, shape, modeling or constructing meaning to words, ideas, opinions, information, facts and abstract thoughts to literally make sense. Knowledge storing is a means by which organisations preserve knowledge so that other members of the organisation could retrieve it for future use without an interaction with the person who possesses such knowledge in the first place [12].

In particular, knowledge management skills are required in universities as institutions for knowledge generation and dissemination, and the extent these skills are applied determine the effectiveness of their administrations in realising their missions. The essence of knowledge management is to create new knowledge and timely apply such to maintain strategic and competitive advantage. Organisations - whether education or business - that succeed in knowledge management are those that view knowledge as an asset and most important resource for developing organisational norms and value, which support the creation and sharing of knowledge [13]. Knowledge management increases the ability of the universities to learn from their environment and incorporate knowledge into the academic processes by adapting to new tools and technologies. It is used to examine the overlapping and ongoing relationships among faculty, students, course and programmes in any school academic

environment [14,1]. The value of knowledge management in universities relates directly to the effectiveness with which it enables staff and students to deal with the issues and situations of today with a view to effectively envisioning and creating their future.

Universities exist for creating, using and managing knowledge from their environment and adapting to knowledge from outside environment to meet teaching and learning challenges. The ability to do this is what places a university in a position to have an edge over others. The task of knowledge management appears to be more daunting at the departmental level. This is because; teaching and learning take place more at the departmental level, which demands knowledge sharing, capturing, mapping and storing. This calls for enormous skills to manage knowledge effectively and well versed in current developments in knowledge and information. In addition, the available knowledge and information at the disposal of HODs are required to be put to effective use. The heads of departments, made up of male and female lecturers (gender), are supposed to provide leadership by ensuring the smooth functioning of their departments through the discharge of responsibilities bordering on teaching/learning, research and other activities necessary for the realisation of the departmental objectives. Gender is used in this study to depict the sex classifications of heads of department who carry out administrative functions at the departmental levels in universities. Heads of departments are expected to coordinate generating of knowledge through research, senior staff mentoring of junior ones and manage them for the benefit of departmental staff, students and outsiders. However, their effectiveness in carrying out these tasks has not been ascertained. More so, the dearth of resources at their disposal has put their knowledge management ability into serious jeopardy. Despite this, their effectiveness in applying knowledge management skills in their administration is yet to be established in this part of Nigeria. It is these issues that this study seeks to address. On this basis therefore, the problem of this study is posed as a question thus: How does HODs' application of knowledge management skills such as knowledge sharing, capturing, mapping and storing influence their departmental administration in universities in South-South zone of Nigeria?

2. RESEARCH QUESTION

To what extent do heads of departments apply knowledge management skills in university administration with regards to:

- Knowledge sharing;

- Knowledge capturing;
- Knowledge mapping;
- Knowledge storing?

3. HYPOTHESIS

Gender does not significantly influence heads of departments' application of knowledge management skills in university administration in the aspects of:

- Knowledge sharing;
- Knowledge capturing;
- Knowledge mapping;
- Knowledge storing.

4. LITERATURE REVIEW

Knowledge management encompasses the management of content as well as corporate education and training. With the increased growth in technology, universities, like other organisations are forced to implement some form of knowledge management programmes to have a competitive edge. A survey reported that 80 percent of organisations have some knowledge management efforts underway, 25 percent have chief knowledge or learning officer, and 21 percent have a knowledge management strategy that has been communicated to employees throughout the organisation [10]. This is a clear indication that knowledge management is a serious affair in organisations because their survival depends on it. However, knowledge management is important only to the extent that it enhances a university's ability and capacity to deal with, and develop in accomplishing their mission, gaining a competitive advantage, performing effectively and coping with change. Knowledge management ensures effective allocation of resources and staff, increases productivity without increasing the cost [1].

According to Bouthillier and Shearer [15], knowledge sharing is often a major preoccupation with knowledge management. It involves the transfer of knowledge from one or more person to another one or more. Although, knowledge can be acquired at the individual level, to be useful, it must be shared by a community.

Ranjan and Khalil, [1] reported that the rapid growth of emerging and cutting edge technologies coupled with knowledge management systems have led to the increased adoption of new applications that includes ranking the institutions, as-

sessing the quality of lecture delivery, assessing the programmes and courses, measuring the performance of students and faculty, tracking research and developments and enhancing faculty development. The integration of these applications enables the sharing of knowledge that is necessary for any institution's administrative effectiveness.

Research suggests that successful knowledge sharing involves extended learning process rather than simple communication processes, as ideas related to development and innovation need to be made locally applicable within the organisation [11]. While communications of knowledge is important, it is the processes through which knowledge is shared that determine whether organisational learning occurs, and therefore, whether knowledge sharing process was a success. Thus, findings showed that while managerial initiatives were sufficient in one aspect of its knowledge sharing efforts, more administrative resources would likely enhance outcomes [16].

Collison and Parcell [17] suggest that knowledge capture means capturing knowledge in such a way that it can be re-used. There needs to be a link between capturing knowledge before, during and after the event/project/task has been executed and in terms of accessing what has already been captured. Information Technology Construction Best Practice [18] reported that discussions about knowledge management usually refer to the need to capture one or both of two distinct types of knowledge – explicit and tacit. Explicit knowledge is the very factual information that is relatively easily documented, while tacit knowledge is the more subjective approaches people take in situations where there may be no single right or wrong answer. It is often the key to why a particular organisation is successful.

The capture of individual staff or groups' knowledge is vital for universities. Key decisions are made based on experience and knowledge which are usually shared informally. Through knowledge capture processes, universities could identify and leverage their organisational knowledge to enhance the value of their academic programmes. Findings by Hari, Egbu and Kumar, [19] revealed that capturing knowledge prevents the loss of critical knowledge due to retirement, downsizing and outsourcing; helps in problem solving, managing change, organisational learning, succession planning and innovation. It could also result to less duplication of work, faster and better problem solving, more efficient team work, more innovation and better ideas, improvement in staff motivation and management support. However, leadership and a committed effort are needed to make knowledge capturing successful.

Knowledge mapping [20] is the process, methods and tools for analysing knowledge areas in order to discover features or meanings and to visualize these in a comprehensive, transparent form so that the relevant features of an organisation can be highlighted. Knowledge maps are created by transferring certain aspects of knowledge into a graphical form that is easily understandable [21].

Okada and Shum [22] reported that knowledge mapping can be a useful strategy for students and educators to construct meaning from the oceans of data, information and opinion. Due to the widespread uses of new technologies and open learning resources, people have greater access to information, interaction and reconstruction than ever before. For that, knowledge mapping can be used to organise better the process of learning, research teaching and producing materials. Empirical findings indicate that knowledge mapping has been successfully used in education to facilitate students' learning [23].

Simon [24] reported that people are perhaps the most effective means for storing the organisation's experience. Individuals in the process of performing their functions, generate knowledge that largely remains in their heads. However, research findings showed that no one particular member of an organisation is likely to be the sole repository of any organisation's memory, networks of individuals have been found to be powerful medium of storage and retrieval of the organisation's explicit knowledge [25]. Researchers such as Hansen, Nohria and Tierney [26] and Krackhardt [27] found that social networks play an important role in accumulating and storing knowledge in the organisation and allowing individuals to locate and access this knowledge. Mere existence of knowledge somewhere in an organisation is of little benefit; it becomes a valuable asset only when it is stored and accessible [28]. Research findings had it that an organisation's ability to preserve knowledge has an important consequence for its performance [25]. The frequency of use of an organisation's knowledge can be applied as an indicator of the effectiveness of stored knowledge [29].

Studies by Ackerman and McDonald [30], and Anand and Glick [31] found that computer-based technologies play a key role in storing large amount of knowledge and making them accessible. These technologies such as electronic databases and electronic bulletin boards are widely used examples of such systems in order to collect, store and make explicit knowledge accessible.

From Nigerian perspectives, Krubu and Krub [32] found that there is relatively high level of awareness of the need to scientifically manage knowledge in Nigeria,

and that the level of implementation of knowledge management is below 40 percent judging from the analysis of data, objective evaluation of responses from face to face interviews, direct observations and assessment of physical facilities on ground.

Uchendu, Osim and Akuegwu [33] found that knowledge management in terms of knowledge sharing and mapping has significant relationship with university lecturers' job performance in Cross River State, Nigeria, and that the state of lecturers' job performance in universities in Cross River State, Nigeria is a function of how knowledge is managed in the universities.

Ugwu and Ezema [34] found that academic librarians in Nigerian universities require skills for knowledge management strategy, and that they require quantitative metric skills for the application and measurement of knowledge management and skills for mapping out processes are equally essential in developing strategy for knowledge management.

5. METHODOLOGY

The design adopted for this study was descriptive survey. The adoption of this design was predicted on the fact that the study involved the use of representative sample from a population of the subjects (HODs) and thereafter draw conclusion based on data analysis. The study covered 4 federal universities located in South-South geopolitical region of Nigeria, selected purposively. The population of the study consisted of 274 Heads of Departments in the 4 universities. Proportionate sampling technique was used based on unequal population of male and female HODs to select 200 of them, which is 50 HODs from each university.

A researcher-constructed instrument called "Knowledge Management Skills and University Administration Questionnaire (KMSUAQ)" was used to collect data for analysis. It had two sections – A and B. Section A sought information on gender (sex) which is a demographic variable of the respondents. Section B contained 24 items, 6 of them measured each of the four variables isolated for the study. Each item had 5 response options, where 1 was the least score and 5, the highest score. The respondents were required to rate their application of knowledge management skills in university administration by ticking one of the 5 options against each item.

The instrument was face-validated by experts in measurement and evaluation. The reliability of the instrument was established through a trial test. 50 copies of KMSUAQ were administered to 50 HODs in a university not used for this study. The scores obtained were analysed using Cronbach Alpha Method, which also provides a

measure of construct validity of the instrument. The coefficients obtained were 0.72 for knowledge sharing, 0.82 for knowledge capturing, 0.88 for knowledge mapping and 0.90 for knowledge storing. These figures confirmed that the instrument was reliable for use in achieving the research objectives.

The instrument was administered personally by the researchers and research assistants to the respondents in their various institutions. Copies of the questionnaire were filled and returned on the spot. All the 200 copies of the instrument were retrieved and found valid for analysis. Thus, a 100 percent returns rate was achieved. Descriptive statistics (mean and standard deviation) and Independent t-test statistical analysis were used to analyse the data collected. Summaries of results were presented in tables, followed by interpretations.

6. RESULTS AND DISCUSSION

6.1 Research Question

To what extent do HODs apply knowledge management skills in university administration with regards to:

- Knowledge sharing;
- Knowledge capturing;
- Knowledge mapping;
- Knowledge storing?

The independent variable is HODs' application of knowledge management skills, viewed from 4 dimensions, while the dependent variable is university administration. Descriptive statistics (mean and standard deviation) are used to answer the research question. Grand mean(x) for each variable was computed by finding the average of aggregate scores for items measuring each variable. These grand means were then aggregated and averaged to obtain the overall grand mean(x) of 3.04.

Table 1. Mean (X) and standard deviation (SD) of responses by HODs in their levels of effectiveness in the application of knowledge management skills in University administration

N =200				
S/No	Item	X	SD	Decision
1	Knowledge Sharing. Encourage voluntary transfer of knowledge about teaching programmes among staff.	2.94	1.38	L
2	Encourage individual staff to seek required knowledge on research activities from others.	3.23	1.16	H
3	Operate database for access to students' records and use by departmental staff.	3.20	1.12	H
4	Transfer tacit (personal) knowledge about departmental matters through story telling.	2.98	1.29	L

5	Use web-based technology in assigning departmental responsibilities.	2.95	1.49	L
6	Encourage exchange of ideas on the use of available resources through direct person to-person interaction.	3.55	1.27	H
	Grand Mean(x) and SD	3.14	1.29	L
7	Knowledge Capturing Create multimedia representation of departmental tasks and their relationships.	3.02	1.32	H
8	Use diary to record experiences and feelings of staff about daily operations of departments.	2.73	1.38	L
9	Encourage purposeful reflection so as to assist staffs develop generalization about departmental activities.	3.29	1.19	H
10	Convert departmental objectives into tacit learning so that staff can use them.	2.92	1.23	L
11	Initiate modalities to capture staff's individual knowledge about departmental administration.	3.38	1.25	H
12	Encourage staff to develop departmental activities into new strategies for task performance.	3.20	1.19	H
	Grand Mean(x) and SD	3.09	1.26	L
13	Knowledge Mapping Show the existing and desired relationship between concepts and organise ideas into categories.	2.85	1.26	L
14	Use of mental models to perceive, simplify and make sense out of complex systems.	3.23	1.28	H
15	Define the sequence of tasks which link actions within and across departmental functions to achieve specific goals.	3.21	1.04	H
16	Measure relationships between staff groups and knowledge processing entities in departmental affairs.	2.63	1.02	L
17	Explore beliefs of individual staff or groups in order to establish cause and effect relationship.	2.97	1.04	L
18	Search for natural, simple and powerful methods for describing and analysing the flow of departmental information.	2.79	1.27	L
	Grand Mean(x) and SD	2.95	1.15	L
19	Knowledge Storage Safeguard important knowledge in computers for future use among departmental staff.	3.29	1.17	H
20	Ensure storage of tacit knowledge by individual staff within themselves.	2.79	1.27	L
21	Store vital departmental record in file cabinets.	2.90	1.23	L
22	Store knowledge for network and reuse purposes for departmental benefit.	2.93	1.21	L
23	Safeguard knowledge about the department for transfer to individual staff.	2.90	1.08	L
24	Store knowledge in the department to encourage inter-group access among staff.	3.14	1.10	H
	Grand Mean(x) and SD	2.99	1.18	L
	Overall Grand Mean(x) and SD	3.04	1.22	H

**Decision Range: Mean(X) score of 3.04 and above is regarded as high (H) (effective), while mean score (X) below 3.04 is regarded as low (L) (not effective)*

By this result, mean ratings for variables from 3.04 and above are regarded as high level of application of knowledge management skills and effective, while mean ratings for variables below 3.04 are regarded as low level of application of knowledge management skills and not effective. Summaries of the results are presented in Table 1.

The results in Table 1 revealed that the overall grand mean score of HODs' application of knowledge management skills in university administration is 3.04 with a standard deviation of 1.22. This forms the basis for decision to determine the level of effectiveness of Heads of Departments in their applications of knowledge management skills in university administration. This means that HODs are high (effective) in their applications of knowledge sharing and knowledge capturing aspects of knowledge management skills in university administration. On the other hand, HODs are low in their applications of knowledge mapping and knowledge storage aspects of knowledge management skills in university administration. However, item-by-item analysis indicated that HODs are high (effective) in 3 items (numbers 2, 3 and 6, with a grand mean score of 3.14) in their application of knowledge sharing, 3 items (numbers 9, 11 and 12, with a grand mean score of 3.09) in knowledge capturing, 2 items (numbers 14 and 15, with a grand mean score of 2.95) in knowledge mapping and 2 items (numbers 19 and 24, with a grand mean score of 2.99) in knowledge storing.

Conversely, the results further revealed that HODs are low (not effective) in 3 items (numbers 1, 4 and 5) in their application of knowledge sharing, 3 items (numbers 7, 8 and 10) in knowledge capturing, 4 items (numbers 13, 16, 17 and 18) in knowledge mapping and 4 items (numbers 20, 21, 22 and 23) in knowledge storing.

From these results, the knowledge management skill HODs apply most in their administration in universities is knowledge sharing, followed by knowledge capturing while the least is knowledge mapping, followed by knowledge storing. This means that HODs are best in applying knowledge sharing skill than any other knowledge management skill in university administration.

6.2 Hypothesis

Gender does not significantly influence HODs' application of knowledge management skills in university administration in the aspects of:

- Knowledge sharing;
- Knowledge capturing;
- Knowledge mapping;
- Knowledge storing.

The independent variable is gender while the dependent variable is HODs' application of knowledge management skills in university administration. Independent

t-test statistical analysis is used to analyse data obtained. Summaries of the results are presented in Table 2.

Table 2. Independent t-test analysis of the influence of gender on HODs' application of knowledge management skills in university administration

Variables	Male, N =126		Female, N=74		t-value
	X	SD	X	SD	
Knowledge mapping	19.07	5.30	18.79	4.59	0.371
Knowledge mapping	18.21	5.19	19.07	4.64	-1.178
Knowledge mapping	17.62	4.61	17.65	3.99	-0.046
Knowledge storing	17.75	4.68	18.28	4.16	-0.817

Not significant at 0.05; df = 198; Critical t-value = 1.972

Results in Table 2 revealed that gender does not significantly influence HODs' application of knowledge management skills in university administration with respect to knowledge sharing ($t = 0.371$, $P = .05$), knowledge capturing ($t = -1.178$, $P = .05$), knowledge mapping ($t = -0.046$, $P = .05$), and knowledge storing ($t = -0.817$, $P = .05$). These figures are found to be less than the critical t-value of 1.972 at 0.05 alpha level of significance and 198 degrees of freedom. Thus, the null hypothesis is retained while the alternate hypothesis is rejected.

Further examination of the results indicated that male HODs have higher mean application of knowledge sharing ($X = 19.07$) than their female counterparts ($X = 18.79$) in university administration. Female HODs have higher mean application of knowledge capturing ($X = 19.07$), knowledge mapping ($X = 17.65$) and knowledge storing ($X = 18.28$) in university administration than their male counterparts, but these did not warrant significant difference.

6.3 Discussion

The results of the analysis of research question in Table 1 revealed that the knowledge management skill heads of departments apply most in university administration is knowledge sharing, followed by knowledge capturing. However, their least level of application of knowledge management skills in university administration is found in knowledge mapping and storing, which interestingly, they exhibit at low levels of effectiveness.

By implication, this result generally has it that heads of departments are effective in their applications of knowledge sharing and knowledge capturing. That is, the way and manner they apply these skills yield tangible results in the administration of universities at the departmental level. Conversely, they are not effective in

knowledge mapping and knowledge storing aspects of knowledge management skills in university administration. That is, the way and manner they apply these skills do not yield the expected results in the administration of universities at the departmental level.

A plausible explanation for this finding is that heads of departments are in a position where they come across new information, books, research findings, interact with staff and students, and liaise with people outside the department. From these myriad sources, the HODs are likely to acquire new experience and knowledge with which they use in handling departmental responsibilities effectively. Furthermore, knowledge management practice emphasizes the creation of new knowledge and the timely application of organisational knowledge to maintain strategic advantage [7]. Therefore, virtually all HODs would like their departments to be placed above others, and as such, they are likely to do everything possible to achieve this feat, being mindful of the inherent benefit. Thus, they see knowledge management as a veritable means of accomplishing this desire, and as such work towards achieving success in it.

As a follow up, HODs being grassroots' leaders only handle knowledge related to their fields of learning, which may not be too large for an individual to manage. Thus, any knowledge generated by the department or tapped from outside sources is likely to be put into effective use.

This finding also revealed that HODs make use of knowledge sharing in their administration most than any other knowledge management skill. The reason for this could be that their offices are meeting points for staff, students and outsiders, and as such social interaction remains the hallmark. This interaction enables them to acquire new experiences, ideas, information and knowledge which enhance successful departmental administration. In addition, university environment is considered free for people to pursue and acquire knowledge, and so, people consider it safe to share knowledge. This position corresponds with the views of Ranjan and Khalil [1] that the academic environment in general is considered trustful in the sense that no one is hesitating nor being afraid of publishing knowledge. The fact that universities deal with knowledge production and dissemination, which enhance the productive capacity of the present and future generations, places the HODs in a position to manage knowledge effectively. HODs hold positions which are strategic in university administration. This accounts for the reason why university authorities place much regard on them for the fulfillment of university mission. Therefore, the way and manner

knowledge is managed at the departmental level paints the picture of what it will be at the institutional level.

Results of the hypothesis revealed that gender does not significantly influence HODs' application of knowledge management skills in university administration. That is, male and female HODs apply knowledge management skills in university administration the same way and manner. This same result has it that female HODs have higher mean application of knowledge management skills than their male counterparts. However, this difference does not warrant any significant influence that requires certain considerations in the appointment of HODs.

This finding suggests that gender does not determine how HODs apply knowledge management skills in university administration. The fact remains that application of knowledge management skills such as knowledge sharing, knowledge capturing, knowledge mapping and knowledge storing in university administration does not call for any special qualification bothering on sex. Any person can use them. The implication is that HODs should be appointed based on individual lecturer's track record of achievement in handling students and staff matters, as well as their experience in generating and managing knowledge, and not on gender.

This outcome can be explained from the fact that since male and female HODs are exposed to the same type of training, perform the same functions, work in the same university environment and have access to knowledge as leaders, they are likely to perform the function of applying knowledge management skills in university administration without a difference. Closely akin to this, both categories of HODs are given the same support by university administration at the centre [35]. This finding corresponds with the position of Plato in Ekanem [36] that men and women have equal ability and can attain the same height, given the same opportunity.

7. CONCLUSION

The conclusions drawn from this study's findings were: Heads of departments were high (effective) in their applications of knowledge management skills such as knowledge sharing and knowledge capturing. In contrast, they were low (not effective) in their applications of knowledge mapping and knowledge storing in university administration at the departmental level. This has made universities in Nigeria to be functioning despite glaring inadequacies. The knowledge management skill applied most by HODs in university administration was knowledge sharing, followed by knowledge capturing. This is a clear indication that they tap knowledge domiciled in

the department and outside, which they apply in piloting the departmental affairs. Knowledge mapping and knowledge storing had the least application and HODs exhibited low levels of effectiveness in them. Gender does not significantly influence HODs' application of knowledge management skills in university administration. Therefore gender is not a factor in using knowledge management skills to handle university responsibilities at the departmental levels.

RECOMMENDATIONS

Arising from the findings, the following recommendations were made:

- Heads of departments should intensify efforts in making knowledge mapping a top priority. This will engender organising ideas into categories which will enable them to be flexible and creative in thinking and reasoning. With this, they are placed in a better pedestal to explore the belief of individual staff or groups for the purpose of establishing cause and effect relationship in departmental matters.
- HODs should work towards ensuring that knowledge storing is given a new lease of life. They should accomplish this by investing in ICT resources to safeguard vital departmental knowledge. This will help in storing appropriately, important departmental records and information which can be reused when the need arises. In addition, there should be proper documentation of knowledge within the department.
- HODs should initiate modalities whereby stored knowledge and information can easily be accessible. This is necessary because any knowledge or information that is not accessible is of no benefit to mankind. Knowledge creates useful impact in departments only when they are accessed and utilized by staff and students.
- HODs should make provisions for more capturing of knowledge. Where knowledge capturing is taken to a greater height, it will ensure proper acquisition of knowledge and allow cross fertilization of ideas. This will enhance research productivity of staff and also aid proper discharge of teaching responsibilities.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Ideal Teacherhood in Vocational Education

ABSTRACT

Aims: Ideal teacherhood in vocational education has not been widely studied or comprehensively defined. However, in the changing work life, the role of vocational education teachers (VET) becomes more and more important as they are responsible for educating future employees in numerous professional fields. What does ideal teacherhood consist of in vocational education?

Study Design: The narrative research approach was chosen to study VETs' perceptions of ideal teacherhood in vocational education.

Methodology: In this study, twelve Finnish VETs were recruited from one vocational education college with multiple fields. The data obtained included oral (N=5) and written (N=7) narratives.

Results: According to the results, the conception of ideal teacherhood turned into a more realistic one as the VETs' work experience increased.

Conclusion: Ideal teacherhood in vocational education occurred in the VETs' descriptions through six features of which three are connected with VETs' professional self and three with personal self. Ideal teacherhood in vocational education can be found in the confluence of these two areas of VET identity.

Keywords: ideal teacherhood; teacherhood; teacher identity; vocational education; vocational education teacher.

1. INTRODUCTION

The core goal of vocational education is to provide vocational education students with good professional expertise. Vocational education teachers (VET) introduce necessary skills and knowledge to be learned in a form that students can learn and practice [1]. These skills and knowledge support their learning processes and motivate them to enter work life. VETs are expected to create quality learning environments and guarantee excellent learning results. In addition, VETs have to

update their knowledge and skills constantly as well as to renew professionally, personally, and communally. VETs interact not only with diverse students but also with other personnel and rapidly changing work life. Along with these goals, it is possible to refer to the ideal teaching in vocational education and to the concept of a good teacher. Uusiautti and Määttä [2] state that it is not possible to define strictly the criterion of a good teacher — ideal teacherhood in this case — but a teacher is always a unique personality. Personality is a teacher's essential tool [2], which means that development toward ideal teacherhood mean somewhat the same as development toward a good personality [3].

Notwithstanding, it has been questioned whether the essence of good teacherhood can be even defined [4]. Conceptions are contradictory [5,6], nor is it always that straightforward to list the factors of good teacherhood [2,7].

Still, attempts to create definitions of good or ideal teacherhood are abundant. Teachers' continuous and determined self-development and commitment to the personal and professional growth make the prerequisites for the development of good personality [1,8]. Renewal and personal growth necessitate also redefinitions of one's professional identity including reflection of one's self at work and in free time as well as evaluation of one's values, dreams, and commitments [9]. Resulting positive conception of oneself as a skillful expert and developing individual lays the foundation of a good professional identity [10,11,12]. Likewise, the definition of good teacherhood is necessary in vocational education. Next we will discuss the challenges of and possible outlines of such a definition. The purpose is to analyze how VETs themselves perceive ideal teacherhood in vocational education.

2. THE DIFFICULTY OF DEFINING IDEAL TEACHERHOOD IN VOCATIONAL EDUCATION

Constant change is an essential part of VETs' work. Because of this, the definition of ideal teacherhood in vocational education seems unreachable. In Finland, the reform of curricula in vocational education brought new challenges in VET's work [13]. Likewise, new conceptions of learning, more and more diverse student groups, and new teaching arrangements have changed VET qualifications [14]. Students are still seen as the core of VET's work, but instead of education and teaching, current conception of learning emphasize more guidance of learning and learning processes [15,16].

Various organs of society target expectations and pressure to teachers' work. Teachers should be simultaneously supporters of holistic psychological and physical development, collaborators who are equipped with exquisite interaction skills, users of the latest technological innovations and social media who can renew their teaching and search actively new information, as well as, first and foremost, societal contributors and activists [17].

VETs have to enhance students learning processes by organizing various learning situations in diversified and updated learning environments that resemble actual work situations, methods, and places. Almost every student group includes students with special needs, which means that teachers must be able to design individualized study paths for each student [18]. Work with students with profound and multiple learning difficulties reflects on teachers' professional identities as well [19]. VETs are expected to be familiar with the latest societal and work-life changes and the related influence on qualification requirements. A teacher's role in relation to students involves more than ever education about the roles of society and guidance of study processes [20,21,22].

Along with new learning environments arrangements of workplace learning periods necessitates that VETs possess specific familiarity with society, work life, and business life as well as active and developmental cooperation with these instances [23,24,25]. Multiprofessional cooperation also makes a more salient part of VETs' work [26]. Due to VETs' multisided work description, the limits of a teacher's role have been questioned: "When is a teacher not a teacher?" [27]. Where are the limits of a teacher's qualifications is an essential question when defining ideal teacherhood and reflecting on its relationship with the reality of teaching in practice. VETs' work can include the requirement of ideal activity and ideal teacherhood [28].

Ideal teacherhood has been greatly studied in the light of different students' opinions [29,30,31,32]. For example, student teachers have been asked to compare themselves with their conception of ideal teacherhood [33]. Indeed, differences between students' and teachers' opinions have raised interest already for a long time [34], and there are studies analyzing how concepts of "ideal student" and "ideal teacher" are connected to each other [35], how ideal teacherhood contributes to teacher effectiveness [36], and the relationship between teachers and students [37].

However, ideal teacherhood in vocational education has not been widely studied. This study aimed to contribute to this gap in knowledge. We wanted to

analyze what ideal teacherhood consists of in vocational education in the first place according to VETs' perceptions. This viewpoint was chosen because VETs' own conceptions have not been profoundly analyzed thus far.

3. VOCATIONAL EDUCATION TEACHER'S IDENTITY

Ideal teacherhood in vocational education is connected with a teacher's identity. Our previous study analyzed VET's identity [38] revealing that it consists of four areas:

(1) Substance knowledge, including the know-how of VET's professional field, professional expertise, and work-specific skills.

Teachers are traditionally perceived as subject matter experts. Knowledge of subject matter has always been the core feature of a good teacher [39]. However, instead of distribution of information, today's teachers are merely expected to handle transmission of knowledge. Moreover, evaluation of information and skills is important in these days. In addition, professional expertise has to be updated constantly, and the readiness to professional change and development has to be provided already in vocational basic education.

(2) Pedagogical expertise, including the ability to lead teaching, learning, and study processes, organize and analyze teaching situations, and encounter and guide students.

Although technology and teaching methods develop all the time, teachers' personal inputs still matter. It is especially apparent in the pedagogical, ethical, and moral dimensions of teaching. Pedagogical expertise is a combination of many knowledge and skills related to student interaction and how they are applied in the practical complexity of teaching situations [2].

(3) Work-life skills, including co-operation skills, willingness to create networks, ability to work in various teams, and economic and administration skills.

VETs work in collaboration with colleagues in the college and with employers and other representatives of the professional field. VETs function as mediators between vocational education students and work-life professionals.

(4) Developmental abilities, ability and will to develop one's mastery over the knowledge and skills in one's vocational field, participate in the development of one's field and work life, and trust in the progress of vocational development through teaching and learning processes.

Due to the professional change and variation, VETs are required to possess such knowledge and teaching skills that helps vocational education students adjust to the day's professional expectations. VETs are expected to work for and influence the appreciation of their vocational field.

The classification of professional identity in many ways reminds earlier illustrations of a teacher's professional identity [40,41,42,43,44]. Our research was focused on less studied teachers: VETs' perceptions have not been studied much compared to, for example, elementary school teachers. However, their work differs greatly from other teachers' work.

In this study, we continue our analysis of VETs' perceptions of their work. The focus is especially on their ideas about ideal teacherhood and its connection with professional identity.

4. METHODS

The purpose of this study is to describe VETs' understanding about ideal teacherhood in vocational education. At the same time, the goal is to analyze how VETs try to develop professionally and how ideal teacherhood is connected with professional identity. The following research questions were set for this study:

(1) How does ideal teacherhood in vocational education appear according to VETs' descriptions?

(2) How is ideal teacherhood in vocational education connected to professional identity according to VETs' perceptions?

In this study, twelve Finnish VETs were recruited from one vocational education college with multiple fields. The request to participate in the study were sent to all 28 VETs in this college. The teachers had the following questions to help them to create their narratives: (1) How long you have worked as a VET and how old are you now?; (2) How did you end up in a VET's profession?; (3) How did you develop as a VET of this kind that you are today?; (4) What were you like at the beginning of your career and how are you today as a teacher?; (5) What kind of a teacher would you like to become?; and (6) What would you like to achieve in your teacher's career?

The teachers were asked to either write their narratives or record them with a digital recorder that the researcher would transcribe afterwards. The data obtained included oral (N=5) and written (N=7) narratives. The narrative research approach

was chosen to study VETs' perceptions of ideal teacherhood in vocational education. The approach was considered suitable because of its context-bound, personal, and subjective nature. In this kind of research, the power is given from the researcher to the research participant [45]. The narrative research approach simply refers to analysis of narratives told by people [46].

The concept of narrative defines narrative analysis [47]. The analysis of narratives means that situations and events, people's characteristics and other elements in narratives are categorized into themes and types. In this study, the purpose was to analyze how ideal teacherhood appears in VETs' narratives and what kinds of themes and types emerge from the data. The narrative analysis pursues constructing a new narrative that is based on the original narrative data [48] – a description of ideal teacherhood in this case. According to Polkinghorne, a result of the narrative analysis is a time-bound, structured, and plotted entity with a conclusion [47]. This kind of meta-narrative reveal various parts of the data and their confluences.

The data analysis was based on the qualitative data, twelve narratives that were categorized with the analysis of narratives and combined as conclusions with the narrative analysis [49]. The analysis of narratives means categorizing based on types, metaphors, or classes [50]. Marjatta Saarnivaara [51] pointed out that, in narrative research, description can be seen as the foundation of the construction of narratives. Description can be widened and specified with analysis. In this study, categorization followed the idea of the analysis of narratives pursuing the identification of key factors and their interconnectedness [49]. In this sense, the analysis was data-based, which means that the themes emerging in the data were analyzed and reduced as the categories introduced as results. According to Jerome Bruner [52], paradigmatic knowledge is typically rigorous and formal, and produces argumentation that follows from logical statements and careful definition of concepts and categories.

In narrative research like this one, the reliability and validity of the data are worth discussing. Transferability criterion refers to sufficient detail of the context and whether the findings can justifiably be applied to the other setting [53]. In this study, VETs presented various occupational fields and therefore, their descriptions of professional identity covered vocational education teacherhood widely. The meeting

of the dependability criterion is difficult in qualitative work in general because the research themes and data are often impossible to repeat [53].

Careful description of the select methods and data obtained strengthen the dependability and trustworthiness of the study [53]. The narrative method seemed to suit extremely well to the research on teachers' professional development and identity: teachers create and construct their identities by talking, interpreting, and reflecting their experiences and opinions, which can be seen the foundation of their perceptions of ideal teacherhood as well [54,55].

5. RESULTS

5.1 The Possibility of Ideal Teacherhood

When defining ideal teacherhood in vocational education, VETs answered to the question of what they set their sights on as teachers, what kind of teachers they would like to be, and what is important in teacherhood. Many VETs described their insecurity and mistakes taking place at the beginning of their teacher careers. This has been noted by earlier research as well [56,57,58]. The VETs in this study also talked about their pursuit of being a perfect teacher. VETs reflected on their unrealistic goals quite aptly:

I made plenty of mistakes. I tried to be a strict, assertive buddy, and this caused the conflicts with the adolescent students... - You have to be an honest personality (7).

In general, VETs seemed to become able to reflect on the possibility of reaching ideal teacherhood more realistically after they had gained practical experience of a VET's work:

Experience makes you strong. Experience has made me into what I am today (5).

Teaching necessitates constant reflection [9]. Likewise, the data in this study showed that ideal teacherhood seemed to arise from evaluations between oneself and professional and communal factors influencing teaching (see also [59,60]). As the VETs developed their individual personality as teachers and could strengthen their professional identity, they started to accept themselves as they were. This provided them with strength to work as personalities which meant that they had to give up on the preconceived, perhaps unrealistic, role of an ideal teacher and have courage to indulge in teaching situations as themselves.

My teaching style is quite colorful. But now I dare to be myself! (4).

Following one's own path is not easy nor can any teacher avoid new challenges and learning or new goals. The uncertain future of professions fester many VETs' minds, but still they want to do teaching well.

I am more like a coach, expert, educator, and some guide who shows various opportunities that are reasonable for the youth (6).

My dream is to work with balanced and nice youngsters who are highly motivated to learn a profession for themselves (9).

The heterogeneous student material sets pressure for the pursuit of ideal teacherhood in vocational education. Many VETs learned to understand that not all students aim at the top in their field but students' goals and readiness are extremely variable.

The fact that you have more and more difficult students and their life situations are hard. So, you always have a feeling that, in addition to being able to provide them with right kind of teaching for work life, I should be able to give them good guidelines in life (4).

5.2 The Features of Ideal Teacherhood in Vocational Education

The conception of ideal teacherhood turned into a more realistic one as the VETs' work experience increased. The idealistic ideas from the beginning of their careers became more practice-based and turned into fields of expertise guiding their work and illustrating their core know-how. Ideal teacherhood in vocational education occurred in the VETs' descriptions through six features.

5.2.1 Mastery of one's professional field and ability to act as a reformer

VETs' own experiences and learning about the profession can function as students' support, especially when it comes to the acquisition of good professional skills and knowledge. Mastery of one's professional field means that the VET knows the nodes and critical points as well as the phases of professional development.

You have to keep updated all the time, and that is hard for sure. In our field, the technology develops so fast, that you really have to work hard to keep in the picture (7).

The purpose is to widen my own expertise. Then I will have more information to distribute to students and more opportunities to realize practical teaching (11).

Along with their profound mastery of the profession and teaching it to students, VETs influence the renewal of professions and enhance students' readiness for life-long learning.

And I think that I will never be ready as a person, and therefore, I cannot become ready as teacher either. As I grow as a person, I also develop as a teacher. - You always have to keep up the profession by developing the professional side. And you cannot become a master in that either. You mature as a human being (4).

5.2.2 All-round pedagogical expertise

Ideal VETs know different teaching methods, are able to plan and be flexible in teaching situations according to students' needs, and give room to individuals and various students' learning abilities. Evaluation at its best can also enhance students' learning motivation.

I would like to develop and know more all the time. I do follow my profession a lot and I like this field and these subjects I teach. And I would like to study, too, in the future (5).

I would like to develop into a better expert, for example, of learning difficulties and to encounter the youth with problems (9).

5.2.3 Networking and collaboration

Ideal VETs can develop professional expertise and students' careers by creating connections with work life. Networks and multi-professionalism necessitate cooperation, and so does the updating of vocational education. Electronic communication, real-time flow of information, and internationalization also demand new forms of cooperation.

...independent and autonomous teacher's work has more and more changed into cooperation and team work. Teachers have to be able to adjust their teaching and especially evaluations within predetermined dates... mastery over ICT and various registers and follow-up systems, as well as cooperation and interaction skills (12).

5.2.4 Encouragement and support for students

With even the smallest gestures, VETs can help students to achieve the greatest results — a few words of encouragement can be enough. Teachers'

ability to encourage students is also self-enhancing because it strengthens teachers' contentment with their ability to guide, teach, and support.

...teaching is not the most important thing but learning... I would like to be a VET who never gets into a rut. I would like to develop all the time and know more. I would think that I could transmit this field so that students could construct their professional identities in their own way... (5).

5.2.5 Fostering of justice and equity, bearing responsibility

VETs are responsible for distributing information, support, and guidance to all vocational education students concerning their study processes and goals, and the contents to be studied. The ultimate goal is to make each and every student feel welcome to education regardless of various background factors, learning histories, and study abilities.

You have to be extremely fair with them but simultaneously very differentiating as well. VETs' work requires high physical and mental shape (8).

5.2.6 Positive basic values and ability to act as a bellwether

Teachers can teach students about necessary life skills, resources, strengths and values, as well as attitudes toward oneself, work, and other people. VETs can become irreplaceable and primary models, idols, or bellwethers to their students. Their teaching can show the direction in life or encourage to find one's own goals for studies and life in general.

...if only you could have the student understand what is best for him or her, why to do this job and study. And why to put one's heart in this job. To become a teacher who inspires them. Or they could fear a little, but not too much, not too frightened to enter. To find a balance in this work, so that it would not become too flaccid (10).

To find success in life, students need to learn about, for example, diligence, joy, good manners, politeness, modesty, and taking care about the basics in life:

...take care that your clothes are clean, do not use dirty language and behave well, and do not drink during the weekend, and try to foster your good reputation as the prospective professionals in the field, and teach how to eat healthy, and everything that I as a parent have done with my own children (4).

5.3 The Connection between Ideal Teacherhood in Vocational Education and Professional Identity

In this study, VETs referred to two professional identity selves when talking about ideal teacherhood in vocational education. These identities are interconnected but can also be viewed separately. They are professional self and personal self (cf. [38,59,61,62]). In Results section 5.2, three first mentioned features represent professional self and three last mentioned belong to personal self.

VETs develop their professional identities and construct their conception of ideal teacherhood in vocational education during their whole careers through reflecting on these two selves in professional identity. Teachers reflect on their experiences of acting as a teacher and compare them with their personal selves and conceptions of their inner beliefs, ethicality, and values.

It is like two different people fighting (6). Reflection helps VETs to form a conception of their professional identity and themselves as ideal VETs: who am I and what am I like as a VET and what do I want to accomplish in this profession. The professional and personal selves in professional identity are in constant, even demanding, dialogue over how to work ideally, how an ideal VET behaves in the first place, what kind of substance knowledge is appreciated and how to develop and update it, what kinds of pedagogical solutions are made in teaching situations, and how to act and participate in the developmental work at the workplace.

Mostly work seems to be guided by the professional self, which may not necessarily represent the true, realistic, and relevant guide for teaching work but merely an ideal image of a VET with unrealistic demands. However, it seems that the personal self, along with a VET's age and work experience, tries to balance between idealistic demands with encouraging, practice-based thoughts.

At the beginning, I used to take everything really personally, and students' all actions were like I had did them. I worried so much about students' problems and perceived them even too close. This year I have consciously tried to get rid of this feature but I always have to remind myself about it. I am a demanding teacher, strict too when necessary, but still I try to establish a relationship with students that makes the study atmosphere relaxed and active (9).

Along with time, the personal self helps VETs to act as genuine personalities at work and to accept the incompleteness. This means that VETs understand that

it is impossible to reach ideal teacherhood in vocational education, but it is important to pursue toward it.

Nowadays, I can speak openly like this. Is it because of my age or profession? (10).

Sometimes, the professional self functions as a sort of shield in a VET's work. On the one hand, it can regulate a VET's behavior so that the teacher does not bring out his or her characteristics, values, or convictions that do not fit in the vocational education context in general. On the other hand, the professional self can help the VET to cope when the work feels overwhelmingly busy, tiring, or mere monotonous toil.

6. DISCUSSION

The study showed how VETs found it difficult to describe ideal teacherhood in vocational education at first [63,64], but eventually they connected it with explicit work-related expectations, successful solutions, and goals. Ideal teacherhood in vocational education was also closely connected with a teacher's professional and personal identities. The aforementioned features of ideal teacherhood in vocational education can also be considered as the manifestations of professional and personal self in professional identity. Therefore, the ideal professional self consists of the mastery of one's professional field and ability to renew it, versatile pedagogical skills, and networking and cooperation skills. Personal self consists of students' encouragement and supporting skills, equality and justice as well as responsibility in teaching, and good basic values and bellwether's role as a teacher. This connection is illustrated in Fig. 1. It shows how the professional self and personal self are interconnected, and ideal teacherhood in vocational education is located in their borderline. When in balance, the emergence of or pursuit toward ideal teacherhood in vocational education is possible.

For VETs, this illustration contributes information about ideal teacherhood from many perspectives. First, when it comes to teachers themselves, the role of professional identity has a great emphasis in VETs' work. They are not only teachers but also experts in their own vocational fields. Therefore, their identity includes elements that, for example, teachers in general education do not necessarily possess. Nevertheless, VETs are teachers too, who, in order to be good teachers, must use their personality as a part of their work.

Second, VET characteristics make a salient part of ideal teacherhood. The combination of these identity dimensions is relevant to realize when dissecting the development of professional identity in VETs. In this study, the research participants were VETs from various occupational fields. Therefore, the illustration in Fig. 1 is not limited to just one field of vocational education but covers various fields: each profession has its own specific features related to a VET's professional self that must be considered when analyzing ideal teacherhood.

Third, this study was based in Finland where vocational education has increased its popularity among the youth having finished compulsory education. Therefore, it is more and more important to focus on ways to enhance the development of teacherhood in vocational education. The new interest in vocational education necessitates thorough understanding about the importance of proper professional identity in VETs, but as teachers in all education levels, personal identities as teachers should not be overlooked either. This viewpoint contributes to the discussion of future development of VETs' work and education not only in Finland but also abroad.

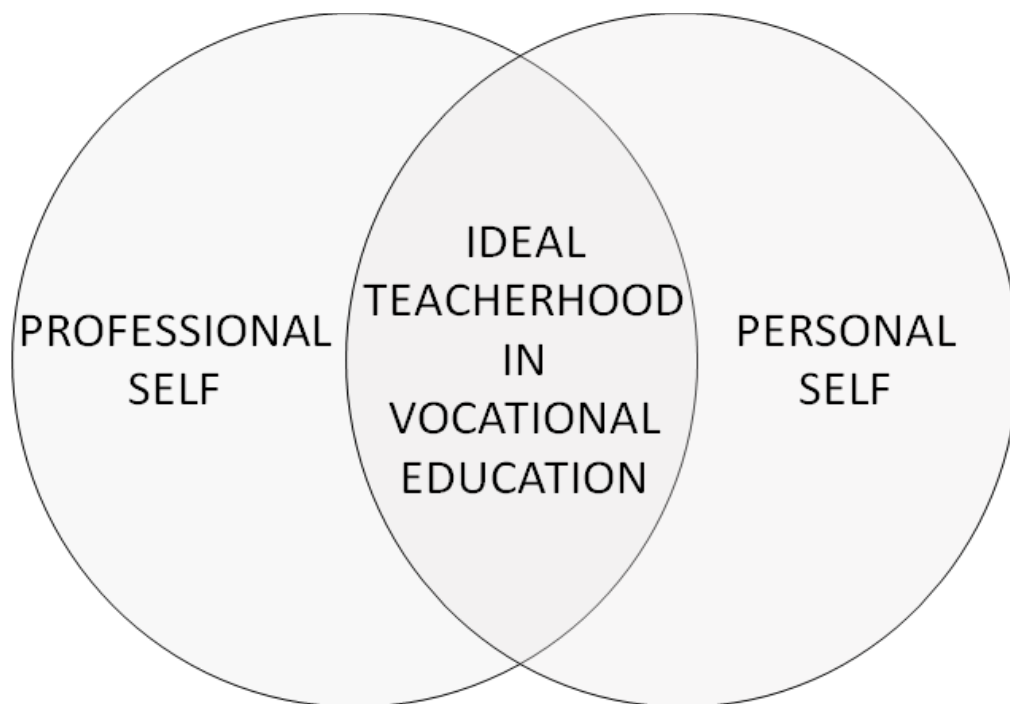


Fig. 1. Ideal teacherhood in vocational education and teacher identity

7. CONCLUSION

Meaningful work is the source of human well-being [65]. This study showed that identity reflection makes a salient part of VETs' perceived well-being at work [66,67]. The development toward ideal teacherhood in vocational education happens through each teacher's personal reflection including the shift from the dominating professional self to the flourish of personal self and, finally, toward the balance between them. Perhaps, ideal teacherhood in vocational education lies not so much in teachers' outer performances but intrinsic reflection and balance. This does not mean that they would need excellent work-life skills, knowledge, and networks in their special fields, but, when acquired, they make a salient part of their well-constructed professional identity [68]. Eventually, teachers, who are in the first name terms with their vocational education teacher identity, can act as bellwethers and true developers of their fields. They are inspiring and motivating teachers who, due to their expertise, enhance students' learning and are able to educate future experts for the needs of work life.

Therefore, VETs' work includes a distinct ethical dimension. This study showed how VETs' perceptions of the realities of the profession and ideal teacherhood emphasize the ethical side of the work. Teachers' work in general is focused on significant phases and situations in people's lives [69,70,71]. According to Elena Seghedini [72], teachers' ethical action in teaching develops alongside the development of professional expertise and vice versa: professional expertise develops also through ethical action. In Finland, Emmi Enlund, Mari Luokkanen, and Taru Feldt [73] studied teachers' ethical burden and ethical dilemma, and ended up recommending that education institutions should utilize the ethical guidelines composed by trade unions. They would support teachers' work. Common models to help teachers' action in problematic situations could be created based on the guidelines, which would provide teachers with collective certainty in ethical considerations. Williamson McDiarmid and Mary Clevenger-Bright [74] point out that teachers' work and professional development are closely tied in the wider society. According to Kirsi Tirri [75], expertise in teachers' work develops through education and experience and includes freedom and, first and foremost, responsibility to act in the profession.

Indeed, a well-balanced teacher identity and core values are the sources of stability and sense of purpose for teachers [76]. This viewpoint contributes also to

the current discussion of stress and coping as well as the sense of self-efficacy in teachers [77,78,79,80]. For example, studies about perceived level of self-efficacy have proven to be the core dimension of preventing and treating teachers' stress [81]. When considering the findings from the point of view of ideal teacherhood, it seems relevant to suggest that a successful identity development and a positive conception of oneself as a VET contributes to the sense of self-efficacy at work and respectively to one's well-being at work as well. These kind of perspectives appear of increasing importance in today's rapidly changing work in all occupational fields, including that of VETs.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Gender Differences in the Achievement and Retention of Nigeria Students Exposed to Concept in Electronic Works Trade through Reflective Inquiry Instructional Technique

ABSTRACT

This study was designed to determine the gender differences in the achievement and retention of Nigerian students exposed to concepts in electronic works trade through reflective inquiry. The pre-test, post-test, non-equivalent control group, quasi-experimental research design was adopted. The study was carried out in Lagos State. 43 students constituted the subjects in the experimental group and 62 students constituted the subjects in the control group for the study. Two research questions and two null hypotheses, tested at 0.05 level of significance guided the study. The instrument for data collection was Electronic Work Trade Achievement Test (EW-TAT). The instrument was subjected to face validation by five experts in Vocational teacher education and Electronic technology. The EWTAT was tested in trial to determine its psychometric indices and reliability coefficients. The EWTAT reliability coefficient was 0.83 using Kuder-Richardson's estimate formula. Mean was used to answer the research questions; while ANCOVA was employed to test the hypotheses. This study revealed that the mean score of boys was higher than the mean score of girls taught Electronic works trade using reflective inquiry instructional technique, but the mean score of girls was higher than that of the boys in the test for retention of learning. Consequently, the researchers recommended that Technical College teachers should adopt the use of the reflective inquiry instructional technique to the teaching of Electronic works trade and Ministry of education and administrators of Technical Colleges should always organize seminars, conferences and workshops to sensitize technical teachers on the use of instructional technique.

Keywords: gender difference; achievement; retention; electronic works trade and reflective inquiry instructional technique.

1. INTRODUCTION

There has been an increasing concern over the years globally about the right of women. This has been attributed to the observations and beliefs of many scholars that the female gender is greatly marginalized in Africa, Nigeria not being an exception [1,2]. The term gender is socio-cultural and is built based on the biological expectations of the individual on the basis of being a male or female. Gender has sound psychological background and is used to refer to specific cultural patterns of behaviour that are attributed to human sexes. Gender, then, refers to a set of assumptions about the nature and character of biological differences between males and females, assumptions that manifest in a number of ideas and practices that have a determinant influence on identity, social opportunities and life experiences of human actors [3]. The assumptions tend to define the task and roles of a particular sex, thus enhancing role and behavioural identity for the individual. It could influence what a person is expected to do or not. It also influences the person's belief in respect of being a male or female.

In the educational system, gender is important as it tends to influence the pattern of school enrolment and academic performance of students. This is partly because gender roles affect familiarity with academic content, career aspirations, attitude toward subjects, teacher expectations and preferred approaches which also affect academic performance [4,5]. In most societies, gender role has relegated females to the sidelines, preventing them from participating in and benefiting from educational and development efforts.

In the recent times, the gender factor has assumed prominence in science vocational and technical education discourse. It has been documented that disparity exists between male and female students performance in these disciplines. In some cases boys had an edge over girls in academic achievement [6,7]. On the other hand, it was reported [8] that such a difference does not exist. However, it was observed [9] that in some countries in conformity with certain traditions, technical and vocational education is regarded predominantly for boys only and that attempts are being made to facilitate girls' attendance in technical and vocational institutions. This sex biased tradition of technical education still exists in Nigeria. Women have little or no access to some programmes. Many scholars have researched into gender differences in academic performance especially in sciences and mathematics. Many have found that the male students performed better than their female counterparts [10,11,

12,13,14,15,16]. But, a few scholars have also found no significant difference in academic performance in science and mathematics between male and female students [17,18,19].

The controversy as to which of the sexes would have better academic performance therefore, continues. The same can also be said with regards to Electronic work trade. It was discovered (Owoso, J.O. University of Nigeria, Unpublished thesis) that there was significant difference between boys and girls in academic achievement in Automobile technology trades in technical colleges. It is better to look beyond gender characteristics into the interaction between individual learner's specific characteristics and particular features of instructional treatment in order to determine the reasons for academic performance? The trait-treatment interaction theory suggests that there is a connection between personality traits of the learner and variables of the instructional situation and that the effect of learning must be interpreted as the result of that interaction [20].

Since learners have individual differences with different features of the instructional situations which may appeal to them, it is therefore, assumed that they would find a common ground not only for learning but for retaining what is learnt through reflective inquiry (critical thinking and inquiry) instructional technique. Inquiry is a term used in science and other related fields to refer to a way of questioning, seeking knowledge or information or finding out about phenomena [21]. They also explained that it involves investigation, searching, and doing, formulating hypotheses, gathering and interpreting data and arriving at a conclusion. Critical thinking is a reflective thinking which involves mentally engaging in cognitive processes to understand conflicting factors [22,23,24]. This mental engagement results in a person actively constructing knowledge about a situation in order to develop strategies for proceeding within that situation. Students must reflect on their previous understanding of the issue and their newly acquired knowledge in order to respond to an issue. Thus reflection helps students to develop higher-order thinking skills and prompt them to relate new knowledge to their prior understanding, think in both abstract and concrete terms, apply specific to a given tasks and understand their own thinking and learning [25].

Reflective inquiry is therefore, a thinking process through which individual can examines their experiences to better understand the assumptions and implications of events and actions in their lives [26]. The process of reflective inquiry entails asking penetrating questions, challenging assumptions and carefully examining the implications of their actions and choices. This study was designed to determine

if gender difference would occur when students are exposed to Electronic works trade through reflective inquiry instructional technique.

Research Questions

1. What is the influence of gender on students' mean achievement scores in Electronic works trade?

2. What are the mean scores of students taught Electronic works trade with Reflective Inquiry instructional technique and those taught using the conventional teaching methods in the test for retention of learning?

Hypotheses

HO₁: There is no significant difference between the mean achievement scores of boys and girls taught Electronic works trade with reflective inquiry instructional technique.

HO₂: There is no significant difference between the mean scores of boys and girls taught Electronic works trade with reflective inquiry instructional technique in the test for retention of learning.

2. METHODS

2.1 Design of the Study

The study adopted the quasi-experimental research design. The research makes use of pre-test, post-test non-equivalent control group design. The researcher randomly assigned intact classes to treatment and control group. This was necessary in order not to disrupt the normal classes of the students and the school timetable. The design of the study was in the following ways:

$E_G, O_1 - O_1;$

$C_G O_1 - O_1;$

Where E_G stands for experiment group;

C_G stands for control group;

O_1 stands for pre-test/post-test observation;

X stands for the treatments using Reflective Instructional Technique;

- stand for the use of the Conventional method.

The independent variables consisted of conventional method and reflective inquiry instructional technique, while the dependent variables were the posttest and the retention tests.

2.2 Participants

The 105 participants of this study comprise year II students of Electronic works trade in all the technical colleges that offer Electronic Work Trade in Lagos state. The entire population was 105 made up of 76 boys and 29 girls.

2.3 Research Instrument

The instrument for data collection for this study consists of Electronic works trade achievement test (EWTAT). The EWTAT which was used to test the achievement and retention of students in Electronic works trade was developed based on the test blue print table. The pretest and posttest items were developed based on CRT 12 (Electronic Devices and Circuits) module. It consists of 30 multiples choice items with five options. The construction of the test blue print was based on National Board for Technical Education (NBTE) Electronic works trade curriculum and course specifications 2008. The test items covered all the contents of the lesson plans developed to cover the major topics used for the study. The Reflective Inquiry lesson plan was used to teach the experimental group while the control group was taught with conventional lesson plans.

The instrument was validated in the following ways. The face and content validities were determined by experts in electronic works trade, test and measurement and language education. The pilot tryout of EWTAT was conducted in Federal Science and Technical College Ijebu-Mushin, Ogun State and the psychometric test analysis was carried out to determine the Difficulty and Discrimination Index of each item in the test. An item is good if it has Difficulty Index ranging from 20 to 80; Discrimination of 0.20 and above and its entire distractor index a negative decimal [27]. Therefore, a total of the 30 items of the EWTAT had good difficulty, discrimination and distractor indices.

The trial test for determining the coefficient of stability of the EWTAT was carried out using test re-test reliability technique using two weeks interval. The reliability coefficient of the instrument was found to be .83 using Kuder Richardson formula 20 ($K - R 20$), since the test items are of multiple choice types.

2.4 Experimental Procedure

One week intensive training programme was organized for the teachers that were involved in the study. The training exercise was based on the purpose of the study, the topic to be taught, the use of the lesson plans, the use of instrument and

general conduct of the study. The conduct of the study took place during the normal school lesson periods. On the first day, before the lesson commenced, EWTEAT was administered as pre-test to both the experimental and control groups after which proper teaching commenced by using the prepared lesson plans. The experimental group was taught with reflective inquiry lesson plans while the control group was taught with the conventional lesson plans. Each lesson lasted for 90 minutes and the treatment lasted for 10 weeks. At the end of the treatment, a posttest was administered on both groups with the EWTEAT; the scores obtained from both groups were compared to determine if there is any significant difference in the performance of the two groups. The data collected was used for further analysis; therefore they were collected and kept under the custody of the researcher.

2.5 Reflective Inquiry and Classroom Teacher

Inquiry and critical thinking have been universally accepted as being the ideals and central aim of education [28]. It refers to the activity engaged in to overcome a situation of doubt to generate knowledge with provisional and tenuous results posited in the light of new experience and insight. For reflective inquiry to have some practical value in a school environment with its multidisciplinary nature and developmental levels, reflective inquiry should be viewed as an overreaching concept and **method** (Institutional learning plan, 2003, University of Calgary). In reflective inquiry classroom, teacher has the following roles to play: a. guides **learner and assist students** to discover **meaning to a given** task which **encourage** them to become self-regulatory, self-mediating and self-aware, b. models learners' thoughts, commitments, beliefs and **attitudes** by helping students to reflect on the consequences of specific actions and thoughts in the learning process, c. guides the students and motivate the learners to put challenge into learning and transfer their current learning to **a new situation**, d. guides **the students to** form relationship between concepts, ideas, processes and principles of operation of devices, functions of the devices, e. guides the students to build on the existing concepts, principles and principles of operation of appliances and system, f. **guide the learners to reach their goals** by facilitating **learners ability** to build on existing concepts, knowledge, principles and internalize new information to become independent students, develop a deeper understanding of fundamental ideas and problem solvers, g. guide the students to structure information into organizational patterns and provide a framework for what to be learned. h. guides the students to

question **prompt tacit assumptions** by asking penetrating, prompt and leading questions that will help the students to uncover meaning, and lead them to the solution of some specific tasks, i. guides and provides classroom environment that will enable students to learn and work in groups to discuss, think, proffer solution to problems and accomplish specific tasks, j. encourages bright students or **more experienced** and skillful students, to guide, coach and teach the dull or less skillful students to accomplish specific tasks, and k. takes on the role of a coach **or guardian** and engages learners in active dialogue to encourage critical thinking, debate and reflection on specific tasks.

2.6 Data Analysis

Data collected were analyzed using the appropriate descriptive and inferential statistics of the statistical Package for the Social Sciences (SPSS) Programme. In testing for the possible post-experimental difference in achievement and retention between males and females, the Analysis of Covariance (ANCOVA) was used and the hypotheses were tested at 0.05 level of significance.

3. RESULTS AND DISCUSSION

3.1 Research Question 1

What is the effect of gender on academic achievement of students studying Electronic works trade?

The data presented in Table 1 show that male students taught Electronic works trade with reflective inquiry technique had a mean score of 4.37 in the pretest and a mean score of 25.03 in the posttest making a pretest, posttest mean gain in the male students taught with reflective inquiry techniques to be 20.66. Meanwhile, female students taught Electronic works trade with reflective inquiry technique had a mean score of 4.54 in the pretest and a posttest mean of 24.45 with a pretest, posttest mean gain of 19.91. Also, male students taught with conventional method had a mean score of 4.25 in the pretest and a mean score of 19.22 in the posttest making a pretest, posttest mean gain in the male students taught with conventional method 14.97. Meanwhile, female students taught Electronic works trade with conventional method had a mean score of 4.33 in the pretest and a posttest mean of 17.61 with a pretest, posttest mean gain of 13.28. With these results male students taught Electronic works trade had higher mean scores than female students in the Achievement

Test. Thus, there is an effect attributable to gender on the achievement of students taught Electronic works trade.

Table 1. Mean of Pretest and Posttest of Male and Female Students Taught Electronic works trade in the Achievement Test

Gender	Reflective Inquiry Techniques				Conventional Method			
	n	Pretest	Posttest	Mean Gain X	N	Pretest	Posttest	Mean Gain X
Male	32	4.37	25.03	20.66	44	4.25	19.22	14.97
Female	11	4.54	24.45	19.91	18	4.33	17.61	13.28

3.2 Research Question 2

What are the mean scores of boys and girls taught Electronic works trade with Reflective Inquiry instructional Technique in the test for retention of learning?

The data presented in Table 2 shows that boys had a mean score of 35.67 in the post-test and a mean score of 34.33 in the test for retention. The girls also had a mean score of 35.48 in post- test and a mean score of 34.98 in the test for retention. The result indicates that the girls performed better than male students in the test for retention of learning.

Table 2. Mean of Boys and Girls Taught Electronic works trade with the Reflective Inquiry Instructional technique in Achievement Post-Test and Test for Retention of Learning

Group	N	Post-test	Test for Retention
		X	X
Male	76	35.67	34.33
Female	29	35.48	34.98

Hypotheses

HO₁: There is no significant difference between the effect of gender (male and female) on students achievement in Electronic works trade.

HO₂: There is no significant difference between the mean scores of boys and girls taught Electronic works trade with reflective inquiry instructional technique in the test for retention of learning.

The data presented in Table 3 shows F-calculated values for mean scores of experimental and control groups in the achievement test, gender and interaction effect of treatments and gender on students' achievement in Electronic works trade. The F-calculated value for Group is 151.225 with a significance of P at .000 which is less than .05. The null-hypothesis was therefore, rejected at .05 level of significance. With this result, there is a significant difference between the mean achievement scores of

students taught Electronic works trade with reflective inquiry instructional techniques and those taught with conventional method. The F-calculated value for gender is 4.835 with a significance of P at .030 which is less than .05. This means that there was significant difference between the effects of Gender on students' achievement in Electronic works trade. Therefore, the null hypothesis of no significant difference between the effect of gender (male and female) on students' achievement in Electronic works trade is rejected at .05 level of significance. The interaction of treatments and gender has F-calculated value of 1.004 with significance of P of .319. Since .319 is higher than .05, the null hypothesis for interaction effect of treatment and gender is accepted. Hence, there is no significant interaction effect of treatments given to students and their gender with respect to their mean scores on the Electronic works trade Achievement Test.

HO₂: There is no significant difference between the mean scores of boys and girls taught Electronic works trade with reflective inquiry instructional technique in the test for retention of learning.

Table 3. Summary of Analysis of Covariance (ANCOVA) for Test of Significance between the Mean Scores of Experimental and Control groups in the Achievement Test, Effects of Gender and Interaction Effect of Treatments given to Students and their gender with respect to their mean scores on the Electronic works trade Achievement Test

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	992.311 ^a	4	248.078	47.871	.000
Intercept	1706.006	1	1706.006	329.203	.000
Pretest	3.478	1	3.478	.671	.415
Group	783.680	1	783.680	151.225*	.000
Gender	25.059	1	25.059	4.835*	.030
Group * Gender	5.202	1	5.202	1.004	.319
Error	518.223	100	5.182		
Total	48999.000	105			
Corrected Total	1510.533	104			

*Significant at sig of P < .05

Table 4 shows that the F-value for group is 6619.048 with significant of P at .000, which is less than .05. The null-hypothesis was therefore, rejected at .05 level of significance. With this result, there was significant difference between the mean scores of students taught Electronic works trade with reflective inquiry instructional technique and those taught using conventional teaching method in test for retention

Table 4. Summary of Analysis of Covariance (ANCOVA) Test of Significance between the Mean Scores of Experimental and Control groups in the Retention Test

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of P
Covariates	23.924	1	23.924	2.777	.097
	23.924	1	23.924	2.777	.097
Main Effects	57028.997	1	57028.997	6619.048	.000
	57028.997	1	57028.997	6619.048	.000*
Explained	57031.555	2	28515.669	3309.660	.000
Residual	2903.555	337	8.616		
TOTAL	59934.894	339	176.799		

*Significant at sig of $P < .05$

The findings of this study have revealed that male students had a higher mean score in the Electronic works trade achievement test than that of female students. At the same time, analysis of covariance was employed to test the second hypothesis, Table 3, at the calculated F-value (4.835), significance of P (.030) and confidence level of .05, there was a significant difference between the main effects of gender (male and female) on students' achievement in Electronic works trade which confirmed that the difference between the achievement of male and female students in Electronic works trade was statistically significant favouring boys. The obvious implication of this finding is that there was an effect attributable to gender on achievement of students in Electronic works trade. This finding is similar to findings of several other studies that were conducted on gender effects on achievement of male and female students in mathematics, sciences and technology fields. For instance, one of the important discoveries emerging from studies involving the effect of inquiry based instructional approach on academic achievement was the revelation of gender differences favouring boys. This also affirms that disparity exists between male and female students' performance in mathematics, sciences and technology fields [10,11], and in some cases boys had an edge over girls in academic achievement [5]. Generally, boys were consistently found to perform better than girls on vocational and technical achievement tests, suggesting that boys generally possess greater vocational and technical skills than girls. Male advantages in vocational and technical skills have been established in studies conducted by scholars [Owoso, J. O. University of Nigeria, Unpublished thesis, 29], where the trends of gender differences were found to be stable and consistent. Thus, in studies where differences in achievement were evident males typically had stronger vocational and technical skills than girls. The identified gender effect on achievement in Electronic works trade was responsible for the significant gender effect found in students' achievement in Electronic works trade. Thus,

the superiority of male students in vocational skills acquisition was responsible for their improved achievement in Electronic works trade.

These findings revealed that students taught with reflective inquiry instructional technique had a higher mean score than those taught with the conventional teaching method in the test for retention of learning. The analysis of covariance of the retention test presented in Table 4 confirmed that the difference in the mean score of the students taught with the reflective instructional technique and those taught with conventional teaching method is significant. This showed that the reflective inquiry instructional technique has positive effect on the students' retention of learning in Electronic works trade. This affirms that active learning approach facilitates active knowledge construction, develops higher order thinking skills, improves memory and enhances transfer of learning to other situations [30,31]. Another author [32] was of the opinion that by teaching students to think, they will gradually begin to realize that conscious reflection secretes understanding. This finding is in support of many authors' views [Owoso, J. O. University of Nigeria, Unpublished thesis, 33,34], that retention of learning is not affected by gender but by the degree of original learning, time at which retention is measured and the individual's working memory capacity among other factors. Thus since boys and girls were taught with the same method, they acquired the same degree of original learning hence, their retention of learning was not significantly different.

4. CONCLUSION

The study revealed that there was significant difference in the achievement and retention of boys and girls in Electronic works trade when taught using reflective inquiry instructional technique. The difference in achievement was in favour of boys while the difference in retention was in favour of girls. Also, students retained their learning for a longer time when they were allowed to think on possible solutions to a problem while engaging in practical activities with real objects, tools and machines collaboratively.

5. RECOMMENDATIONS

Based on the findings the following recommendations are made:

*Technical College teachers should adopt the use of the reflective inquiry instructional technique to the teaching of Electronic works trade.

*Ministry of education and administrators of Technical Colleges should always organize seminar, conferences and workshops to sensitize technical teachers on the use of reflective inquiry instructional technique.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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***Mirgorod artistic ceramic center – the history of creation.
The end of the 19th century and the beginning
of the 20th century***

Abstract: The research is devoted to separate aspects of the activities of Myrhorod ceramic institution at the end of the 19th century and the beginning of the 20th century. The achievement of the institutions and persons involved in the establishment of the center and the most famous school graduates were listed in the article.

Keywords: Myrhorod art and industrial school, ceramics, art.

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***Миргородський художньо-керамічний
навчальний осередок – віхи становлення.
Кінець XIX – перша третина XX століття***

Анотація: Дослідження присвячене окремим аспектам діяльності Миргородського навчально-керамічного закладу кінця XIX – першої третини XX століття. Перелічено досягнення установи, а також діячів, причетних до становлення осередку, та найвідоміших випускників школи.

Ключові слова: Миргородська художньо-промислова школа, кераміка, мистецтво.

Заклад, що проіснував нині вже більш як століття, виробив у різні періоди свого існування життєздатні форми та методи роботи, відповідав на непрості виклики часу. Подібний досвід у галузі підготовки вітчизняних майстрів-

художників з кераміки особливо цінний нині, коли втрачаються цілі види вітчизняної художньої культури і декоративно-ужиткового мистецтва.

Вивченню художніх процесів, особистостям мистецької культури на історичній Полтавщині присвятив кілька змістовних розвідок вчений мистецтвознавець В. Ханко [1]. Мистецькі навчальні заклади України глибоко досліджено у працях доктора мистецтвознавства Р. Шмагала [2]. Дослідженням різних аспектів керамічних виробництв присвячено праці доктора мистецтвознавства О. Школьної [3].

Художньо-промислова школа (1896–1918), Художньо-промисловий інститут (1918–1919), Художньо-керамічний технікум (1920–1929), Інститут будівельних матеріалів (1929–1933) – перелік назв закладу в означений період.

Початок керамічного навчального осередку було зроблено відкриттям Миргородської художньо-промислової школи (МХПШ) у 1896 році на базі керамічних майстерень. Варто зазначити, що звернення до керамічної справи у Миргороді не було випадковим: за козацьких часів у місті існував гончарський цех, поряд з Миргородом розташовані потужні осередки народного гончарства Хомутець та Комишня, наявні поклади високоякісних гончарних та вогнетривких глин (у долинах рік Хорол та Псел).

Ініціативи місцевої громадськості співпали з низкою заходів із підтримки традиційних промислів, котрі впроваджувало Полтавське губернське земство.

Навчальний процес був розрахований на п'ятирічний термін, діяли два відділення: художнє та будівельне, що проводило підготовку вчених – рисувальників та майстрів з гончарного виробництва, відповідно. Навчальний процес у закладі було побудовано за взірцем провідних художньо-промислових закладів Росії. У майстернях школи вивчалось виробництво фарфору, фаянсу, напівфаянсу, майоліки та кам'яного посуду (за напрямком тонкої кераміки); на будівельному відділі опановували виробництво цегли звичайної, вогнетривкої, облицювальної (від простої до фігурної), черепиці, підлогових плиток, каналізаційних труб, кахельне виробництво.

До викладання залучалися випускники провідних учбових закладів країни: Імператорської академії мистецтв, Центрального училища технічного рисуння (Санкт-Петербург), Строгановського училища технічного рисуння, Школи товариства заохочення мистецтв, а згодом з закордону (Коломийська гончарна школа, керамічні заклади Богемії).

Серед найвідоміших викладачів: художник-педагог, етнограф, архітектор О. Сластьон, засновник професійної школи латвійської кераміки Р. Пельше, керамісти-технологи П. Ваулін та Г. Монахов, художники-керамісти С. Патковський, М. та О. Білоскурські, Ю. Лебіщак, А. Боровичко.

Свідченням високого рівня влаштування практичної справи стало успішне виконання низки комерційних замовлень: фасадна майоліка для церкви у Новій Охті (Санкт-Петербург), фасадна майоліка для Єдиновірчої церкви, братського будинку та приватного будинку М. Ніконова, облицювальні кахлі для великої кількості печей та керамічні іконостаси для церков тощо. Вдалою була й виставкова діяльність школи: 1900 р. Міжнародна виставка керамічних виробів (золота медаль); 1902 р. Всеросійська кустарно-промислова виставка (бронзова медаль); 1905 р. Навчально-показова виставка (бронзова медаль), 1907 р. Всеросійська кустарна виставка з іноземним худ-пром. відділом (мала срібна медаль); 1907 р. Міжнародна промислово-будівельна виставка; 1908 р. Міжнародна будівельно-художня виставка (диплом за участь поза конкурсом); 1910 р. Південно-російська сільськогосподарська промислова та кустарна виставка (велика золота медаль); 1912 р. Міжнародна навчально-промислова виставка «Обладнання та устаткування школи» (велика золота медаль). У стінах закладу отримали освіту чимало діячів рідної культури, назвемо найвідоміших: І. Северин, М. Гаврилко, М. Микиша, М. Погрібняк, Р. Лісовський, І. Падалка, І. Українець.

Перша стадія існування установи була позначена процесами швидких змін у європейській архітектурі та мистецтві. З'являється низка напрямків, що можуть бути об'єднані узагальнюючою назвою модерн. Стильові метаморфози із затримкою проте переміщалися на схід континенту та зрештою вплинули на виробу керамічних майстерень МХПШ. Так, у архітектурно оздоблювальному обличкуванні та сакральній кераміці виразно простежуємо риси новацій візантійсько-руського характеру, експерименти з ефектними керамічними поливами. Вони були пов'язані із захопленням японським мистецтвом, притаманним одному з напрямів модерну. Наслідування рослинних мотивів у формі та декорі виробів школи означеного періоду – також риса вище згаданого стилю.

Часто носіями стильових рис були викладачі закладу. Зокрема, у кількох роботах з музею навчальної установи унаочнено не властиві художній кераміці ознаки станковізму у класицистичній формі. Одна з цих робіт (таріль «Свати» авторства О. Сластьона (випускник Імператорської академії мистецтв). Риси

віденської сецесії та рішення, властиві народній кераміці західних теренів України, можемо пов'язувати із впливом авторитету викладачів вихованців Коломийської гончарної школи С. Патковського, О. Білоскурського, Ю. Лебіщак, А. Боровичка й інших. Надзвичайне багатоманіття модерну заохочувало до пошуків, а національно-романтичне відродження, властиве згадуваному періоду, стимулювало вироблення власного виразного обличчя закладу на засадах української культури.

У період національно-визвольних змагань початку ХХ століття Україна на короткий період отримала шанс відновити державність. Трансформації зачепили й освітянську галузь. Миргородську художньо-промислову школу перетворено на художньо-промисловий інститут. Заклад діяв під орудою В. Кричевського – видатного архітектора, художника й великого українського патріота набув національних рис. Тоді тут працювали два відділи, відділ тонкої кераміки видозмінено на декоративно-народного мистецтва. До роботи залучилися провідні українські художники того часу: Ю. Михайлів, С. Налєпинська-Бойчук, М. Касперович, що були носіями новацій у національному мистецтві, читав лекції з історії мистецтва В. Щербаківський [4]. Серед вихованців закладу відомі О. Саєнко, О. Бізюков, О. Стельмах, О. Статива, С. Томах, В. Філянська. Заклад проіснував лише один рік, проте створив передумови для успішної, плідної роботи осередку в наступні періоди.

Захоплення влади більшовиками стало початком згубних процесів, що менш ніж за десятиріччя призвели до нищення усього національного. Проявилися ці процеси й у творах з майстерень закладу, який з часом цілком позбувся художнього відділення. Натомість прийшла облуда тоталітаризму, що у керамічних виробках набуде форм пропагандистського характеру. Проте ще на початку існування Миргородського художньо-керамічного технікуму за умов політики українізації проводилась робота майстерень, де виготовлялись вироби національні за змістом та формою. Робота викладачів-новаторів на ґрунті українських традицій (С. Налєпинська-Бойчук, М. Касперович, І. Падалка) не минулася даремно. З'явилася низка виробів з ознаками бойчукізму. У цей період серед викладачів відомі митці: О. Сластьон, Є. Сагайдачний, Ф. Красицький, Ф. Балавенський, І. Українець, О. Білоскурський та інші. Вироби вихованців експонувалися на численних виставках, у тому числі зарубіжних (1923 р. Всесоюз-

на кустарна та сільськогосподарська і кустарно-промислова виставка – почесний диплом другого ступеня, 1927 р. Всеукраїнська ювілейна виставка).

Виробам, виготовленим у зазначений період, властива творча інтерпретація народної традиції. Випускниками закладу стали: М. Котенко, М. Матвійів, В. Панащатенко, Т. Балавенська, І. Мороз, Є. Литвиненко, В. Лиско. Із впевненістю можна стверджувати, що ця доба існування закладу була однією з найпродуктивніших, а МХПШ стала одним з центрів національної культури в регіоні. У подальшому технікум мав трирічну форму навчання, також діяла дворічна професійна школа. Розподіл на відділення відбувався за принципом: художнє (тонкої кераміки), яке очолював О. Сластьон, та технічне (грубої кераміки) на чолі з М. Білоскурським.

Важливу роль у навчальному процесі, як завжди, відігравали майстерні закладу, серед яких відомі (назви змінювалися): порцелянова, фаянсова, майолікова, майоліково-фаянсова, скульптурна, керамічного малювання, декоративно-будівельна, кам'яномасово-шамотова, майстерня будівництва спеціальних печей та учбово-показова цементно-пісочна. Поряд з основною – навчальною, майстернями здійснювалася й виробничо-комерційна діяльність. Зокрема, виконувалися замовлення на виготовлення: хімічно-порцелянового посуду, порцелянових вакуум-апаратів, порцелянових чашок для лабораторії, попільничок, подарункових келихів. Слід відзначити, що виконання майстернями Миргородського навчально-керамічного центру комерційних замовлень із залученням учнів стало традицією, відомою ще з перших років існування закладу. Тісна робота молодих керамістів з досвідченими майстрами сприяла передачі майстерності і вкоріненню певних традицій установи.

З відмовою від політики українізації відбулося посилення комуністичного ідеологічного тиску. Орієнтація на великотиражне виробництво, пов'язане з індустріалізацією, диктувало нові підходи. З виробів учнів зникають знайомі національні мотиви, виконані ретельно із застосуванням складних технік декорування. Натомість бачимо спрощення із застосуванням супрематично-авангардистських форм, які часто доповнювалися агітаційними лозунгами-закликами на кшталт: «Пролетарі всіх країн, єднайтеся» чи «Виконаймо зустрічний». Техніка виконання подібних речей – аерограф, трафарет, що найкраще підходить для масового виробництва.

На жаль, з часом умови розвитку в лещатах соцреалістичного режиму фізично знищили багатьох митців, причетних до становлення миргородської навчально-керамічної інституції (М. Касперович, С. Налєпинська-Бойчук, І. Падалка).

Наприкінці 1920-их особливо помітною була постать І. Українця, митця-кераміста, що за складних обставин, зазнаючи шантажу та утисків, все ж виконував обов'язок педагога, розкриваючи тонкощі керамічного ремесла.

1929 року Художньо-керамічний технікум у Миргороді було реорганізовано у навчальний комбінат (інститут будівельних матеріалів, робітфак і технікум), проте художньому відділенню вже місця не було.

Слід відзначити, що сторінки історії цієї установи пов'язані із періодом розвитку за умов вільної праці на засадах новітніх течій на ґрунті традиційної національної культури. Також винятково важливим на першу третину ХХ століття було місце особистості висококультурного, освіченого вченого-педагога, здатного власним прикладом повести учня за собою.

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Structural and pedagogical model of professional competence forming of logistics officers during their professional training

Abstract: The article shows the feasibility of using pedagogical modeling to improve the professional competence of future logistics officers. The main focus is on the characterization of approaches and principles used to build structural and pedagogical model. The model has a block structure, it consists of individual blocks, between which there is a clear correlation. Methods, approaches (systemic, active, competent, acmeological) and principles (scientific, context, elective, problematic, technologizing, awareness of reflexivity) are characterized, which were the basis of structural and pedagogical model.

Keywords: logistics officers, professional competence, pedagogical modeling, structural and pedagogical models, methods, approaches, principles.

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Структурно-педагогическая модель формирования профессиональной компетентности будущих офицеров тыла в процессе профессиональной подготовки

Аннотация: В статье раскрыто целесообразность использования педагогического моделирования для совершенствования профессиональной компетентности будущих офицеров тыла. Главное внимание сосредоточено на ха-

рактике подходов и принципов, которые используются для построения структурно-педагогической модели. Модель имеет блочную структуру, состоит из отдельных блоков, между которыми есть четкая взаимосвязь. Охарактеризованы методы, подходы (системный, деятельностный, компетентностный, акмеологический) и принципы (научности, контекстности, елективности, проблемности, технологизации, осознанности рефлексивности деятельности), которые положены в основу разработки структурно-педагогической модели.

Ключевые слова: офицеры тыла, профессиональная компетентность, педагогическое моделирование, структурно-педагогическая модель, методы, подходы, принципы.

Отметим, что практика ведения военных операций требует внесения существенной коррекции в профессиональную подготовку будущих офицеров тыла во время обучения в высших военных учебных заведениях. Довольно часто от профессиональной компетентности офицеров тыла зависит успех всей военной операции. Сегодня в корне меняется стратегия профессиональной подготовки офицеров. На первый план выходит поиск и отбор научной информации, необходимой будущему профессионалу для дальнейшего совершенствования своей профессиональной деятельности, причем «конкурентоспособность базируется не на сумме усвоенных во время обучения знаний, а на умении их творческого применения и способности самостоятельно их пополнять» [7, с. 23].

В практическом аспекте, исследуя теоретические и практические пути совершенствования профессиональной компетентности будущих офицеров тыла, мы пришли к осознанию необходимости использования педагогического моделирования. Именно педагогическое моделирование позволит выйти на новый уровень качества профессиональной подготовки. Результатом педагогического моделирования является разработка структурно-педагогической модели. Под моделью формирования профессиональной компетентности будущих офицеров тыла в процессе профессиональной подготовки мы понимаем графическое изображение, которое отражает основные характеристики, базируется на общем образе будущего офицера тыла.

Коротко обоснуем, почему мы используем термин «структурно-педагогическая» модель. В нашем видении, структурной будет такая модель, которая состоит из совокупности структурных блоков, включающих конкретные

элементы между которыми установлена четкая взаимосвязь, причем механизмы связи всех блоков создают целостную внутреннюю структуру. Модель признано педагогической, учитывая то, что в ее основу положены педагогические подходы и принципы формирования профессиональной компетентности, а главным детерминантом ее действенности выступают обоснованные педагогические условия.

С целью разработки структурно-педагогической модели формирования профессиональной компетентности будущих офицеров тыла в процессе профессиональной подготовки нами были использованы адекватные авторскому замыслу методы исследования. В частности, анализ официальных и нормативных документов, философских, социологических, психологических и педагогических работ был произведен с целью обоснования модели. Особое внимание уделялось изучению военной педагогики и психологии, которые помогли выявить составляющие профессиональной компетентности офицеров тыла и оговорить блочную структуру модели. Нами использовались: систематизация и обобщение теоретических положений для разработки составляющих модели и выделения действенных педагогических условий; структурно-системный анализ, который обеспечил комплексность исследования эффективности разработанной структурно-педагогической модели; обобщение и коррекция экспериментальных данных для научного обоснования педагогических подходов к формированию профессиональной компетентности будущих офицеров тыла. Мониторинг, анкетирование, наблюдение, тестирование, интервьюирование, беседы, анализ продуктов деятельности, метод экспертных оценок как эмпирические методы имели действенное влияние на выявление противоречий в методике традиционного обучения и введение педагогических инноваций в процесс формирования профессиональной компетентности будущих офицеров тыла. Основным методом признано педагогический эксперимент, который позволил проверить эффективность разработанной структурно-педагогической модели в учебный процесс Военной академии (г. Одесса).

В методическом аспекте, при разработке структурно-педагогической модели формирования профессиональной компетентности будущих офицеров тыла, во внимание были приняты советы А. Масля [4]. Учитывая их, в модели в графическом виде была отражена способность будущих офицеров тыла к саморазвитию в личностной и профессиональной сфере. В основу практической

деятельности по разработке структурно-педагогической модели положены рекомендации А. Марковой [3], о взвешенном подходе к разработке отдельных структурных блоков.

Таким образом, нами было разработано структурно-педагогическую модель, которая состояла из совокупности конкретных структурных блоков, между которыми была установлена четкая взаимосвязь. Все блоки в модели создавали целостную внутреннюю структуру и были направлены на результат – существенное повышение профессиональной компетентности будущих офицеров тыла. Эффективность модели определялась соблюдением конкретных требований: 1) соответствием разработанной модели той реальности, в которой происходит профессиональная подготовка будущих офицеров в высших военных учебных заведениях; 2) последовательным внедрением разработанной модели в профессиональную подготовку будущих офицеров тыла; 3) легкостью применения составляющих структурной модели в теории и практике организации учебно-воспитательного процесса.

Отметим, что в основу методологического блока было положено конкретные подходы и принципы. Так, к основным подходам, на которые сделан акцент при формировании профессиональной компетентности офицеров тыла, отнесены: системный, деятельностный, компетентностный и акмеологический. В частности, системный подход дал нам возможность рассматривать процесс профессиональной подготовки будущих офицеров тыла с позиции целостности. Во время его внедрения, мы принимали во внимание тот факт, что профессиональная подготовка будущих офицеров это достаточно сложная педагогическая система с четким содержанием, иерархией структурных элементов в учебном процессе. Деятельностный подход предусматривал формирование активной позиции будущих офицеров во время учебной деятельности. На его основе можно осуществить существенное влияние на изменение в личностных взглядах курсантов на целесообразность формирования профессионализма. Использование деятельностного подхода было направлено на совместную деятельность офицеров с преподавателями в реализации профессиональных целей. Компетентностный подход признан профилирующим в профессиональной подготовке будущих специалистов. Он предусматривал формирование таких компетенций, как: заданные навыки (требование выполнять определенные индивидуальные задания) использование знаний и умений на рабочем месте на

уровне установленных требований (стандартов) к данной работе; способность ответственно выполнять обязанности; способность находить решения в нестандартных ситуациях и применять знания в новых условиях производственной деятельности [2, с. 96-97]. Акмеологический подход базировался на концепции профессионализма и состоял из четырех взаимосвязанных подсистем: 1) профессионализма будущего офицера как личности; 2) профессионализма его профессиональной деятельности; 3) нормативности профессиональной деятельности и поведения; 4) сформированной «Я-концепции» [6].

На основе изучения наработок военных педагогов была избрана конкретная логика практической деятельности по внедрению выделенных подходов, которую представляем в виде взаимообусловленных шагов: 1) анализ общей и специальной профессиональной подготовки будущих офицеров тыла; 2) определение цели в формировании у подавляющего большинства курсантов надлежащего уровня профессиональной компетентности; 3) конкретизация задач, которые необходимо выполнить; 4) непосредственное практическое внедрение подходов в учебно-воспитательный процесс; 5) обобщение результатов в конкретных научно-методических продуктах (научно-методическое обеспечение, тренинговые программы, деловые игры, конкретные проблемные учебные ситуации).

К основным принципам отнесены принципы научности, контекстности, елективности, проблемности, технологизации, осознанности рефлексивности деятельности. Так, принцип научности предполагает включение в содержание профессиональной подготовки курсантов только достоверных научных фактов. Отметим, что научность, прежде всего, предусматривает невозможность искажения научной информации и базируется на необходимости усвоения будущими офицерами методов научного познания. На основе внедрения принципа контекстности подготовка будущих офицеров направляется на жизненно важные цели, которые реализуются в Вооруженных Силах Украины. Этот принцип является целесообразным, учитывая то, что контекст – это «система внутренних и внешних условий поведения и деятельности человека, который влияет на восприятие, понимание и преобразования человеком конкретной ситуации» [1, с. 40]. В практическом смысле он предусматривал выработку практических умений по выполнению адекватных социальных ролей с учетом профессиональной деятельности офицера тыла. Принцип елективности предусматривает

предоставление курсантам определенной свободы в выборе содержания и средств учебной деятельности. Этот принцип базируется на сочетании интересов личности курсантов и образовательных требований самого высшего военного учебного заведения. В практическом смысле он был направлен на целостное развитие личности курсантов, творческий и практико-ориентированный характер их обучения и базировался на опережающем характере обучения. Исключительно важным в формировании профессиональной компетентности является принцип проблемности, ведь он отражает закономерности изменения структуры профессиональной подготовки в сочетании с методами обучения на основе логико-познавательных противоречий учебно-воспитательного процесса. В контексте этого принципа основными требованиями к содержанию теоретического материала были системность содержания, форм, методов и средств изучения профессионально ориентированных учебных дисциплин и высокий уровень обобщенности понятий. Этот принцип оговаривал целенаправленную деятельность преподавателей по постановке учебных проблем, касающихся совершенствования профессиональной компетентности будущих офицеров. В целом, он ориентировал преподавателей на целенаправленное создание проблемных ситуаций и детерминировал необходимость разработки соответствующего учебно-методического обеспечения. На основе работ П. Матвиенко [5] было выделено принцип технологизации, который подчиняет весь учебный процесс усвоению практических технологий по формированию конкретных умений и практических действий в выбранной сфере. Мы исходили из того, что технологизация предусматривала практическую деятельность преподавательского состава в предметной области и обеспечивала соответствие результата поставленным целям по формированию профессиональной компетентности. Этот принцип предусматривал сочетание двух начал – практического и педагогического, а также направлял образовательные программы на совершенствование профессиональной компетентности будущих специалистов. Он был профилирующим при организации практики будущих офицеров тыла и базировался на определении комплекса профессионально важных качеств будущих специалистов и играл важную роль в формировании творческого потенциала курсантов. Принцип осознанности рефлексивной деятельности в области формирования профессиональной компетентности курсантов предусматривал понимание ими всех своих действий по повышению результативности деятельности. Этот

принцип базировался на креативном подходе к рефлексии. Считаем, что его максимальная реализация поможет повысить уровень личностного роста, а также повысит эффективность самоконтроля будущих офицеров.

Вывод. Формирование профессиональной компетентности будущих офицеров тыла в процессе подготовки в высших учебных заведениях должно базироваться на использовании педагогического моделирования. Его использование приведет к разработке и внедрению в учебно-воспитательный процесс высших военных учебных заведений структурно-педагогической модели. Такой подход позволит существенно усовершенствовать все показатели профессиональной компетентности будущих офицеров тыла.

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The development of a dual training system

Abstract: This article describes the dual education, which last decade, are widely used in a variety of higher and secondary educational institutions of the Republic of Kazakhstan. The authors reviewed the history of the birth of dual education, the history of the development, of this system in Germany, Russia, Georgia, Kazakhstan. The paper provides concrete data on the dual system of education in the Kazakh Agro-Technical University S. Seifullin.

Keywords: dual learning, dual system, the student production.

Information about the dual training

Rigid and constantly increasing competition, forcing employers to reduce the volume of vocational training in the workplace; difficulties in agreeing the content of learning between the enterprise and vocational school, leading to the reduction of the

role of teaching and working environment and thus to a decrease in the share of practical training in the workplace, all of this led to the choice of article topics.

President Nursultan Nazarbayev in his annual address to the called local companies and higher education institutions of the country to participate in the dual system of education, stressing that "today, the dual system has been successfully operating in 60 countries around the world", that is necessary to generate a wide range of business cooperation mechanisms and educational institutions, "so that future professionals can get the necessary skills directly to enterprises, and the one who is already working, able to enhance their skills, career change, if necessary - and the sphere of activity" [1].

Vocational education has never conceived without relation to the production area. Of particular interest in the dual training system in Kazakhstan is not accidental.

The dual education system - involves a combination of practical training at the enterprise in the profession with theoretical views of education in schools.

The history of the development of the dual form of vocational education has its roots in ancient times.

Vocational orderly and regulated in legal terms, there were more than a thousand years ago in Europe and Asia. Master had to instil in them the need for the development of a craft knowledge and skills, which he owned. However, the secrets of which existed in almost all crafts and provides the advantages of one over the other craft, often kept secret, reveal that students are not allowed.

Father of the dual system of vocational education is considered to Georg Kershtenshtayner (07.29.1854 - 01.15.1932) was a German teacher and. From 1895 to 1919 he headed the Munich city council and the school was engaged in folk reform of the school curriculum [2].

In the early 20th century in Munich Kershtenshtayner introduced a new, practice-oriented, type of school, who put her profession and the need for the spotlight. In the 1900/1901 academic year in Munich, it was founded the first professional school for butchers, confectioners, chimney sweeps, barbers and hairdressers. They have become an example of the new, a divided by profession, type of school, which was to supplement the production training.

The term "dual system" emerged only in the second half of the sixties in connection with the discussion introduced in 1969 on the Vocational Training Act. Since

then, the German system, which combines a state vocational school with production training is considered a world model, and exported to many countries [3].

At the federal level in Germany, the Law "On education", "Craft Code", "Directive on the availability of instructors", which regulate the relationship with the student enterprises and educational institutions. The law stipulates which enterprises can participate in training (from 500 thousand. Involved 3.6 million. German companies in the program of vocational training).

Modernisation of vocational education in the Republic of Kazakhstan determines the need for fundamental change in the number of traditional approaches to the system of training. To date, the dual training system - one of the most effective forms of training professional and technical personnel in the world, which is widespread in industrialized countries and is a major training system in more than 60 countries [4].

The dual system of education in Russia

The dual system in the interest of all participating parties - businesses, workers and the state.

For the enterprise - this is an opportunity to prepare for themselves images, saving on the costs of search and selection of employees, their retraining and adaptation.

For young people, the dual training - a great chance to acquire early independence and easier to adapt to adult life. Already during the training they receive for their work at the company cash consideration, and after it - a job to which well prepared.

Analysis of educational research suggests that in the modern system of vocational education especially important is the practice of dual training in Germany, Austria and Switzerland. Moreover, in most developed countries (US, UK, Finland, Korea, etc.) In the training system includes elements of the dual model [5, 44-47].

As additional tumors employers the ability of college graduates was observed to identify the different factors that influence the solution of production problems. Experts pointed compliance training requirements of employers, and the highest level of satisfaction in terms of "the ability to quickly learn the specifics of production" (99%), "duty, responsibility, commitment to professional growth" (98%), "the ability to apply theoretical knowledge in practice" (98%) and "the level of knowledge in the field of specialty" (98%) [6.161-163].

The dual training in Georgia

The German education system is in crisis, so Georgia should not use it as a role model, he says politician, former Minister of Education and Science Gia Nodia. In Germany, a rigid system, and it is difficult to reform. Why should we take as a model is a system in crisis (though stronger than ours)? Why not focus on the best?" [7].

Meanwhile, the Ministry of Education and Science of Georgia noted that the basic principle of the German model - a dual education, which means that the student has a lot of time and opportunities to engage with the learning and working process [7].

The German model of education, which includes the combination of study and work, will be introduced in Georgia in two or three years [8].

Reforms planned by the Government, provides for adoption of the German model of the education system in order to pay more attention to efficient system of vocational education. It is necessary to adequately prepare local personnel to respond to the basic principles and the requirements of economic development of the country, facing Georgia today, says T. Sanikidze [8].

"Every year we release five to ten times more bankers than is actually necessary to the banking sector. The same situation is in the legal direction and foreign relations ... Today we have no veterinarians, technologists in the field of animal husbandry and food industry, while the business is carried out important projects in animal husbandry".

According to him, businessmen account for their funds to send staff to Europe for training, while the government spends budget money on people who can not exactly find a job or have to retrain to find work.

"It should not continue", - the prime minister said, noting that such a solution could be to change young people's attitudes to the unclaimed higher education institutions [9].

The dual education system in Kazakhstan

As you can see, the situation with Russia and Georgia, the same as in Kazakhstan.

The dual training is one of the additional activities of SPE RK. I recall, in his message, "Kazakhstan's way - 2050: Common goal, common interests, common future" President of Kazakhstan Nursultan Nazarbayev noted that "in the next 2-3 years

it is necessary to form the nucleus of a national system of dual technical and vocational education", and "in the long term it is necessary to provide for the transition to the state guarantee of getting young people and technical education" [1].

The dual system of vocational training, recognized worldwide, is the most common and recognized form of training that combines theoretical training at school and job training at the manufacturing enterprise [10].

The seminar will focus on the accumulated experience, the prospects and the possibility of introducing elements of the dual training model with active participation in the training business, conducted trainings.

Experience in the use of the dual training system showed the following advantages of this system compared to the traditional: (A) the dual system of training eliminates the main drawback of traditional forms and methods of teaching - the gap between theory and practice; (B) in the mechanism of the dual training system inherent impact on the professional identity, creating a new psychology of the future employee; (C) dual system of training employees creates a high motivation to gain knowledge and acquire skills in the work, because the quality of their knowledge directly related to the performance of official duties in the workplace; (G) interest of heads of relevant institutions in the practical training of their worker; (E) an educational institution, to work closely with the customer and takes into account the requirements for the future experts in the course of training; (G) the dual training system can be widely used in the professional training of Kazakhstan in the coming years [2].

The dual education system has long been recognized worldwide. Widely distributed it in Germany and its economic successes eloquently about the value of the dual training [eleven].

At the initiative of the Chamber of Entrepreneurs of Almaty signed 44 agreement on dual training. As a positive example of effective co-operation will bring to the enterprise "AlmatyEnergService". Plant representatives participate in the drafting of the experimental curriculum, conduct practical training in the company, taking care of all the necessary expenses - depreciation of equipment, material consumption, special software. clothing and food. Before enrolling in college every future specialist signs the contract for the entire period of study with subsequent employment guarantee [10].

With regard to the specific tasks before the Kazakh agro-technical university task it is to prepare highly qualified specialists in their field. Especially the lack of zoo-technical staff felt across the country as a whole. Department of "livestock production and processing technologies" signed a contract with JSC "Asyl-Tulik" and "Astana-Onim" for dual training of specialists 5V080200 - livestock products. "Also, contracts were drawn up with the bases of the fundamental institutions of Astana. production associations data specialists examined 15 programs specifically chosen so close to the production process. These are the themes: assessment of the animals on external indicators; measurement of live weight, and external indicators; definition of daily weight gain; development of technology for care animals; assessment of the ability of reproduction; familiarization with each breed of animal; the definition of waste and production characteristics; Bulls score on private producers and indicators on the quality of the children and the like.

In view of the dual training for students 4 courses of 411, 412, 413 groups of the two subjects were selected: (1) "The Cattle" - 3 credits, 15 workshops of JSC "Asyl-Tulik" (2) "Equine" 3 credits, 15 workshops in partnership "Kazakh tulpars" LLP "Astana-Onim".

Conclusions

Intensive processes of structural changes occurring in the economy of the Republic of Kazakhstan, resulted in the highest demand for new formation specialists who have, on the basis of this historical, economic and political situation, flowing into the country, to successfully implement these processes. Practice, the interests of the economy, intensive development path, which moves our country, should dictate the goals, methods and content of technical and vocational education.

Analysis of the world experience in the use of the dual training system creates the preconditions for the implementation of the most effective of its parties in Kazakhstan's education system. And the introduction of the Kazakh model of dual training will help address the needs of determining the frame (the market will adjust staffing requirements).

An important innovation is the certification of graduates, ie future experts. Previously, young professionals - graduates was confirmed by the Commission on the final certification of educational organizations. Today, the Law "On Education" assignment procedure qualification graduates separated from the educational process. Since 2012, in accordance with the instructions of the Head of State in Kazakhstan

started work on the transfer of this function in a competitive environment, employers' associations. To date, three certification center set - in tourism, mining, and oil and gas industry [2].

Thus, the dual training system - an innovative type of organization targeted training, which involves the coordinated interaction of educational and production areas for training. The idea of a dual education takes its real practical circuits. The interaction of education with business, labor market actors - this is one of the components of a modern model that is demanded by society.

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***Practice-oriented environment of the institution:
a factor in increasing the quality of education
(for example, Kazakh Agro-Technical University
named after S. Seifullin)***

Abstract: Leading the beginning of training of students of higher educational institutions (in this case, the Kazakh Agro-Technical University (hereinafter KATU) is a close relation of training with labor-round development of autonomy and students' initiative - one of the most important conditions for the proper construction of the teaching of all agronomic disciplines, unless specifically: Physics, Chemistry, languages, computer science, etc .. The solution to these problems requires students to obtain higher education, had practical training, were able to link theoretical knowledge with practice. In light of these problems properly organized practical exercises the students acquire special importance. The given problem in an article.

Keywords: practice, guidance, training, competence.

According to S. Soloveitchik, there are three forces that lead students to learn obedience, passion and purpose. Obedience encourages goal beckons, and driven by passion. If students are indifferent to the subject, the hobby becomes a heavy burden [Shlyapina 2014]. Practice-oriented exercises and tasks form the students' ability to see their application and use by this knowledge in everyday life. These jobs allow you to not only create a positive motivation to study the subject, but also through the development of interest in the subjects (science, chemistry, physics, languages, etc.) to learn and produce excellent, high-quality, educated and competent experts [Selevko, 1998].

One of the components of the quality of education - students' competence in dealing with the real issues and problems that arise in real-life situations. Against this background, the practical component of the learning process is of great importance. Values are not just basic knowledge and the student's ability to apply this knowledge in practice, the ability to work under modified conditions, to find personal meaning in the content of education, to carry out self-reflection activities [Sofronova, 2006].

Therefore, we believe that the purpose of vocational training is not only to teach a person to do something, to acquire professional skills, but also to enable it to cope with various life professional situations.

Before we proceed to the immediate consideration of the nature of the practice-oriented approach to teaching students should clarify the meaning of the concepts of the nature, approach and practice-oriented training. The approach - a set of techniques, methods, impact on someone, something, to study anything in the conduct of the case. The essence - the totality of the essential characteristics and qualities of things, the substantial core of self-existence. Finally, practice-oriented learning - this type of training, the predominant purpose of which is to develop the students' skills and applied skills that are in demand today in various areas of social and professional practice, as well as the formation of understanding of where, how and for what obtained skills used in practice [Fatihova, 2005].

Jurisprudence (in our case computer science, pedagogical discipline, physics, chemistry, Kazakh and Russian languages) in high school cause a holistic process of professional socialization of students and the formation of social personality traits. Higher Education provides professional socialization and spiritual development of the individual. To the teacher there are special requirements on the part of society to moral norms of consciousness and behavior, motivation and obligation to profession-

al role characteristics of the individual. In this regard, there are actual questions of the formation of the teacher the most appropriate and effective methods and techniques of the educational activities, providing high its performance, implying the formation of his individual style. True style is found that makes the severity of teacher individuality, promotes democracy, efficiency of pedagogical influence on students, productive dialogue participants in this process, maximum disclosure of individual potential of each student [Kohanoeskaya 2014].

Scope of mass higher education is going through a fairly significant transformation under the influence of the requirements for its graduates, which makes the current social and professional practice. The main motive of such claims - the young person must be prepared in high school so that he could without any problems and delays included in the labor force, productive use of skills, experience and competencies obtained during the learning [From the Internet].

Under such conditions, the special weight begins to acquire one of the areas of educational practice - practice-oriented training, about which there is no certainty on the part of the general theoretical framework and from the forms and learning technologies. So far, only a series of statements is not in dispute - this kind of training should focus on specific practices, rather than textbooks, should be carried out in close co-operation of educational institutions and industrial organizations [Kohanoeskaya 2014].

A significant obstacle to the transition to a practice-oriented education is the lack of common procedures, which should develop appropriate educational form.

KATU S. Seifullin envisages strengthening of applied, practical character of higher technical education, the adequacy of its modern requirements of economy, science and social life.

Despite the importance of practice-oriented training for a modern vocational education, its content and form have not yet received adequate theoretical and methodological development.

In pedagogical theory and practice are not sufficiently substantiated the essential characteristics of professional formation of the future experts in the educational environment of the institution, there is no corresponding model, the implementation of which would provide an opportunity to improve the quality of training of specialists in different branches of production.

The educational process, built on the principle of practice-oriented training, ensures the effectiveness and attractiveness of the study: (1) for the students (in the form of the presence of variant places of practice); (2) for teachers (in the form of the possibility of updating the content of their work, as well as the release time to engage in the design and methodological activities); (3) The system of practice-based learning involves the revision of the existing educational process, setting new requirements for its content [Kryaklina, 2012].

According to the projected contact professional activities of specialists agronomic trends, graduate at the time of graduation must: (a) have the practical skills they mastered the direction of the educational program agronomic specialties disciplines; b) have the skills of analytical, operational, algorithmic, control and supervision, energy-saving, emergency and preventive, regulatory and information activities; c) be able to: work independently; plan their professional activity; formulate and solve professional problems; g) know: professional language; the device of the professional sphere; labor market unit of the city for their professional direction; theoretical and practical possibilities of the professional direction [Kryaklina 2014].

Practice-oriented approach in the training of specialists at the present stage of modernization of vocational education and industry needs independent, creative professionals, enterprising, entrepreneurial, can be profitable, offer and develop ideas and find innovative solutions and implement cost-effective projects.

Methodological aspects of the meet production needs and initiation of future professionals in the process of social transformation of society is the professional development of students. Without treatment vocational training to practice-oriented technology training and education of students is problematic enough to perform the tasks [Yasvin, 2001].

The most narrow approach links the practice-oriented training with the formation of the professional experience of students by immersing them in a professional environment in the educational, industrial and pre-diploma practice (Yuri Vetrov, N. Klushina).

The second approach (authors VT Dmitrienko, P. Patterns) with practice-oriented training involves the use of professionally-oriented training and simulation techniques technology fragments future professional activity through the use of contextual features (professionally oriented) study of relevant and non-core disciplines.

Third, the most comprehensive approach very succinctly formulated F.G. Yalalov in action-competence paradigm, according to which the practice-oriented education is aimed at the acquisition other than knowledge, abilities, skills - Experience of practice in order to achieve professionally and socially relevant competences [Material from the Internet].

Practical tasks students contribute to the development of very important volitional qualities needed in life: persistence and perseverance in work and in overcoming the difficulties encountered, the high sense of responsibility, hard work and diligence. We teach practical courses mainly in the first year. Therefore, always pay attention to that carrying a particular case study, students acquire a range of knowledge, acquire skills of independent solution of their tasks, learn more deeply and better the material on which the order was built. The practical tasks are specified knowledge that what was just in the mind, it is real, tangible, visible, real. In the process of their implementation is carried out to develop practical skills, appears and develops students' initiative, their creativity, which is very important in educational matter. Practical tasks prevent premature onset of fatigue, performed with great desire, interest and businesslike.

The program which provides only the main types of practical tasks, but they are, as observations show, the teachers are not fully implemented, some teachers sometimes only after passing the theoretical material, assign specific lessons for practical work; not always perform tasks available in textbooks. They should be carried out in close connection with the studied theoretical material; practical tasks should take place at all stages of the educational process.

The purpose of practical work can be different. Some of them formed and perfect knowledge, others - develop certain practical skills and help deeply understand and internalize the material under study, but it is clear that to hold them need to start from the beginning of systematic teaching, with the gradual complication of the content given by the tasks and sequential increase of the degree of independence of students in their implementation [Mikheev, 2007].

The quality of the students' knowledge and skills of practical work is determined, basically, the nature of its organization and involves greater mental activity of the future experts, stress their attention will attract students gained experience and the use of previously acquired knowledge.

Before the implementation of practical tasks, it is necessary to systematically prepare the students to carry out teaching job to fulfill these tasks, through detailed instruction, joint with the entire audience of preliminary exercises. A necessary condi-

tion for the preparation and conduct of practical work is a collective and active work of the entire audience in explaining new material [Skamnitskaya, 2006].

The first practical tasks are half-independent nature and are conducted under the direct guidance and supervision of the teacher in the classroom. In our university (KATU) is provided on the first classes take students so called members of the knowledge that at the end of the semester, trimester check how advanced a particular student in his direction (this is our case, with regard to employment in physics, chemistry, languages, computer science, pedagogical disciplines, etc.). The teacher monitors the implementation, in the course of doing the work necessary observations, guidance and assistance. Only then, when the teacher believes that students will be able to cope on their own, can be given practical exercises independent character.

Of great importance is the fact, as the task is made and how it is presented to the students. Tasks performed mechanically, without the necessary understanding and active mental work, pedagogically inappropriate. Any practical operation is feasible and should be quite difficult. It is important to foster the ability to spend on the job is not longer than necessary, and this teacher should do the work himself, and know how much you need her time and thus correlate with the time for students. The delay in the execution of tasks shows that the student possesses or bad by its execution or does not understand the assignment.

Conclusion

In organizing and carrying out practical tasks need to: (1) the students were prepared for their implementation; (2) the task based on the knowledge available to the students, that is, They were available; (3) there was no difficulty in understanding and performing the task; (4) drew the attention of students to the main; (5) students are stimulated to new efforts in the work of independent coping.

During the design phase of practice-oriented content of teacher education the following tasks: (1) the definition of criteria for the selection of practice-oriented content of the material; (2) determining the ratio of the theoretical and activity-related components in the learning process; (3) determination of the ratio of classroom and independent work of students in the development of practice-based learning content.

The content of the discipline reflects the capacity and complete knowledge of the relevant science - agronomic directions (specialties). Therefore, the content of the study subjects should reflect the modern level of development of the science and its specificity.

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Practice-oriented training in accordance with the idea of humanization of education

Abstract: Practice-oriented training in accordance with the idea of humanization of education can overcome the alienation of the human sciences, reveals the connection between knowledge and everyday life of people, the challenges facing them in the process of life. Along with the consistent and logical statement of the principles of science at all grade levels in each training topic contains material reflecting its value, place of a natural patterns in everyday life. In this article, the authors reviewed within practical-based learning information security.

Keywords: humanization, training, orientation, informative safety.

In modern conditions for information security professionals changing labor market should be able to solve complex professional tasks diverse.

According to the state educational standards of higher education of the third generation of students certain professional competence should be formed corresponding to the objectives and needs of potential employers [Bordovskaya, 2011].

Competence approach in teaching requires the ability to analyze, comparison, compare, organize, make decisions, predict the result of the action relate to the purpose of the nominated [Verbitsky, 2009].

The Eurasian National University (ENU) conducted systematic work aimed at developing future information security professionals the necessary competencies in accordance with the requirements of the educational standard and demands of potential employers. The emphasis is on the transformation of the education system so that the first to awaken the desire to solve professional problems, and then to teach a person to realize them.

Information security is not possible without the use of an integrative approach, as with the rapid improvement of digital technology increases the threat and the vulnerability of digital information. Implementation is the integrative approach allows you to create a holistic view of the upcoming professional activity. Such an approach is necessary both within any single discipline and interdisciplinary level. For example, considered in the course of the basics of information security topic for the identification and authentication of identity using biometric technologies can be built within the framework of advanced training, when combined with the appropriate sections of physics, mathematics, management activities [Verbitsky, 2011]. Addressing the protection of personal data requires the integration of knowledge and skills in technical protection of information, record management, management activities [Gulyaev, 2008].

The task was to identify and testing technologies to generate in the future of information security specialists the necessary competence to realize the integrative approach.

Training of students is based on a wide range of educational technologies. Preference is given to those technologies, which include practice-oriented interactive communication [Zinchenko, 2010]. This is primarily a problem-oriented approach, as the problem - the basis of mental activity [Kiryushin, 2007]. The student is placed in the problematic situation of the professional field. Next, it passes all stages of conscious choice, search and decision-making [Minakova, 2011]. As part of the subject studied topics deconstructs, aware of the problem, studying the information for the formulation of alternatives, and represents an alternative to considering, makes a decision, it presents, draw conclusions, organizes them to experiment. This focuses on the formation of motivation to achieve success, activity and interest.

Professional development the problem, of course, relevant for teachers and education in general. Professionalization of the individual leads to the formation of the special qualities and features inherent to representatives of the profession. These psychological education facilitate the execution of professional activities and lead to the development of the best ways and methods of its implementation. The multifaceted activities of teachers, due to the development of his personal qualities, combines teacher relationship with yourself as a professional, with his colleagues and students. All of these components form, in our opinion, the integral characteristics of the teacher labor, dictate his professional development.

Professional competence of teachers should be psychologically mature man, to have a sense of humor, be artistic, have a professional inspiration always have excellent health and mood, not to show irritation, and not "to get personal", strive to improve its performance. In our opinion, the teacher must be competent not only in the knowledge and skills of the pedagogical process, but also in the knowledge and skills on self personal characteristics of the teacher.

The nature of competence is that it occurs only in the organic unity with the human values under the condition of deep personal interest in this type of activity.

Statement of the problem of motivating the professional field of choice demanded separation technology problems. For the isolation and formulation of problems, its division into tasks widely used critical thinking technology. She is known to have the steps of: "call" - the awakening of existing knowledge and interest in obtaining new information; "Comprehension" - new information; 'Reflection' - the birth of new knowledge [Kanayeva, 2012].

The essence of the practice-oriented training is to build the educational process on the basis of the unity of emotional and imaginative and logical components of the content; acquiring new knowledge and gaining practical experience of their use in solving vital problems and challenges; emotional and cognitive saturation of creativity of students.

Objective need for designing the content of educational programs of the higher education level is dictated by the current state of modern industrial production. The contents of any subject - it is always certain information about objects, phenomena and processes. These subject matters are different from each other. When avalanche growth of information arises the problem of selection of the most representa-

tive objects of a particular area of expertise, providing a complete training, and then the professional activity of specialists [Solyankin, 2011].

Practice-oriented training in accordance with the idea of humanization of education can overcome the alienation of the human sciences, reveals the connection between knowledge and everyday life of people, the challenges facing them in the process of life. Along with the consistent and logical statement of the principles of science at all grade levels in each training topic contains material reflecting its value, place of a natural patterns in everyday life.

The essence of the practice-oriented training is to build the educational process on the basis of the unity of emotional and imaginative and logical components of the content; acquiring new knowledge and gaining practical experience of their use in solving vital problems and challenges; emotional and cognitive saturation of creativity of students.

Within the framework of practice-based learning enjoys absolute priority (and the main "educational material" is) is the activity, organized and carried out with the intention to obtain the intended result. To do this, and most training should be arranged not in a conventional manner. It must be converted to a specific activity, composed of a plurality of individual acts of activities, organized into a single unit and designed to achieve a common goal [Yasvin, 2001].

A significant obstacle to the transition to a practice-oriented education is the lack of common procedures, which should develop appropriate educational form.

Activity approach (with its ideology and technology) as the basis for practice-based learning, that is, this type of training, the aim of which is the formation of abilities of pupils, callable today in various areas of social and professional practice, and an understanding of where, how and for obtained which are used to practice skills.

New landmarks of modern society in the development of modern production generate a special need in the synthesis of a single system of professional work of theoretical, fundamental and specialized knowledge, practical skills, experience, spiritual values, intensification of forward and backward linkages between them [Kryaklina, 2012].

Modern production estimates of graduates on a qualitatively new criteria, which puts at the center of graduate work, the ability to realize their intellectual capabilities, strengthen creativity (self-actualization), the development of space of their

professional activities, the generation of new knowledge, activities, "nurturing" the necessary personal qualities (self-organization).

Applying critical thinking technology allows: (a) allocate the causal relationships; (B) to analyze the tasks, find and correct errors, as well as substantiate and prove the correctness of their thoughts and actions; (C) be able to separate the important from the essential and to be able to focus on the first.

Experience has shown that putting in problem situations gives high motivation to study the subject. The student has to learn to see the problem and formulate the problem of the problem. Educational problems are generated in different ways: (a) the search for new ways of practical application of the process under study; (B) encouraging the analysis of facts, events, situations; (C) the need to use old knowledge into practice in the new environment; (D) the contradiction between the theoretical solution and impracticable; (D) the reformulation of questions, varying tasks [Material from the Internet, 2011].

Task-oriented approach combined with the use of critical thinking techniques allowed to enter the interdisciplinary communication. Effective in the formation of interdisciplinary connections turned out project approach. Work on the project includes the following steps: defining objectives, planning, decision-making, implementation, monitoring and protection of the project results in [material from the Internet, 2012].

If the project activity is an important part of communication, because the work has its own stable internal independently reproducible motives in the team on a task. The students felt the need for knowledge of project management. Project approach forms the communicative competence, develop research skills, analytical thinking, mutual evaluation and monitoring capabilities [Omarov, 2011].

Using a practice-oriented approach, combined with the project develops training activities, independence, motivation, skills, overcome the contradictions in the interaction of the participants. The use of electronic educational resources (Moodle system) allows the student at the early stages of the discipline is structured to present the material under study, to focus on the key aspects of the discipline individualized pace [Ignatieff, 2011].

To relate the professional competence with the requirements of modern innovative economy, a course on the commercialization of scientific research read ENU [Tretyakov, 2010]. For perception and memorization of terms on intellectual property

and commercialization of game elements are used, such as crossword puzzles [Abulkhanova-Slavskaya, 1980].

Conclusion

Analysis of the results of systematic work on the selection of technologies the implementation of practice-oriented approach led to the conclusion that the implemented training allows future professionals to flexibly adapt to changing professional situations, identify key issues chosen for alternative solutions, evaluate them and find the best option and to develop programs action. In the future experts formed a holistic view of their future professional activity, reduced the degree of uncertainty in the solution of possible problems on the professional requirements of employers.

Qualifying operation ready for implementation in specialized laboratories, departments and services of institutions, organizations and enterprises involved in information security, as well as to introduce into the educational process on a laboratory practical disciplines of specialization [From the Internet].

Thus, the use of active educational technologies stimulates constructive thinking - students become active participants in the learning process. They formed the skills and competencies required to meet the challenges of professional sphere, brought the ability to determine their actions in line with those of other people, to unite like-minded people.

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Language consciousness on the example of the Kazakh language: the linguistic and philosophical approach to the problem

Abstract: Problems of language, especially the problem of linguistic consciousness can not be studied only on the basis of pure linguistics paradigms and reductionist approach, because the language is not only a means of communication but also a tool of thinking. Language requires understanding, and this requirement can be feasible only in the case when, on the one hand, its content side is invariably associated with the human psyche, etc. This article deals with the problem from a philosophical and linguistic point of view.

Keywords: linguistic consciousness, philosophy, linguistics, ethnicity, language and identity.

The process of cross-cultural communication can be difficult due to lack of knowledge and social experience communicating with each other, especially ethnic linguistic consciousness of another communicant, the specifics of his mentality. All this inevitably raises the need to study the problems of "language and culture", "linguistic consciousness and cultural identity", "language, consciousness, a national identity and mentality" among the most important socio-linguistic and psycholinguistic issues, the solution of which is possible only on the basis of extended methodological paradigm and interdisciplinary approach that, firstly, allow to reveal the connection between the phenomena of "consciousness", "language", "personality", "ethnic group"; secondly, to study the phenomenon of the "national language consciousness" in its subject, activity and mental forms in contrastive aspect; thirdly, to describe and identify the role of the language elements in the form of implicit eksplitnoy-transmission of national and cultural consciousness of the people. In view of the

above, in this paper we use an integrated approach in the description of the national linguistic consciousness [Shayakhmetova, 2007].

The theoretical basis for this research were the philosophical interpretation of language and consciousness ratio, language and thought (Berdyayev, M. Voloshin, Heidegger, H.G. Gadamer, N. Lossky, I. Ilin et al.). Theory the relationship between language and consciousness, language and thought, language and ethnicity, language and culture; study of Russian and Kazakh psycholinguists (Vygotsky, Leontiev, S. Rubinstein, A.A. Leontev, L.V. Saharny, E.F. Tarasov, A.A. Zalevskaya, Y.N. Karaulov, R.M. Frumkina, N.V. Dmitryuk, I.A. Sternin, Z.D. Popova, R.S. Nemo, V.P. Belyanin, M.I. Lazaridi etc.); conceptual principles of modern cognitive linguistics of the cognitive mechanisms that determine the similarity and the difference a conceptual picture of the world in different languages (D.N. Shmelev, A. Melnikova, E.S. Kubryakova, V.A. Maslova, A.E. Karlinsky, G.G. Gizdatov), the position of cultural linguistics about the similarities and differences lingvokulturologicheskikh fields in different languages (A.M. Vereschagin, V.G. Kostomarov, V.V. Vorobyov), the idea of sociolinguistics and ethnolinguistics (Yu.D. Dersheriev, A.D. Shveytser, L.B. Nikolsky, B.A. Serebrennikov, A.S. Gerd, A.O. Orusbayev, M.K. Isaev, B.H. Hasanuly, G.G. Gizdatov, E.D. Suleimenov, Z.K. Ahmetzhanova, A.R. Beysembayev, D.M. Kistaubayeva, A.K. Kalzhanova, G.I. Abramova, K.M. Abisheva, S.Zh. Bayandina, D.D. Shaybakova, V.D. Narozhnaya, R. Osmanova, M. Shingareva et al.) [Shayakhmetova, 2007, Zhusupov 2014].

Language consciousness of different ethnic groups, which is part of the public consciousness, it is necessary to study, using an integrated approach based on a combination of psycholinguistic and cultural approaches, and bringing data ethnology and etnokognitologii.

Language consciousness should be studied not only as a mental process that is linked to human mental activity, but also as a psycholinguistic and cognitive phenomenon, which manifests itself in the linguistic consciousness of people to communicate.

Legend linguistic consciousness in the context of Sciences

Consciousness - one of the major phenomena of human and society. It is the ability to manipulate images of social interactions, actions with objects, natural and cultural ties, separated from direct contact with people and acts of activities, consider these images as the conditions, means, guiding their behavior. The many facets of

consciousness has made it a subject of study of many sciences: philosophy, psychology, law, psychiatry.

Philosophical understanding of consciousness is not unique, and is associated with pluralism philosophical positions and schools, especially the rapidly emerging in the controversy with Marxism. The complexity of the problem of consciousness research contributed to the emergence of different, quite contradictory points of view on the definition of the essential nature of consciousness. So, in a variety of philosophical conceptions of the past, absolutizes and contrast the data obtained research about the psychological properties and features of human mental activity, hypertrophied role of intuition, will, feelings, unconscious motives, carried out the rationalization of the phenomena of human mental life, taken in isolation from the real subject-practical activity of the person and the specific historical forms of social relations in which the activity takes place individuals. Within the framework of these concepts of human nature was limited to the activity of consciousness, and consciousness is regarded only as a cognitive relation of man to the world. For example, the classical tradition, combining Greek philosophy, Arabic-language philosophy, modern philosophy, the Hegelian panlogism and analytical philosophy of the present, identifies thinking and consciousness. The apotheosis of this approach is the adoption of the French philosopher of modern times Descartes: "I think, therefore I exist" [1994].

World perfect eventually "is an absolute being, the cause of the formation of a certain being, its essence and truth. This is the essence of the Hegelian method, in which, according to Marx, the idea serves the creator of reality, and the reality is the external manifestation of the idea" [Klassen, 1987].

According to the position of the English philosopher of modern times Dzh. Berkli mind "is presented as a vessel, which already contains the ideas and samples of what a person will encounter in the world, there is nothing but the real existence, except the substance of the spirit, soul, and my self" [Hegel, 1970-1972]. A variation of this position is a priori the German philosopher Immanuel Kant, to make demands, "proceed from the assumption that objects must conform to our knowledge of ..." [Kuznetsov, 1989].

Idealistic approach defines consciousness as independent of the brain, but is determined by some spiritual factor (God, idea). Defending the idea of the primacy of consciousness in relation to the matter, idealists posit that consciousness itself is designed to explain all things.

In contrast to the position of idealistic philosophy, materialism seeks communion, unity between the phenomena of consciousness and the objective world. There are words of Karl Marx: "For Hegel, the thought process ... has demiurge of reality, which is only the external manifestation. I, on the contrary, the ideal is nothing else than the material world reflected by the human mind, and translated it "[Klassen, 1987]. Marxism begins to study with material processes, only then determined the nature of the ideal. If G. Gegel panlogicheskogo demonstrates the development of the principle of self-development as the ideal substance, then the ideal of Marx - is forthcoming form the reflection of social relations, the material form of otherness, "the result of becoming" [Marx, 1969].

Philosophical understanding of consciousness and language awareness

According to the position of materialist philosophy, "the ideal is the whole of human consciousness - a high concept and everyday understanding, good will and envy, Descartes' clear and distinct way of thinking" and the so-called unconscious [Zhussupov, 2015]. It stands out not only the mental and physical worlds, and the third world - the world of knowledge [Abrahamyan, 1987]. The philosophical contrast between physical and mental worlds corresponds to the delimitation of the material and ideal.

A special feature of the materialist approach is the selection of the fundamental properties of consciousness as socially. Ideality of consciousness, the ability to reflect the social world and to create spiritual phenomena are considered as a quality unique to humans.

The logic of methodological pluralism, which is present in modern philosophical discourse in recent years, led to the emergence in Western philosophy of dualistic interactionism, in which is based on the situation that quite independently of each other, there are the "world of material objects" and "the world of spiritual objects" that these two worlds influence each other, the brain affects the mind and the consciousness of the brain, consciousness is perfect, since the information perceived by a person separate from its material carrier" [Hegel, 1972].

The public nature of consciousness is generated in society, in the collective social and practical activities. The result of the joint activity of people was the development of abstract thinking and language. Consciousness and language form a dialectical unity: in their existence they presuppose each other both internally decorated logically perfect content supposes its outer material form. Language is the immediate

reality of thought, conscience [Popper, 1983]. It is involved in the process of mental activity as the basis for its sensual or gun. Consciousness is not only detected, but is formed through language.

"In the words, grammatical forms, syntax captures the image of the soul of your people; like footprints on the sands of petrified waves, long existing seas, anchored in him the desire, inclination, dislike, beliefs, superstitions, primitive knowledge of the world and man. It was in the era of myth-making was assigned the male and female gender sky, the stars, the earth, the rivers, to inanimate objects, and the principles that guided those who produce generic distinction is now also impossible to solve, as well as the origin of most words. Nothing amazing Greeks, like what the Egyptians sky was a woman, a man and the earth "[Parandowski, 1992]. The development of consciousness language plays an ambivalent role, on the one hand language environment mediates the ethnic coloration of consciousness; On the other hand, it acts as a mediator between being specific and logical structures.

Language is not only a way and a means of communication and expression, but also a means of understanding, decoding infinite universe of meanings. On internal and external validity of a person imposes a grid of values, expressed in the language of [Zhussupov, 2014].

M. Heidegger Philosophical study of the language, and the problem posed by their understanding of the occurrence of deterministic hermeneutic approach to the analysis of culture and consciousness. Language, according to M. Heidegger - of "being home", at the same time is the very being. Language is not the character set is a simple representation of things, but on the contrary, the word is the essence of things. From the point of view of M. Heidegger, the traditional methods of philosophy should be complemented by an analysis of the hermeneutic of language and thought [1988].

This view is shared by the German philosopher H.G. Gadamer, student M. Heidegger, considering language as a "fundamental layer design world, anticipating a scheme of cognitive capabilities" [Schmidt, 2003].

In Western literature it was made to celebrate as the defining feature of analytic philosophy "linguistic turn" or "linguistic emphasis" ... turn to the study of the philosophy of how we talk about the world and how to argue about the reasoning. Related to this mainstreaming of philosophy of language and its central problem - the problem of values [Lenets, 2010]. The main object of study in the philosophy of "ana-

lysts" US Charge d'Affaires, Bertrand Russell, L. Vitgenshteyna, R. Karnapa, U. Kuayna associated with the logical analysis of language, directly based on the study of signs, sign systems.

In this independent activity of consciousness without pre-understanding, without understanding the background is "a fiction of rationalism". The theoretical activity of consciousness is a secondary understanding [Signs, 2002]. In all kinds of contemporary hermeneutical method - grammatical, stylistic, historical, psychological - is dominated by the language analysis, which gives the language of the ontological status of the phenomenon; with history, culture, human relationships are treated as language education.

The main concepts of hermeneutic method are "getting used to the historical context of the text", "meaning of the text", "estimate", etc. Hermeneutic model for analysis is the scene of "Tea with a shift" from a fairy tale L. Carroll [Carroll, 1977]. Hermeneutical studies postulate the fact natural communicative mind, communication is considered as the basic structure of consciousness. Bakhtin first introduced the distinction monologism and principled dialogism consciousness occurring in the given text [Bakhtin, 1979]. Considering the polyphony as the principle of cultural dialogue, Bakhtin stated: "We are talking only certain speech genres and relatively stable forms of construction of the whole" [Bakhtin, 1979].

To create an interactive situation required position "outsidedness" ie going beyond the usual, fixed set of meanings, that does not mean the disappearance of axiological systems of their social and cultural environment, while at the same time involves the heart, his willingness to understand and accept another culture, another way of thinking [Bakhtin, 1979].

As. Bakhtin wrote one culture may ask other questions that this second culture in front of him did not put forward [Bakhtin, 1979]. Therefore, the condition of intercultural dialogue is the ability to reconstruct the normative value system be rebuilt for himself, meaning the codes of other cultures and relate them to their cultural settings.

Conclusion

At the end of the twentieth century in the philosophical speculations regarding the given text to the fore the problem of the communicative nature associated with the development of sociological consciousness against the background of modern civilization shocks. In connection with the formation of a new society integrating crops outstanding figure of Russian philology and philosophy V.S. Bibler introduces the

concept of "light field of consciousness", associated with the idea of dialogism cultures [1989].

The idea of the dialogue of cultures is set at the level of everyday communication of autonomous individuals. The ability and capacity to a total of personalized communication of individuals under conditions of growing global processes of time becomes a problem not only awareness, but also life in general. Thus philosophers are allocated different models of communication in the East and the West, as a reflection of the consciousness of otherness. In the West, the dialogue model is linear (Socratic maieutics), in the East traditionally present ethics nenavyazyvaniya own categorical model of dialogue is pointed: "Japanese scientists have good reason call their method of dialogue" Communication minimum posts "in contrast to the European, which is called" communication maximum message". Communication takes place on the Japanese non-verbal, non-verbal level: more thought, less words [in 1989].

Pre-positioning of understanding the world in the East - consciousness, freed from the cliches, cliches that can go beyond the usual understanding that is evident in the aphoristic style of Taoist sages: "If anyone says - does not know, who knows - he does not say" [1989].

The paradox of modern civilization is that the unification and typification of individual features in parallel there is a pluralism of forms of public expression.

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On the issue of selection of a literary text in class Russian as a foreign language

Abstract

In this article we are talking about cross-cultural communication in the classroom of the Russian language as a foreign language in high schools of Kazakhstan and Georgia. The authors, based on the accumulated experience of work in the classroom with students of Russian as a foreign language, tried to formulate the basic principles on which is built the language learning process.

Keywords: competence, culture, communication, language consciousness.

Introduction

Intercultural communication - communication between people from different cultures, "... an adequate understanding of the two participants in the communicative act, belonging to different national cultures" [1].

The development of intercultural competence on employment on Russian as a foreign language requires, while retaining the basic, communicative approach to learning, finding new ways and methods, the effectiveness of which must be the basis of further increase motivation to the subject.

A special place in the construction of teaching intercultural communication given to the initial phase of training of foreign students, which is a complex and controversial period of adaptation and socialization. Its features: a new socio-cultural environment, significant psychological, emotional and physical stress, intense training, professional orientation training, training a large employment of students, the continuity in the horizontal and vertical levels, that is, between objects and between stages; coordination of training between academic disciplines, and so on.

In the medical, social, psychological and pedagogical aspects of adaptation problem is most thoroughly solved in a number of dissertations (Goroshenko A.M., Ivanova M.A., Izotov E.F., Knyazev G.P., Filippov, A.C., Cap L.I., Chernjavskaia T.P., Shaglina N.D., Shiryayev I.V.), monographs (Arseniev D.G., Zinkovsky A.V., Ivanova M.A.; Titkova N.A.; Schurevich G.A., Zinkovsky A.V., Ponomarev N.I. et al.), in a variety of scientific and methodical collections.

Based on the accumulated experience in the classroom with students working on Russian as a foreign language, we have tried in this article to formulate the basic principles on which is built the language learning process. It seems that they reflect the perception of a foreign language (in this case - Russian) as a means of "entry" into the culture of another people, as a way of learning the values and priorities of the different media of linguistic consciousness.

First of all, it must be assumed that the public nature of the language is the basis for cross-cultural communication. This principle is based on the recognition that the social nature of language provides an objective opportunity of familiarizing foreign language subjects, in this case, the non-Russian to the new reality for them using the language as a communication unit according to the scheme: a new language - a new culture.

A similar view is held, for example, Professor Irwin Wyle (USA), are actively using this method in the teaching of the Russian language in an American college. His students learn Russian through the top of her literature - Pushkin, Dostoevsky, Tolstoy, Turgenev, Gorky, Sholokhov. According to forecasts of US experts - linguists, political scientists - Russian language is confidently moving to the forefront of the world's languages, and Russian literature, no doubt, it has long been at the forefront of world literature. This is clearly evidenced by the statements of universally recognized titans of literature as Balzac, Dumas, the Goncourt, Moppan, Bernard Shaw, Hemingway and others.

Back in the early 80s of last century Russian language and literature is taught in the United States 800 schools and 34,000 undergraduate and graduate students selected them his specialty. In teaching Russian foreign specialists-linguists, as a pivotal moment of considering the principle of interest, enlightenment - awakening thirst for knowledge of Russian literature, Russian films, the study of masterpieces, has attracted considerable interest, forming aesthetic taste. From the beautiful - to the study of language, perhaps it is because of all formulate another principle.

Intercultural communication: main features

As rightly observed English cross-culture expert Robert D. Lewis, "self-criticism, the desire to avoid the annoying and stressful factor, a more precise assessment of personality, tact, tolerance, adaptation to the other side without damage to self-esteem, a careful study of the culture, history and language your partner - all the funds should be set in motion at a meeting of cultures" [Lewis R. 2001].

It is necessary to ensure that such an understanding did not prevent cultural components as the traditions and customs, everyday culture, everyday behavior, "national culture of peace", as well as features of the national character and thinking communicants [Antipov G.A., Don O.A., Markovina I.Yu., Sorokin A., 1998].

The book T.I. Kapitonova, L.V. Moskovkina "Methods of teaching Russian as a foreign language at the stage of pre-university training", about the impact of ethnic and cultural characteristics of the foreign students in the process of learning the Russian language. "Foreign students are carriers of different cultures, some cultures characterized by their tics, significantly different from the Russian. This is the reason for the difficulties encountered in communicating students of different nationalities together in their communion with the Russian people (starting with elementary mis-

understanding of the behavior of Russian people's motives and ending with culture shock)" [Kapitonova T.I., Moskovkina L.V., 2006].

Working with the students, the teacher should remember the basic rules of thumb intercultural communication and to teach them to their students: (a) if you allow yourself to overlook the importance of intercultural communication, intercultural contact is doomed to failure; (B) do not give the estimated characteristics of other cultures: the bad crop does not happen - there are different cultures; (C) are not captured by the stereotypical thinking; (D) be flexible in intercultural communication; (D) increase the intercultural competence, etc. [Kosov A.V. 2007].

Terms of successful communication depends on the correct construction of the educational process, early learning, socio-psychological and other kinds of adaptation:

"Someone else's culture is only in the eyes of another culture reveals itself fully and deeply. One meaning reveals its depth by meeting with others, other people's meaning, between them begins a dialogue that overcomes the isolation and one-sidedness of these meanings, these cultures" [1984].

It's hard not to agree with the SG Ter-Minasova, which states: "All the subtlety and depth of the entire cross-language communication and mezhkulturopoy problems become particularly evident, and sometimes I realized, when comparing the foreign language with native and foreign culture with its own, the usual" [Ter-Minasova SG, 2000].

Thus, the task of the teacher - to build a classroom and extracurricular work so that the differences of national cultures, traditions, mentality, national-psychological characteristics of students, did not lead to the emergence of conflicts. Specific requirements must be applied to the formation of international groups in which intercultural communication occurs on a daily basis.

Formation of intercultural dialogue: the role of the teacher

In the process of learning Russian as a foreign language, students learn not only linguistic knowledge, but also the idea of the culture, the mentality, customs and traditions of the Russian people and other peoples residents in our country.

So, what to do pre-university stage of teacher training foreign students for formation of intercultural communication in Russian language lessons, cultural and regional geography and outside the classroom: (a) form groups, taking into account national circumstances; prevent the indoctrination of the learning process; (B) the

manner of employment, and measures should not be excessively edifying, because students come to Russia already fully formed personalities; (S) to carry out activities during extracurricular time considering interests and needs of students, help students in dealing with international and intercultural issues; (D) to develop and enrich the linguistic identity of the foreign student at the junction of two or more cultures; (E) take into account their personal, national, religious features the formation of study groups; (G) assist students in dealing with international and interpersonal problems and conflicts; (H) in the classroom and use linguistic geography linguistic study of local lore materials that introduce foreign students to the culture of Russia and the region.

Psychological aspects of the perception of the text

It is equally important to analyze the psychological aspects of perception and understanding of a text message, story, novel. In the perception of literature plays an important role understanding of subtext, deep meaning and, ultimately, the motive. For example, an exclamation, one might even say, Chatsky cry Griboyedov in the comedy "Woe from Wit", "- Coach me, coach!" - Can hide behind seemingly ordinary to immediately submit crew irresistible desire to break with the bored society, surrounding the hero, who is no longer He wants to have anything to do with him!

Depth of reading the text, revealing subtexts, the inner meaning of works vary greatly among the readers. They are usually hatred of one person to another is much more than an understanding of the external sense of a message. In the process of studying literature and, accordingly, its "building material" - the language, it is necessary to link their theoretical knowledge with the fullness and complexity of life, with its overtones to make classes and lectures are not only educational, but also man formation. "Pairing the academic and moral, literary and human, comprehending it, the focus of attention, because the problem of the educational effectiveness of the lesson, and the teacher's work is considered the most challenging and important for our time" (1.3).

A qualified teacher is doing a great work ethic, commenting on his studies, lectures statements of the great philosophers and sages. Educational thoughts accompany and can be said to haunt word all his life, because it helps their pupils and students to comprehend the categories of good and evil on the example of the works of Pushkin, Turgenev, Dostoevsky, Balzac, Oscar Wilde, and others. This involves a huge educational activities.

Every great writer has their own style, deeply original, unique, distinctive. It is impossible to confuse Pushkin to Tolstoy or Turgenev, Nekrasov, even if they are writing about the same. Comparative analysis of literary works is very important, and we must be able to explain the harmony of the different works and the literature. Especially if we are talking about rethinking of classic and contemporary literature, their comparison, especially in trying to find their moral ideal.

In the study of language vocabulary is particularly important structural and semantic analysis of the words. Texts on which is carried out linguistic analysis should awaken thoughts and feelings. With language a person gets the opportunity to join the new national culture, clinging to its spiritual riches. Then familiarization and cognitive function of language is closely intertwined with the educational, person forms. It should be a clear definition of perception of reality (both real and figurative) on the rational-logical or conceptual, emotional and sensory or figurative (as noted in the literature as an art). In this case, the language becomes material substrate both conceptual thinking and imaginative.

Conclusions

Based on the above, we can understand the great importance attached to the figurative semantics corresponding word-concept. After all, the image of living associations. Speaking about the poetry of Pushkin, Gogol aptly that shaped the word "abyss of space" and that "every word is immense". This statement is fully applicable to any artistic image, painting, sculpture, music, dance, and if the image as a category of knowledge, compared with the concept of a cognitive categories that are detected characteristics, at first glance, the opposite, but the inconsistency which turns mutual understanding.

Based on the above, attention should be paid to the emotional and cognitive training to learn more about the language and culture of understanding of its carriers - the selection and analysis of images fiction texts, which are able to raise the creativity in the learning process and enrich the aesthetic personality.

Thus, the basic principles of selection of literary texts for reading, can be considered:

- 1) the principle of learning through the beautiful, ie through literary texts carrier function;
- 2) educational-cultural principle, directly correlated to the first principle;

3) the principle of interest. This is the volumetric principle (literature, art, cinema, ballet, dispute);

4) The principle of bringing up training of the person;

5) the principle of formation of aesthetic perception of literature and reality (words, images, tropes).

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Pragmatic, psychological, linguistic, social aspects false

Abstract

The authors examined the psychological, pragmatic, social aspects of lies, deception. In this article, the authors distributed the kinds of deception and falsehood: (a) false-imagination, the purpose of which, as a rule, is to make his own image features outstanding personality; (b) false-justification, which takes place in a situation exposing misdeeds; (s) false-rally - type of lie, in which with the help of a specially designed scenario the person creating the false impression of a particular face or the environment; (d) false-hex in the form of gossip; (e) a lie-sell and others.

Keywords: lying, cheating, sociology, psychology, linguistics, pragmatics.

Approaches to the pragmatic, social and psycho-linguistic description of the lies and the construction of a pragmatic theory of lies carried out mainly by foreign scientists. The main objective of this research was to "breeding taxonomy of lies, which is carried out by means of truth" [Vincent, in 1981], "the definition of types of deceptive speech acts" [Falkenberg, 1982], "the typology of false speech acts" [Giese, in 1992], "structuring destination types of lies" [Castelfranchi, 1994]. It is clear that all approaches undertaken on the principle of removing the main, distinct types, forms of communication of false statements to further their classification, as well as the construction of the theory lies.

One of the objectives of this study is to understand the theoretical analysis of foreign and domestic authors about the different kinds of lies in interpersonal interaction [Lenetz, 2013].

P. Ekman very broadly interprets the concept of "a lie". Ekman highlights two main forms of lies: (1) the default (concealment of the truth) - the liar hides the true information, but does not report the false [Shkuratoa, 2005, Ekman, 1999] (2) the distortion (communication of false information) - Liar taking further action - it is not only hides the truth, but in return is false information, passing it off as true. C. Bock reserves the term "lie" so that P. Ekman calls distortion, and the term "mystery" - for thus default. Default - is more profitable, as is usually easier to remain silent than to deceive obviously, this has nothing to do, while at the distortion is always a chance to be caught [Ekman, 1999]. Default does not deserve more justification than outright lies. Both are just different ways of lying. Each method is elected, depending on the circumstances. But, of course, easier to hide the truth: I do not need to invent anything to get confused with the prospect of (our memory is imperfect) in their own explanations. In silence there is another advantage: there is always the opportunity to step back and admit it. After uttering a lie to make it very difficult [Lakshina, 2012].

In addition to the default and distortion P. Ekman identifies many types of lies: a scam, truth-telling in the form of deception (ie, according to the truth, but, for example, tone of voice suggests the opposite; cheating expects that its right not to believe); half-truths (ie, telling the truth is not completely do not agree). Innuendo or avoiding conversation on exciting theme allows you to fool without resorting to any special lies. But not any half-truth is a fraud: if a person honestly admits that he can not openly express it. "Honest half-truths" can manifest in such traits as a stealth [Ekman, 1999]. Tolstoy said that a half-truth - a false negative, insidious kind of mis-

information [Sbintzov, 1990]. V.I. Svintsov equates silence and half-truths to the "usual lies". Half-truths - are messages that do not have some elements of the necessary information, so that there is at receiving a false idea of the reflecting object. Half-breeds semi freedom, gender justice, gender humanism. But one thing - sex really occurs as a result of obvious abnormalities information, and quite another - a half-truth, caused by natural causes (for example, every scientist is able to report half-truths, as it always is halfway to the truth) [Sbintzov, 1990]. "Half-truth is more dangerous than a lie; a lie is easier to recognize than a half-truth, which is usually masked. To deceive twice" (Kunitzina, 2001).

Another opportunity to lie, to say the truth - it is huddling confused evasion (dodge). The advantage of this trick before the half-truths and serve the truth in the form of deception is that the liar is no need to say no unrighteousness [Ekman, 1999].

"Insolent" a lie (on I. Gofmanu) - if there is compelling evidence of lies and a deceiver, knowing this, still continues to lie, and this is not just a lie [Gofman, 2000].

Zh. Dyupra distinguishes two kinds of lies: deliberate (well thought-out, deliberate) and the unconscious [Simonenko, 1998].

The analysis of verbal behavior in intents and purposes, there are several types of misleading: a sham or scam, acting out roles, lies a hint, silence, half-truths, the formation of false assumptions or assumptions deliberate ambiguity feigned lie, a sham operation (the game) or joke, indirect lies [Zussupov, 2015]. All these situations are among the most complex in the process of verbal interaction. In this connection it is necessary to examine the nature and character of the false statements as a speech act, determine its semantics and structure to take into account the subject and the environment in which the process of verbal communication, as well as the intention of communicants [Zhussupov, 2015].

The recipient makes a false conclusion about the sender's intention due to the knowledge that this statement is accepted to use for creating such beliefs. In other words, the sender is trying to convince the recipient to the intent, which he really does not. Thus, in this example, the sender saying «But it was still good that you», expressing the intention to thank you for the concern, in fact, hides his displeasure act of a friend. Externally, the sender saying sounds like gratitude, internally it, however, has the intention to accuse of excessive attention [Lenetz, 2013]. This type of false speech act we define as the explicit, which expresses the intention of the send-

er, which he really does not. Implicit false speech act may be defined as the sender makes the false speech act, while pretending to desire to cause a certain reaction of the recipient. In fact, the sender has no intention to cause this reaction [Zhussupov, 2015].

V.V. Znakov considers the following types of lies: a blatant lie - a lie based on an incorrect knowledge (when the subject learned of his error, but he was already embarrassed to admit to others that he and misleading). The egocentric self-centered monologue lies reflects the position of the subject, seeking to meet the significant demand for it and not think about the benefits or harm caused by false specific person or any group of people. But egocentric lie is not always caused by egoistic and selfish motives. Sometimes it is not due to the personal and professional circumstances - as in situations with a variety of psychological experiments (for example, to identify the personality of conformity). Virtuous lie is not a lie altruistic (helping the object of lies and not a "rescuer" brings no benefit), as liars considered their personal interests, they lie, in accordance with their ideas of what is good, good for anyone, including yourself [Znakov, 1997].

White lie (for the good) - it is a lie, uttered in order to preserve the integrity of his inner world, to prevent interference with privacy. The situation that in any human relationship should not be a lie too primitive. Ann Landers believes that truth sometimes used as a club, causing brutal "pain" [Ekman, 1999]. Therefore, the "white lie" can be understood also as a desire not to hurt another human being the truth (altruistic lie) [Gavrilova, 2005, Mixailov, 2012, Shkuratov, 2005, Ekman, 1999]. Doctor cheating, assigning a placebo - a white lie. Apparently, the secret is that, along with medications to patients give something more valuable: the confidence that they will benefit [Thenev, 2012].

H.G. Lerner writes: "Reflecting on the life of a woman, I had to pay special attention to the word "pretending" (pretense, simulation, playing out of themselves), it often reflects the desire that lead astray, to protect others and to ensure the preservation of himself and our relationship. Pretending naturally occurs from false and restrictive definition of self that a woman often learns without question or doubt. Thus it is closely connected with femininity, that is, it is simply that teaches women to do culture". This lie is based on self belief and self-deception [quoting from Znakov, 1997].

G. Lassister, based on types of aggression, identifies three types of fraud: about the social (deception for the benefit of society), anti-social (lie, perfect to evade

the law) and authorized (white lies, fabrications, evasiveness, which is located within the boundaries of social norms and morality; it occupies an intermediate position between the first two) [Brilling, 2012].

Only unbiased she looked at the nature of the phenomenon of 'false', it is possible to talk about the extent to which they are evil, to what extent we are responsible for the distortion of the truth, and to what extent are able to abstain from deception.

Folk wisdom strongly condemns false. You can drive and its proverbs, unequivocally condemning the fraud: (1) for a man to lie - to die (Uighur); (2) the other fool on the day itself - for life (Finland); (3) do not live a lie, God's will; sovrësh - not you die, so forth will not believe (Russian); (4) where there is truth, falsehood runs away (Turkish); (5) a liar - a novice thief (Japanese); (6) lies - the truth fragments; a thousand wrongs do not cost a single truth (Armenia); (7) lies have short legs (English); (8) though the executioner over his head - tell the truth (Abkhaz); (9) lies have short life; telling the truth - you lose friends (Kazakh) and lots of other [Zhussupov, 2015].

Islam teaches, "the faithful weigh scales, and do not reduce the people of their things, and do not walk on the ground, spreading mischief" [Sura 26: quoting from Zimbuli, 2012]. It is forbidden in Islam and the concealment of defects in the goods [Yusuf, 2007].

Ignatenko has introduced its own classification of fraud, he had collected in the study of Eastern treatises. He singled out cheating in its purest form (disinformation), amphibole (uncertainty statements), substitution (objects or people), perjury, perjury, false letters (fake and anonymous) stated, knowingly false predictions, pretense, provocation and the creation of false circumstances [Thenev, 2009].

I.P. Shkuratova carried out the most detailed classification of the different types of lies. In addition to the default lies, lies the good, falsehood - the presentation itself, it secretes: lies, concealment, in which a person hides some its activities, not necessarily restricted or reprehensible [Shkuratova, 2012]; etiquette lies, carried out on the basis of general agreement on the observance of etiquette [Znakov, 1995, Shkuratova, 2012]; lie-delusion as a variant in which a person tells a lie, but he can be sure that he does a good deed; false-imagination, the purpose of which, as a rule, is to make his own image features outstanding personality; lie-justification, which takes place in a situation exposing misdeeds; lie-rally - type of lie, in which with the help of a specially designed scenario the person creating the false impression of a

particular face or the environment; lies, slander as a gossip; lie-sell (fraud) is immoral lies associated with financial benefits and may have different scales: from the shell game to create a Ponzi scheme (the negative consequences of cheating is very noticeable, this kind of lies has been classified as a criminal offense) [Simonenko, 1999. Tkathuk, 2005, Shkuratova, 2012]; lies-betrayal, in which a person seeking their own benefit at the expense of damage to the people who trusted him; lies as a profession attribute associated with the concealment of trade secrets [Andrushkin, 2003, Shkuratova, 2012].

Conclusion

In Russian, as in the Kazakh language, dissemination of false information idioms match "to direct slander", "stir up trouble", "slander with three boxes", "build slander", "poison bikes", "unleash the fog". Hype (Scam, trickery, etc.) correspond to "turn the mill", "turn the dynamo," "feed breakfast", "play-act", "instruct the nose", "hypocrite", "powder her brains", "palaver". Manufacture of lies is usually described, based on the non-verbal components: lie without blushing, without wincing, without batting an eye, in the eye. Negative assessments are stable Russian comparisons "lies that broom sweeps clean", "slander that coal", "lying, that the ears wilt", "lie like hell".

Thus, the kinds of lies, despite some differences, have in common is that they are considered as a specific effect, aimed directly at him (in terms of self-deception, a lie aimed at himself).

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Psycholinguistic nature lies

Abstract: The article deals with a pragmatic, psihologogicheskaya and linguistic nature of the lie. Lies, deception in the presented from different points of view. The cultural and linguistic characteristics considered lies in the social aspect. The authors considered violations in speech acts and their consequences.

Keywords: linguistics, cultural studies, psychology, lies, deception.

Introduction

In linguistics, the explanation of concepts such as lying, cheating has become possible thanks to the so-called pragmatic turn, which greatly expanded the horizon of questions [Stepanov, 1981; Eco, 1985; Giese, 1992]. It is about trying to explain the conditions, types and purposes of language use, based on the structural features of the linguistic sign system, which is the object of study of semiotics. According to

the object of studying modern semiotics is divided into three components: syntactics, semantics and pragmatics [Morris, 2001].

Understanding and recognition of lies was developed in the West for many years. A significant part of the foreign study was devoted to identifying specific behavioral signs of lying about a person, as well as the study of the polygraph (P. Ekman, U. Frizen, A. Mehrabian et al.). A relatively new and unexplored for Russian science research area lies. In domestic psychology best known work on the psychology of lies [Yu. Zhukova 1999 V. Znakova 1999 S. Simonenko 2000]. Recently, the Russian psychology marked increase in interest in the problem lies. The importance of this problem is obvious: different manifestations of lies, deceit, falsehood (manipulation, fraud) is constantly detected in situations of interpersonal communication, social and inter-group relations. This can lead to increasing trend of mutual distrust in the environment, in society. A few years ago the analysis of the causes of the falsity of children and adults occupied mainly teachers and lawyers, but now the problem is interested in representatives of different professions - social scientists, philosophers, marketers, image makers.

Definitions lying, cheating

Psychological analysis of lying communicative phenomenon reveals fundamental differences in the understanding of the content of this notion in the Western and Russian culture [Ryumshin, 1996]. Typical American dictionaries are those values the concept of a lie: "1. Untrue statement made with intent to defraud; lie, lie. 2. What it produces or is intended to produce a false impression" [Signs, 1995]. The Oxford English Dictionary states: "In the modern use of the word" lie "is usually a shade of a pronounced moral judgment, and politely told him trying to avoid, it is often replaced by fine synonymous as" fraud "and" not true", having a relatively neutral sounding" [Shus, 1999].

There is a cultural identity understanding of "lies" and "deception": essential for English speakers is an indication of the target and the target effects (direction of action) for the Russian national consciousness relevant is the intentional aspect (intentionally), the reference dimension (if the truth is distorted). The originality of the nomination is that each nation divides the world in their own way, in accordance with his vision. It was found that the submission of lies and deceit, they are subject, the pro-

perties inherent in the English and Russian language cultural community, are in the form of myths, archetypes, symbols, standards and behaviors [Panchenko, 1999].

Well-known in the literature and art techniques like hyperbole, exaggeration that exists in the literature a genre - science fiction, advertising, business and many other social phenomena, based on the embellishment. In Central Asia, there are a variety of ethnic folklore as the "LOF" - deliberate exaggeration or approval for fun, jokes phenomena, events, things or their properties. Widespread legends, tales, anecdotes permissible lies [Briling, 2000].

We consider it fair to assume that a breach of the basic conditions for the implementation of the speech act leads to false speech act, under certain circumstances. In this case, for further taxonomy false speech act relevant are following him, "measuring", or rather their violation: an essential condition - the presence of a distinctive feature for each individual speech act; illocutionary goal; recognizing intentions of the sender by the recipient. Let us briefly consider these violations.

Violation of essential conditions is the distortion distinctive feature of each of the speech act. In our study, we have identified the following types of false speech acts: assertiv, komissiv, directive, declarative, and expressives kontaktiv. Violation assertiva essential feature is the sender's responsibility for the false message/statement (cf. poetic function.); komissiva - a false acceptance of obligations to perform an action in a particular context (cf. referentivnaya function.); direktiva - in prompting the sender the recipient to perform an action, built on knowingly false syllogism recipient (cf. metalinguistic function.); declarative - in a false indication on the status of the sender's authority (cf. connotative function.); expressive - in a false sender terms of psychological state, his relationship (evaluation) of the status quo (cf. emotive function.); kontaktiva - in false courtesy, recognizing the authority of the recipient (cf. phatic function).

The false sender assertive speech act is successful in the event that in the proposition it represents a false situation. Representatives of the group assertivov are the most typical example of the false speech act. Illocutionary goals assertivah false sender succeeds with the help of the proposition, which represents a distorted state of affairs in the casting world, and their responsibility for the said judgment [Lenets 2013].

The study A.S. Gerasimovoy and E.A. Sergienko tales seen as one of the external sources of knowledge of the fraud. During the comparison of the results ob-

tained on the material of children's stories and fairy tales, identified common features of deception: it is mainly "to verbalize" leading motive of cheating is "avoiding trouble", the age of the person deceived the vast majority is "senior". Cheating occurs in the "knowledge" and is mostly successful form of behavior, it "believe" [Berdyayev, 1999].

The difference between the languages can be traced to Russian phrases that are associated with a Russian soul "lie on a grand scale", "lied to the full", "cheat to the fullest", etc., for which the English language has been found adequate translation [Panchenko 1999].

In both compared languages recorded a negative evaluation in comparison deceitful, cunning man with a fox, in many folk traditions symbolizing evil cunning and deceit. Russian language for the man who lies with a man fixed the comparison *sivym gelding* - "lies like a trooper". For the Russian world view "cab driver" is the standard of falsity, because it is associated with abuse, abusive degree. Many people believe that the word "dealer" and "liar" are synonymous. This proverb says "do not be fooled - you do not sell" [Panchenko, 1999].

For the emotional evaluation of nominations, "liar", "liar" lexical equivalent in English there. Deceived associated in both languages with a boy at school "around as a boy around the finger".

Observations on the lexical and phraseological means nominate and describe the deception and its variants, have revealed these features of the Russian national character, such as: emotional (English language is more restrained in emotional cheating characterization); tendency to passivity and lack of control is manifested in the fact that people thought powerless over the situation that has no responsibility for the action produced, including fraudulent [Panchenko, 1999].

"Cash lie involves the use of suitable means capable of deceiving others. Consequently, every lie must not only at variance with the truth, but also seem plausible" [Volosyuk, 2009]. That is a lie, to be a *samoyu* mostly hidden under a mask and apparent truth.

It is believed some domestic authors, lies and manipulation *lozhyu*- is actually the human species quality. So, B. Porshnev wrote: "... The second signaling system was born on the foundation *interdiktsii*" [Gumilev, 2007]. It was an objective mechanism between individual influences on behavior.

The essence of this system is that it encourages the object of influence do anything that is not dictated by its own sensory impulses of his body, and it is clearly beyond imitative impulses inherent in animals, in this case, it has already antibiologichna [Duprat, 2008].

Related lie paid tribute to a lot of wise people, including the great philosophers. The most common definition of European culture in St. Augustine: a lie - it said with a desire to tell a lie. The main difference lies of deception is that it is always based on verbal or non-verbal intentionally untrue, false allegations. K. Melitan considers false indication powerless, because children and adults begin to lie when their actions appear "something bad", it is necessary to hide from others. Man lying to observe the elementary rules of courtesy [Marks, 1995]. According to Plato, a lie - a phenomenon many aspect. He distinguished between "lie in the mind" - as an error and "false words" - as a hoax: "He who speaks of things in accordance with what they are telling the truth, he who talks about them differently - lying" [Ekman, 1993]. According to Kant's moral philosophy, a lie is unacceptable under any circumstances: from the Christian point of view, it is a sin, a civil - an affront to human dignity [Ekman, 1999]. Kant rejected any lie on the grounds that "a lie is always harmful to someone, if not to an individual, the person in general, because it makes unusable is the source of law". A. Schopenhauer argued the need for the statements do not correspond to the truth of the allegations in situations of undue interference into the internal world of the individual. He believed the lies necessary instrument of self-defense against curiosity. Modern western psychologists rely on the philosophical tradition, which is most clearly expressed in the definition of Hugo Gratiusa: "Lying in the strict sense there is an intention connected with the desire to cheat is not true, that takes away or limits the neighbor opportunity judgments, which he, according to a tacit agreement has natural right". Thus, the definition of a lie, Western thinkers formulated, based on the concept of infringement of the rights of who lie. Because of this understanding lies west - moral and legal [Marks, 1995; Ekman, 1993].

Psychological theory O. Lipmana about lying as a volitional act intended result: for any volitional acts characterized by the presence of certain internal or external braking torques. In the case of brake lies is the simultaneous presence in the mind of the liar par with a complex set of misconceptions true, true representations. In the fight against false and true representations of complex misconceptions won by goals and intentions, and then the person is lying [Simonenko, 1998].

The phenomenon lies often provides guidance on the immoral character of the man who lies, such as "Lie, without blushing". Often regarded as a synonym for false slander. A.I. Ilin points to the inextricable link lies and betrayal. According Solv'yev "lie - in contrast to the confusion and errors - is a conscious and morally reprehensible because contrary to the truth" [op. on the iconic 1995]. Therefore, Russian understanding lies V.V. Znakov called subjective and moral [Marks, 1999].

B.S. Shalyutin defines a lie as "not just a communicative act, a specific effect of the number carried out through communication, and it is directed - directly - to the destination lies" [Shalyutin, 1996]. Lies - activity, subjective process. To lie man is free. Lying there nalaganie primary, not existed before the reality. To lie an act took place, the subjective reality of lying about should allow the internal split, and at the same time on three lines: the goal - means; a true picture of reality - is false; value - mark. Lies, therefore, requires the duality of the human "I" [Shalyutin, 1996].

I.N. Svintsov believes that close to the concept of "false" is the concept of "intentional misinformation", implying that the person possessing the true knowledge, informs the other party deliberately false information [Meshcheryakov, 2005].

D.I. Dubrovsky defines fraud as disinformation - false, incorrect message that can mislead the person to whom it is addressed; distinguishes between malicious deceit and virtuous. He distinguishes among the participants of the process of deception producer ("cheating"), the object ("cheated") and the victim ("Betrayed") fraudulent act, noting that "cheated" by no means always the victim, that is, "Deceived" [Zhussupov, 2015]. Cheating - is a form of disguised manipulation [Kunitsyn, 2001].

V.P. Sheynov considers cheating as deliberate and unfair message to the victim of false information with the aim of unseemly [Schein, 2003]. He believes cheating particular case of fraud, which refers to the manipulation of a victim of illegal methods. They discussed various types of fraud: Gambling, fortune telling, financial fraud, fraud in banking fraud in travel agencies [Material from the Internet, 2013].

Thus, to the west of historical and cultural tradition it is the inclusion of a typical dictionary definition of a lie or an explicit or implicit indication to the person to whom lie. The Russian definitions lie regarded as a moral or an immoral act of lying about the subject, distorting the truth.

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The basic principles of the Kazakh education terms

Abstract: The article is devoted to the basic principles of term formation in the Kazakh language. Different in terms of education of Kazakh terms. Opinions of researchers differ: There are two, three, four, five ways of formation of the Kazakh language terms. Another feature of the period of term formation is the lack of boundaries between words general literary language and terms. This indicates that the terms are not yet fully separated from simple words. Today, as in the main property of terms increased, it is about improving their structure. Especially it is observed in the course of formation, the formation of terminology of social sciences, science and technology in general.

Keywords: term, term formation, abbreviation, tracing paper, syntax, morphology, semantics.

Introduction

But the main source terminological creativity is Kazakh. In this regard, all the layers of the literary language (literary language, spoken folklore, dialects, and others). The direct contribution to education terms made Kazakh educators, they first turned to the inexhaustible source of vernacular vocabulary of the Kazakh language, giving it a terminological meaning, using the methods of word formation, formed and evolved over the centuries.

The term formation can be divided into three basic principles: the principle of common to all languages, national, taking into account the peculiarities of the development of society and the language, and classification, typical of industry terminology. With regard to methods of forming a national terminology, however, there is no consensus, just as there is an established principle of term formation. The reason is not developed of the conceptual apparatus, which leads to errors in the determination of the boundaries between the sources and methods of term formation, mixing the concepts of "path" and "methods" of education. There is no unity in the definition of the scope, framework, productive and unproductive ways education terms. Some researchers distinguish three types of education terms: (1) the words education terms literary language and dialects; (2) the formation of terms based on the way the national language; (3) borrowing words from other languages as a term.

Others are four ways education terms: (1) terminologization; (2) reterminologizatsiya ie Use of the terms of other sectors; (3) formation of terms; (4) to make the loan words international properties (internationalization).

According to the third, there are two ways - affixation and compounding.

Fourth provide methods that are based on the methods of word formation of the national language: (1) semantic; (2) morphology; (3) parsing; (4) tracing; (5) reduction of words (abbreviation).

As can be seen from the above, a clear distinction between the methods of term formation did not work, so can not be regarded as identical with the content, structure and ways of education terms created from elements of the national language and borrowed words, because with the help of the national language elements are new terms and borrowed accepted in finished form. For this reason, each object must be called by its name, and evaluated accordingly, only in the case where no derivational system for education terms desired word or word is not suitable for the system of adopted words, new terms are formed.

The formation of new terms - not a whim of the people involved in this, and creative professionals are able to accurately, clearly, specifically designate the concept in connection with specific needs, who have mastered the ways of word formation of language, distinguishing sources of development and taking into account the patterns of the language.

Ways of formation of terms in the Kazakh language

In the Turkic languages in general in Kazakh, in particular, to establish certain models of formation of new terms. From whatever material and whenever the term was created, it is based primarily on the affixation: compounding, contraction of the words (abbreviation). In some languages, it reveals yet another pathway for the formation of words, terms formed with prefixes (re, anti, counter, etc.). However, this method is not productive in agglutinative languages, particularly the Turkic languages. Method abbreviation (abbreviation of letters, reduced syllables) appeared in the Kazakh language only after the revolution. This model was originally used to refer to the nomenclature names later became very productive.

Thus, in the process of development of the Kazakh language was formed four ways education terms.

Firstly, the adoption of some of the words of the Kazakh language terminology of values, ie, semantic method. It is productive when (1) terminologization ancestral words of literary or general literary language; (2) terminologization dialects; (3) the transition from one system to another terminology.

Secondly, the derivation methods, they can be divided into three groups (a) or morphological synthetic method (using affixes); (B) syntactic and analytical (compound words, addition); (C) the method of abbreviation (abbreviation).

The third tracing method. At first glance, it seems that it performs a connecting function between the two previous methods. That is, using borrowed word and first two possible ways. In other words, in the basis of a concept, the idea and carried out by means of the national language, through it does not use.

Fourth, a method borrowed from other languages ready terms. At the same time borrowed under the terms defined as a system of words, which came mainly from the Russian language, Russian and international lexicon.

As a ready-term first used the word with dialectal usage and features, have fallen into the language of the national language. There are also borrowings from other languages, which are derivatives, have long formed in the language. Having

considered ways and means, which played a direct role in the formation and the formation of the Kazakh terminology, we can draw some conclusions: no matter how many ways of education - three or five they were due to the development of translation and translated literature. Even at first glance unrelated to the transfer of the semantic method has resulted examples of Russian language. Therefore, even taken without translation, the term turns into a borrowed word, passed the selection of translators. In this regard, it is necessary to note that, unfortunately, "many researchers terminology problem by showing the various ways and means of education, do not attach importance to their formation in the translation. Therefore, education terms necessary in connection with the transfer.

In accordance with the selected language material will analyze each of the methods education terms. Semantic way is to use a special terminology significance of traditional Kazakh and borrowed in ancient times, Arabic, Persian words. A new feature of these words is developed on the basis of a value.

As already mentioned, a semantic way, it is understood in the first place, full use of the capabilities of the national language. The internal features of language is the ability of some native words or a nationwide general literary language gets a new, special meaning, or a tendency to terminological function of one of the meanings. Thus, amplified denominative specific property of these words. They help to expand the conceptual apparatus of a particular science; participate in its development and at the same time fill up a special layer of the lexical language. This is possible in connection with the expansion and contraction of the word, but it is necessary in the period of intensive development of the society.

In this paper, the terminology is not only considered as part of the standard language, but as an independent, key section in lexicology. If the basis of the state language is a written literary language, its core is the terminology and scientific language. These two concepts will be considered in the aggregate, as the terminology contributes to the development and establishment of scientific language. Terminology system in turn is replenished with new lexical units of scientific language. Changes in terminology system are reflected mainly in the press, journals and articles, textbooks, manuals.

It is known that scientific language is the medium where the terminological system is formed. It does not confine itself, fueled by the vocabulary of the literary

language. This is evidenced by the state of the terminology, since 20-30-ies till our time.

Formation, formation and enrichment of the Kazakh language terms
The purpose of this article is to review the Kazakh terminology, the historical aspect, the way of its formation, periods of formation and development; its current state and direction, as well as identifying its role in enriching the scientific language.

Let us dwell on a few main points: (1) The term we mean the various concepts referred to the words. Whatever concept is not meant by the term, whatever sense it is not carried, it must designate a single point. (2) The semantic features of the term is that it retains significant integrity. (3) The components of the term are the root, affixes, the entire word. His special sign - a symbol. (4) In terms of lexical-semantic changes are often associated not with a purely linguistic processes, and with the extra-linguistic. Terminology is closely linked with the development of science and life, and the emergence of new concepts. Thus, the terminology is formed in accordance with laws and social development is its reflection. (5) At present, the richness of any language, including Kazakh, it is impossible to know without terminological system. (6) This layer of vocabulary associated with the concepts of past, present and future are in the language of a reflection of new concepts and phenomena. (7) The terminological system is constantly replenished by the vocabulary of the literary language. (8) Formation of Kazakh terminology associated with the development of social, political and cultural life of our society. (9) The development of the terminology can be divided into two periods. First period - the second half of the XIX century up to the October Revolution, and the second period - from the October Revolution to the present day. (10) In the cultural life of the Kazakh people, the second half of the XIX century, has had a beneficial effect on the progressive development of the language. During this period, the first appearance of prints. Articles of newspapers and magazines of the time, "Dala ualayatyny gazeti", "Turkistan ualayatynyn gazeti", "Kazakh" newspaper, "Aikap" magazine reflect the state of terminological vocabulary. (11) Materials printed in these publications were mostly translations, so the appearance of terms in the Kazakh language has often been associated with their translations from the Russian language. During this period, the establishment of terms occurred spontaneously. Each author of the newspaper articles and magazines to use their own terms. (12) In the creation of the Kazakh terminology big role A. Baitursynov, which can be considered the "father" of the Kazakh terminology. (13) The concept of "Ka-

zakh terminology" laid a very capacious sense. It covers the vocabulary, reflecting the different phenomena of different areas of knowledge in science and technology, media, radio, television, politics, art and special literature, etc. Therefore, only the socio-political and humanitarian terms are discussed in this paper. (14) According to the socio-political and human sciences, since the 20s to the present day, it has been published about 40 bilingual terminology dictionaries. About 30 of them were transferred to the computer and the register of social and humanitarian terms, which amounted to more than 67 000 words. In addition, since 1982, the Department of terminology and translation theory have been created around 500 thousand card funds, awaiting analysis.

Conclusion

Scientific research begins with terms of 30 years, when the Academic Center was established under the People's Commissariat, and when it methodical bureau, where terminology issues involved famous linguist HC Zhubanov. Since 1935, when the Council of Ministers of the Kazakh SSR was established the State Terminology Commission, which is currently under the Cabinet of Ministers of the Republic of Kazakhstan.

The formation and development of Kazakh terminology contributed to the written language. If there is no letter, the question of the terms would not have been raised. In the history of the Kazakh culture in a short period has had three kinds of writing, based on the Arabic script, Latin, Cyrillic, which is a wealth of material in the study of terminological vocabulary of the Kazakh language.

The formation and development of high terms of translation role, especially in the political, artistic and scientific literature, as well as various teaching aids.

For a long time, translation is closely linked to the study of literature. In linguistics this problem for the first time raised the well-known linguists HK Zhubanov, S. Amanzholov, on the theory that we are guided in their work.

Social Sciences and Humanities in our time divided and developed their own ways, each of them has its own terminology system. But the terminology system of these sciences have not been studied. Therefore, in this area we need to research on the various social sciences and humanities (linguistics, literature, philosophy, jurisprudence, etc.).

In the formation of the Kazakh terminology, each historical period has left its mark, such as across-the overcoming of the population illiteracy, confiscation, collectivization, the creation of collective farms, the new economic policy, industrialization, defense of the Fatherland, five-year plans, Virgin Soil Upturned, spaceflight, intensification, reconstruction, independence, independence state, etc.

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The contradiction in the language of the question: a new look at old things

Abstract: The author of this article studied the psychological, pragmatic, social aspects of lying, cheating, have long been considered in research scientists. Presented new perspectives on well-known assertion.

Keywords: lying, cheating, sociology, psychology, linguistics, pragmatics.

The most important functions of destructive deceit should include: (1) disinformation partners, co-workers, in the broad sense - of its own population and the Allies about the true state of resources and ideas source of fraud; (2) total and increasingly undermine the growing confidence in the relationship between people and social groups, repeatedly hampering social communication, which requires the use of special procedures, the so-called social security, the insurance system of deception that objectively increases in the society social entropy and the centrifugal tendencies; (3) the creation of conditions anti system [Gumilev, 2007], in which the Company, its

structural elements (including certain public authorities), are produced in the relationship within yourself and with other societies deception, sooner or later themselves broken up or demolished competitors (counterparties) who were able to recognize the deception and use it for their own benefit or to successfully resist him.

Leveraging this thesis, it is possible to quote Jean Duprat: "... if the well-known collective unit can only exist based on a lie, the purpose of it is immoral, and the foundations of its existence devoid of objective value" [Duprat, 2008].

Among the main methods of psychological defense Freud identifies the following security mechanisms associated with the concept of a lie: rationalization (protective reasoning, by means of which the subject seeks to give logical and morally acceptable explanation of anything, and the true motives remain in the shadows - a means of maintaining self-esteem personality) and depersonalization (self-change, the loss of his "I"; the loss of the ability to be an individual) [Andryushin, 2003]. Prof. DI Dubrovsky, author of the book "Deception", argues that deception - is a means to protect and promote the interests of both individuals and groups, classes, nations and states [Dubrovsky, 2001].

Many researchers believe the deception of a broader category than the truth and falsehood (C. Bock, R. Hopper, R. Bell) [Zhussupov, 2014]. According to them, except for oral and written statements, introducing companion astray, deceive, you can also through the gesture, Morse code, different characters [Marks, 2001]. T. Karson and his co-authors believe that the content of the "lies" of the concept includes only an attempt to mislead others, while the word "fraud" always means success: achieving a deceiver desired effect [Zhussupov, 2015]. Cheating is based on the conscious effort to, one of the participants of communication, to create a partner a false idea of the subject matter, but cheating does not distort the facts. The hallmark of deception - a complete absence in it of false information, direct distortion of the truth [Marks, 1997].

Paul Ekman, unlike other studies, uses the concept of "lies" and "deception" as synonyms. Ekman defines a lie (or fraud) as the act by which one person misleads another, making it deliberately, without prior notice to its own purposes and without clearly expressed by the victim's request not to disclose the truth. Thus, in determining the lies we have to take into account not only the liar, but also a victim of fraud [Ekman, 1999].

According to Berdyaev, a lie there is always largely a phenomenon of the social order. Man lying mainly another and another. And even when a person is lying to himself, then he does it, having consciously and unconsciously in mind other [Berdyaev, 1999].

V.V. Marks said that was not true in the mass media and interpersonal communication situations, usually manifests itself in one of three varieties: as a true error (man speaks the truth, himself without realizing it); It lies in various forms of allegory (allegory, irony, joke, etc.); lie manifests itself in lies [Zhussupov, 2014]. Vranje - a typical product of Russian culture, it is a communicative phenomenon: one way to establish a good relationship with a partner, bring your fiction fun yourself and him, so there is no intent to deceive the listener. Classic lies characterized by the fact that the liar gets unconcealed pleasure, enjoyment from the process of presentation of fables [Marks, 1999; Signs, 1995]. Often, it should be treated as an external manifestation of the protective mechanisms of the person to address feelings of anxiety, discomfort caused by dissatisfaction with the subject of his relationship with others [Marks, 1999; Kunitsyn, 2001]. The desire of man to protect his inner world of "intrusion", the reluctance to bare soul before others [Zinchenko, 2000; Marks, 1995; Kunitsyn, 2001]. Dostoevsky believed that the lie is innocent [op. on the iconic 1999].

In VIDal dictionary states that "lie - lie, tell lies, contrary to the truth". Russian authors identify the following aspects of lies: the reference, intentional (if distorted the truth, and this is done deliberately or not) and communicative (the impact of inappropriate statements on the facts of the other person) [tsit.po iconic, 1995].

V.V. Znakov defines a lie as saying based on confusion, incomplete knowledge or humorous intent; lies as a deliberate distortion of the truth known to the subject, carried out with the aim of introducing errors into the interlocutor; fraud as a half-truth, or the truth, which in the opinion of the deceiver, deceived trigger on erroneous conclusions from the established facts [Marks, 1999].

YI Cool said that's not true - it is a statement based on a sincere delusion speaker or his incomplete knowledge of what he was saying. It is not true, as deception, based on incomplete information, but, in contrast to the deceit, the speaker is not conceals the known information and does not pursue any purpose other than sending a message containing a partial (or misleading) information [op. According to Kovalenko, 2000].

Along with other deception being attributed to the individual and self-deception. B. Shalyutin notes that the concept of self-deception captures one of the capital of the facts of the inner life of man's self-deception's value (notional) "I" collective "I". Self-deception as every lie is an act of exposure. Self-sacrifice in the name of self-deception - is on what the person is capable of, but that is still not capable of humanity. From the point of view of the psychology of communication and mutual self-deception is a special case of internal dialogue, auto communication: here and cheat, and deceive represented in one person. The most obvious situation that lead to self-deception, usually due to the fact that the person getting some knowledge, does not believe in his credibility or even denies, rejects from itself [quoting from Zhussupov, 2015]. Illusion - a voluntary self-deception when the recipient agrees to believe that reports communicant. If deception - is a communication control to the detriment of the recipient, it is an illusion - a communication management for the benefit of the recipient [Brilling, 2012].

"Analyzing deception - says Dmitry Dubrovsky, - we must distinguish between action and result, and thus, the manufacturer, the object and the victim of fraudulent activities. For the analysis of deception as a social phenomenon it is necessary to consider the following questions: "Who is cheating?", "Who cheated?", "How to cheat?", "Why deceive?" [Dubrovski, 1994].

"Cheating" - the subject, decided to produce desinforming action (pass false information to conceal the true facts, lie treacherously disturb the word, promise, justify dishonest, the obvious injustice, etc.). This commitment puts this subject in a special position "closed communicant", which conceals and disguises the true purpose of their actions. A number of local researchers pay attention to the importance of the authority of "cheating" for "deceived" [Porshnev, 2006], while under the influence of authority of cheating always easily overcome with discrepancies between the observed phenomena and the meaning of the message. At the individual level, the characteristic features of "cheating" are cunning, dissimulation, hypocrisy, a diplomatic politeness, ability to evade direct questions, to achieve the effect of deceiving by half-truths, vague statements, the game on the "excessive" expectations "deceived".

All this requires "deceiving" of the game, as it were on several levels at the same time, so any managed cheating may indicate, in particular, and the high intellectual qualities of "cheating". That is a significant activity for the information on the conditions of social interaction may be false in its own right and true, but to be mis-

understood, which can lead and has led to an incredibly devastating [Gumilev, 2007]. Hence, lies and truth, especially in the area of social interaction, it is vital to distinguish, select, and on this basis to correctly understand the goals and aspirations of its customers, sponsors and media. Nevertheless, even today, despite the millennia of evolution own society as in the individual, and have difficulty organized professional communities are coming as soon as professional activity is the need to identify the true and countering false information about the subject and object of activity, and the more necessary operating strictly true.

Concepts intension and extensional also underlie the distinction of extensional and intensional contexts [Ariytnova, 1982]. Intensional context allows replacement of only intensionally equivalent expressions. Extensional contexts called the set of claims, which extensional equivalent linguistic expressions are interchangeable, ie. E. Take into account only the extension of expressions. Extensional synonymy until recently was considered rare, but now she has been given much attention in the works devoted to the study of methods of influence on the recipient by the media [Bolindger, 1987; Schmid, 2003].

The varieties of distortion of information about themselves and include such things as Machiavellianism, manipulation and presentation itself. "Machiavellianism" Western psychologists call "human tendency to manipulate others in interpersonal relationships thin, subtle or physically aggressive means, such as flattery, deception, bribery or intimidation" [Znakov, 2002]; as a strategy of social behavior, including the manipulation of others for personal gain, often contrary to them (ie, other people's) own interests; as a psychological syndrome, based on a combination of interrelated cognitive, motivational and behavioral characteristics [Marks, 2002].

Every person entering into communion with others, translates the wealth of information on his identity. Even if a person is present in the room in silence, in which there are other people, they are paying attention to it, read for yourself the necessary information about their socio-demographic and personal features [Kovalenko, 2007; Shkuratova 2004]. As rightly noted by I. Goffman, in humans, there are two ways to tell something about themselves: "arbitrary expression, which he gives information about himself, and an involuntary expression, which he pretends to be" [quoted by Shkuratova, 2004].

E. Goffman considers itself the presentation by role behavior. The "social drama", he created the concept samopredyavlenie is the individual performance of cer-

tain roles to a specific audience, which initially prepared for the purpose of perfect realization, then playing in front of others [Hoffmann, 2000]. V.N. Kunitsinoy proposed the following definition: "self-presentation - short-term, specifically motivated and organized process of presenting information about themselves in terms of verbal and nonverbal" [Kunitsyn, 2001]. As a special case of self presentation, N.V. Perepelitsa allocates pseudo self-revelation, understood as the message itself is not just incomplete, and distorted or misleading information [quoting from Maslennikova SA, 2003]. E.V. Zinchenko in this case speaks of a false self-disclosure [Zinchenko, 1999].

The concept of a lie can be seen as the result of generalization of experience of the subject, relating to the lie and its various manifestations in communication. E.V. Zinchenko study led to the conclusion that the representation of students of lies, falsehood, deception and lies were poorly differentiated [Zinchenko, 2005], but these concepts in terms of psychology have different contents [Soft, 2011].

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Bilingualism and multiculturalism: from the study of foreign scientists

Abstract: In the annual Message of the President of the Republic of Kazakhstan - Leader of the Nation N. Nazarbayev to people of Kazakhstan "Strategy" Kazakhstan-2050": a new policy established state" noted the necessity of multilingual training, active introduction of foreign languages in Kazakhstan reality, because "Trilingual's should be encouraged at the state level. We need to make a breakthrough in learning English. Possession of these "lingua franca" of the modern world will open for every citizen of our country's new unlimited possibilities in life. "In accordance with the objectives set by the President of the Republic of Kazakhstan in the State Program of Education Development of the Republic of Kazakhstan for 2011-2020. The State program of functioning and development of languages for 2011-2020 and the cultural program "Trinity of languages" all the people of Kazakhstan in 2020 must master Kazakh, 95% - and 25% of Russian - English.

Keywords: bilingualism, Multilinguism, language personality, bilingual linguistic identity.

Introduction

In the scientific literature discusses general issues of bilingualism from the standpoint of linguistics, psychology, sociology, psycholinguistics. Bases of occurrence of bilingualism can be derived from the writings of L. Gumilev containing deep ethno-cultural observations [Gumilev, 1990]. Systematized aspects of the problem in collective monographs and articles of the Soviet period. On a variety of factual material philologists characterized most important types of bilingualism, identified forms and types of bilingualism.

Of considerable interest is linguistic typology of bilingualism proposed E. Vereschagin in «Psychological and methodological characteristics of bilingualism». According to the researcher, it is necessary to distinguish three types of productive bilingualism: subordinativny, coordinative, medial. Subordinativnym author calls productive bilingualism, in which the voice works are wrong. Productive bilingualism providing a product of correct speech, the author calls coordinative. The third type of productive bilingualism is associated with ethnographic and cultural studies subjects, including regional studies aspect [Vereshchagin, Kostomarov, 1990].

Language planning in the light of bilingualism and polylinguism

Today, multiculturalism and multicultural education is determined by the state of the national language education policy. Its principles are reflected in the Constitution of the Republic of Kazakhstan, the Law "On languages in the Republic of Kazakhstan" and "On Education". Article №6 "Law on Languages" states: "Every citizen of the Republic of Kazakhstan has the right to freely choose the language of education and training". Language planning, aimed at expanding the functions of the state language, is an efficient and effective tool for increasing the Kazakh language competence, making the main focus of the Kazakh language polylinguism and self Multilinguism - social reality.

Language policy states in the modern world is determined by the interdependence of four main factors: (1) the language situation; (2) language ideology; (3) the distribution and the role of English as the world; (4) increasing pressure to recognize the rights of linguistic minorities [Spolsky, 2004].

Language planning is a very complex system, in order to analyze language planning used simplified models. Model analysis allows us to represent language planning as an abstract simplified diagram of the major components and their causal relationships. There are several models of language planning; All models are used to

study the same subject - language planning, but are focused on different aspects. T. Thombrun, V. Jernudd [cited by Fasold, 1991], W. Rivers [2003] and F. Grin [1999] analyze the language planning as an economic phenomenon. This approach allows to evaluate the costs and benefits of language planning for subjects and objects. B. Spolsky proposes to analyze the language planning and language policy as an option [Koenig, 2003]; J. Fishman proposes a phased model of language revitalization [Fishman, 1997]; R. Cooper [1996] identifies four models of analysis: language planning as a management innovation, language planning as marketing, language planning as a tool to achieve and maintain power, language planning as decision-making. Model analysis of language planning as a management innovation was inspired by the theory of change and its main focus is on the process of change in language planning. Model analysis of language planning as there was under the influence of marketing management theory and focuses on planning mechanisms. Model analysis of language planning as a tool for achieving and maintaining power arose under the influence of political sciences and analyzes ulterior motives and goals of the planning entities - those who generates the language policy and language planning holds. Model of language planning as a decision-making based on social theory and is aimed at the study of social relations in society and, above all, on the social changes resulting from language planning.

R. Cooper, based on models of language planning as innovations as marketing as achieving and maintaining power as decision-making process offers an activity model, which consists of eight elements: which actors try to change the language behavior of any object for any purpose, under any circumstances, what means, as decided and with what effect [Cooper, 1996].

J. Smagulova offers multi-component analysis model of language planning, based on the summary of P. Cooper, economic models, models of language planning as an option, which includes information about all the components described in language planning and communications. Multicomponent analysis model of language planning, in addition to the above, includes language policy, language ideology and goals of language planning. In addition, the proposed model contains much more detailed breakdown of virtually all signs of possible components that will greatly facilitate its use [Smagulova, 2004].

Bilingualism and multiculturalism

State language policy Multilingual community is mainly of two types: either supported monolingualism in all of their constituent territories and bilingualism remains a «private matter» of migrants and immigrants; or for administrative purposes, one or two languages become official, and in the case of minority languages is a policy that meets their ethno-cultural needs, especially in education in the mother tongue [Protasova].

O. Kolyhalova, considering the socio-cultural and philosophical aspects of bilingualism, notes that the philosophical approach to the problem of bilingualism allows you to see the function of bilingualism is not only the feasibility of communication between peoples and cultures, but also in a significant expansion of the capacity of the verbalization of thought [50: 20]. We can not agree with the view that the problem of bilingualism and bikulturizma has a specific angle when viewed from the perspective of national minorities, linguistic choice is dictated by the language and cultural dependence. In this case, the main language is not native and is regarded as an effective means of entry into the modern world and the true civilization [Kolykhalov, 1999].

Language personality [Bahtigereeva 2004, 2005; Bogin 1984; Sentries 1987; Karasik 2005; Karasik, Dmitrieva 2005; Lyapon 1999 and others] as a carrier of a particular language holds in his mind the information issued in linguistic terms, rules and regulations of use. As a carrier of a particular language and culture language personality is a national type. V. Karasik allocates Lingvokulturnye Valais, recognizable images of representatives of a particular culture, the totality of which is the culture of a society. Lingvokulturnyj type is a variation of the concept, the content of which is typable personality [Karasik, 2005]. You can talk about the language of the person as a social type. It is necessary to take into account various parameters: age, professional, gender, education. According to V. Karasik and O. Dmitriev, “cultural personalities classification involves the allocation of those personality types that have had a significant impact on the behavior of the respective culture. It is possible to select the type of ethno-cultural in general, have estimates from qualified members of other ethnic groups, and one or the other type of sociocultural under appropriate culture” [Karasik, 2005]. Researchers distinguish different types of the Lingvokulturnye corresponding to a particular culture [Dmitriev 2005; Ivushkina 2005; Karasik 2005; Krysin 2001; Korovin, 2005 and others]. It emphasizes the recognition

of images of "representatives of a particular culture, the totality of which is the culture of a society" [Lyapon, 2000].

Linguistic identity can be seen as an individual with a strong author's style of communication and writing. M. Lyapon draws attention to the following: "A comprehensive description of the person (generally as a producer of the text, as well as the creator of the poetic system) brings researchers to solve two problems: 1) the synthesis of a particular way of linguistic identity, to build its characteristic system of preferences, strategies use of language; 2) to identify patterns of linguistic reflection, "I'm speaking": specific linguistic identity, designing linguistic portrait - your own, contributes to the construction of a generalized image of a native speaker as an object of verbal influence [Lyapon, 2000].

Researchers bilingualism pay attention to the verbal behavior of communicants bilingual. Bilingual verbal behavior can be characterized by interference, intercalation, switching codes. The principal differences between these phenomena identified E. Karlinskii to offer their comparative characteristics. Interference represents the influence of language on the speech on H1 H2, whereas under the intercalation meant wedging elements of the language in a speech at the H2 H1 while preserving the native core predicate. Distinguish inventory and phrasal intercalation. The first is a wedging individual words in a speech at the H2 H1. [Carlin, 1990]. This wedging, according to our observations, can be caused not only by the lack of lexical element in H1 from H2, but also communicative strategy of integration of the recipient [Vereshchagin 1990 Issers1999; Prokhorov, 1997], [Tuksaitova, 2007]. Bilingual relations are characterized by asymmetry, as one of the languages will be leading in terms of possession of speaking / writing, on the importance of communicative functions. Do not have a unique solution and the problem itself proficiency, the solution of which is related to the question of at what point a person is considered bilingual. Usually under command of the language means the ability to carry out such activities in the language that is creative, which is manifested in the ability to generate new statements, depending on the changing situation [Abil E., Ismakova B., Tazhibayeva S., Ibrasheva A., Guchigova S., Kamzina M., Alberti V., Tran Dinh L., Koishybayev G., Raimbekova A. 2012-2016].

Findings

Value polylinguism and bilingualism in linguistics, in particular in the Kazakh language, has not been fully explored. In this article, we have only a certain part of the sociolinguistic problems.

A number of scientists lead the arguments with respect to these linguistic phenomena. But we must take into account the fact that at every stage of the development of foreign language learning in a number of system components is formed with a set of rules that is different from the source language.

All these ideas are partially correct. But they confirmed experimentally only in those cases where a more or less obvious and more difficult cases may be the result of a combination of the most incredible trends and circumstances.

To learn a second language, according to scientists, it is necessary, first of all, to have the desire to learn it. It can not be realized by the man himself, but implicitly present in it. This positive attitude to the language, speaking to the people on it, and emotional recovery experienced by students when classes are well organized and enjoyable, tangible results from studied. In addition, there should be a psychophysiological ability to process a new language and assimilate it (powers of perception and memory). Finally, it should provide «access» to the language, that is, get training materials, provide an opportunity to communicate with native speakers.

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Bilingualism and multiculturalism: A case study of the Kazakh language

Abstract: Bilingualism and multilingualism as a science was regarded in many scientific articles and reports, it is devoted to research in the field of psychology, medicine, cultural studies, sociology, political science, pedagogy and linguistics course. Language processes, including processes of bilingualism, not amenable to direct regulation. Currently, the example of the Kazakh language, you can see how it affects the functional status, standardization and distribution of the official language, as well as an increase in the degree of bilingualism of the country. In this paper we analyze the language planning: the linguistic situation, language policy, the relationship with polylinguism bilingualism, multiculturalism, etc.

Keywords: bilingualism, Multilingualism, language personality, bilingual linguistic identity.

Introduction

In the scientific literature discusses general issues of bilingualism from the standpoint of linguistics, psychology, sociology, psycholinguistics. Bases of occurrence of bilingualism can be derived from the writings of L. Gumilev containing deep ethno-cultural observations [Gumilev, 1990]. Systematized aspects of the problem in collective monographs and articles of the Soviet period. On a variety of factual material philologists characterized most important types of bilingualism, identified forms and types of bilingualism.

Of considerable interest is linguistic typology of bilingualism proposed E. Vereschaginym in «Psychological and methodological characteristics of bilingualism». According to the researcher, it is necessary to distinguish three types of productive bilingualism: subordinativny, coordinative, medial. Subordinativnym author calls productive bilingualism, in which the voice works are wrong. Productive bilingualism providing a product of correct speech, the author calls coordinative. The third type of productive bilingualism is associated with ethnographic and cultural studies subjects, including regional studies aspect [Vereshchagin, Kostomarov, 1990].

Language planning in the light of bilingualism and polylinguism

Language planning, aimed at expanding the functions of the state language, is an efficient and effective tool for increasing the Kazakh language competence, making the main focus of the Kazakh language polylinguism and self Multilinguism - social reality.

Language planning in Kazakhstan has a mixed character, which is defined by: (a) the variety of subjects and differences in their view of language planning; (b) the conflict of ideologies (monolingual - bilingual - multilingual); c) a set of sociolinguistic factors (demographics, regional differences, the share of Kazakh-Russian monolinguals and bilinguals-activity process of language changes, the continuing disparity of status and housing state of the Kazakh language, the current role of the Russian language as a linguistic capital, the increased role of the English language, etc. etc.).

Language policy states in the modern world is determined by the interdependence of four main factors: (1) the language situation; (2) language ideology; (3) the distribution and the role of English as the world; (4) increasing pressure to recognize the rights of linguistic minorities [Spolsky, 2004].

There are several models of language planning; All models are used to study the same subject - language planning, but are focused on different aspects.

T. Thombrun, V. Jernudd [cited by Fasold, 1991], W. Rivers [2003] and F. Grin [1999] analyze the language planning as an economic phenomenon. This approach allows to evaluate the costs and benefits of language planning for subjects and objects. B. Spolsky proposes to analyze the language planning and language policy as an option [Koenig, 2003]; J. Fishman proposes a phased model of language revitalization [Fishman, 1997]; R. Cooper [1996] identifies four models of analysis: language planning as a management innovation, language planning as marketing, language planning as a tool to achieve and maintain power, language planning as decision-making.

R. Cooper, based on models of language planning as innovations as marketing as achieving and maintaining power as decision-making process offers an activity model, which consists of eight elements: which actors try to change the language behavior of any object for any purpose, under any circumstances, what means, as decided and with what effect [Cooper, 1996].

J. Smagulova offers multi-component analysis model of language planning, based on the summary of P. Cooper, economic models, models of language planning as an option, which includes information about all the components described in language planning and communications. Multicomponent analysis model of language planning, in addition to the above, includes language policy, language ideology and goals of language planning. In addition, the proposed model contains much more detailed breakdown of virtually all signs of possible components that will greatly facilitate its use [Smagulova, 2004].

Bilingualism and multiculturalism

Developed as a result of discussions contemporary approaches to the problems of multiculturalism or cultural pluralism based on the actual recognition of cultural and ethnic attachment as an integral part of the psychology of personality. Moreover, becoming increasingly popular idea of the possibility of mutual enrichment of cultures, on the integration of the components will be retained. In the last twenty years in international scientific journals published numerous articles on the principles of multiculturalism [Kogilla Moodley, 1983; Jerzy Smolicz, 1997; Olshtain, Kotik, 2000; Kheimets, Epstein, 2001].

It is difficult to build new on the ruins and debris from. Today, it is clear that much more effective way is not a mechanical rejection of the old culture and identity, but an attempt to adapt, to reconstruct culturally conditioned habits and customs in

order to fit them into a new living conditions. The ideology of the «melting pot» has not worked, and today it is discarded [Olshtain, Kotik, 2000].

State language policy Multilingual community is mainly of two types: either supported monolingualism in all of their constituent territories and bilingualism remains a «private matter» of migrants and immigrants; or for administrative purposes, one or two languages become official, and in the case of minority languages is a policy that meets their ethno-cultural needs, especially in education in the mother tongue [Protasova].

This monograph deals with the problems of bilingualism A. Mayorova with social positions. The author conceptualizes the concept of «language», «language functions», «social character of language», «Language and Society» in relation to the concept of social bilingualism. Researchers use the term «communicative space» (Wednesday), which is located inside the speaker of the individual. The components of communicative space the author includes speech and artistic genres. Stand out «frame», «tone», subject content and intellectual sphere to which the content belongs, communicative situation with the entire set of cash directly implied and thinking the components that make up the idea of it each participant [Mayorova, 1997].

O. Kolyhalova, considering the socio-cultural and philosophical aspects of bilingualism, notes that the philosophical approach to the problem of bilingualism allows you to see the function of bilingualism is not only the feasibility of communication between peoples and cultures, but also in a significant expansion of the capacity of the verbalization of thought [50: 20]. We can not agree with the view that the problem of bilingualism and bikulturizma has a specific angle when viewed from the perspective of national minorities, linguistic choice is dictated by the language and cultural dependence. In this case, the main language is not native and is regarded as an effective means of entry into the modern world and the true civilization [Kolykhalov, 1999].

Language personality [Bahtigereeva 2004, 2005; Bogin 1984; Sentries 1987; Karasik 2005; Karasik, Dmitrieva 2005; Lyapon 1999 and others] as a carrier of a particular language holds in his mind the information issued in linguistic terms, rules and regulations of use. As a carrier of a particular language and culture language personality is a national type. V. Karasik allocates Lingvokulturnye Valais, recognizable images of representatives of a particular culture, the totality of which is the culture of a society. Lingvokulturnyj type is a variation of the concept, the content of which is

typable personality [Karasik, 2005]. You can talk about the language of the person as a social type. It is necessary to take into account various parameters: age, professional, gender, education. According to V. Karasik and O. Dmitriev, "cultural personalities classification involves the allocation of those personality types that have had a significant impact on the behavior of the respective culture. It is possible to select the type of ethno-cultural in general, have estimates from qualified members of other ethnic groups, and one or the other type of sociocultural under appropriate culture" [Karasik, 2005]. Researchers distinguish different types of the Lingvokulturnye corresponding to a particular culture [Dmitriev 2005; Ivushkina 2005; Karasik 2005; Krysin 2001; Korovin, 2005 and others]. It emphasizes the recognition of images of «representatives of a particular culture, the totality of which is the culture of a society» [Lyapon, 2000].

If we talk about bilingual as a bilingual person, it should be noted that each bilingual your vocabulary and language skills (in our case - Kazakh and Russian). As a carrier of a particular culture, which laid the national stereotypes of behavior, specific attitude, bilingual acts as a national type.

Researchers bilingualism pay attention to the verbal behavior of communicants bilingual. Bilingual verbal behavior can be characterized by interference, intercalation, switching codes. The principal differences between these phenomena identified E. Karlinskii to offer their comparative characteristics. Interference represents the influence of language on the speech on H1 H2, whereas under the intercalation meant wedging elements of the language in a speech at the H2 H1 while preserving the native core predicate. Distinguish inventory and phrasal intercalation. The first is a wedging individual words in a speech at the H2 H1. [Carlin, 1990]. This wedging, according to our observations, can be caused not only by the lack of lexical element in H1 from H2, but also communicative strategy of integration of the recipient [Vereshchagin 1990 Issers1999; Prokhorov, 1997], [Tuksaitova, 2007]. Bilingual relations are characterized by asymmetry, as one of the languages will be leading in terms of possession of speaking / writing, on the importance of communicative functions.

Exploring the problem of verbal behavior of the Kazakhs bilingual, G. Suyunova identifies the following types of verbal behavior: 1) Type K (Kazakh) - bilingual in communicative situation uses only the Kazakh language. 2) Type P (Russian) - a bilingual communicative situation uses only Russian language. 3) Type of

AAC (Kazakh-Russian-Kazakh) - bilingual in communicative situation mainly uses the Kazakh language, but within a communicative act is switched to Russian. Interest is the identification of the causes of primary use of the Kazakh language and identify factors switching to the Russian language. 4) Type of RRC (Russian - Kazakh - Russian) - a bilingual communicative situation mainly uses the Russian language, but within a communicative act repeatedly switches to the Kazakh language. The author notes communicative acts with a single switching codes in which bilingual and start conversations in one language (Kazakh or Russian), due to any reason switched to another language. Re-switching, as in the types of AAC and RRC does not occur. Situation with a single switching codes are characterized by low volume at situationality while maintaining semantic and thematic completeness. By increasing the duration of communication such situations would be characterized by repeated code switching, transforming into a situation of Krk and RRC [Suyunova, 2000]. Kazakhs Bilingual in communication with each other implement all of the above types of verbal behavior, but one of them is usually the most typical of a bilingual, describing it as a linguistic identity [Karasik, 2005].

Findings

Value polylinguism and bilingualism in linguistics, in particular in the Kazakh language, has not been fully explored. In this article, we have only a certain part of the sociolinguistic problems.

A number of scientists lead the arguments with respect to these linguistic phenomena. But we must take into account the fact that at every stage of the development of foreign language learning in a number of system components is formed with a set of rules that is different from the source language.

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Diversion potential nonce words, to borrow the words and its role in creating linguistic world

Abstract: The authors linguistic terms "Occasional derivation" and "occasional derivation" used in the article broadly as contextual synonyms. The article is devoted to occasional and borrowed derivation in the artistic (poetic) text, which is an implementation of the gaming potential of the language in which the updated implicit meanings and peripheral matter Asked linguistic personality - the author intentionally for a specific purpose. In this aspect occasionalism derivation, borrowing is seen as a kind of language game, as the game derivational, during which in the creative acts of diversion created by the author's poetic picture of the world.

Keywords: derivation, occasionalism, loan words, language picture of the world.

Introduction

Occasional derivation, as the gaming potential of the language can be interpreted as a creative cognitive act exposes implicit mechanisms and possibilities of the language system. In the process of occasional derivation are created and modified by new knowledge about the world, updated the hidden meanings and peripherals, with innovative shades of meaning are given by the author, the creative personality of language, deliberately. In functional terms Occasional derivation reflects the different communication setup language personality - the creation, selection of nominations for the relevant subject and abstract realities; expression of the subjec-

tive emotional attitude of an individual to a particular fragment of picture of the world; features and its own system of values of a person communicates (Arutyunov, 1979).

The object and the result is a non-standard derivation occasional, reflecting the specificity of the language picture of the world on the individual cognitive, emotive, axiological and pragmatic levels.

Occasional problems in the text of the study have a fairly long history (V.V. Vinogradov, S.D. Katznelson, A.V. Kunin, A. Lykov, M.D. Stepanova, E.I. Shendels, B. Fleischer, O.G. Revzin, R. Budagov, X. The Brinkman, D.V. Gugunava, V.P. Izotov, V.V. Panyushkin et al.) (Arkhipov, 2001).

In the development of theoretical positions on this topic, we relied on the concept of domestic and foreign scientists in the field of language theory (Charles Morris, German G.P., Kubryakova E. Hanpira, Y.N. Karaulov, Y.D. Apresyan, N.F. Alefirenko, L.Y. Buyanova, V.Z. Sannikov and others).

However, multilateral research occasional diversion as a method and as a means of creating a language picture of the world is not carried out in domestic linguistics, while strengthening the capacity of an explanatory theory of language contributes to the revitalization of linguistic development in line with this perspective (Bukireva, 1998).

The question of filling a stepped derivational nests new units of different levels is one of the most pressing problems facing the linguists at the turn of the century and require further Miscellaneous Aspect characteristics (Bukireva, 1998).

Derivational potential occasional

Derivative unit or derivation step in a synchronous system of a language is a process of converting a linguistic unit, taken as the (elementary), using the existing tools in the language (derivation operator); for example, a noun forest is the source unit to form words using the suffix forester -nik and zero inflection. The new word (derivative) has a new derivational and lexical meanings can not be reduced to the sum of its components (Buyanova, 1999).

Derivation, as a theoretical and methodological construct that allows the system to explain the relationship of language, language development as a continuous process of signification, it shows the way the creative use. Derivational processes define all the paradigmatic and syntagmatic language communication, but traditionally adopted to calculate their levels of language to distinguish between: (1) morphono-

logical derivation (for example, age - lame); (2) inflection (eg, play - play); (3) word-formation (eg, a close - pri6lizit); (4) lexical (ice - ice - a sight); (5) syntax (sun burned out grass - Sun burned out grass); (6) semantic, which is expressed in the textual level.

Derivation - a unidirectional process, but its direction is not always obvious. The higher the level of the language system, the more the characteristics of the analyzed units should be involved; eg, for determining the development of verbal polysemy, distinction of primary and secondary values, you must explore paradigmatic relations models proposals, organized by these verbs, to find out the possible ways of filling the syntactic position (Zemsky, 1972). At the level of the models offer the direction of conversion is based on the analysis of semantic and syntactic structure of sentences, with the value of the original proposal should be a euphemism when setting values derivative deals. This rule is necessary for determining the direction and inside the model between model derivation proposals. An example within the model derivation may be uncertain, personal suggestions, passive, efficient and design-relative. Between the model derivation relationship can be illustrated operations causation and no causative. He told the truth (no causative design: not the subject of the action is due to the influence of another subject or subjects) - He was forced to tell the truth (causative construction: actor forced due to the outside) (Zemsky, 1998). The increase in the linear extent and value of the new proposals is provided by the operator causation, which can be called "positive", the operator with the sign "minus" no causative process is carried out; eg. Children surrounded by a garden fence - Children surrounded garden (house, table, teacher, etc...). Of second model shows the semantics of the subject: the subject of the second design function can be performed only animate noun in the plural. This is offset by the lack of specification in the sentence syntactic position levers (Zhdanov, 2003).

Circle syntactic derivation process is not outlined clearly enough. In addition to compression phenomena (for example, the phrase occurrence of irrigated agriculture), contamination (colloquial pay the fare), conversion, transformation, paraphrases, to derive include all kinds of complications grammatical sentence structure, changing the characteristics of the logical-syntactic and communicative plan (Zhogina 2000). For example, offer a strong tradition distinguishes the entire eastern culture in the beginning of the paragraph of the order of the words expressive or conditional text-link structure: predicate verb has the value of the ratio and determines the

syntactic position characteristic of the subject carrier ("Eastern culture") and feature specifications ("sustainability traditions"). According to this source must be a member of the derivation structure. The entire eastern culture is different stability of traditions, it is the most elementary, is isomorphic to the structure and is independent from the context (Ishmael, 1991).

Linguistic picture of the world

Linguistic personality and is interpreted as a dynamic system, which has an exclusive value for a wide variety of spaces: the spiritual, emotional, rational, intuitive, conscious and unconscious, of usual and creative (language level), and a representative of the potential (level of speech). Linguistic personality is also a functional system, and linguistic consciousness carries a reflection of all ontogenetic stages of formation of the language person (Zhussupov, 2009).

The artistic/poetic text may be interpreted as a reflection of the linguistic consciousness of the individual. In this respect, the diversity of poetic texts is differentiated according to the principle of representation in each particular text of a language picture of the world of its creator (Liakhovich, 2001).

Poetic (and prose) meta languages different authors are unique and inimitable: being single semiotic substance, meta-language is always a significant attribute of a language personality, creative text as a description of life or "possible", the virtual world, which is especially brightly presented in poetic occasional text (Suleimenova, 2002).

From the standpoint of holistic-systemic approach of the substrate (A.V. Bladder) providing for the division of the internal language of the individual device on a person: 1) mental (the thinking), 2) the language (which owns a specific language), 3) speech (talking) and 4) communicative (communicates), stands an understanding of the language person of the author of art in four aspects: 1) the identity of the owner of a verbal-logical and creative thinking, which is characterized by unintended and emotional intensity; 2) the person owning the language as an abstract system of language and language as activity; 3) a person whose individuality and uniqueness are manifested in the art text / discourse, which is linked to the language selection actualized (meta linguistic) funds; 4) a person has a high potential of cognitive competence, leading the eternal dialogue, understanding M.M. Bakhtin occurring between the author of the work and character, between the author and the reader of the target,

which is especially characteristic of the linguistic identity of the creator nonce words and features of a language picture of the world (Maksimenco, 2002).

Emotionally expressive function is the basis for the individual copyright-occasional formations, which, unlike the nominative token designed to perform a classification function, that is to divide the world on a denotative fragments in connotative components (Hanpira, 1996) act as primary.

Occasional operation range is extremely wide: in some cases they are extremely expressive (expressive) goals, in others - create a complex aesthetic image, contribute to the artistic design of the author, in the third - service installation to express feelings, moods individuals.

The highest frequency of neoplasm's among stylistically painted characterized conversational household and professional use words which, combining with the nominative function expressive estimated directly and openly, sometimes rough, express attitude to the realities.

The study showed that stylistically marked formation observed in the nests of different typologies: from single-stage jack-pairs and fan derivational nests to complex multi-derivational nests (Zhussupov, 2009).

In the group of single-stage jack-pairs most widely used word-forming nest, where on the basis of attributive word-combinations with the agreed definition, which defines the word is omitted, and the role of structural and motivating advocates defining word, formed universal words that are synonymous with reduced stylistically neutral units. Such education emerged in line with the trend of economy of language, the essence of which lies in the fact that, in short Nomination and linguistic chain accommodates a maximum content (Zemsky, 1972).

Among the universal neologisms quite frequent homonymous education, for example: private business and personal pension; continuing education; continuous planning; itinerary and route taxi.

Stylistically it can be painted and derivatives – neo logical Seme. So, on the basis of stylistically neutral term allergy colloquially originated semantic neologism meaning "deep dislike for someone or anything". Neutral in stylistic terms - verb "to connect with each other so as to form a closed loop, a single system for the circulation of anything" became the source for the tumors with the meaning "to unite, to make a general" is used in everyday professional speech (Buyanova, 2000).

Stylistically painted neologisms found in word-building nests not only as derivatives units, a number of word-building nests, they play the role of producing basic words to form, in some cases, the nest and branched poly component derivational paradigm (Zhussupov, 2008).

Borrowing as a way of derivation

Borrowing - 1) the transition elements of one language in another language as a consequence of a more or less prolonged contact between these languages; 2) the word or the turnover included in the language as a result of this transition. May borrow phonemes (eg, phoneme (f) was taken from the Greek language), morpheme (such as, for example, the morpheme *ism*, *anti*-etc.); for foreign language patterns can be created syntax (eg, verbal participle headlines such *Summing up* - the result of the influence of English syntax) (Liakhovich, 2001).

The most frequent and typical form of linguistic borrowing - borrowing of words or lexical borrowing. Causes of lexical borrowing can be external and internal (Bukireva, 2000). The main external reason - close political, economic and trade ties between the peoples - native speakers. The most typical form of influence due to such constraints - borrowing the words with borrowing things or concepts (words like a car assembly line, radio, cinema, television, laser, transistor, etc...). Other external causes of borrowing - the need to identify with the help of the foreign word any newly appeared a special kind of objects or concepts; for example, to refer to the servants at a hotel in the Russian language was strengthened by the French origin of the word *porter* (a word the servant not clearly indicate the scope of the activities of the entity) (Bukireva, 2000). The need for specialized items is particularly acute in science and technology, where foreign-language lexical elements are strengthened as the terms differ in content from semantically close to them ancestral words: compare pairs of *transformer* - *converter*, *compression* - *compression*, *sedation* - *calming*, etc. (Zhussupov, 2008).

Under the influence of foreign words - their formative or semantic structure - can be created by word-of tracing paper. Borrowing foreign language vocabulary - a natural and logical process, accompanying the contact of peoples and their languages. This process enriches the language and usually does not harm its identity, t. To. While maintaining the basic, "his" Dictionary and, moreover, remains unchanged inherent in the language grammar (Kalniyazov, 1978). However, in the history of the

language there are periods of very intensive foreign language influence and extensive use of foreign words (such as it is in Russian language in the 80-90-ies. The XX-th century.), Which may cause a negative attitude to foreign words (Zhussupov 2011), which are considered not only as an unacceptable blockage of the native language, but also as symbols of alien ideology and culture (Ulukhanov, 1996). However, despite the protests, often coming from influential writers, public figures, politicians, the vast majority of borrowed words is stored in the hand with one important condition: if they have a communicative necessity and they are used in accordance with the functional and genre and stylistic features speech (Kolynin, 1993).

Conclusion

In many situations, incomprehensible neologisms can be interpreted as a specific "verbal mask" allows you to hide true feelings and emotions of its creator and the media; as a kind of psychological protection of their own inner world, as an attempt to describe the world of symbols, bunches own spiritual intellectual and psycho-emotional experience, not giving, according to the author, images usually lexical-semantic resources and universal symbols, images.

Language game in the game text as a factor text generation designed to involve the reader in his creative research. It involves limiting the sensitivity of the reader to various kinds of linguistic innovation, tuned to the game aspects of the text, which he, in fact, enter into dialogical relationships. The reader is expected to be able to identify, isolate, to unravel the greatest possible number of linguistic (and meaning) of mysteries contained in the text. This involves not only the specific attitude of the reader to the text, but also the specificity of the 'occasional' text.

Conceptually, important, basic producing words, on the basis of which the construction of the author's YAKM implemented differently directed processes occasional derivation are snow tokens (moral ideal), star (the desire to perfect the future), the world (as harmony in the soul and in the living space), love - as a moral basis and the principle of building a new life - a virtual world of poetry.

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Intercultural communications: Ethnic consciousness in the language

Abstract: In a world often both participants of communication speak a second language, bringing his own cultural nuances. In connection with the expansion of intercultural contacts an increasing need of society for specialists in various fields, knowledge of foreign languages. The authors of the article considered intercultural communication, which suggests, along with knowledge of foreign languages and the ability to more adequately interpret the communicative behavior of the representative of a foreign society, as well as the willingness of participants to communicate to the perception of other forms of communicative behavior, understanding its differences and varying from culture to culture. As part of the article the authors examined the ethnic consciousness, which exists in the form of ethnic identity, ie, awareness of belonging to a certain ethnic community, conscious reflection of life.

Keywords: culture, consciousness, communication, ethnicity, code, verbal, non-verbal communication.

Intercultural communication involves communication between representatives of different cultures, in which at least one of the participants can speak a second language. In today's world, where English is firmly occupied the position of the international language of communication, often both participants of communication speak a foreign language, bringing his own cultural nuances. In connection with the expansion of intercultural contacts an increasing need of society for specialists in various fields, knowledge of foreign languages. In the foreground the necessity of providing verbal intercultural communication (Zhabayeva 2014).

Recent efforts linguistic studies strongly suggest that the linguistic categories influence the perception of space, time, yourself, other people, and also reflect the peculiarities of the national character, largely defining features of the social behavior of the individual. Ethnic consciousness different from each other, but these differences are determined not language, but the social and cultural conditions. The base code and the basis of any semiotic system of culture is the ethnic language (Grushevitskaya, 2002).

The mastery of foreign language code that allows to successfully implement intercultural interaction, involves the study of cultural characteristics that determine the specificity of social and business behavior of the partner, determined by the influence of historical traditions and customs, lifestyle, etc. Therefore, foreign languages as a means of communication between different peoples and cultures must be studied in indissoluble unity with the world and culture of the people speaking these languages (Sitaram, Kogdell, 1992).

V.N. Teliya believes that sign language embodies culture and cultural connotation speaks manner of its implementation. It defines how to interpret cultural connotation denotative or figuratively-motivated, kvazidenotativ, aspects of cultural values in the categories. V.N. Teliya argues that if the language units have cultural and national specificity, the latter must have ways to display and means of relating to her, that is, to strengthen the kind of "bridge" that connects to a single chain, "the sign body". one hand, and on the other - concepts, patterns, models, symbols, myths, etc. signs national and wider - of human culture, the development of the people - a native speaker (Telia, 1996).

Thus, from the point of view of V.N. Teliya, the concept of cultural connotation is the base for the linguistic cultural science - scientific discipline that studies embodied in a living national language, material culture and mindset and manifest them-

selves in the language of their processes in an efficient continuity with the language and culture of the ethnic group. Culture, or rather "the community's cultural subjects and mastered verbal descriptions of cultural traits (or activities), defines common consciousness communicants" (Krasnyh, 2002).

"Mir Studied language" consists of "complex extralinguistic facts", the social cultural structures and units, which are at the basis of language structures and units are recognized in the past. We can say that the language picture of the world is a reflection of the social cultural world view. Not knowing the world of the target language, it is impossible to learn the language as a communication tool, it must be mastered just as a way of storing and transmitting information as language, devoid of life-giving soil - culture media. This, incidentally, also explains the failure of the artificial languages, and are not widely known and condemned to dying (Gudkov, 1997).

As the linguist Claude Levi-Strauss, language is both a product of culture and its important part, as well as the condition for the existence of culture. Moreover, the language - specific mode of existence of cultural factor in the formation of cultural codes. As any native speaker is both a carrier of culture, of language signs acquire the ability to act as signs of culture and thus serve as a means of presenting the basic cultural facilities (Ikonnikova, 1995). That is why the language is capable of displaying national cultural mentality of its speakers. Language (or rather it) as a phenomenon of culture can capture and reflect the value system, mood, valuation, ie, generally identifies systematic media image of the world of a particular culture. Thus, the system detected the cultural stereotypes that reflect the peculiarities of the national character (Ter-Minasova, 2000).

Ethnic knowledge along with the psychological make-up of the ethnos is a static component of ethnic psychology. It arises in the process of historical development of ethnic communities as an awareness of the world. Ethnic consciousness exists in the form of ethnic identity, awareness of belonging to a certain ethnic community, conscious reflection of life (Tarasov, 1992).

The study of ethnic cultures is based on the methods of ethnographic and historical analysis, sociology, structural linguistics achievements. Culture is regarded as a system of symbols and meanings, which requires its interpretation and explanation. One of the most important features of modern culture - Cognitive, which allows a person to create a picture of the world (Gorelov, 1980). Cognitive function is closely linked to the signifying (sign).

The term "national cultural space" is understood as "information-emotional (ethnic) field as the totality of all individual and collective cognitive space as the diversity of actually existing and potential knowledge and understanding of the national carriers of the mental linguistic complex" (Krasnyh, 2002).

Non-verbal aspects of intercultural communication. Each culture creates its own stereotypes of consciousness and behavior, based on their own vision of the world. What is significant in one culture may not be irrelevant to another. It is well known that the symbolic significance of movements, postures, gestures, and even look at different cultures carries a different, sometimes opposite sense. Nod his head in Russian means "da" and Bulgarians - "net". Caucasian and American about their grief or unhappiness report with a sad expression on his face, waiting for that other person to do the same; Vietnamese in a similar situation will smile, because he does not want to impose their psychological state interlocutor and relieves it of feigned expression of emotions (Arutyunov, 1989).

D. Likhachev offers a broad understanding concept sphere. "Together, potency, opened in the vocabulary of the individual, as well as all the language as a whole", can be called concept sphere" (Likhachev 1993).

Different cultures and traditions describe their world, but people around the world regardless of nationality, it works the same for all laws. In this regard, the content of thinking and cognitive positions, namely a body of knowledge about the world is "concept scope" of the language. This concept was proposed D.S. Likhachev to refer to a particular field, the aura of language, which is related to the amount of knowledge, skills and cultural experience of the individual and the nation as a whole. D.S. Likhachev emphasizes the idea of the subjective sphere of the national side concept "phenomenon, which has no name, as it is not in the world. We can only guess it with other, related, and the already mentioned phenomena, but as something original, distinctive, it is not for mankind. It is clear from what is crucial for the people of the richness of the language that determines the wealth of "cultural consciousness of the world" (Likhachev 2000).

Particular attention in the study of non-verbal forms of intercultural communication given to cultural differences of perception of space and time. Spatio-temporal context forms a unique cultural identity "picture of the world", generates a certain type of thinking, the pace and rhythm of life, the nature of the relationship between people, the specifics of their daily contacts (Vereshchagin, Kostomarov, 1990).

E. Hall identified four areas of communication. First "intimate" zone separates close enough people who do not want to devote my life to third parties. The space of the intimate zone is outlined from 0 to about 40-60 cm.

The second communication zone - "personality" -. 45 to 120 cm It is in this area is carried out of the individual communication with other people, as it is - the most suitable to talk about distance.

Third - "social" - zone defines the distance of communication in formal contact (from 120 to 260-300 cm). This distance is more convenient for communication with strangers or with a small group of people.

Fourth - "public" - communications zone begins with 3-3.5 m and beyond. This zone is called the open. It is used when communicating with a large audience, at public events, for example in the state and religious ceremonies, as well as art institutions (Hall, 1995).

The specific features of the medium itself and has the national language and culture. The intercultural dialogue must take into account features of the national character of the communicants, the specificity of their emotional warehouse, national specific features of thinking (Morozov, 1998).

Ethnic consciousness different from each other, but these differences are determined not language, but social cultural conditions. The task of describing cultures A. Vezhbetskaya proposes to solve by resorting to the help of the definition of cultural norms. Cultural norms underlying characteristic of a given society interaction methods can be explicitly presented in the form of cultural scenarios formulated in terms of lexical universals, that is, universal concepts I lexicalization in all languages of the world. Thus, A. Vezhbetskaya talks about the possibility of building a universal, independent of the specific language of painting, which will deliver an analysis of ethnological centric bias and facilitate the comparison of different cultures and their mutual (Vezhbetskaya, 2001).

Each culture is seen as a system of meanings, which has its own essence, its own internal logic, which can be comprehended by a rational explanation. The rational explanation is a mental reconstruction of cultural-historical process, on the basis of its universal nature, isolated and fixed in the forms of thinking. It involves the use of the ideas and methods of philosophy, which advocates a methodological basis of Cultural Studies, puts forward the idea that every culture is inherent already quite an individual way of seeing and understanding the world as a nature, every culture

has its own, distinctive nature, which in exactly the same form can not have no one other store (Yerasov, 1998).

What language categories reflect the peculiarities of the national character and evaluate the phenomena of external and man's inner world, largely defining features of the social behavior of the individual, it is not in doubt (Ushakov and others 1989). In his studies, A. Vezhbitskaya concluded that cultural specific words are conceptual tools that reflect the past experience of the company with regard to actions and thoughts about different things in certain ways, and they contribute to the perpetuation of these methods. As society changes, these tools can also be progressively modified and discarded. In this sense, the inventory of conceptual tools company never "determines" all his world, but obviously influences him (Leontiev, 1997).

At national level, the space represented a "national cultural space", understood as information and emotional ("ethnic") field as the totality of all individual and collective cognitive space as the diversity of actually existing and potential knowledge and understanding of the national mental linguistic complex (Labunskaya, 1988).

Each culture is inherent in their perception and use of time. From that, what is the value of time in culture will depend the pace and rhythm of life, types and forms of communication between people. In order to understand your partner, you need to know how time is perceived in his culture (although each acts unconsciously in his time continuum) (Shamne, 1999).

One of the most important cultural differences, according to E. Hall, is the difference between monochronal and Polichrono perception and use of time. monochrome perception of time means that in the same period of time can only be one type of activity and actions are implemented consistently, one after another, like links in a chain. Polichrome perception of time, on the contrary, suggests that for a certain length of time can do many things simultaneously. This difference gives rise to different behaviors of different cultures (Hall, 1995).

The essential features are the beauty, power, sex, but it is possible and such characterization as nonsense. The word friend is among the three most frequent responses to stimuli such words as found - another meeting --with another way - one, promise - friend, comrade - one good - one, forgive - Other etc. Favorite Russian business - word - often has the same characteristics: to speak - on the souls; conversation - heart to heart, soul, for the soul; conversation - from the heart, the soul. In the world the image of the British friend is primarily associated with the enemy and

foe. For an English friend - this girl, boy, animal, neighbors, mate, brother. We see from a cursory analysis of the linguistic consciousness in Russian and English are recognized features of an ethnic nature, which K. Kasyanova defines as "generative grammar of conduct" (Ufimtseva, 1998).

K. Kasyanov revealed features of the system image consciousness Russian and English. These realities are the most important in the Russian language consciousness: home, life, money, timber, day, love, work, water, fun, business, death, the table, the road, and in English: sex, money, work, foot, water, time, life, love, car, house, death, home, bed. The most common evaluation: bad, good, a lot of fast, always; Quality: high, good, my old, but for the English - good, nothing, bad, now, never, happy, great. Typical for the Russian actions are: to live, think, speak, and for. English - work, help, drink. (Ufimtsev, 1998). Russian Language consciousness has at its center the person, and the English language consciousness - those. Linguistically man British consciousness primarily associated with woman, man - this boy, child, creation, father, eater, and he attributed the qualities of strong, alive, fat, it also relates to the ape and mankind (Ufimtsev, 1998).

V.V. Krasnyh proposes to use cognitive linguistic approach, which involves the analysis of the cognitive aspects of communication, along with the proper linguistic, and identifies two basic "plan" of communication: (a) general linguistic aspect (relevant for any communication, any discourse of any language); (b) National determinirovanny component (relevant to the national discourse, redefining the last national specificities) (Krasnyh, 2002).

Thus, the mind, the individual performing the processing of reality in the form of a certain way of structured and systematic knowledge and understanding, is responsible for fixing, storage, evaluation of human performance and enter into complex relationships with thought and language (Vinokur, 1993).

Consciousness and thinking form a single mental linguistic complex, which acts as a language tool Person of certain ethno-cultural community. Language that defines the character and development of the human mind, is a prerequisite for the formation, development and functioning of culture. Ethnic consciousness are very different from each other, but these differences can not determinirovatsya language, but social cultural conditions.

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Intercultural and Linguistic Communication in a Cross-Cultural Space

Abstract: This article deals with a literature review and analysis of the concepts of "cross-cultural", "linguistic cultural studies" and "Intercultural Communication". The concept of "crossover of culture" is broader than "linguistic cultural studies" and "Intercultural Communication" - it not only calls for the understanding and study of their native language culture, not only helps to communicate with speakers of other languages, but also through the similarities and differences enriches language media culture all ethnic spectrum reflection of the world in the language. The authors argue that a departure from the ethnocentrism in the study of language - the most important step at the present stage of development of linguistics, and in this area the most interesting is the use of the experience of teaching Kazakh / Russian language as a foreign language in a multi-ethnic and multicultural community.

Keywords: cross-cultural, linguistic, social cultural studies, intercultural communication.

The term "cross-cultural" came to us in the 19th century and is translated from the "intersection of the English language.

"A long time passed before he was in demand in the American philosophy and then psychology (Alieva, 2007).

Crossing cultural approach is the most urgent, in our opinion, in light of problems of linguistics at the present stage as a common methodological premise of anthropological knowledge of the system. It involves tolerance of all ethnic mentalities and language systems. That is why more than ever paradigm of linguistic tolerance is the most relevant in the anthropocentric scientific picture of the world. And only crossover of culture, understood as the interpenetration of the worlds languages and cultures, the combination of similarities and differences, is the only correct approach to language learning (Gurdham, 1999).

The methods of teaching the theory lingvoregional geography word was nominated foreign language, which is based on the orientation of the registration of a specific national cultures in contact, keeping the culture of the country of studied language. G.D. Tomahin stresses that linguistic geography is different from the language didactics: the basis of its linguistically-oriented linguistics that studies national - marked linguistic units (Tomahin, 1996). In recent years, due to globalization and internationalization in all spheres of social life of societies has been an increasing interest in issues of intercultural communication (Kulbaeva, 2010). And if you are still interested in interethnic communication manifested itself mainly in the field of teaching foreign languages, but today there are grounds to consider this issue in the wider educational context. In his mind, focused on the country linguistics "is based on the language of the organic connection with extralinguistic reality on the language ability to reflect all the peculiarities of the environment, history, media people, especially its material and spiritual culture. It is based directly on the cumulative function of language" (Ter-Minasova, 2004).

The language of social functional concept of the main categories of the national study is a specific category of conflict, giving rise to all sorts of barriers. These cultural barriers that are invisible at the level of the same culture, they become apparent in a collision (or mapping) of native culture with other people's different from

her: in the worst case, awesome, and usually several theories that could serve as the internationalization of education. Linguistic socially functional concept of culture developed in the writings of Yu. Prokhorov, E.I. Passov, C.T. Ter-Minasova, D.B. Gudkov, I.A. Sternin and other (Kulbaeva, 2010). At the heart of this concept is the position of the orientation on the national-specific, on account of original interpretations of the national specificity of communicative-verbal behavior of representatives of different ethnic groups, in particular Russian.

Problems intersecting cultural adaptation is reflected in the theory of gaps developed in translation theory and linguistics ethnological. According to this theory, the presence or absence of gaps in this or that text is the result of the success or failure of his naturalization in a specific cultural context. Lacunas - it combined the concepts specific to any culture (Markarian, 1983). In Yu. Sorokina works V. Zhelvis and many other kinds of gaps highlighted and drawn a classification. The third concept, encounter the communicants on mastering the skills in the culture of the target language, is the theory idioadaptation and A. Romfoza, data Markarenom E. and A. Severtsev. According to these authors, these terms refer to a state of marginal linguistic cultural community in which there was or there is a radical restructuring or replacement values (Zhelvis, 1977).

One of the expressions of anthropocentric paradigm in linguistics is the emergence of a new direction - a linguistic cultural studies, which are the subject of language and culture, located in the dialogue, the interaction between them (Telia, 1996; Stepanov, 2004; Arutyunov, 1998; Maslow, 2004). Complex and many pronged nature of language and culture relations, their relationship, relationship, mutual influence and interaction in the process of human communication has given rise to a new integrated discipline synthesizing type, directly related to the culture of research - linguistic cultural science, which "examines certain way selected and organized set of cultural values, exploring live communication processes of generation and perception of speech, language experience and national mentality of the person, gives the system description language "world view" and implements educational, educational and intellectual training tasks (Vorobyev, 1997). Thus, linguistic cultural science, in the broadest sense, explores the "manifestations of culture of the people who influenced and were fixed in the language" (Maslow, 2004).

Cognitive level thesaurus linguistic identity is achieved through the thesaurus type of organization knowledge, which is closely associated with deep-cognitive processes, and it is shown,

Firstly, due extralinguistic and linguistic knowledge in human memory circuit.

Second, cognitive theory, which studies ways of interaction and organization of all types of knowledge used in the process of communication, this cognitive theory is realized in the process of actualization of the cognitive approach. This approach, according to R. Kasymovoy, "reflects simultaneously being involved psychological processes in contact with reality, ie, synthesis mechanisms of perception (the first signal system) and thinking (the second signal system)" (Kasimov, 2005).

Cognitive structures are shown in the first and second contacts with the reality of the student. During the first contact occurs between the convergence of a number of language and the objective world in the mind of the individual, in the second case, the contact takes place in the student communicative activity, which reproduces the thoughts "in accordance with a fixed system of concepts in the thesaurus" (Kunanbayev, 2005).

Note that in this paper we consider the notion of "communication" and "communication" as synonyms, followed by many scientists (Leontiev 1984; Furmanova 1993; Ter-Minasova 2005; Azimov, Shchukin, 2004, etc.), although there is also a point of view, delimiting these concepts (Parigin 1999; Elizarova 2005).

The founder of the theory of intercultural communication can be termed E. Holl, which is one of the first to conclusively prove a link between culture and communication, saying: "communication - it is a culture, the culture - is communication" (Hall 1959, 1981, 1982), and also drew an analogy with study of foreign languages with the help of grammatical categories. It was in the course of adoption and discussion of the scientific community E. Holla ideas appeared the concept of "cross-cultural", "International Cultural", "crossover culture" and "multicultural", which, without having a clear delineation of the strict co-exist in scientific research (see. About this, eg Elizarova 2005; Lustig, Koester, 1999). However, the term "intercultural" is most prevalent, so arose a new direction of scientific knowledge it is called the theory of intercultural communication. It should be noted that, in our opinion, intersecting cultural studies can serve as a basis for further development of the problems of intercultural interaction at different levels.

Kulbaeva B. considers that E.F. Zeer wrong, because in a situation of intercultural communication needs of the individual secondary set of competencies, including the different types of knowledge. To determine the set of competencies, consider what types of knowledge are needed secondary language person (Kulbaeva, 2010).

Crossed cultural and linguistically Lingvo didactic aspect - it is a complex area of scientific knowledge about the language, the formation of the linguistic paradigm identity in a multicultural world and the relationship and mutual influence of language and culture. The concept of formation of the "secondary" language person, takes possession of the culture of foreign language communication (Khaleeva, 1989), based on the ideas of anthropological linguistics (Benveniste, 1995, Humboldt, 1985) and the doctrine of "linguistic identity" (Sentries, 1993), the origins of which academic ideas V.V. Vinogradov (Alieva, 2007).

T.A. Van Dyck, B. King, Charles Fillmore believe that the knowledge that make up the frame, enough to ensure understanding in any given situation. But the frames include a limited range of knowledge, So, Charles Fillmore, the semantics of the frame allows for the possibility that the speakers can fully have knowledge of the word included in the vocabulary of a certain area (Van Dijk and others, 1988).

T.A. Van Dyck and V. King indicate the knowledge needed for communication. Classification them on various parameters shows the diversity of their types: (1) scientific and non-scientific knowledge; (2) social and individual; (3) substantive and methodological; (4) language, metalinguistic; (5) declarative and procedural; (6) encyclopaedic and language; (7) knowledge of congenital and acquired; (8) the knowledge learned and mastered (Gerasimov, Petrov, 1988).

The required minimum of knowledge, contributing to mutual understanding of interlocutors, includes the following knowledge: (A) knowledge of the socio-linguistic categories (language skills); (B) metalinguistic knowledge (knowledge about the communicative situations in which used some form of knowledge of the rules of language); (C) the pragmatic knowledge (knowledge of communication strategies for the production and perception of speech, understanding it); (G) social knowledge (data knowledge of philosophy, economics, humanities, etc.); (D) knowledge of encyclopaedic (knowledge of the lexical background words, knowledge of the world); (E) the cognitive mental knowledge (knowledge about the culture of other peoples, their traditions, customs, national character) (Kulbaeva, 2010).

The methods of teaching the Russian language in different branches of linguistics problem of intersecting cultural interaction primarily reflected within lingvo regional geography theory, the foundations of which were laid E.M. Vereshchagin and V.G. Kostomarov. Some aspects of intersecting cultural linguistics and linguistics are considered in Y.D. Apresyan, T.M. Batalova, A.J. Varga, L.G. Vedenin, A. Wierzbicka, I.G. Dubova, A.G. Zdravomyslova, V.T. Klokov, N.G. Komlëva, Leontiev A.A., Lurie S.T., Manekin R.V., R.P. Milrud, I.V. Bridge, J.E. Prokhorov, L.N. Pushkareva, Z.V. Sikevich, Yu.A. Sorokina, P.V. Sysoev, E.F. Tarasova, S.G. Ter-Minasova, O. Khristoforova, L.I. Chinakovoy, A. Schyutsa, E.S. Yakovleva (Abisheva, 2005).

I.N. Gerasimov, V.V. Petrov believes that in the knowledge base consists of the following knowledge (A) knowledge of the language grammar (phonetics and phonology), complemented by knowledge of composition and lexical semantics; (B) knowledge of communication; (C) extralinguistic knowledge: (1) knowledge of the context of the objectives and plans of the recipient, his ideas about the speaker and on the environment, etc.; (2) the general background knowledge, ie, knowledge about the world, about the events, conditions, actions, etc. (Gerasimov, Petrov, 1988).

The distribution of knowledge, dedicated T.A. Van Dyck, V. Kingom, V.I. Gerasimov, V.V. Petrov competency may look like the following: language competence - (1) language skills, knowledge of the socio-linguistic concepts (vocabulary, grammar, phonetics, syntax); (2) communicative competence - pragmatic knowledge (communication strategies, knowledge of communicative situations, knowledge of the principles of verbal communication); (3) linguistic cultural competence (knowledge of the cultural realities of the people); (4) general background knowledge, cultural and mental skills, knowledge of the world; (5) social cultural competence (knowledge of the socio-linguistic conventions, norms, customs, traditions, rituals, etc.) (Kulbaeva, 2010).

Scientific-theoretical principles of language competence as the most important means of communication, storage and transmission of information, its connection with thinking, role in the development of personality; speech activity theory discussed (Vygotsky N.I., Zhinkin A., Leontiev A., Luria A.R., and others.); patterns of speech ontogenesis (Anokhin A., Leontiev A., Ushakova T.N., etc.); language learning with human products, it needs (A.A. Zalevskaya, I.A. Winter, L. Szczerba and others.); theory of language competence (Luria, Leontiev A.A., M.M. Gohlerner, P.B. Nevel,

I.A. Rapoport, M.V. Vatyunov, A.M. Shahnarovich, L.V. Yassman et al.), and analyzed the work of scientists (Zhusupov, 2015).

Language competence is understood as a command of the language of their nationality and as a second language possession. E.D. Suleimenov, N. Shaimerdenova define it thus: language competence - is the knowledge and ability to use adequate linguistic means, depending on the particular situation, the nature of the relationship between the speaker and the listener, the goal of communication and many others (Suleimenov, Shaimerdenova 2002).

Linguistic competence of cultural studies, in V.V. Vorobiev - is the perfect knowledge of speaking, listening the whole system of cultural values, expressed in the language. This extremely generalized knowledge is reflected in the general and sectoral encyclopedias, research on culture and language (Sysoev, 2003).

Thus, having considered the manifestation of culture as an intersecting defining element of the modern understanding of the world, it can be concluded that crossed cultural linguistic philosophy is a kind of paradigm. One of the methodological grounds crossed cultural, we can assume that linguistic cultural studies, serving as an integrated approach to synthesizing the relationship and interaction between language and culture in their function-oriented system of universal humanistic values. Another methodological grounds crossed cultural appears, in our view, intercultural communication theory (Alieva, 2007).

To update the linguistic cultural urological competence should have complex knowledge about the situation, about the world of the culture of the people, because culturological linguistic competence, serving linguistic form, requires non-linguistic way of its disclosure. And because it is the unity of the actual linguistic and non-linguistic content, need to expand it, and cognitive skills, presented in the form of cognitive models.

Thus, culture is a complex phenomenon that defines the system of value orientations of society as a whole as well as individual - specific culture media. As the G.V. Elizarova, a comparative study of cultures is only possible given the fact that each culture is reflected in the unique language - its medium (Elizarova, 2005). That is why the crossover cultural aspect is the actual object of methodical study, and the results of such a study should be introduced to the methodology of foreign language teaching.

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The impact of media education on the image of the state in the global information market

Abstract: The problem of state image making is one of top priorities for politicians, economists, statesmen, teachers and research workers. Image is one of priorities of a successful country. Strategic development of a country depends on many factors, the key role being played by image making policy, public representation and positioning of public persons to the nation. Each country is keen to spread as many positive facts about itself as possible. Positive positioning in world markets attracts investors and helps to develop both country and its people. The article examines existing methods of positioning of a state for inner and outer audiences. Also, new terminology is introduced as well as concept of “state brand” is regarded as a unit of scientific value and significance. Branding and positioning are considered as crucial means to manage perception of a country by mass-media. Image making starts with a country's brand making. This research regards a country as a product which must be presented as economically attractive and competitive in modern world. We use media technologies as instruments of image making and examine media as tools used in state's imagemaking.

The research is focused on interaction of an object of image making with target audience through mass-media channels of communication. The author proves that everyone and everything has some image, but image which you need, must be formed, ruled, corrected and controlled. An image of a state is a result of effective communication.

Keywords: image, brand, media, press, social opinion.

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Влияние медиаобразования на формирование имиджа государства на мировом информационном рынке

Аннотация: Статья рассматривает систему позиционирования государства в СМИ на внешнем и внутреннем рынках. Имидж – это одна с приоритетных составных успешного государства. Стратегическое развитие страны зависит от многих факторов, среди них ключевая роль принадлежит введению имиджобразовательной политики, от публичных шагов и позиционирования публичных личностей к народу в целом. Анализируются причины создания информационных поводов, выявляются функции, описывается нормативно-правовая база, регулирующая деятельность СМИ в формировании положительного имиджа и государства. В исследовании рассматриваем страну как товар, который необходимо презентировать в СМИ максимально привлекательным и конкурентным для мирового общества. Как инструмент создания имиджа используем медиа технологии. Статья содержит научное видение создания положительного имиджа государства и раскрывает медиамеханизмы формирования позитивного имиджа государства.

Ключевые слова: имидж, бренд, пресса, медиа инструменты, общественное мнение.

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Вплив медіаосвіти на ефективність позиціонування держави на світовому інформаційному ринку

Анотація: У статті викладено наукове бачення творення репутації держави, розглянуто приклади підсилення іміджу держави на міжнародній арені. Проведено оціночне дослідження системи позиціонування держави на внутрішньому і зовнішньому ринках. Окреслено низку знакових факторів, що впливають

на сприйняття держави у світі. Позиціонування та сприйняття країни, її віддзеркалення у ЗМІ тотожне реальній ситуації: економічним показникам, рівню життя громадян, наявністю середнього класу та ін... Імідж - пріоритетна складова інвестиційно привабливої держави, стратегічний розвиток якої залежить від багатьох факторів, серед яких ключова роль належить дипломатам, їх веденню іміджетворюючої політики, результатом діяльності котрої є залучення інвестицій у розбудову економіки країни. Як інструмент творення іміджу використовуємо медіа технології. Акцентується увага на взаємодії об'єкту, імідж якого формується, з цільовою аудиторією через медіа інструменти. Авторка доводить, що імідж потрібно послідовно у співпраці із висококваліфікованими журналістами: створювати, керувати ним, коррелювати та контролювати. Проблема творення державного іміджу є найбільш пріоритетною сферою і для дипломатів, політиків, журналістів і для науковців.

Ключові слова: імідж, рейтинг, бренд, журналістика, медіа інструменти.

Вступ. Позиціонування держави напряду пов'язане з її віддзеркаленням у ЗМІ. Кожна з держав, представлених на мапі, прагне стати визнаним світовим брендом. Поняття «бренд» передбачає статус і високий рівень життя, лідерство у багатьох сферах. Успішному бренду передує дипломатичність публічних кроків державних лідерів і представників країни за її межами, а також клопітка праця іміджмейкерів щодо створення відповідного іміджу, що визначає пріоритетну складову успішної держави.

Актуальність тематики. Стратегічний розвиток країни залежить від багатьох факторів, серед яких ключова роль належить веденню іміджетворюючої політики щодо створення і позиціонування державного бренду, висвітлення матеріалів у світових ЗМІ про Україну. Вагомим фактором у формуванні іміджу є не лише економічна стабільність, а й професійний рівень медіапрацівників. Держава, як будь-який інший об'єкт іміджу, – це товар, який необхідно подати у вигідному, конкурентному світлі певній аудиторії. У більшості держав передбачено створення, затвердження і виконання офіційних програм формування «Бренду країни».

Мета статті. Проаналізувати основні світові тенденції творення державного іміджу, держави-бренду з використанням медіамеханізмів.

Аналіз досліджень і публікацій по темі. Дослідники, здебільшого політики Лі Куан Ю [1], Г.Й. Удовенко [2], К.І. Грищенко [3], В.П. Горбулін [4], Б.І. Тарасюк [5], науковці-практики Том Адамс [6], Г.Г. Почепцов [7], В.Ф. Іванов [8], Б.Д. Гаврилишин [9], виходили з різних уявлень про сутність іміджу, масову комунікацію, процеси сприйняття інформації та закономірності формування громадської думки. Науковці-практики Іванов Валерій Феліксович і Почепцов Георгій Георгійович акцентують на веденні послідовної інформаційної політики, вагомості ЗМІ та сучасних медіаінструментів у формуванні громадської думки та іміджу держави. Питання іміджу держави актуальне й не вирішене, немає єдиного алгоритму творення іміджу, проте очевидним є те, що саме дипломати є головними комунікаторами з іноземними медіа, їх виступи і інтерв'ю формують враження про державу, громадську думку.

Результати дослідження. Оприлюднені матеріали у ЗМІ доступні для широкого загалу, є інструментами формування іміджу, репрезентують країну, формуючи уяву про неї у громадськості і є цінними для даного дослідження. Матеріали було відібрано за ключовими словами «імідж України», «державний імідж», «формування громадської думки», «імідж підприємств», «залучення інвестицій», «державний бренд», «позиціонування України». У кількісному співвідношенні було проаналізовано тисячу публікацій, документів та інформаційних заміток. Дієвим інструментом для досягнення завдань є ЗМІ, саме через призму подачі матеріалів у медіа відбувається формування громадської думки про імідж. Сприйняття бренду у ЗМІ має бути не лише емоційним, а й підтвержене наочним прикладом (статтями, історичними фактами, фото і відеоматеріалами), що доводять заявлені постулати і факти: екологічність, політичну і економічну стабільність, високу якість життя, розвинений туризм, позитивну репутацію лідерів країни у ЗМІ.

Державний бренд (*авт.*) – це поєднання історичних цінностей і сьогодення країни, її образ, імідж, репутація громадських і державних діячів, участь у міжнародних проектах, рівень освіти і освіченості громадян, сучасна медична сфера, наукові та спортивні і культурно-мистецькі досягнення. У конкурентному, маркетингово розвиненому Всесвіті брендинг є основою стратегії, що має підсилити конкурентну спроможність країни. Держави, що інвестують у імідж, використовують брендинг, щоб досягти результатів у всіх сферах, зокрема бізнесі і науці, бути цікавим для інвестицій, туризму та експорту і бути перспективними

прибутковими галузями, а не збитковими. Рівень сприйняття України у світі диктується матеріалами, висвітленими у ЗМІ, зумовлений способом життя громадян. Станом на 2015-2016 рр. Україна досягла апогею популярності у світі, проте її імідж потребує клопіткої фахової роботи. Позитивними, сприятливими є такі фактори: прогресивність поглядів дипломатів, патріотизм деяких політиків, відкритість і бажання комунікувати зі іншими державами, інтеграція у світові товариства, демонстрація у ЗМІ еволюції державотворення, дипломатичність, високий рівень професіоналізму медіапрацівників.

2014-2016 рр., живучи у ворожому оточенні АТО, Україна зберігає рівень демократії, підґрунтям її є, звичайно, традиційні цінності, повага та толерантність, закріплена на генетичному рівні, найнезаангажованішими є соціальні мережі та Інтернет портали, у ЗМІ зберігається право дати протилежну чи альтернативну думку. Головне в Україні – це людський капітал, які зберігається й підсилюється у сприятливому середовищі, зокрема одним із найважливіших факторів є умови праці і життя, матеріально технічне забезпечення громади. Успішна нація – позитивний імідж держави. Політичні й економічні реалії, сьогодення диктують нові умови для творення державного іміджу. Україні необхідно підкорегувати діяльність ЗМІ як інструменту творення іміджу країни, вийти на новий рівень співпраці ЗМІ і державних органів, удосконалити внутрішню редакційну політику. Як це зробити без конфлікту інтересів і хаосу у суспільстві, які інструменти необхідні для цього – головна тема для досліджень міжнародних і вітчизняних експертів. Медіамеханізми формування позитивного державного іміджу у XXI ст. використовуються іміджмейкерами, політологами, медіа експертами та науковцями на повну потужність. Вплив ЗМІ на формування іміджу держави беззаперечний. Медіа органи формують і програмують імідж держави. Яким буде імідж України у світі напряду залежать від економічної стабільності, матеріально добробуту українців, наявного середнього класу, подачі матеріалів у ЗМІ, їх впливу на цільову аудиторію. Результатом правильної інформаційної кампанії є базова основа успішної держави: економічна незалежність і стабільність, послідовна дипломатична політика, інвестиційна привабливість держави, високий рівень туристичного інтересу до країни, військова міць та готовність і бажання лідерів налагоджувати дипломатичні відносини на всіх рівнях. Фактори формування іміджу держави вважаємо сприятливими і цікавими для тиражування у інформаційному просторі: сенсаційні резонансні події з позитивним забарвлен-

ням, майстерно подані іміджмейкерами для широкого загалу. Наука іміджологія – засіб дипломатії: економічної, інформаційної та політичної. У процесі вивчення з'являється типологізація іміджу держав. Зокрема, виникає питання, як оцінювати імідж, за якими критеріями, адже те, що для одних невдача, для інших може бути успіхом? Позитивний імідж держави науково трактуємо як стабільний, аргументований економічними показниками, відсутність рецесії. Агресивний чи миролюбивий, демократичний чи диктаторський імідж держави? За яких умов, за якою шкалою вимірів можемо оцінювати рейтинг державного іміджу. Як скорелювати популярність, зокрема України, у світовому інформаційному просторі для подальшого позитивного стабільного іміджу. У 2014-2016 рр., спостерігаючи за тиражуванням у ЗМІ теми популярності країни, стаємо свідками того, як Україна переходить із категорії країна в бренд. У 2014 р. дослідження FutureBrand задекларували, що не всі з 75 досліджених країн можна кваліфікувати як «бренд». Справді, тільки 22 відповідають критеріям і мають конкурентну перевагу над іншими. Щоправда, Україна розглядається світовими експертами як перспективна держава на шляху до того, щоб стати брендом. Потенційні інвестори і бізнес партнери, світові корпорації заявляють, що вони будуть торгувати охочіше з країною брендом, ніж просто «країною» [6]. Факторами країни-бренду є наявність репутації за високу якість продукції-послуг; туристичне прагнення відвідати країну; інтерес до навчання в країні; екологічна безпека і сприятлива комфортна інфраструктура; більш ніж задовільний рівень життя громадян; низький рівень корупції; відсутність воєнно-політичних конфліктів та економічної кризи. За результатами щорічного дослідження Future Brand Том Адамс, генеральний директор департаменту стратегії на Future Brand, оприлюднив пріоритети у формуванні державного бренду: «Дослідження цього року показує, що наявність сильного бренду країни приносить конкурентну перевагу в плані туризму, залучення інвестицій, споживчі переваги для бізнесу. Традиційним пріоритетом є популяризація на державному рівні ідентичності країни, робота над репутацією, що формують корпоративний і споживчий бренд. Для тих країн, які ще не досягли статусу «бренду», у висновках пропонується цінна інформація про методи, які сприятимуть формуванню бренду у подальшому і підняттю у іміджевому міжнародному рейтингу» [6]. Авторка пропонує розглядати країну – як товар. Успішний досвід процесу іміджетворення пропонується запозичити у світових держав, що досягли статусу бренду і вдало створили позитивний імідж

й сприятливі умови для громадян. Цитуючи Лі Куан Ю «Якщо неправильно керувати країною, всі розумні люди поїдуть з неї», [1, с. 228]. Є над чим подумати, подбати про імідж України...

Перспектива. Вболіваючи за популяризацію позитивного іміджу України на міжнародній арені Грищенко Костянтин Іванович – український політик і дипломат, доклав чимало зусиль: проводив прагматичну політику, в основі якої лежали національні інтереси України, прибираючи емоційну та ідеологічну складову відносин між країнами. Важливим напрямом зовнішньої політики К. Грищенка було усунення візових бар'єрів для українців. Під керівництвом міністра лише за два роки українським дипломатам вдалося домовитися про безвізовий режим з Ізраїлем, Туреччиною, Бразилією, Аргентиною [3]. Потужним ідеологом проукраїнських ідей у світі був дипломат Удовенко Геннадій Йосипович [2] - перший і поки єдиний українець Президент найголовнішого представницького світового форуму - Генеральної Асамблеї ООН; виховав не одне покоління українських дипломатів, котрі підхопили його патріотичні погляди і прагнення працювати на підсилення іміджу України. Його формула 3-х "П" (патріотизм, професіоналізм і порядність), яким має відповідати український дипломат, увібрала в себе його особистий багатолітній досвід і стала свого роду негласним кодексом поведінки української дипломатії. У "кодексі" українського дипломата Геннадій Йосипович на перше місце поставив таку рису як "патріотизм" [5].

У роботі над іміджем важливою є подача матеріалу громадськості. Саме ЗМІ є основним інструментом творення іміджу Країни (лідерів), створення, або ж руйнування рейтингу бренду. Вагомий внесок у формування іміджу України, а саме розвитку медіафаху здійснює Академія Української Преси на чолі з її Президентом, професором Валерієм Феліксовичем Івановим. Доктор філологічних наук, президент Академії української преси Валерій Іванов - автор і співавтор понад 300 наукових робіт, зокрема 30 монографій, 7 підручників і 15 посібників, 45 брошур. За сприянням професора Академія Української Преси видає низку підручників і найреєтинговіших світових навчальних посібників з питань медіа для фахівців, які журналісти та журналістські організації, інститути журналістики отримують безкоштовно. Безумовно, В.Ф. Іванов - людина креативна, непересічна і відповідальна, приклад для наслідування для піарників, журналістів та іміджмекерів. Висока планка життя і наукової діяльності демонструє колосальні здібності професора, він створює сприятливі умови удосконалення ме-

діаосвіти, його науково-практична діяльність орієнтована на підсилення конкурентоздатності українських журналістів на світовому медіа ринку; у своїй діяльності налаштований на формування конкурентної вітчизняної школи висококласних фахівців публік рилейшинз. **Методи В.Ф. Іванова [8]: системна і послідовна праця, що веде до очікуваного результату.** «Академія української преси» – сприяє поінформованому та критичному сприйняттю медіа українським суспільством, дотриманню стандартів соціально-відповідальної журналістики. Також пропонує українським журналістам та прес-секретарям, іміджмейкерам, незалежно від їх політичних поглядів, можливості, фахового підвищення кваліфікації та професійного рівня, здійснювати координацію вже існуючих журналістських заходів. Діяльність Академії ґрунтується на принципах практичного журналізму, свободи слова та розвитку демократії в Україні. Програма АУП спрямована на досягнення західних медіа-стандартів для розвитку незалежних медіа в Україні. АУП є провідним лідером у сфері медіаосвіти, що інспірує ключові ініціативи, та одним з ресурсів для підвищення стандартів журналістики. Система соціальних комунікацій у стадії еволюції, класичні поняття іміджелогії, журналістики вийшли за межі традиційного їх трактування. Безперечно, журналістика напряду впливає на якість іміджу об'єкта, від фаховості медіапрацівників залежить те, як буде сприйнято громадськістю певну інформацію. Сьогодні основне завдання медіа – якісна, ефективна, високопрофесійна комунікація з метою формування й тиражування позитивного іміджу України у світі.

Докторант-іміджмейкер В.В. Чекалюк пропонує науково-практичне бачення шляхів удосконалення підготовки медіа фахівців у ВНЗ:

- Для ефективною підготовки майбутніх журналістів (медіапрацівників) необхідно залучати ресурси всього викладацького складу, кафедр на пошуки «позитивного ядра змін», тобто найефективніших моментів діяльності і найбільш вагомих успіхів, яких удалося досягти в освітньому секторі.

- Формувати бачення підготовки фахівців у майбутньому на основі інформації про найбільш значні успіхи у минулому, а також шляхом пошуку відповіді на запитання: «До чого ми прагнемо? Цінності і методи досягнення мети: яким має бути сучасний журналіст у перспективі, через десять-двадцять років?»

- Визначається довгострокова і короткострокова мета, досягнення якої допоможе наблизитися до ідеалу. Завдання всіх учасників навчального про-

цесу, і студентів зокрема, - представити свої пропозиції щодо того, як можна поліпшити підготовку фахівців у закладі. Це можуть бути бізнес-проекти, участь у міжнародних наукових та грантових програмах, думки про роботу кафедр, проведення практики, залучення державних установ для прийому студентів на практику, волонтерство під керівництвом медіа-метрів, введення нових дисциплін тощо.

- І нарешті - конкретизація. Процес повинен закінчитися складанням чіткого плану з докладним описання всіх кроків, необхідних ресурсів і відповідальних за виконання людей. Можна використовувати будь-які методи стратегічного планування, результатом якого буде успішне працевлаштування і надалі підтримання партнерських зв'язків з альма-матер для прийняття студентів – проходження практики й взаємного підвищення кваліфікації.

Висновки. У співпраці з державними іміджмейкерами - сучасна журналістика – це ефективний інструмент для творення іміджу держави. Поняття «журналістика» у взаємодії з виконанням завдань державних іміджмейкерів зводиться у цьому випадку до технічного забезпечення масових інформаційних процесів формування іміджу, створення сприятливого ґрунту для подальших кроків влади. Журналіст - це фахівець, котрий здобуває інформацію. Звертаючись до алегорії, - журналіст – це розвідка, а іміджмейкер – це антирозвідка. Завдання іміджмейкерів - запропонувати журналістам матеріали для пошуку, які будуть максимально сприятливими для формування іміджу держави. Створити для журналістів відчуття розвідки, а насправді дати те, що потрібно для підсилення статусу держави. В даному дослідженні ми оперуємо терміном «журналістика». Це специфічний вид суспільно-політичної діяльності, що полягає в системному знаходженні, обробці й періодичному поширенні суспільно значимої інформації на масову аудиторію по каналах масової комунікації з метою сприяння соціальному прогресові. Зрештою, і вся преса, і будь-який кореспондент зайняті саме цим. Політичні і економічні реалії сьогодення диктують нові умови для творення державного іміджу. Україні необхідно підкоректувати діяльність ЗМІ як інструменту творення іміджу країни, вийти на новий рівень співпраці ЗМІ і державних органів, удосконалити внутрішню редакційну політику. Як це зробити без конфлікту інтересів і хаосу у суспільстві, які інструменти необхідні для цього – головна тема для досліджень міжнародних і вітчизняних експертів. Медіа-механізми формування позитивного державного іміджу у XXI ст. використовуються

іміджмейкерами, політологами, науковцями на повну потужність. Вплив ЗМІ на формування іміджу держави беззаперечний. Саме медіа органи формують і програмують імідж держави. Яким буде імідж України у світі напряду залежать від подачі матеріалів у ЗМІ, їх впливу на цільову аудиторію. Результатом правильної інформаційної кампанії є базова основа успішної держави: економічна незалежність і стабільність, послідовна дипломатична політика, інвестиційна привабливість держави, високий рівень туристичного інтересу до країни, військова міць та готовність і бажання лідерів налагоджувати дипломатичні відносини на всіх рівнях.

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The legal basics in the field of energy integration within Eurasian Economic Union

Abstract: The article examines the integration in the energy sector in the Eurasian Economic Union. Defines the legal basis of integration and examines the Treaty on the Eurasian Economic Union.

Keywords: Treaty, energetics, laws, integration, oil, gas.

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Правовые основы интеграции в сфере энергетики в рамках Евразийского экономического союза

Аннотация: В статье рассматривается интеграция в сфере энергетики, осуществляемая в рамках Евразийского экономического союза. Определяются правовые основы интеграции, а также Договор об учреждении Евразийского экономического союза.

Ключевые слова: договор, энергетика, законы, интеграция, нефть, газ.

Уже давно прошло то время, когда законодательство об энергетике, в том числе о передаче энергетических ресурсов ограничивалось территориями отдельных стран. Например, французский закон о распределении электрической энергии был принят в 1906 году [1]. Интеграционные процессы, происходящие в современном мире, охватывают самые различные области жизнедеятельности. Интеграция означает качественно новый этап сотрудничества стран,

международных организаций или субъектов, осуществляющих хозяйственную (предпринимательскую) деятельность.

Особый интерес вызывают интеграционные процессы в сфере энергетики. Подобные процессы вовлекают в свой оборот различные отрасли энергетики: разведку и добычу полезных ископаемых, производство энергетических ресурсов, доставку энергетических ресурсов от мест добычи и производства к местам их потребления. Среди иных отраслей экономики энергетическая отрасль выделяется особой структурой, дроблением на отдельные сегменты и вовлеченностью в сложные процессы экономических отношений. С другой стороны, именно энергетика в силу ряда обстоятельств, отличается большой способностью к интеграционному взаимодействию.

Наиболее близким и доступным примером интеграции в сфере энергетики является интеграционное взаимодействие в рамках Евразийского экономического союза. В плане перспектив регионального интеграционного взаимодействия ЕАЭС является уникальной площадкой, в рамках которой апробируются механизмы интеграции в сфере энергетики стран, имеющих различную структуру энергетической отрасли, и формируется опыт правового обеспечения такой интеграции. История развития правовых систем государств-членов ЕАЭС налагает свой отпечаток на характер интеграционного взаимодействия в сфере энергетики. Наряду с общими подходами, свойственными процессу интеграции и претендующими на характеристику в качестве универсальных правовых регуляторов, обнаруживаются и особенности, значение которых ограничивается рамками Евразийского экономического союза.

Правовую основу ЕАЭС, составляет Договор «О Евразийском экономическом союзе», подписанный в г. Астане 29.05.2014 г. Положения этого акта подтверждают приверженность Сторон целям и принципам Устава Организации Объединенных Наций, а также другим общепризнанным принципам и нормам международного права. Кроме того, Стороны принимают во внимание нормы, правила и принципы Всемирной торговой организации. Договор имеет 33 приложения, которые относятся к различным его разделам. Важнейшим является Приложение № 33 к Договору о Евразийском экономическом союзе в виде Протокола о прекращении действия международных договоров, заключенных в рамках формирования Таможенного союза и Единого экономического про-

странства, в связи с вступлением в силу Договора о евразийском экономическом союзе.

В соответствии с п. 1 ст. 6 Договора право Союза составляют:

- Договор о Евразийском экономическом союзе;
- Международные договоры в рамках Союза;
- Международные договоры Союза с третьей стороной;
- Решения и распоряжения Высшего Евразийского экономического совета,

Евразийского межправительственного совета и Евразийской экономической комиссии, принятые в рамках их полномочий, предусмотренных Договором о Евразийском экономическом союзе и международными договорами в рамках Союза.

Пункт 3 статьи 6 отдает приоритет Договору в случае возникновения противоречий между международными договорами в рамках Союза и Договором о Евразийском экономическом Союзе.

В Договоре «О Евразийском экономическом союзе» содержится раздел, посвященный энергетике, раздел XX «Энергетика». Из всех правоотношений, реализуемых в рамках ЕАЭС, правоотношения энергоснабжения, относятся к числу наиболее важных с точки зрения обеспечения экономических основ интеграции. Практика межгосударственных отношений знает много примеров сотрудничества в сфере энергетики. Наиболее известен процесс интегрирования в сфере энергетики в рамках Энергетической Хартии. До последнего времени считалось, что это единственное в своем роде соглашение, касающееся межправительственного сотрудничества в энергетическом секторе, охватывающее всю энергетическую производственно-сбытовую цепочку (от разведки до конечного использования) и все энергетические продукты и связанное с энергетикой оборудование [1, с. 52]. В Договоре «О Евразийском экономическом союзе» энергетика значителен хотя и в качестве важнейшего, но не единственного элемента сложной системы экономической интеграции. Важнейшее значение имеет статья 79 Раздела XX. Данная статья содержит конститутивные положения, которые служат правовой основой интеграции в сфере энергетики стран, заключивших Договор «О Евразийском экономическом союзе». Согласно п. 2 ст. 79 к отношениям хозяйствующих субъектов государств-членов, осуществляющих свою деятельность в сферах электроэнергетики, газа, нефти и нефтепродуктов, не урегулированным разделом XX, применяется законодательство го-

сударств-членов ЕАЭС. В соответствии с п. 3 ст. 79 положения раздела XVIII Договора, определяющего общие принципы и правила конкуренции в отношении деятельности хозяйствующих субъектов государств-членов в сферах электроэнергетики, газа, нефти и нефтепродуктов применяются с учетом особенностей, предусмотренных разделом XX и разделом XIX («Естественные монополии») Договора.

В Договоре «О Евразийском экономическом союзе» закреплён приоритет норм Договора перед нормами национального законодательства стран, участвующих в ЕАЭС, что достаточно принципиально с точки зрения идентификации самого Договора, как регулятора отношений в сфере энергетики, реализуемых в рамках ЕАЭС. Этот принцип стал неотъемлемой частью установившейся в годы поиска национальной самоидентификации, традиции нормотворчества многих стран постсоветского пространства, в том числе государств-членов ЕАЭС. Здесь прослеживается определенная аналогия с так называемым первичным правом Европейского союза, которое содержится в договорах о создании Европейского союза, частные правовые нормы при этом содержатся в многочисленных постановлениях, директивах и судебных решениях, составляющих вторичное право Евросоюза [3, с. 391].

Таким образом, выстраивается основа для наднационального сотрудничества в рамках ЕАЭС. Присутствует один из важнейших признаков наднациональности, а именно: законодательная деятельность ЕАЭС как международной организации, обладающей правосубъектностью, международно-правовой статус которой закреплён в п. 2 Договора «О Евразийском экономическом союзе».

Нефтегазовый сектор, один из наиболее значимых для стран, участвующих в Евразийском экономическом союзе. Законодательство, направленное на регулирование отношений по добыче нефти и газа, доставке их потребителю и потреблению, стало формироваться в рамках создания национальных правовых систем с начала 90-х г.г. XX века. Этот процесс отличался сложностью и противоречивостью, поскольку национальным законодателям приходилось решать целый комплекс проблем, связанных с определением прав собственности на недра и полезные ископаемые, на объекты, входящие в состав предприятий трубопроводного транспорта. Кроме того, вырабатывалась техника национального нормотворчества, а также апробировались новые подходы в сфере межгосударственных отношений, поскольку сами отношения по добыче и перемеще-

нию нефти и газа от мест добычи к местам переработки и потребления, как правило, осложнены иностранным элементом. Таким образом, законодательство, обеспечивающее регулирование в нефтегазовой сфере развивалось под значительным воздействием национального элемента, что в итоге привело к закреплению норм, направленных на защиту внутреннего энергетического рынка и обеспечение экономических интересов этих стран [4, с. 46].

Достаточно серьезным фактором, оказывающим влияние на право ЕАЭС, является наличие в странах, участвующих в союзе, систем законодательства об энергетике. Первоначально положения п. 1 ст. 6 Договора о Евразийском экономическом союзе выводят национальные законодательства за рамки права ЕАЭС, однако правила пункта 2 ст. 79 Договора все же допускают возможность применения и норм национального законодательства. В этом случае можно говорить о том, что те правоотношения в сфере энергетики каждой из стран ЕАЭС, которые не осложнены иностранным элементом, по общему правилу, регулируются именно нормами национального законодательства государств-членов ЕАЭС. Учитывая то обстоятельство, что право является не только регулятором, но и в определенной степени фиксатором общественных отношений, придавая им стабильность и устойчивость, приходится признать факт влияния на право ЕАЭС национального права государств-членов ЕАЭС. Из всех стран, которые участвуют в процессе деятельности ЕАЭС, наиболее сбалансированным и целостным является законодательство об энергетике Беларуси, России и Казахстана, что отчасти может свидетельствовать об общем состоянии энергетики в этих странах. Например, в Беларуси, Казахстане и России создано достаточно полное законодательство о трубопроводном транспорте, хотя до самого момента возникновения ЕАЭС в Российской Федерации так и не был принят закон о трубопроводном транспорте. Законодательство Армении и Кыргызстана в большей степени представлено общими законами об энергетике, которых нет в Беларуси, России и Казахстане. Такие особенности национальных законодательств расставляют все страны ЕАЭС в порядке определенного ранжирования на старте интеграционного процесса в сфере энергетики.

Из всех источников права Евразийского экономического союза, главенствующая роль принадлежит Договору о создании союза и международным договорам в рамках союза. Хотя статья 6 Договора (п. 1 ст. 6) и относит международные договоры ЕАЭС с третьей стороной к праву союза, но делает оговорку

(п. 2 ст. 6) о том, что международные договоры Союза с третьей стороной не должны противоречить основным целям, принципам и правилам функционирования Союза. Последняя оговорка крайне важна с точки зрения необходимости правовой оценки участия государств-членов ЕАЭС в заключаемых после создания ЕАЭС международных договорах, а также международных договорах, заключенных до момента создания ЕАЭС.

Таким образом, правовую основу Евразийского экономического союза образуют Договор о создании Евразийского экономического союза и иные международные договоры, заключаемые как в рамках ЕАЭС, так и ЕАЭС с третьей стороной.

Право ЕАЭС сформировано и развивается на основе принципов и норм международного права, практики межгосударственного взаимодействия, правоприменительной практики, а также национальных законодательств государств-членов ЕАЭС.

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A woman - criminal

Abstract

The article raised issues concerning criminal behavior of women and attitudes of young people to the possibilities of rehabilitation of women - criminals. This paper describes (on the basis on the author's own research) assessment of how many young people give a chance to women leaving prisons for the proper functioning in the society. The problem of anti-social behavior seems to be marginalized. A reflection on women violence against children, students in the school, or the elderly in family homes or seigniorial institutions appears rarely. The study involved men and women aged 20 - 35 years.

Keywords: woman, morality, family, crime, motivation for change.

Motivation, morality, family in the aspect of anti-social behavior of women

Changes in behavior, views of a man should be seen in motivation and self motivation. The first one means, among other things, inducing another person to do something he or she wants. We are dealing with two types of motivation:

1. by attitude - which shows how someone feels, thinks. It is expressed in the sense of self-confidence and faith in one's abilities and positive attitude.

2. through the incentive - it occurs when a person who is motivated receives profits from specific actions. The most valuable of the range of motivation is self-motivation. Its severity decides on an internal attitude to a particular task. The effectiveness of motivation depends on the environment. The basic principles that guide

motivation include: one's own motivation necessary to motivate others and to have that specified aim. Compliments motivate, they are given only by those, who have high self-esteem. Family, due to its size and prevailing there relationships, is conducive to increasing motivation [1].

Homeostasis of rational and emotional intelligence aids in coping with life's tasks. One cannot take full advantage of the intellect without the support of emotional intelligence. They should be perceived as equivalent. With good cooperation of these two properties, their harmony, they both increase. A man should understand the meaning of the notion - to draw intelligently from emotion. Emotional intelligence is a collection of, among other things, the ability to motivation, persistence in achieving goals, the ability to recognize emotions in others, establishing and maintaining relationships with others [2].

Grading the man to a set of elements of matter, it can be noted that he is only a small speck. A human being is not only close to the physical or biological world, he is also a subject to the laws assigned to living beings, he is a co-founder. He is characterized by empirical attitude. Hence, he is capable of achieving a new ontological structure, as he uses his senses in which the cognitive, sensory and aspiratory processes occur. The energy of the human soul draws energy from the desire to know the whole of reality. In everyday life, a man makes an empirical evaluation. He demonstrates a willingness to defend the values of ideal. Often, this leads him to resign from comfort of life or life itself (for example, an act of parents' heroism toward their children). He also has a processing capacity of the world to himself and others. A man, ready for a positive change, begins his social life from life within the family. An empirical man becomes a subject to psychic facts. He is a separate entity, individual, and at the same time is associated with multiple communities. This is the phenomenon of humanity [3].

Invalid transfer of values often leads to deviant behavior of individual family members, especially the younger generation. The problem of deviation affects all social groups, the economic status of the family does not matter [4].

The family members create a lifestyle, preferred values and world view, cultural patterns [5].

The family also determines the development of the human personality. It is the small community. Each member participates in specific rights, duties [6].

The man, his humanity seal with moral behavior, that is close to him, among other values such as welfare, community, responsibility, national security and family [7].

Family members have to deal with a specific situation of dependence, relationships and interactions, which take time dimension.

Family mediates between the past, present and future. The future is created on the canvas of experiences and events of the past in order to give a chance to the present. Parents give their children: 1. The values and traditions. 2. Roles and responsibilities of family members. 3. Preferred types of partnerships. 4. Methods for solving conflict situations. 5. Attitudes towards their own children. 6. Emotional climate in the family. 7. The style of education [8].

Conditions of well functioning of moral - religious education in the family are:

1. Life in integration, namely relations between parents - children, father - mother, siblings - siblings, have a positive effect on the sense of security and stabilization of all members. The opposite is the disintegration of family life.

2. Proper parental attitudes characterized by the acceptance, understanding the developmental needs of the child, giving the possibility of normal development and learning, being responsible for the child, oneself and others. Disastrous for the moral development of the child are the undesirable parental attitudes that limit the potential development of the child, they often decide about the existence of the anti-social behavior.

3. Patterns of personal behavior, as the parents show the child what is the role of men and women in social and family life, the opposite, from the point of view of social welfare and family, is the lack of personal role models, or presentation of personal anti-model by a parent.

4. Father's and mother's love providing the child with a sense of being needed, important and valuable, opposite of it is hunger for love and, consequently, the child's distorted perception of himself and the world around him.

5. Transferring the timeless and universal values, that is, introduction of children to respect for the ancestors, their culture, respect for national traditions and linking them with the present [cf..9].

Parents are also required to guide their lives by moral principles, such as concern for the welfare and happiness of others, fairness in the treatment the needs of

others, the recognition of every person as a human being, preservation of impartiality towards people and their lives [10].

Woman and criminal

Parents are called to raise awareness of their children, that every human being realizes moral good or distributes evil with his actions, [11] and not to avoid place and meaning of suffering as the experience of the life of every person in the dimension of temporal existence [12].

Educational environment of people that present anti-social behavior is characterized by a lack of proper quality of parental care to which they belong - sensitivity of mothers and the lack of conditions that allow to meet the needs of belonging and safety. Maternal sensitivity to the needs and development of the child determines the correct relations between child and his mother, his communication with other members of society. Lack of adequate conditions is conducive to socialization accompanies life in family environments that are broken, a drinking problem occurs, also when parents suffer from any disorder in the form of antisocial personality [13, p. 8 and others].

Motivations of committing crimes are different among men and women. Women cross moral and legal standards also because of the desire to become richer, and committing a crime by a man is often an goal in itself. Besides, women commit fewer crimes than men. This is due to the performance of their social role - mothers, because they feel responsible for compliance with the rules associated with that role. Large agglomerations, however, increase the risk of committing crimes by women [14, p. 21- 28].

Every human being lives by set sequence of events which are filled with unique emotions and events. They impinge on the next stages of life of the individual. Some men and women are endowed with disturbances in the form of psychopathy which has a fixed long-term nature. Its symptoms can be observed at an early age. It is expressed by repetition of anti-social behavior. Negative behaviors are caused, among others, by alcohol, unemployment, problems at home and negative emotions [15].

The causes of criminal behavior of women are their daily problems, feelings of rejection, lack of psychological support, jealousy, longing for material goods, resentment, revenge and retaliation, ambivalent feelings, attitudes of anxiety to the tasks

set by fate, internal disorder and anxiety, a temporary increase in aggression, the pursuit of goal at all costs [15].

There are models of personality conditions of women-criminals. Personality is shaped by a lifetime, especially in childhood and early youth. Its shape is decided by external stimuli and self-activity of an individual and his level of reactivity. Both the structure of personality, as life experiences and interactions with others form a whole image of the person committing crimes. In childhood, there is a conflict of dependence - independence from the mother. Failure to resolve this conflict leads to disturbed relationships in adulthood. This in turn, leads to hostility, hatred, rejection and emotional fear of ultimate rejection by significant others. It seems that it is a result of what is described by Badora and Karpuszczyńska, "among the surveyed inmates, the most were single women (39.4%). Considering this and the fact that the offenses committed by the most of young women can be assumed that they are looking for their way of life, they do not assume responsibility for others and yet, they are willing to risky behaviors and fun" [16, pp. 217 and others].

As follows from the research conducted by Dariusz Sarzała (...) "among the most important negative factors, which often lead to the accumulation of conflict with the law include: parental alcoholism or (and) siblings, lack of emotional ties in the family, aggressive behavior, abandonment by one of the parents, the lack of positive role models in relation to work and fulfilling social roles, the use of improper methods of education, deprivation of care, lack of control, criminal behavior patterns" [17, p. 58].

For years, an increase in deviant behavior of young people, including girls is being noted. The social, political, economic transformation contributed to this situation. The function of care - upbringing family has been reduced. Underage girls more often play truant, carry out acts of vandalism, they become prostitutes. Loitering stopped to be foreign to them. Deviation is understood as all kinds of deviation from the social norm, which arose as a result of disturbances which occurred in the psychosomatic area and in the sphere of consciousness. Lack of parental love becomes a pass for minors to a world where social norms are not obeyed [18].

There is a violation of the symbiosis of emotions in cognitive processes, which should touch the human functioning in the sphere of moral, physical, health, sexual, personal and social [19].

It can be concluded that committing crime by women is a consequence of, among other things, negative childhood experiences. They have contributed to the accumulation of fear which has been transformed in aggressive behavior [20].

According to L. Olejnikowa, experienced in the work of rehabilitation of prisoners and relying on various studies, "... women stay in isolation is not critical for the prevention of crime". This measure in her opinion only causes family breakdown, loss of housing, and finally the severity of demoralization. Further she writes: "Going back to the environment of the freedom turns out to be harder than the imprisoned women suppose while in prison. The reaction of the public is not sympathetic to the prisoners, and in particular to women marked by the stigma of "demoralized mother" rehabilitation proceedings for women is similar to the one for men. Where necessary, they take an apprenticeship. They are sometimes employed, as far as possible with compensation, both inside and outside the prison. Various forms of cultural, educational, sports and other forms of meaningful development activities are applied to them i.e. education through art, theater, as well as original psych-correctional programs prepare women-prisoners to freedom. The therapeutic impact is applied to those in need of such help" [21, pp. 21-23].

In prisons the language of the prison is present, which marks a second life. After being released women run their own lives, which is imbued with habits from the prison. It is true that more and more staff adheres humanitarian principles to the imprisoned, still the inmates feel the difference that exists between them and the officers. World behind bars forgets that people are equal to each other. In the world of prison you cannot even wash the things that belong to other prisoners. Unfavorable for the individual becomes a manifestation of fear, critical analysis of one's own feelings. This all creates for inmates and officers the difficult situations that can lead to mental disorders. The prison subculture determines the quality of life in there. The supreme value is a solidarity group, which as Dariusz Sarzała emphasizes, "(...) is the value of providing protection to subcultural groups against external threat, especially the weakening of the integration in the group. It has significant importance in the practical functioning of the group because its consistent adherence may cause every conflict with one participant of prison subculture lead to a confrontation with the entire group. Furthermore, in accordance with the principle of solidarity, the group is obliged to bear the consequences (i.e. disciplinary) in the case of misconduct by one of its members" [22, p. 284].

Those who do not want to give up to the secondary demoralization, often have symptoms of stress, which disorganize the work of staff and generates internal conflicts. The forming of groups of the prisoners, on the one hand, cause conflicts and on the other they reinforce internally the existing groups. It all interferes penitentiary process [23].

The inmates often feel a sense of loneliness, like the one that occurs after the loss of a relative. Leaving family, friends, the prisoners feel the loss, insecurity [24]. They live in isolation, as if they were in mourning. They are close to phases of loss, such as - numbness (hopelessness), longing (anxiety, fear), disorganization and despair (apparent reconciliation with the loss, which breeds depression), reorganization (the individual should regain contacts, but prison conditions are not favorable) [cf.. 25].

What is lacking is social support, which would allow to minimize effects of sudden breach of sense of social identity, belief in the stability of the world and the human relationships [26]. It should be emphasized that "social support construed as assistance from other persons or institutions, plays a very important role in everyone's life, especially in very difficult or even impossible to overcome situations. Support of this kind is needed both to individuals and to groups located in different life situations, socio-economic and psychological standing, and regardless of age and social role" [27].

Paradoxically, the prisoner is penalized in a multidimensional way. The punishment according to the Criminal Code is not the only severity for women - offenders. The sense of loneliness, loss of job, everyday prison rigor lead to suffering. The only chance to not only survive in isolation, but also to have adequate self-esteem is to get up the courage to peek into the depths of one's own suffering. Dealing with its size, release of the related negative emotions lead to finding inner peace, which is necessary for continued existence. A man, who controls his emotional state is able to follow further, despite previous failures, fiascos or anti-social behavior. True rehabilitation is not done in the external and the system dimension. It is done by the individual who is able to deal with his own weaknesses. A man ready for a positive change cannot be conformed to the surface calmness. He must seek permanent constructs that will allow him to be the manager of his own life [28].

It is believed that so-called women's liberation is for themselves and for the society something harmful, because it led to the disappearance of family ties, it weakened the processes of education and socialization of children. As a result, women violence against other members of society intensified, they often commit murders under influence of alcohol. Female violence bears the features of coercion. It seeks to force or omission of an action by the victim. The most cruel criminal behavior of women include murder and infanticide. According to psychiatrist the infanticide is recognized as being the result of an act of impulsiveness. It most commonly affects women-offenders who suffer from depression and other mental disorders in terms of honesty and will. Often these women are characterized by neurosis. It happens when women experience a crisis of puberty, pregnancy or menopause. The next crime is physical violence and psychological violence against children and adults, including the elderly. The most hidden social violence is the violence of women against men, which often ends in murder. Thinking about killing the gives them pleasure. Lighter categories of offenses committed by women may include beatings, thefts and robberies [cf...29].

Research results

Studies, which were to bring an answer to the question - to what extent young people see the possibility of women - offenders to fully return to the community - one hundred students were examined. Among them there were - eighty female students and eighty male students in the age group 20 - 35 years of age. The tables below present the results.

Table 1. Evaluation of rehabilitation of women – killers

The degree of evaluation of readaptation	Men 20 – 35 years of age		Women 20 – 35 years of age		Difference	
	N	%	N	%	N	%
Very high	1	1.25	3	3.75	2	2.5
High	5	6.25	4	5.0	1	1.25
Average	11	13.75	10	12.5	1	1.25
Low	22	27.5	36	45.0	14	17.5
Very low	41	51.25	27	33.75	14	17.5
Σ	80	100	80	100	32	40.0

Source: Author's Own Research

Looking at the results set out in Table 1 can be seen that very few men and women give a chance for full rehabilitation of women offenders (1.25% and 3.75%), as well as a high probability of success (6.25% and 5.0% respectively). Average possibilities were indicated by 13.75% of men and 12.5% of women. By far the largest group of respondents are men and women who give little or no chance of rehabilitation for women-killers (27.5% and 51.25%) and (45.0% and 33.75%).

From the above data, it can be concluded that women – killers cannot, after being released, rely on social support.

Table 2. Readaptation of women - infanticide in the assessment of men and women

The degree of evaluation of readaptation	Men 20 – 35 years of age		Women 20 – 35 years of age		Difference	
	N	%	N	%	N	%
Very high	0	0	0	0	0	0
High	3	3.75	5	6.25	1	1.25
Average	11	13.75	9	11.25	2	2.5
Low	26	32.5	30	37.5	4	5.0
Very low	40	50.0	36	45.0	4	5.0
Σ	80	100	80	100	11	13.75

Source: Author's Own Research

Table 2 contains an assessment of rehabilitation of women who have done cruelty in the form of infanticide. Young respondents this time also do not see big chances for rehabilitation of women-infanticide and thus they expressed in this way strong disapproval of these women conduct. None of the respondents indicated a very high possibility of re-adaptation and only 3.75% of men and 6.25% see high, and 13.75% and 11.25% see average possibility. Low and very low possibility was chosen by 82.5% of men and women.

Table 3. Possibilities of rehabilitation of women – offenders of violence against children

The degree of evaluation of readaptation	Men 20 – 35 years of age		Women 20 – 35 years of age		Difference	
	N	%	N	%	N	%
Very high	4	5.0	4	5.0	0	0
High	6	7.5	10	12.5	4	5.0
Average	12	15.0	24	30.0	12	15.0
Low	13	16.25	18	22.5	5	6.25
Very low	45	56.25	24	30.0	1	15.0
Σ	80	100	80	100	22	41.25

Source: Author's Own Research

Violence against children was not always recognized and socially stigmatized. Not long ago, corporal and mental punishment in specific educational situations were considered desirable. Today, fortunately, this is changing, but at the same time modern methods of education do not fully bear fruit. Respondents pointed to the very high and high chances of rehabilitation, respectively 12.5% men and 17.5% women, average chance was expressed in the form of 15% and 30%, low and very low possibility of readaptation recognized the 82.5% of male students and 52.5% female students. Such a difference among other things, can cause stereotypical recognition of protection of vulnerable where in the ladder of needs safety of children is one the highest level.

Analysis of the research results that has been included in Table 4 allows to note that the problem of women violence against elderly is incorrectly perceived less significant than the violence against the child. It should be emphatically stressed that older people due to their dysfunctions of health are no less vulnerable than children and, therefore, it is easily to be violent against them. They experience this violence more from women than from men probably because care treatments, nursing and accompaniment in everyday struggle with problems are primarily tasks of women, both at home and in institutions. The problem of elder abuse begins to be a big challenge for modern societies, if only because, so far a chance to reverse the trend of aging population, especially highly industrialized, living the high life standards, has not been seen.

Table 4. Assessment of possibility to return to society or women - perpetrators of violence against the elderly

The degree of evaluation of readaptation	Men 20 – 35 years of age		Women 20 – 35 years of age		Difference	
	N	%	N	%	N	%
Very high	6	7.5	7	8.75	1	1.25
High	8	10.0	10	12.5	2	2.5
Average	15	18.75	14	17.5	1	1.25
Low	16	20.0	19	23.75	3	3.75
Very low	35	43.75	30	37.5	5	7.25
Σ	80	100	50	100	12	15.0

Source: Author's Own Research

The analysis of the results of research that has been included in Table 4 allows to note that the problem of women violence against elderly is incorrectly perceived as less significant than the violence against the child. It should be emphatically stressed that older people due to their health dysfunctions are no less vulnerable than children and, therefore, it is easily to be violent against them.

Table 5. Opportunities for rehabilitation of women – perpetrators of beatings

The degree of evaluation of readaptation	Men 20 – 35 years of age		Women 20 – 35 years of age		Difference	
	N	%	N	%	N	%
Very high	14	28	14	28	0	0
High	14	28	16	32	2	4
Average	13	26	12	24	1	2
Low	7	14	7	14	0	0
Very low	2	4	1	2	1	2
Σ	50	100	50	100	4	8

Source: Author's Own Research

Women also execute beatings. These are acts carried out against children, women and men. Evaluation of their behavior and opportunities for readaptation is much higher than in the previously described cases. There is not a very big difference in the assessment of respondents between women and men. A certain amount of goodwill towards women aggressive behavior may take place due to often perception of a woman who must and can herself take care of her own interests, even breaking the law. The degree of aggression and its size keeps growing. Quite a few women is aggressive after drinking alcohol, which is present in the lives of many women, especially the young.

Thefts and crimes belong to the lower category of crime. The reason for committing them is mostly desire to possess material things, use of the current trends in fashion and “comfort” of life. The evaluation of the readaptation is, compared with previous cases, very beneficial for women-offenders. Considerably more than half of women and men respondents believe that women engaged in those crimes have a very good chance to rediscover the social structures of theft, where you do not see certain regularities, namely the taking of someone’s or social property is also a form of harming a person. Such an assessment can be discerned perhaps in stereotypical meaning of this category of crime. Assessment of the rehabilitation of women who have violated the legal norms appropriating someone else’s property is described in tabular form below.

Table 6. Evaluation of rehabilitation of women - offenders in the area of theft and robbery

The degree of evaluation of readaptation	Men 20 – 35 years of age		Women 20–35 years of age		Difference	
	N	%	N	%	N	%
Very high	23	23	28	28	5	5
High	23	23	30	30	7	7
Average	30	30	25	25	5	5
Low	19	19	14	14	5	5
Very low	5	5	3	3	2	2
Σ	100	100	100	100	24	24

Source: Author’s Own Research

Summary and Conclusions

Based on the presented literature and analysis of author's own research, it can be noted that:

1. More and more women, especially young commit multiple crimes.
2. The reasons for this state of affairs can be discerned in the cultural changes, the weakening of family ties, and it is also determined by a change in the quality of personality structures of women.
3. Opportunities for the rehabilitation of women - offenders in the assessment of young respondents depend on the type of crime.
4. Women, murderesses and infanticide were assessed harshest. Their chances for a full return to society are negligible.
5. Slightly higher possibilities of rehabilitation have been noticed in the case of crimes of women violence against children (men evaluated this type of crime very seriously), and the elderly.
6. At the same time the person who carried out the theft, robberies and beatings, according to the students are most likely to become a new fully-fledged members of society.

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The interjection functor in the genesis of grotesque

Abstract: The subject of this survey are interjections as one of the foci of grotesque convergence. Their versatile constitution, their great adaptability and polifunctionality, their semantic variability and syntactic autonomy, their performative density and most particularly, their super expressive nature turn them into important and unique grotesque operators. Due to interjections as the pillars of coherence within the grotesque panorama, the positive balance within the antinomy Semiotic-Symbolic is maintained. Moreover, due to intejections permanent breaches are achieved within the uni-Form, that is otherwise an unbearable burden for the human creature.

Keywords: interjection, grotesque, semantics, pragmatics, performative-ness, transformation, Semiotic-Symbolic, Anti-Form.

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Междометийный функтор в гротескогенезе

Аннотация: Объект настоящего исследования – междометия как один из фокусов гротесковой конвергенции. Их разнородный состав, большая адаптивность и полифункциональность, их семантическая вариативность и синтаксическая автономность, их перформативная плотность, и особенно ультразакспрессивная природа делают междометия не только важными, но и уникальными гротесковыми операторами. Благодаря им, как стержням когеренции в гротесковой панораме, поддерживается благотворный баланс в рамках антиномии Семиотическое-Символическое, а кроме того, делаются

перманентные прорывы в уни-Форме – иначе непосильное бремя для человеческого существа.

Ключевые слова: междометие, гротеск, семантика, прагматика, перформативность, трансформация, Семиотическое-Символическое, Анти-Форма.

1.1. Ускользящая идентичность междометий

Группа междометий (*interiectiones*) чрезвычайно сложна для определения и концепирования, из-за своей разнородности (гетерогенности) и исключительно пестрого языкового состава. Предыдущие попытки классификации и категоризации этих единиц в какой-то мере односторонни, недостаточны и в большой степени внутренне противоречивы. Сами классификации не основываются на ясных и однородных критериях. Большинство исследователей принимает междометия как морфологическую, т.е. авторепрезентативную и самодостаточную („самородную“) в структуральном отношении категорию, но наряду с этим они не отрицают, что сами междометия могут быть представляемы различными частями речи (категориями слов): частицами, наречиями, местоимениями, целыми фразами, даже фразеологизмами и др. А возможно ли, чтоб в этой роли выступали одновременно несколько категорий слов, и как различать их от частиц? Большая часть междометий просто фонетическая (или фоносилабическая) секвенция (звукоподражания). Что касается их синтаксической или внесинтаксической роли, вопрос тоже слишком спорен. Я думаю, что подобная постановка не совсем правильна, так как сам синтаксис имеет прагматическое предназначение, а прагматический текст составлен из синтаксических единиц (предложений, периодов). Оба понятия не должны быть в оппозиции, ни даже строго обособленными, потому что представляют два лица одной и той же вещи. В новой русской лингвистике термин предложение-высказывание часто встречаем. Факт, что междометия самая самостоятельная и независимая группа единиц, не держит их вдали ни от синтаксиса, ни от языка. Они просто сильно адаптивные, ассоциативные и ассимилятивные образования, при том полифункциональные – мимикрируют и как неглагольные предикативы (или ономотопеические глагольные субституты), и как существительные, и как прилагательные, и как числительные, и как фразы или фразеологизмы, и как императивные конструкции, и как аффективные модулянты и импрессивные

операторы, и как метатекстовые функторы. Некоторые ученые воспринимают и бехабитивы (посредством формул учтивости): *Извините!*, *Простите!*, как междометия. Междометия могут быть воспринимаемы и как супплетивные (субститутивные) слова в их роли текстовых синонимов (о синонимии при междометиях пишет Мери Лакова [1]. Мачей Гроховский пишет о предикативных междометиях, которые он характеризует как несклоняемые, используемые самостоятельно, замещающие, независимые от вербального контекста высказывания (в отличие от дополняющих высказываний), способные, однако, как ономотопеи, появляться в функции элемента высказывания (в отличие от воззваний и интеръекций), но в отличие от ономотопей, быть конституентом лишь несообщительных (неизъявительных, неассертивных) высказываний: *a kysz, huzia, jazda, won, wynocha, wara, marsz, precz, naprzód* itd. ('брысь, убирайся, скатертью дорога, катись, вон, марш отсюда, спасайся, вперед' и т.д.) [2]. Гротесковые панно В. Гомбровича изобилуют такими междометийными предикативами.

Следовательно, прежде всего выделяется их семантико-синтаксическая идентификация („самоличность”). Сам факт, что с чисто „лабораторной”-морфологической точки зрения (условно говоря), они могут быть репрезентированы различными категориями слов, серьезно расшатывает их морфологический статус. Их близкое родство с частицами, например, бесспорно, но предыдущие попытки разграничить два вида единиц неубедительны. Утверждается, что одно из выразительных средств (одни из возможных конституентов) междометий - это частицы, и наряду с этим прилагаются усилия, чтобы они были разграничены как равнопоставленные, но отдельные категории. В качестве отличительной черты частиц указывается их экспрессивность и модальность (экспрессивность тоже является частью более общего (гиперонимного) понятия *модальность!*), а что касается междометий – они выражают душевное состояние, настрой души, что тоже есть экспрессия. На самом деле все, что приписывается частицам как их отличительная особенность: эмоциональность, экспрессивность, модальность, усиливающая, обозначающая степень (градуальная) и т.д. способность, можно отнести и к междометиям. По мнению Станислава Грабиаса, они сигнализируют эмоциональные состояния говорящего, и поэтому их называют импульсивными операторами, симптомами личной позиции, как и экспрессии [3]. Многократно

обращается внимание и на их многозначность. Установление их точного количества исключительно трудно, из-за их эфемерности. То, что междометия изолированный знак [4], что сильнее всего приближаются к афектантам (некоторым частицам, наречиям и др., функционирующим как составная часть синтагмы), но в отличие от них свободны (не связаны) и могут появляться как отдельные синтагмы или как самостоятельные высказывания [5], то, что напоминают эквиваленты предложений и что позиционированы ближе к самостоятельным, чем к вспомогательным словам, то, что в выразительном плане могут быть распределены в две подгруппы: иконические и в группу индексов, а в прагматико-перформативном плане – в три: импульсивные, имитативные и императивные [3], не очень помогает в их идентификации и не решает проблему. Как иконические знаки они являются образами акустично-слуховых или динамично-визуальных явлений [3], и это делает их особенно подходящими дейкторами для гротескового образотворчества. Их можно рассматривать и как метатекстовые операторы: „я сигнализирую тебе другим образом (изобразительно-звуковым), что испытываю боль, отвращение, страх, гнев, облетчение, удивление, что что-то мне вкусно, что чем-то пренебрегаю и т.д.”.

Схожа и позиция Марека Вишневого. Предлагаемый им синтаксико-прагматический критерий ведет к тому же результату – по мнению польского ученого, одна часть междометийных выражений (пол. *wypowiedzenia wykrzyknikowe*), как он их называет, - это невысказанные синтаксические целости, сосредоточенные на выражениях с пустой коннотацией, которые к тому же не допускают возможности „сожительства” с другими языковыми единицами. Это отличает их как от звательных, так и от дополняющих высказываний (*Ejże. Ba. Ja wiem, że tobie wszystko jedno. Ojej. Moja. Cholera. Znów się spóźnię. O Jezus. Ale on głupi.*) ('Эй. Ну. Знаю, что тебе все равно. Ох. Моя. Блин. Опять опоздаю. О, Боже. Ну, и дурак же он') [по 6]. Поскольку это не единственные позиции и формы проявления междометий, а предлагаемые дистрибуции слишком развернуты, все труднее становится найти общий квалифицирующий элемент, который объединил бы все подгруппы и «опознал» бы их как представителей одной и той же категории. Не знаю, достаточно ли основательно двуделение, предложенное М. Вишневым, на междометия и междометийные высказывания, так как категориальное единство опознаваемо

– просто идет речь о различных формах проявления определенного (одного и того же) типа языковых единиц. Исходя из позиции М. Гроховского, М. Вишневский разделяет это точку зрения относительно различной дистрибуции междометийных высказываний и предлагает деление: *апеллятивные междометия* (*apele* – что-то вроде „вскрикиваний” = *wykrzyknienia*), вступающие в линейные связи со звательными высказываниями, и *интеръекции*, которые не связываются со звательными формами. К первой группе причисляются и хабитуальные формулы вежливости (приветствия) (*ach, hallo, hej, oj, cześć, czolem, dzień dobry, ojej, ratunku, serwus, ejże, dobranoc, do widzenia, pa* – ‘ах, если, привет, оой, добрый день, матушки, помощь, сервус, ээй, спокойной ночи, до свидания, пока’), а ко второй, охватывающей парентетические междометия – преимущественно колоритные, с уже ослабевшей грубой коннотацией, „бранные” формулы (*bagatela, cholera, holender, kurczę, Jezu Chryste, Jezus Maria, o rany, psiakrew, rany boskie* itd. – ‘пустяки, Мамма Миа, к черту, Иисус, Пресвятая Богородица, О, Боже, к чертовой матери, черт его побери’ и т.д.) [6].

Очевидно, критерии оразличения междометий неясны или неудачны, потому что, принимая во внимание и применяя их, оказывается, что по меньшей мере две категории – междометий и частиц – почти совпадают. Образно говоря, мы начинаем кружиться в порочном круге. В некоторых исследованиях утверждается, что с течением времени определенные междометия превратились в частицы или, наоборот, частицы – в междометия, причем не ясно основание, на котором делается эта констатация – вероятнее всего, по интуитивному ощущению. С другой стороны, утверждается, что определенные „бывшие” междометия, „мутировавшие” в частицы, лишь посредством одного дополнительного расширения восстанавливают свой прежний статус и воспринимаются как междометия, опять неясно почему. По линии их синтаксического „поведения”, обычно говорят, что частицы – сопутствующие элементы и не могут являться самостоятельной фразой, в отличие от междометий, но и это не есть правило без исключений. В одном из своих исследований М. Гроховский устанавливает, что модальные (волевые) операторы (*bodaj, byle, niech oby, żeby* – ‘пусть; дай Бог, чтоб’), появляются в междометийных высказываниях: *Bodaj kark skręcił!, Byłeś zdążył na egzamin!, Obyś żył długo i szczęśliwie!, Żebyś o tym więcej nie musiał mówić! ...* (‘Чтоб ты шею сломал!, Надеюсь, ты к экзамену успеешь! Жить бы тебе долго и

счастливо! Пусть не надо будет (не придется) тебе говорить больше об этом!...') [7]. В этой ситуации замешательство углубляется – нам не ясно, каков пространственный охват междометий – с упомянутыми операторами ли следует нам их идентифицировать, но тогда мы зададимся вопросом, это эпистемические частицы или междометия, или же они междометия, представляемые частицами? Если за междометийное будем принимать все высказывание, тогда неимоверно расширяем его объем, размываем его очертания и затрудняем идентификацию; в таком случае междометиями мы должны объявить почти каждый волеизъявление, выраженный оптативной или менасивной (угрожающей) фразой. Следовало бы оспорить и утверждение о контекстуальной независимости междометий, срв. *Niech pan pisze czytelnie* ('Пишите разборчиво, пожалуйста') – частица и *Niech pan już przestanie* ('Ну, хватит уже') – междометие. Относительно междометийного „привкуса” второго высказывания (в отличие от первого) получаем ориентацию именно от контекста.

Как показывает название междометий, они „вставлены” куда-то в синтаксическую равнину – или между частями предложения, или вне его, т.е., они могут составлять другую самостоятельную фразу, выполнять разнообразные морфосинтаксические роли, или же функционировать как метатекстовые операторы. Более логичным и уместным было бы действительно отнести их к синтаксико-прагматической (или прагмасинтаксической) сфере языка. Их способность быть семантико-синтаксическими синонимами (глагола, существительного, предложения-высказывания, приказа) тоже подтверждает данную тезу. Концепция Станьо Георгиева о междометиях сильно приближается к предложенному здесь исследовательскому ракурсу. С точки зрения болгарского ученого, „местоимения – это слова, отражающие переход от мимики и жестов, от инстинктивных реакций при ощущениях к процессу мысленных и семантических обобщений в языке, в его словарном составе. Их нельзя изъять из лексики языка, но нужно рассматривать, учитывая их особую лексическую суть и коммуникативное предназначение” [8]. И чуть дальше ученый дополняет, что обозначающая функция местоимения как лексической единицы ограничивается и определяется эмотивной и изобразительной: „В нем чувства и волевые побуждения, звуковые изменения и образы в большей степени выражаются и сигнализируются, чем отражаются” [8]. Очень ценно

наблюдение, что междометию не чужды мысли и суждения. Они являются частью его конституции, но представляют скорее всего функцию эмоции и ее производную: „Они содержат в себе мысли и суждения (В. Богуславский). Правильно говорить о более особенном номинативном значении междометий, которое не вполне понятийно по своей сути” [8]. С. Георгиев разграничивает два основных типа междометий: *эмотивные* (которые, со своей стороны, разделяются на *рефлексные*, *волеизъявительные* и *контактивные*) и *подражательные* (звукоподражательные и образные) [8].

Точное и убедительное определение междометия предлагает и Иван Куцаров: „Междометие - изолированная неизменяемая часть речи, посредством которой дается звуковое выражение чувствам и эмоциям или уподобляются шумы живой и неживой природы. Междометие не обладает никакими морфологическими категориями. В предложении оно – изолированное слово, а часто является и самостоятельным предложением рудиментарной структуры” [9].

Некоторые исследователи считают, что эмотивные междометия даже асемантичны или десемантизированы [10]. Междометия могут и не иметь константное, фиксированное значение, но это связано с тем, что они многозначны, а не беззначны, и их семантическая доминанта кристаллизуется в соответствующем контексте. Они дополняют семантику своего самого близкого контекста – предшествующей или последующей фразы, выстраивая градацию ее экспрессивности и занимая самую высокую точку (апогей) в шкале экспрессии. Йордан Пенчев считает, что у междометий некоторые общие черты с вставленными оценочными словами и с частицами. По его мнению, они тоже несут значение и входят в высказывание со своей собственной семантикой, но в отличие от оценочных слов, семантика междометий относится ко всему предложению и никогда к отдельной его части. Из-за этого они появляются обычно в начале высказывания или самосотятельно [11].

1.2. Междометие как регулятор ключевой антиномии Семиотическое – Символическое¹

В поиске индивидуально специфического при междометиях на фоне других функционально сродных языковых единиц, мне кажется, что правильное направление – это ассоциативная связь с биномом Семиотическое – Символическое, что делает их сильными гротесковыми функторами. Сенсорно-эмоциональная реактивность, сверхконцентрация экспрессивной энергии словно вызывает моментное „умопомрачение” („мозговое затмение”), которое заменяется в следующей фазе осознанной ментальной когницией. Следовательно, как в продуктивном, так и в рецептивном плане, междометие – познавательный миниконтинуум, из-за чего мы не можем поставить его вне языка, ни вне рефлексии. Поскольку дихотомия лингвистический–экстралингвистический в какой-то мере беспочвенна, в любом случае крайне условна, – интеграционное сцепление между языковым и неязыковым, как в самом языке, так и в мире вокруг нас, ставит под сомнение основания для ее существования. Почти все виды междометий, в первую очередь иконические и индексальные или, в соответствии с другим разделением, импульсивные и имитативные, представляют варианты моментного, имитационного слияния с Абсолютом и примету Семиотического. Даже те, что замещают глагол в предложении: *А вода кап-кап*, показывают, как хоть на некоторое время мы перевоплощаемся в ее образ и действуем от ее имени. Имитируя звуки, которые издает конкретное животное, мы на небольшое время *есть* это животное; выговаривая ругательство, мы на небольшое время *бываем* в его Анти-Формальном поле. Временно покинув Форму, а звуково иллюстрируя реакции нашего тела, мы отождествляемся с их содержанием, т.е. с абъектальным². Все эти междометийные роли ассоциируют и уподобляют нас Универсальной предметности, различным космическим бытийностям,

¹ Термины использованы в смысле, который вкладывает в них Юлия Крыстева. Семиотическое – это Первичная, Пред-Формальная Целостность нашего существования, а Символическое – наш обособленный „я” как символ неизбежной и гнетущей зависимости от Формы в ее всевозможных перевоплощениях.

² Абъект – термин Юлии Крыстевой, которым она определяет праобъект до „зеркальной фазы” Лакана, т.е. до отделения от пере-Едипальной Матери, порождающий экстремально сильное чувство, побуждающее к бунту против внешней опасности, но которое может угрожать и изнутри. Так „разжигается” трагедия человеческого существования, из-за неразрешимой коллизии между Семиотическим и Символическим. В материально-прагматическом аспекте некоторые из проявлений абъектального – это недомогание и отходные телесные продукты индивидуума.

припоминают нам архетип и делают нас интегральной частью Вселенной и Семиотического. Временно возвращают нас в Изначальное Единство, вырывают из петли Формы и придают нам Целостность. Что касается Формальных проявлений (Символического) междометий посредством некоторых бехабитивов, волетивов или адхортативов (побудителей), с их помощью устанавливается более безболезненный контакт (согласование) с неизбежной Формой. Приказы, побудительные фразы свидетельствуют о захвате чужого пространства и его подчинении своему. Варианты приобщения или субординации „противника” являются попыткой держать положение под собственным контролем – чтобы от нас зависело, должно ли что-либо случиться или нет, чтобы заставить кого-либо принять во внимание нашу Форму. Это в какой-то мере „здоровый” автообман с целью временного притупления боли, причиненной Формальными репрессиями.

Эта вербальная „самоотдача”, услужливость, полифункциональность, метаморфичность и трансформативность междометий, а также их прямая связь с Семиотическим, делает их микромоделью трансценденции и активными гротесковыми функторами.

1.3. Междометийная экспрессия как коммуникативный и эмотивный дейктор

Сгущенная, пульсирующая экспрессивность при междометиях и их подчеркнута перформативный статус настойчиво указывают на свой источник и привлекают неудержимо внимание адресата. Силой сугестии, как призыва к содействию и участию, они проявляются как сильно коммуникативные операторы, укрепляющие сотрудничество между А и Ч. Высокая коммуникативная температура поддерживается в первую очередь междометиями с яркой фатической функцией, которые М. Вишневский называет дополняющими высказываниями: *aha, ale gdzie tam, ano, a jakże, bynajmniej, e tam, coś ty, jak najbardziej, jasne, no chyba, na odwrót, naturalnie, nic dziwnego, nie, no, skądże, właśnie, otóż to, pewnie, oczywiście, owszem, w porządku, zgoda* итп. (‘ага, куда там, ну да, еще бы, да ну ты, надо же, само собой, ясно, может быть (пожалуй), как раз наоборот, ничего удивительного, так ведь, да, с чего ты взял, именно, наверно, да ну, конечно, не волнуйся (никаких проблем, можешь не сомневаться, так и будет), согласен и т.д.’) [6]. М. Гроховский допускает, что

некоторые парентетические и примарные междометия не выполняют коммуникативную функцию, а являются лишь знаком автоэкспрессии говорящего, его эмоционального состояния [7]. По моему мнению, повышенная экспрессивность и пластичность этих междометий только увеличивает их коммуникативный заряд, особенно в художественном тексте, где благодаря им крепчает диалог между А и Ч. В случаях, когда производитель речи разговаривает с самим собой, действительно доминирует автоэкспрессивная функция, но этот автодиалог тоже является коммуникацией.

В следующем фрагменте звукоподражательное редуцированное междометие (*Hau! Hau!*) выполняет роль идентификатора для гротесковости изображения и отмечает кульминацию в гротесковой картине. Оно - осевой центр, вокруг которого кружится весь поведенческий арсенал эксплуатируемого до крайнего предела простонародья в романе *Ferdydurke* Витольда Гомбровича; оно вместе с тем словно вторично демегафоризированная метафора (плебеи действительно собаки, а не люди). Ономотопея здесь имеет ключевое экзистенциально-трансформативное и радикальное (революционно)-перформативное значение. Она содержит язвительную иронию крестьян к их господам – подтекст таков: „Вы превратили нас в собак, а мы в качестве таких будем общаться с вами по-собачьи – разорвем вас”. Эскалирующая „вереница” самых разнообразных контактивно-императивных (побудительных) междометий утверждает „зооморфный облик” плебса, стимулирует и иллюстрирует его мятежную силу, служит предзнаменованием стихии его отомщения, а также предупреждением и угрозой так установленному социальному порядку. В состав этого сверхэкспрессивного междометийного каскада входят и целые высказывания (волевые), синтаксический эллипс которых сгущает эмоциональное напряжение и повышает коммуникативный эффект. Диалектная стилизация лексем дополняет гротесковый колорит. Ударная императивность и редупликация междометийных фраз способствует полному повороту в соотношении сил – крестьяне-собаки становятся ведущей стороной, яро преследующей своих врагов-господ, превратившихся в свою очередь в кошек, т.е. в манящую добычу для „собак”. Таким образом кажущееся опускание до уровня животного оказывается „восхождением” до ранга повелителя, диктующего положение, от которого зависит его исход и развитие событий. Угнетатели и угнетенные меняются местами. „Собаки” занимают более высокую позицию для

самосуда над своими сатрапами. Главная заслуга в этом перераспределении сил принадлежит именно междометиям. Перевоплощение в животного - новое соприкосновение с абъектальным и возвращение к Первоначальному миксантропическому Всеединству. Миниобразцом гротесковой когеренции является выражение *Psssa go!*. Как междометийный синтаксический эквивалент выражения 'Пошли его!', оно увеличивает перформативный заряд волевых путем максимальной концентрации предикативности, внушенной имитированием синтаксической сочетаемости (валентности) между предикативным индексальным междометием и личным местоимением в акузативе. Социотрансформативная функция междометий становится сигналом и антиципацией нового общественного порядка.

Ady my nie ludzie, ady my psy, psy jesteśmy! Hau! Hau! – Nagle dziecko przy piersi szczerknęło, chłopka zaś, rozejrzawszy się, że nas jest tylko dwóch, zawarczała i ugryzła mnie w brzuch. Wyrwałem babie brzuch z zębów! Ale już z opłotków wynurzała się cała wieś szczekając i warcząc: – Bierzta go, kumie! Nie bójta się! Gryźta! Huź! Huź! Psssa go! Bierzta Intencyje! Bierzta Inteligencje! Huź, huzia, psssa, kota, kota! Ksss... Ksss³... (F, 215).

Мариан Белецкий акцентирует внимание на перформативном характере абъектального (перформативность тоже является трансформацией одного состояния в другое), так как оно нарушает границы, срывает порядок, спутывает отношения между идентичностью и друговью, а в то же самое время есть само нарушение, уничтожение и спутывание идентичного и различного. Именно поэтому представляет угрозу Символическому порядку как структуре дележек и различий [по 13]. Трансформативно-перформативная сила гротеска выражается не в стирании абъекта или в его нейтрализации, а именно посредством него - в победоносном возвращении к Семиотическому и экстериоризации трагедии индивидуума, которая сублимирует, благодаря эстетике. Гротесковая

³ – *Чтоб пусто было, мы не люди, черт побери, собаки мы, собаки! Аууу! Аууу! – вдруг грудной ребенок, прильнувший к груди матери, пролаял, крестьянка же, осмотревшись вокруг и увидев, что нас всего двое, и она залаяла и укусила меня в живот. Вырвал я живот из ее зубов хищнических! Но отовсюду стала стекаться вся деревня, рыча и со страшным лаем: – Держи его, кум! Не бойся! Кусай! Давай! Давай! Пссст его! Держите Интенции! Держите Ентеллегенции! Ну-ка, айдааа, пссст, кошку, кошку! Кишиши... Кишиши... (F, 215).*

образность с легкостью связывает такие крайние вещи посредством релятивизирования границ и визуально-эстетической „трансформации” абъекта, который „приходит извне и разрывает изнутри” (по словам Ю. Крыстевой). Иконическое абъектальное междометие визуализирует этот процесс.

В драме *Оперетка* польского писателя Профессор с его vomитальными вспышками (иллюстрированными междометием) – Медиум к Космическому, прямая связь с Первичной Целостностью. В этом отрывке порождает ощущение, что междометие овладело (захватило) всей языковой территорией, элементы которой вроде „междометизировались”. Само существительное *wymiot* играет роль междометия. Автор словно „фильмирует” экстремальную трансмутацию Символического сна в Семиотическое, предпринимая языковую офансиву путем „реформ”, за которые берется междометие (метаморфическое и рефренное): компрессировать и эллиптировать синтаксис, придавая таким образом особую дейктивность гротесковому изображению, выделить безличные, безглагольные и бесподлежащие фразы с яркими пространственными ориентирами, выстроить и подчеркнуть метафору с ее космоизирующей функцией, выстраивать градацию эпитетов.

Profesor

A ja rzy...ja Rzy... na prawo. Rzy... na lewo. Rzygam i rzygam. Rzyg. Mdl. Nudzi. Wymiot. Rzyg. Rzyg. Wszerej i wzdluz. W glab i w skos. Rzyg. Rzyg. Co za nudzenie, jak nudzi, jak mdl, rzucam, wymiotuje, wymiot absolutny, radykalny, uniwersalny, kosmiczny, fizyczny, metafizyczny, wszechwladny, wszechobejmujacy, wymiot, wymiot, wymiot, wymiot! (O, 282–283)

Сделанный обзор проблематики наводит на следующие выводы:

1/ Как иконические знаки междометия являются образами слухово-акустических или визуально-подвижных явлений, и это делает их особенно подходящими дейкторами для гротескового образотворчества.

2/ Местоимения имеют ускользящую, флуктуативную и мимикрирующую природу, ввиду чего их идентичность трудно уловимая и различимая среди

⁴ *Профессор*

A я блю... я блю... направо. Блю... налево. Блюю да блюю. Блевание. Тошнота. Скука. Блевание. Блевание. Вдоль и поперек. Внутрь и наискось. Блевание. Блевание. Что за тоска, какая скука, какая гадость, меня рвет, блюю, рвота абсолютная, радикальная, универсальная, космическая, физическая, метафизическая, всемогущая, вездесущая, рвота, рвота, рвота! (O, 282–283)

некоторых языковых категорий. Молниевидный блеск абъектального как подсознательная ностальгическая реакция на Первичную Целостность отличает междометие от всех остальных слов, и в этом состоит его индивидуальная специфика. Это показывает, как посредством междометий гротеск может искать свои корни в самом языке.

3/ Индексальные междометия являются наглядными олицетворениями „нашей животной метаморфозы”, которая не означает антропологическую деградацию, а приобщение к Семиотическому и универсальную адаптацию. Когда мы на небольшое время *превращаемся* в данное животное или предмет, с которым на мгновение сливаемся, мы возвращаемся в Изначальное Единство, добиваемся своей интеграции с Космосом и обретаем свою потерянную Целость.

4/ Междометия в гротесковой зоне чаще всего суть безотказный детонатор Формы или хотя бы альтернатива для более безболезненного контакта с ней.

5/ Удивительная „самоотдача”, полифункциональность и трансформативность междометий, а также их прямая связь с Семиотическим, делает их микромоделью трансценденции и одним из наиболее активных гротесковых функторов.

6/ Междометия в гротесковом изображении - экспрессивные сигнализаторы, коммуникативные „усилители”, катализаторы и „ускорители” диалогического процесса.

7/ Гротесковая оноματοпея имеет ключевое экзистенциально-трансформативное и радикально-перформативное значение.

8/ Социотрансформативная функция междометий в гротесковом поясе становится знаком и „предсказанием” нового общественного порядка.

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On the return of illegally exported cultural values in the context of the UNESCO Convention 1970

Abstract: This article is devoted to a problem of return actual today of illegally taken out cultural values to the states to which they belong in the context of performance of provisions of the Convention on the measures directed on a ban and prevention of illegal import, export and transfer of the property right to cultural values of November 14, 1970. The available experience of Ukraine in the specified question is analysed. Examples of such returns are given.

Keywords: return, illegally taken out cultural values, the Convention of 1970, UNESCO, Ukraine.

By ratifying Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property of 14 November 1970 (hereinafter – the Convention) [1] in 1988, Ukraine has assumed international obligations with the use of all necessary activities (in accordance with national legislation) aimed at preventing the entry into museums and other cultural institutions located in its territory of cultural property originating in another state Party to the Convention and have been illegally exported after entry into force of this international instrument.

Since Ukraine gained independence in the 1990's the return of illegally exported cultural values of their country of origin was an important and complex component of Ukraine's state policy in the field of culture.

Over the last twenty-five years our government made a series of acts of restitution of cultural property (as in Ukraine and by Ukraine) and proved itself as constructive and reliable partner in the international activities outlined form.

The return of illegally exported cultural property states to which they belong have been the subject of research of Olexandr Fedoruk, Sergiy Kot, Victor Akulenko. However, in the domestic cultural environment outlined problems highlighted enough.

The existing scientific studies investigated these questions in fragments. A number of problems now occurring in the mechanism of the return only reinforces the relevance of scientific research with the test questions.

Problem is to analyse the factors and domestic legal practice return of illegally exported cultural property; examples of such return.

Each state is obliged to protect the property, consisting of cultural property within its territory against the dangers of theft, clandestine excavation and illicit export. Relations between the EU and Ukraine within the provisions of the Convention are characterized by respect for fundamental shared values as a basis for cooperation, provide appropriate boundaries for cultural and political dialogue, establish basic common goals and create an institutional network to achieve them.

Unlike the Hague Convention of 1954 [2] which follows the principles of the protection of cultural property in the event of armed conflict, the Convention of 1970 aims to protect cultural heritage in peacetime.

Pursuant to the provisions of this Convention, Ukraine has taken concrete steps to prevent the illicit movement of cultural property across the state border of Ukraine namely: Ukraine Basic Law – the Constitution of Ukraine – stipulates that the State shall ensure the preservation of historical monuments and other objects of cultural value and takes measures to return to Ukraine the cultural values of the people who are outside (article 54) [3]; the Law of Ukraine “On export, import and return of cultural property” was adopted in 1999 and which defined the terms “illegally exported cultural property”, “illegally imported cultural property”, “return of cultural property” [4]; The State Service for Control over transferring of cultural treasures across the state border of Ukraine has founded (2000-2011; from 2011 features of the aforementioned services have been entrusted to the Ministry of Culture of Ukraine); the appropriate form of the Certificate for the right to export (temporary export) of cultural values has approved; the creation and maintenance of the State Register of Cultural Heritage as part of the Museum Fund of Ukraine has regulated [1].

Unfortunately, the sharp rise in illicit traffic of cultural property is one of the negative and dangerous phenomena in the modern world. Statistics show that the number of offenses on illegal trafficking of works of art and other cultural values unflattering increases.

Public risk of smuggling cultural property is due primarily to the fact that such criminal acts can lead to loss of all unique works of art that are the heritage of each nation and humanity as a whole.

Assuming the obligation to return the illegally imported into the territory of the cultural values of other countries Ukraine and other contracting parties within the provisions of the Convention returned many cultural values for the period 2003–2012. Here are examples of the most resonant acts return.

Since 2003 Germany has returned to Ukraine the icon “Entry into Jerusalem” of the 16th century which were stolen in 1984 from the National Museum in Lviv named by Andrey Sheptytsky. In 2011 Germany has returned to Ukraine a picture of Italian artist Michelangelo Merisi da Caravaggio “The Taking of Christ or the Kiss of Judas” were stolen illegally from exhibition of Odessa Museum of the Western and Oriental art.

Seven exhibits (seized in 2006 by the Ukrainian police from thieves) has been returned 2008 from Ukraine to Poland (Princes Czartorysky’s Foundation of the National Museum in Krakow and the Museum of the Polish Army in Warsaw).

In 2010 a vase for fruits (19–20 centuries, Russia, glass, silver) stolen in 2005 from the permanent exhibition of the Hermitage has been returned from Ukraine to Russia.

In 2011 two icons “Crucifixion of standing” (16th century) and “Protection of the Virgin” (16th century) have been returned from Russia to Ukraine. Named curiosities criminals illegally stolen in 1984 from the National Museum in Lviv name by Andrey Sheptytsky. After 30 years of wandering these works were purchased at international European auctions by famous Russian collectors Igor Vozyakov and Michael De Bouar (Yelizavetin). Learning about the facts of theft of rarities collectors handed referred icons to Ukraine.

In 2012 the icon “Jesus' baptism in the Jordan River” (second half of the 16th century) was return from Netherlands to Ukraine. It was also stolen from the National Museum in Lviv name by Andrey Sheptytsky in 1984. She was transferred to Ukraine by Netherlands Institute of Eastern Christian art “Odyhiya” [5].

Currently, work is continuing. One of the main tasks of the Ministry of Culture of Ukraine is the development and implementation of actions to identify and return to Ukraine of cultural values.

In this context the Ministry of Culture in cooperation with the Ministry of Foreign Affairs of Ukraine had worked out a procedure to return a medieval sword (called "Viking sword") which were found in March, 2016 by Estonian Tax and Customs Department checking the car on the Russian-Estonian border. The national experts found that the sword is likely to have been found by so-called "black archeologists" in Ukraine (in Volyn) and illegally exported from our country [6]. The official transference of the rarity occurred in May 12, 2016 in Tallinn (Republic of Estonia) with the participation of official delegations of Ukraine. Currently, the sword has been brought to Ukraine. It will be transferred for permanent storage to the Volyn Regional Museum and be included to the state part of the Museum Fund of Ukraine.

It should be noted that due to the resonant publicity in late of 2015 information on the probability of stay in Ukraine 24 paintings of Dutch artists of 17-18 centuries and 20 century, stolen in 2005 from the Museum of Western Friesland (Horn, Netherlands), a special operation started in Ukraine. As a result of law enforcement agencies of Ukraine in April, 2016 four pieces of art were found that soon plans to return to the Netherlands [6].

Thus, in the context of the implementation of the Convention by UNESCO 1970 Ukraine successfully developing cooperation with the Member States of the European Union in the return of illegally exported cultural values of their country of origin. Each such cooperation and reliable communications are increasing their potential. This positively affects the image of our country, describing it as a reliable and constructive partner. A key role in preventing the illicit import, export and transfer of ownership of cultural property is defined constructive cooperation and joint efforts of all stakeholders at the state level (namely, the Ministry of Culture of Ukraine and law enforcement agencies, the Ministry of Foreign Affairs of Ukraine), and the internationally.

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Media portrayal and exters' assessment on Russia Ukraine conflict

Abstract: The articles explores the problems of Russia Ukraine conflict and the main forms and directions of Russian aggression against Ukraine. It also analyses the basic scientific approaches to the comprehension of the phenomenon of “hybrid war” along with specifics of information and psychological confrontation in the context of the Ukraine conflict. Besides, the attention is also given to the analysis of the main social and communication methods of Russian communication and psychological warfare against Ukraine.

Keywords: fourth generation warfare, hybrid war, disinformation, psychic infection, information war, propaganda, buzz.

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Російсько-український конфлікт в оцінках медіа й експертів

Анотація: Досліджується проблема російсько-українського конфлікту та основні форми і напрями російської агресії проти України. Аналізуються основні наукові підходи до осягнення феномену «гібридна війна», визначається специфіка інформаційно-психологічного протистояння у контексті ситуації навколо України. Схарактеризовано основні соціальнокомунікаційні методи ведення інформаційно-психологічної війни Росії проти України.

Ключові слова: війна четвертого покоління, гібридна війна, дезінформування, інфологема, інформаційна війна, пропаганда, чутки.

Російсько-український конфлікт став справжнім викликом глобальній системі безпеки. Упродовж останніх років міжнародна спільнота активно переосмислює сутність військово-політичного насилля. Україна, на жаль, є «наочною» зоною впровадження нових мультимодальних військових стратегій, у яких традиційні бойові тактики супроводжуються потужними інформаційно-психологічними операціями, дипломатичними кампаніями та економічними санкціями конфліктуючих сторін.

Російська збройна агресія проти України у вимірах військових експертів та журналістів номінується по-різному: «інформаційна війна», «війна четвертого покоління» (4GW), «асиметрична війна», «нелінійна війна», «гібридна війна». Усі ці терміни вказують на багатоаспектність та складність нового феномену протиборства, об'єктивно оцінити який фахівці зможуть лише з часом. Українці ж сприймають цю війну суб'єктивно або через інтерпретації політиків та журналістів. За таких умов важливо пояснити сутність, форми та стратегії гібридних / інформаційних / асиметричних воєн.

Проблема російсько-українського конфлікту – питання гостре та болюче не лише у контексті соціально-політичних реалій України, а й у вимірах наукового осмислення. Представники різних наукових галузей намагаються досягнути модель нової форми геополітичного протиборства, запропонувати шляхи вирішення ситуації. Зазначена проблематика стала предметом досліджень Н. Войтович, В. Кравченка, О. Литвиненка, В. Остроухова, В. Панченка, В. Петрика, Г. Почепцова, І. Руценка, Д. Саїдахметова, М. Требіна.

Термін «гібридна війна» є найбільш вживаним серед українських науковців, журналістів та політиків: «Президент Петро Порошенко заявив, що Росія ще не закінчила війну проти нашої держави і тільки підсилює гібридну війну» (Кореспондент.net, 7 жовтня 2015); «Росія веде гібридну війну не тільки проти України, а й проти Туреччини й ЄС – Турчинов» (ТСН, 2016, 13 січня, 16:43); у 2015 році виходить у світ праця українського дослідника І. Руценка під назвою «Російсько-українська гібридна війна: погляд соціолога».

Цей термін запозичено зі словника американських військових теоретиків. Так, у 2007 Френк Хоффман у праці «Conflict in the 21st Century: The Rise of Hybrid Wars» наголошує на тому, що війни сучасної епохи є гібридним явищем, що розгортаються у межах летальності (невирішеності) певного міждержавного конфлікту та фанатизму партизанської війни. За таких умов держави, або підт-

римувані ними бойовики й терористи, застосовують надсучасне озброєння, використовують телекомунікаційні мережі, вдаються до кіберзлочинності, інформаційної пропаганди і масового психологічного насилля проти цивільних [1].

Враховуючи багатоманітність підходів до визначення феномену гібридної війни, здійснимо їх аналіз та спробуємо виявити ті концептуальні ознаки, які складають її зміст та проектують її подальший розвиток.

Експерти прогнозовано називають гібридну війну найпоширенішим типом політичного насилля XXI століття. Визначимо її характерні ознаки: *гібридна війна починається з «мирних» антиурядових акцій, завершується жорстокою громадянською війною та зовнішньою інтервенцією.*

Український сценарій гібридної війни розпочався з анексії Криму. Лише у період з 1 березня по 21 березня 2014 року було окуповано півострів, блоковано українські військові частини, проведено псевдореферендум. У березні 2014 року виникли масові заворушення у Донецькій та Луганських областях, у квітні були захоплені адміністративні будівлі регіону, збройні формування захопили Слов'янськ, Краматорськ, Артемівськ, а вже 7 квітня були проголошені так звані ДНР та ЛНР.

Жертвами конфлікту стають мирні жителі, насамперед люди похилого віку, жінки та діти.

Представники саме цієї вразливої категорії населення стали своєрідними «іконами» страждань більшості пропагандистських матеріалів. Так, у липні 2014 року за підтримки так званої комісії Народного фронту Новоросії була створена інтернет-платформа «Белая книга» (www.white-book.info), яка у хронологічній послідовності подавала «інформацію про нові злочини київського режиму, прохання допомоги жертвам каральної операції». Більшість таких «історій» розповідали про муки дітей, матерів та пенсіонерів. Станом на 1 березня 2016 року вказаної інтернет-адреси не існує. Хоча у 2014 році за підтримки Міністерства закордонних справ РФ була видана «Белая книга нарушений прав человека и принципа верховенства права на Украине (июль – ноябрь 2014)», яка знаходиться у відкритому доступі (<http://www.mid.ru/documents>).

Зазвичай гібридні війни є неоголошеними війнами.

Ми називаємо російську агресію проти України неоголошеною війною. Так, у 2015 році Національною телекомпанією України був створений документальний цикл «Неоголошена війна. Записки документаліста» (режисер Сніжана

Потапчук). Хоча, зауважимо, людство втратило практику офіційного оголошення війни уже наприкінці XVIII століття. Військові експерти вважають основними тактиками неоголошених воєн дипломатичну ізоляцію, політичну конфронтацію, провокації на кордоні, демонстрацію сили через нарощування військової присутності, підтримку сепаратистських та націоналістичних рухів та, нарешті, офіційні заперечення причетності до таких дій. Увесь цей тактичний арсенал активно використовується Росією проти України.

Деморалізація особового складу військ, диверсифікація громадської думки через засоби масової комунікації.

Саме цей критерій є ключовим у ході ведення гібридних воєн. Інформаційно-психологічний вплив Російської Федерації на населення України, у тому числі на особовий склад військових формувань, з метою послаблення їх готовності до оборони держави та погіршення іміджу військової служби тривав десятиліттями. Це спричинило тяжкі наслідки для захисту інтересів України на початку 2014 року.

27 січня 2016 року головний військовий прокурор Анатолій Матіос повідомив: кількість українських військовослужбовців, які не залишили територію Криму і фактично порушили присягу і зрадили Україну, становить понад восьми тисяч осіб. Кричущий та показовий факт.

Хоча, безумовно, українська армія упродовж усього періоду ведення гібридної війни неодноразово демонструвала приклади героїзму та звитяги. Попри відсутність чітких й однозначних команд від вищого політичного та військового керівництва держави, командири деяких підрозділів зберігали вірність присязі, даній народу України, і не давали «ввічливим» терористам захопити свої військові частини. Звання Героя України у період 2014-2015 рр. отримали 132 військовослужбовці, які виявили виняткову мужність, героїзм і самопожертву під час захисту державного суверенітету та територіальної цілісності України та залишилися вірними військовій присязі.

Прикро, та на інформаційній лінії фронту часто перемагає російський агресор. До цього часу не відновлено українське телерадіомовлення на більшій частині Донецької та Луганської областей. Не запущено й систему іномовлення України. Хоча на думку міністра інформаційної політики України Юрія Стеця, це є «першочерговим завданням Міністерства в умовах гібридної війни, в умовах, коли за кордоном майже неможливо подивитися правдиві новини про Україну.

Ми просто зобов'язані надати світу можливість дізнатися новини не з російських телеканалів, а з рідного UATV» (http://mip.gov.ua/files/Presentation/MIP_2015_years).

Гібридна війна – це асиметрична війна, у якій комплексно використовуються військові сили, політичні та економічні чинники, медіа та дезінформація.

Суб'єктами насилля стають нерегулярні військові формування, бойовики, кримінальні та терористичні організації, які нехтують правилами війни.

За словами міністра оборони України Степана Полторака, число представників збройних сил Російської Федерації та незаконних збройних формувань на тимчасово окупованих територіях Донецької і Луганської областей сягає близько 42,5 тисячі осіб.

«Поле бою» гібридних воєн переноситься на інформаційний та економічний простори.

Ми неодноразово наголошували на тому, що основою ведення гібридних воєн є інформаційно-психологічна складова, а об'єктом її впливу стає насамперед суспільна свідомість. Інформаційна зброя здатна «точково» уражати у саме серце соціальної проблеми, тримати на прицілі увесь суспільний організм. Інформаційне «кілерство» – явище не нове в історії людської цивілізації. У цьому контексті слушною є думка української дослідниці Л. Макаренко: «Використання інформації як зброї проти супротивника має тривалу історію, а в умовах сучасного інформаційного суспільства набирає нових обертів і набуває першорядного значення як знаряддя, що здатне вплинути одночасно і на величезну аудиторію і здатне бити прицільно по тих, хто приймає ключові рішення. Більшість методів та форм інформаційного тиску старі як світ, а отже й широко відомі, тим не менше перед їх силою не здатне встояти жодне суспільство» [2].

На думку військових експертів, інформаційно-психологічний вплив на супротивника здійснюється засобами дезінформування, пропаганди, диверсифікації громадської думки, чутками.

Дезінформування – поширення викривленої, спотвореної, неправдивої інформації (брехня, обман, облуда) з метою психологічного впливу на свідомість людини / суспільства. Розробка дезінформаційних тактик – компетенція спеціальних розвідувальних служб, а не новинних редакторів або журналістів. ЗМІ – це лише канали (знаряддя) поширення дезінформованих повідомлень.

Дезінформування здійснюється за єдиною ідеологічною стратегією, з ретельним узгодженням пропорцій правди та брехні (достовірна інформація використовується максимально). Така тактика спрямована передусім на приховування справжніх намірів, цілей та завдань однієї з конфліктуючих сторін.

Техніка спотворення картини світу за допомогою цілеспрямованого відбору повідомлень передбачає зміщення реальних оціночних акцентів: загострюється увага на незначущих фактах, натомість відтісняються факти дійсно важливі.

Науковці називають декілька технологічних прийомів тактики дезінформування: введення в оману впливової групи осіб шляхом поширення застарілої, неповної, спотвореної, перекрученої інформації з метою вплинути на прийняття нею відповідного рішення.

Міністерство закордонних справ РФ системно «інформує» світову спільноту про хід справ «на Україне». Зрозуміло, що така інформація має усі ознаки прямого дезінформування. До речі, на офіційному сайті МЗС Росії станом на 1 березня 2016 року окремими рубриками виокремлено позиції «Ситуація на Україні» (477 новин), «Ситуація вокруг Сирии» (491 новина).

Модифікація інформаційного потоку – вибіркове надання інформації через її неповноту, напівправду, дозованість, замовчування або тенденційне викладення фактів.

Крім того, у військових стратегічних та оперативно-тактичних операціях основними напрямками дезінформування є: введення в оману супротивника щодо реального початку бойових дій та їх характеру. Згадаймо заперечення В. Путіна щодо присутності російських військ на території АР Крим.

Поширення неправдивої інформації про деморалізацію військових частин супротивника. Така дезінформаційна тактика складає основу інформаційно-психологічного впливу РФ на громадян своєї держави та мешканців частини східних областей України. Повідомлення будуються за принципом емоційної деталізації події, основна їх мета – враження аудиторії. Такі інформаційні формули не містять конкретних фактів. Приміром: *«Наверное, когда хунта стирала в пыль мирные кварталы донбасских городов, это она сдерживала "имперские амбиции Кремля". Ведь никто не принёс столько горя и слез Донбассу, сколько оголтелая украинская военщина. Или, когда десятками гибли дети Дон-*

басса, а их отцы, в отчаянии, хватались за оружие, это тоже были "имперские амбиции Кремля"?» (<http://ruspravda.info/Basni-SBU-17796.html>).

Усі методи інформаційно-психологічного впливу спрямовані на формування вигідної громадської думки та відповідної суспільної свідомості. Саме вони стають справжнім стратегічним капіталом у проведенні масштабних інформаційно-психологічних операцій. Крім традиційних технологічних прийомів маніпуляції (конструювання образу ворога, підтримка соціальних страхів, трансляція дезінформації, кореляція історичної пам'яті), використовуються спеціальні техніки впливу: локальна блокада інформаційного простору, масштабність інформаційної активності, сигнальність інформації.

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Ways of improvement of the regional ecological safety system state management (Kirovohrad oblast case study, Ukraine)

Abstract: This article unfolds the prerequisites of biosphere and ecological crisis development and its negative impact on modern civilization life. Particularly, in this context, we have considered the ecological issues of Kirovohrad oblast Ukraine, and propose optimal ways of their solution on the base of initiation of legislative, organizational and administrative decision-making.

Keywords: environmental hazards, ecological sector, safety, safe development, governmental authorities, state administration.

1. Introduction. Modern civilization has accumulated huge amount of social and economic issues, related with biosphere and ecological factors. Society is in the deep and comprehensive crisis that has engulfed all the life spheres, from ecology and economy up to spiritual and moral aspects. True origin of this epochal crisis lie in the erroneous and self-destructing setting of goals and ways of social development [1, 13, 14].

Present location and functioning of the productive forces in Ukraine is characterized by significant deterioration of the ecological situation in many of its regions that lead to worsening of ecological problems and social tension in society.

One of such regions, where accumulation of considerable number of ecological problems threatens the population safe living and environment, is Kirovohrad oblast Ukraine. There is strongly developed industrial potential in its territory that causes significant man-caused environmental burden on the environment. The main pollutants of the environment are enterprises of mining and processing industry, transport and communications.

The solution of the existing problems will promote environmental safety both resident population and territory of the region in particular, and the state as a whole, which makes the relevance of this study.

2. Analysis of literature data and problem statement. State management in ecological sphere is the fundamental and conceptual base of safe development of the society and the state. That is why this problem is in the center of attention of the scientists, who try to draw through their studies the attention of the state management and society to the problems of ecological sphere.

The following persons dealt with the problems of ecological safety, studying of issues of state and social management mechanisms functioning, analysis of local self-government authorities tasks to ensure their work at the level of thesis researches: V. Vasylo, O. Halatsan, T. Hrusheva, I. Krynychna, B. Hamaliuk, O. Tymoshenko, H. Dziana, O. Lazor, I. Liashko, O. Masliuk, T. Protsenko, V. Trachuk, V. Kostenko.

In particular, Yu. Kovalevska underlines objective need for activation of processes of development of the regional ecological policy, formation of regional level plans that will meet the idea of strategic projects of national level [2].

Analysis of the scientific works of national specialists on various problems of ecological safety of Ukraine confirms that along with their certain general development there is lack of attention to regional aspects of ecological safety ensuring in the context of state management. This fact led us to selection of topic of this research the objective of which is studying of ecological problems of one of the central regions of our country.

3. Objective and tasks of the research. To study ecological problems of Kirovohrad oblast and to outline the ways of improvement of regional ecological safety system state management.

In order to reach the set objective we tried to solve the following tasks:

- to study present state of ecological problems in Kirovohrad oblast;

- to determine special aspects of ecological hazards formation in order to develop ways of the regional ecological safety system state management improvement.

4. Presentation of the main material. Under present conditions the ecological problems become more and more important factor of the economic development of Ukraine. The analysis of the main trends and nature of changes of the regions ecological safety factors proves that preservation of highly energy and resource intensive state economy under the conditions of further depletion of land, water, mineral and raw materials, biotic resources will inevitably lead to formation of large-scale threat to national safety in ecological and natural-technogeneous spheres [3].

According to the article 50 of the Constitution of Ukraine each person has the right for safe for life and health environment and for indemnification of losses in the result of this right infringement [4].

The most pressing ecological problem of Kirovohrad oblast is the treatment of wastewaters. Yes, small rivers of the steppe zone area are characterized by significant mineralization. Their shallowness is almost unable to resist the volume of discharged insufficiently treated wastewaters. In all the oblast rivers there were detected increased concentrations of iron and zinc. These metals may be considered as regional pollutants. The most significant polluters of the oblast surface water are the utilities Kirovohradvodokanal and Oleksandriia-vodokanal. The volume of their discharges of insufficiently treated wastewater is 52.7% of the general volume per oblast. Utility Kirovohradvodokanal, that is included into the list of top 100 polluters of the environment of Ukraine, takes measures, directed at completion of treatment facilities construction and their operation arrangement [5].

In addition, the state of atmosphere air is significantly influenced by the production wastes of the production enterprises of the State Holding Company Oleksandriiavugillia. Present at these enterprises technological equipment and treatment facilities, intended for reduction of pollutants concentration in emissions to minimal allowable emissions, are outdated and physically worn. Operating treatment systems are almost not modified due to lack of money for such works performance. The same applies to TPP No.1-2, TPP No.3, briquetting factories Dymytrivska and Baidakivska, SHC Oleksandriiavugillia, the emissions of which are 70% of stationary sources of pollution in general all over the oblast. The significant damage to air basin is caused by the operation of automobile transport, the emissions from which are 60% of total

emissions to the atmosphere. The reasons of such state are faulty vehicles, low quality of fuel, etc. [5].

In its turn, the oblast is insufficiently provided with local water resources, its hydrogeological conditions are scarcely favourable for formation of underground water stock, as the oblast is located in the zone of the Ukrainian crystalline core-area. This is the reason of the fact that nearly 30% of the drilled wells are without water, other have low debits that gives the possibility to satisfy the needs only of agricultural production. Significant volumes of the underground water are supplied with violation of quality standard: they have increased total hardness, content of dry residuals, iron, manganese, nitrates and nitrate compounds. Objectively, there emerges the necessity to supply water over long distances. Water supply of the city with drinking water is carried out in general at the account of Dnipro water that is supplied through interregional water line OCPE Dnipro-Kirovohrad. The city is provided with underground water only for 16% [5].

The attention is drawn by the improper solvation of issues, associated with storage, processing and disposal of waste along this oblast. The main sources of industrial waste generation is galvanic production, TPP ash, mining industry, waste mercury lamps and devices, containing mercury, mechanical treatment of materials, paint spray processing, waste from motor stations, etc. Partially, the wastes are stores in the enterprise territory that represents threat for environment of human health. All the existing in the oblast waste deposits were arranged more than 20 years ago, and in the city itself – more than 50 years. In oblast settlements, coastal shelter belts, forest ranges, due to imperfect system of sanitary cleansing of settlements, there constantly emerges unauthorized waste deposits of such wastes. At the same time, the issue of construction of special landfill for storage or burial of industrial waste is not solved. Therefore, the oblast needs reconstruction, closure or construction of new waste deposits [5].

In order to solve the issue of waste treatment, first of all toxic and not suitable, as well as prohibited for usage chemical means for plants protection, it is required: to approve oblast project of treatment of hazardous waste according to the Law of Ukraine “On State project of toxic waste processing”; to carry out inventory of polluted and potentially polluted oblast areas; to develop and implement new technologies of secondary resources usage and processing of wastes through reorientation or reconstruction of the existing oblast enterprises [6].

The most polluted river of the oblast is one of the most important waterways of Kirovohrad oblast – Inhul. Laboratory researches and sanitary regulations, as well as standards of surface waters protection from pollution indicate that Inhul, especially within the territory of city, is unsuitable for usage from the point of view of cultural and household purpose. First of all, the river pollution is connected with extremely low general sanitary state of the territory of Kirovohrad city. In the zone of sanitary protection of the river there are located several industrial enterprises: Kirovohrad TPP, several gas filling stations, parking lots, plant Tsukrohidromash and others. In addition, numerous land plots that go directly to the river are not equipped with water-tight cesspits, coastal strip is upturned.

Issues that require urgent solution: construction of facilities of preliminary treatment of the wastewater directly at the enterprises with introduction of effective modern technologies; prevention of wastewater discharge from the old bio-ponds; commissioning of the second stage of the treatment facilities of the CE Kirovohrad-vodokanal; treatment of the oblast centre storm water; setting out of coastal protection strip that will considerable improve the sanitary and ecological state of the river Inhul and other natural water bodies of the oblast [5].

Kirovohrad oblast has highly dissected territory. The present negative natural processes are: landslides, erosion development and gully development. The land degradation is progressing in oblast. At present, the area of such lands is 50%. The danger for the oblast lands is water and wind erosion. Within the territory of the oblast the erosion risks include the processes of sheet floods, gully development and river erosion. The sheet flood is the ground ablation from inclined surfaces with storm and melt waters. On the right bank of the river Dnipro, within the territory of the basins of the rivers Tsybulnyk and Omelnyk, there is located the zone of the largest gully and beam network. In the territory of Svitlovodsk and Svitlovodsk region there takes place the constant process of Kremenchuh reservoir shores destruction. According to the cadaster, there are registered in the oblast 82 landslide, where there are located 49 settlements. The main means of erosion control is removal from the farm lands of areas with angle of incline more than 5 degrees, optimization of field crop rotation, introduction of soil protection systems, slope afforestation, there is carried out the creation of field protective, gully and beam, coastal and other afforestation. Improvement of farmer culture and protection of soil from negative influence of

erosion has to become development and introduction of the Project of development of land relations in Kirovohrad oblast for the following years [5].

From our point of view it is worth considering the nature reserve fund of the oblast that at present include 221 nature reserve territories. The percentage of protected areas is one of the largest in Ukraine (4.14%), but the boundaries of many protected areas are not set out. In addition, anthropogenic impact on violation of reservation conditions create unfavourable conditions for functioning and development of the nature reserve funds territories. It is worth mentioning that the term of the Kirovohrad oblast Ecological network creation Project for 2003-2015, is finished according to the resolution of Kirovohrad oblast Council dated January 24, 2003 No.141, therefore, it is required to approve new project [6].

In its turn, industrial Eastern and Central regions of the country have additional considerable technogeneous impact at the account of enterprises, dealing with uranium mining and processing, so-called "tails" – waste of the enterprises with high content of natural radionuclides of uranium and thorium series, etc. According to the results of the researches, it is defined that the main dose generating source for population is radon in premises air [7, 8].

In the territory of Pertrivka region, in beam Scherbakivska, there is located the tailing dump of leach plant East LP, that have been operated since 1959. At present, there are accumulated in beam about 50 million tons of radioactive waste, general activity of which is 48400 Ku. Among all the sources of ionizing radiation the greater doses are obtained by the planet population from technogeneously strengthened sources of natural origin. [9]. For Ukraine, this component of aggregate dose is at present more than 70% of total value, wherein the lion's share is realized at the account of radon-222 in the air of residential premises [10, 11].

Kirovohrad oblast is one of the most problematic in terms of population exposure to radon. Within the last years, there have been certain tension among the oblast society, connected with increase of number of cases of oncological diseases, which are often associated by the population with radiation. In order to find out actual cause of oncological disease cases number increase, in 2011, in the territory of Ukraine there was for the first time ever implemented the regional project, focused on reduction of population radiation doses, associated with radon – Kirovohrad Project "Stop radon". The analysis of the radon levels research results determined that the standard, provided by the Radiation Safety Standard of Ukraine - 97 [12] is exceeded

by more than 30% of the studied facilities. According to the obtained results, the natural radiation source laboratory, SE Institute of civil health named after O.M. Marzeiev at National academy of medical sciences of Ukraine estimated direct losses for oblast due to this source. It is determined that Kirovohrad oblast loses up to 10 million UAH per year (1.25 million USD) only at the account of radon impact.

According to the requirements of the Law of Ukraine "On protection of man from the impact of ionizing radiation", it is required to develop radiation-ecological certificate and to continue performance of measures, provided by the oblast project "Stop radon".

5. Conclusions. In order to solve the abovementioned ecological issues at the level of local power authorities, it is required to take range of core measures: to develop and to include into approved Strategy of Kirovohrad oblast development for the period up to 2020 the separate section (Strategic goal 4 "Ecological safety and environment preservation"); to involve society and scientists into implementation of measures and projects as to preservation of the oblast environment; to take measures as to setting out of nature reserve fund objects boundaries; to develop the project of removal of dumps of balanced uranium ore from Kirovohrad and other region settlement for its further safe burial; to develop the project of removal from intense usage of deteriorated, low-productive and polluted agricultural lands; to develop specific measures as to protection of soils of agricultural lands from erosion; to implement the system of ecological monitoring and control over effectiveness of land resources usage; to carry out assanation of waste deposits that do not comply with the ecological safety standards.

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Foreign language in the system of professional preparation of specialists in sports university

Abstract: This article deals with the problem of learning a professionally oriented foreign language, particularly Russian, by the physical culture students. There are also basic methods and an educational program.

Keywords: foreign language; Russian language; professional communication in a sports environment; professionally oriented vocabulary.

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Иностранный язык в системе профессиональной подготовки специалиста спортивного ВУЗа

Аннотация: В данной статье рассматривается проблема изучения профессионально ориентированного иностранного языка, в частности русского языка, студентами спортивного университета. Также приводятся основы методики и программа обучения русскому языку.

Ключевые слова: иностранный язык; русский язык; профессиональное общение в спортивной среде; профессионально ориентированная лексика.

Современные стандарты высшего профессионального образования все больше учитывают профессиональную направленность изучения иностранного языка, его нацеленность на профессиональную реализацию выпускников. Являясь единственным спортивным университетом в Болгарии, НСА (Националь-

ная Спортивная Академия) «Васил Левски» призвана положить стандарты в профильном изучении иностранного языка в целях профессионального общения в области спорта.

В основе профессиональной деятельности спортивного специалиста лежат знания и умения коммуникативного характера, относящиеся к организации и осуществлению педагогического, делового и межличностного общения. Поэтому **цель** обучения иностранному языку студентов нелингвистов, какими являются студенты НСА, - это формирование иноязычной профессиональной компетентности, достаточной для практического использования данного языка в их будущей профессиональной деятельности.

Языковое обучение присутствует в программе НСА еще с самого создания Академии в 1942 г., когда она называлась «Высшее училище телесного воспитания». С 1942 по 1992 г. русский язык (далее по тексту РЯ) регулярно изучался в НСА. Затем последовал длинный период, в котором РЯ выпал из программ обучения иностранным языкам, куда он снова вошел в 2012 г. В настоящее время РЯ является и обязательным, и свободно выбираемым предметом для студентов НСА, обучающихся в степени бакалавра и магистра по следующим трем направлениям: 1. Спорт. 2. Физическая культура. 3. Кинезитерапия.

Традиции изучения РЯ в Болгарии, развивающиеся в новых условиях и при наличии новых критериев культурные и бизнес контакты с Россией и стран СНГ, близкородственный характер РЯ по сравнению с родным – все эти факторы определяют возрастающий в последние годы интерес студентов НСА к русскому языку.

Профессиональная направленность обучения РЯ студентов НСА носит узкопрофильный характер, так как ее рамки ограничены, как количеством учебных часов за учебный год (всего 120 занятий по 90 минут каждое), так и спортивной тематикой. Поэтому образовательную стратегию изучения РЯ студентами НСА мы определяем как функционально-коммуникативную. Она направлена, прежде всего, на достижение коммуникативной компетентности с учетом ее использования в профессиональной реализации спортивных специалистов. Основным принципом определения учебного содержания мы считаем принцип сознательной коммуникативности обучения.

В качестве основного подхода подборки и подачи языкового материала мы выбрали коммуникативно-деятельный подход. Речевой материал разграничивается в зависимости от различных видов речевой деятельности (рецептивных: аудирование и чтение; продуктивных: говорение и письмо). Содержание обучения направлено на максимальное развитие говорения, аудирования и чтения при использовании современных активных методов преподавания. Процесс естественной коммуникации – одно из самых лучших условий для осуществления обучения иностранному языку. В ходе этого процесса создаются лучшие предпосылки для переноса комплектности языковых привычек и умений в реальные условия. Профессиональная коммуникация в сфере спорта предполагает, прежде всего, общение со спортсменами, тренерами, специалистами, техническим персоналом и т.д. в процессе спортивной деятельности.

При преподавании русского языка в НСА мы исходили из понимания, что «создание новой модели обучения иностранным языкам тоже возможно только на базе традиционной модели с включением в нее методики ситуационного обучения, метода конкретных ситуаций ("case study"), метода проектов, игровой методики на основе системы учебно-ролевых игр профессиональной направленности...» [2].

Изучая педагогическую и научно-методическую литературу по этому вопросу [1,3,4,5], мы пришли к выводу, что профессионально-ориентированное обучение иностранному языку в сфере спорта требует специфического подхода к отбору содержания. Предусматривая будущую профессиональную реализацию выпускников НСА, мы наметили следующие структурные элементы их обучения РЯ с соответствующими содержательными компонентами:

1. Обучение фонетике: усвоение специфики артикуляции звуков, интонации, ударения и ритма нейтральной речи в изучаемом языке; знание основных особенностей произношения, характерных для сферы профессиональной коммуникации.

2. Обучение лексике: усвоение лексического минимума в объеме 900-1000 учебных лексических единиц общего и терминологического характера; усвоение основных правил речевого этикета.

3. Обучение грамматике: овладение грамматическими навыками, обеспечивающими коммуникацию общего характера; знание основных грамматических явлений, характерных для профессиональной речи.

Задачи курса РЯ для студентов НСА: обучение видам речевой деятельности (говорение, аудирование, чтение) на русском языке на базе лексико-грамматического минимума спортивной направленности; овладение базовой терминологией по профилю подготовки; обучение умения поиска информации по профилю подготовки.

В обучении речевой деятельностью главное место занимает диалогическая речь. Студенты должны овладеть умением участвовать в общении с целью обмена информацией по определенной теме, побуждения собеседника к выполнению какого-либо действия или деятельности в связи с предъявленной ситуацией общения. Лингвистический компонент содержания обучения включает основной языковой и речевой материал: от наиболее употребительных и относительно простых лексико-грамматических средств (ситуативных клише, стандартных этикетных формул, характерных для диалогической речи и т.д.) до диалогов-образцов, отобранных в соответствии с тематикой программы обучения. Система обучения диалогической речи включает в себя следующие группы учебных заданий:

- подготовительные упражнения, формирующие основу говорения (фонетические, лексические и грамматические упражнения);
- упражнения, связанные с решением определенной коммуникативно-познавательной задачи (поиск в тексте ключевых слов и словосочетаний определенной тематики; выделение основной информации и т.д.);
- условно-коммуникативные упражнения (чаще всего примерные диалоги), построенные на речевой материал, учитывающий профессиональную направленность обучения, при которых студенты приобретают умения соотносить действия друг с другом (утверждение – переспрос, вопрос – ответ), т.е. поддерживать двустороннюю активность;
- ролевые игры с разделением группы обучающихся на условных участников различных ситуаций профессионального общения.

Наряду с диалогической речью аудирование составляет основу общения и служит и мощным средством обучения иностранному языку. Оно даёт возможность овладевать звуковой стороной изучаемого языка, его фонемным составом и интонацией, ритмом, ударением, мелодикой. Через аудирование идёт усвоение лексического состава языка и его грамматической структуры. Материалы для обучения аудированию должны быть в первую очередь аутентичными,

т.е. создающие иллюзию естественной речевой среды. Они должны также соответствовать профессиональным требованиям учащихся; содержать новую и интересную для студентов информацию; представлять разные формы речи. Место аудирования в структуре урока зависит от цели, которую поставил перед собой и учащимися преподаватель. При работе над фонетическими навыками обращается внимание на распознавание интонации, на произношение иноязычных звуков в словах и словосочетаниях. Аутентичная речь помогает также освоению и закреплению новой лексики по теме урока (диалог-образец, интервью, комментарий к спортивного события, реклама и др.).

Согласно этим параметрам мы составили следующую программу на первый год обучения студентов НСА «Васил Левски»:

**Программа по РЯ, первый год обучения
I семестр**

№	Название	Аудиторные занятия	Самостоятельная работа	Итого
1.	Фонетика – основные различия между болгарским и русским языками. Ударение. Гласные и согласные звуки.	2	2	4
2.	Грамматика – Именительный и Винительный падежи имен существительных. Особенности Родительного падежа. Конструкции «У меня есть» и «У меня нет».	3	3	6
3.	Олимпийские игры. Спортивная экипировка. Личные местоимения.	3	3	6
4.	Спортивные игры: 1) Баскетбол. 2) Волейбол. 3) Гандбол. Стойки, перемещения, подачи и передачи, элементы техники. Терминология.	4	4	8
5.	Футбол. Техника перемещений. Индивидуальная работа с мячом. Дательный падеж.	4	5	9
6.	Плавание: стили; оздоровительное и прикладное значение плавания. Творительный и Предложный падежи.	4	5	9

7.	Гимнастика. Виды гимнастики: спортивная, художественная, акробатическая; аэробика. Гимнастические упражнения и снаряды.	4	5	9
8.	Легкая атлетика: Бег на короткие, средние и длинные дистанции. Прыжки с места и с разбега. Настоящее время глагола.	4	5	9
	Итого	28	32	60

Программа по РЯ, первый год обучения

II семестр

№	Название	Аудиторные занятия	Самостоятельная работа	Итого
1.	Лыжный спорт. Классификация и терминология в лыжном спорте. Будущее время глагола.	2	4	6
2.	Другие зимние виды спорта. Прошедшее время глагола.	4	4	8
3.	Теннис. Имя прилагательное. Степени сравнения.	4	5	9
4.	Борьба. Характеристика стилей. Наречие.	3	4	7
5.	Пища. Питательный режим спортсмена. Имя числительное.	4	5	9
6.	Спортивные травмы. Допинг-контроль.	4	4	8
7.	Общая физическая подготовка: развитие специальной силы, выносливости; регулирование объема и интенсивности нагрузки.	4	4	8
8.	Массовый спорт и спорт высших достижений, их цели и задачи.	2	3	5
	Итого	27	33	60

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Peculiarities of “Italy” definition in the dictionaries of contemporary English

Abstract: The article deals with the study of linguocultural concept “Italy” on the basis of dictionary entries and frequency analysis. The publication focuses on the main components of the concept and their role in its structure.

Keywords: concept, Italy, linguocultural, frequency analysis, concept perception, field structure, interpretational field, informational content, sensory image.

Despite urgency and popularity of conceptology studies, the definition of “concept” itself is disputable and there are still a lot of definitions in various sources. Linguistic encyclopaedia interprets it as a phenomenon of the same nature as a word meaning, but taken in another system of correlation, where the meaning is used in a language system whereas the concept is dealt with in the system of logical relations and forms studied in both linguistics and logics [1: 384]. In philosophic encyclopaedia the concept is considered to be one of the logical forms of thinking in contrast to estimation and deduction, consisting of notions. Notions of logics and notions frequently used in common speech are differentiated. It is noted that in people’s or person’s thinking concepts are created not by perception and combination of similar properties, typical for the group of objects, but due to the fact that we perceive and process notions of semantic properties of objects [2: 354]. The authors of the “Short Dictionary of Cognitive Terms” suggest the following definition: “*The concept is a term that serves the explanation of units of our mental or psychological consciousness’ resources and the informational structure reflecting the knowledge and experience of the mankind*” [3: 90]. In linguocognitive conceptology concept is supposed to be a national cognitive consciousness unit, formed with the help of linguistic methods for further modelling and description of national conceptosphere [4: 10].

Taking all these definitions into consideration, linguocognitive concepts are considered to be not only the unity of the meaning and the image appearing in people's minds while talking about the item, but also a range of logical and semantic patterns existing in the consciousness of a particular nation due to objective and subjective factors.

Therefore, the task of the paper is to consider the concept "Italy" as a phenomenon of cognitive linguistics and linguocognitive conceptology, and as an important component of the English national conceptsphere, that determines the urgency of the research. The aim of the article is to investigate the structure of the concept on the basis of definitions from monolingual dictionaries. The subject of the article is the peculiarities of the interpretation of the concept "Italy". Dictionary entries are considered to be the object of the research.

There are several theories about the origin of the name "Italy" itself. According to Douglas Harper, it comes from Latin and Greek "*Italia*". However, there might be a connection with an alternation of Oscan *Vitelliu* "Italy", which was used to determine only the southwestern point of the peninsula. Traditionally, it is supposed that "Italy" comes from *Vitali* – a name of a tribe that settled in Calabria and whose name is perhaps somehow connected with Latin *vitulus* "calf". It is also possible, that the country name comes directly from *vitulus* as a "land of cattle". According to a popular legend, it might be a form of an Illyrian word or an ancient ruler *Italus* [5].

In order to find out the most important patterns in perception of the concept "Italy" in contemporary English, we suggest analyzing the definitions, which can be found in seven most widely spread and well-known dictionaries of the English language. Thus, one of them, namely, the Oxford English Dictionary, where the meaning of the concept "Italy" is explained as a "*country in southern Europe; pop. 58,126,200 (est. 2009); official language, Italian; capital, Rome Italian name Italia..*", and gives a brief history of the country [6].

The Collins Dictionary, known as one of the oldest dictionaries of the English language, interprets "Italy" in this way: "*a republic in S Europe, occupying a peninsula in the Mediterranean between the Tyrrhenian and the Adriatic Seas, with the islands of Sardinia and Sicily to the west: first united under the Romans but became fragmented into numerous political units in the Middle Ages; united kingdom proclaimed in 1861; under the dictatorship of Mussolini (1922–43); became a republic in 1946; a member of the European Union. It is generally mountainous, with the Alps in the*

north and the Apennines running the length of the peninsula. Official language: Italian. Religion: Roman Catholic majority. Currency: euro. Capital: Rome. Pop: 61 482 297 (2013 est) Area: 301 247 sq km (116 312 sq miles) Italian name: Italia” [7]. The definition gives not only historical data but also geographical features, which shows that “Italy” can be understood not only as a country, but also as a particular territory.

In the Cambridge Advanced Learner’s Dictionary & Thesaurus “Italy” is laconically defined as “a country in southern Europe” [8]. The Kernerman Dictionary represents this concept as “a republic in S Europe, comprising a peninsula S of the Alps, and Sicily, Sardinia, Elba, and other smaller islands: a kingdom 1870–1946. 56,735,130; 116,294 sq. mi. (301,200 sq. km). Cap.: Rome. Italian, Italia” [9].

The Longman Dictionary of Contemporary English suggests a definition which pays attention also to the cultural heritage: “a country in southern Europe, surrounded on three sides by the Mediterranean Sea. Italy is a member of the EU. Population: 57,998,353 (2003). Capital: Rome. In ancient times, Italy was home of the Roman civilization, which has had a great influence on how people in Europe live and think. The Renaissance began in Italy in the 14th century. Italy has many beautiful paintings, sculptures, and buildings” [10].

The Merriam Webster Dictionary gives two different definitions for “Italy”: “1. Peninsula 760 miles (1223 kilometers) long S Europe projecting into the Mediterranean between Adriatic & Tyrrhenian seas” and “2. country comprising the peninsula of Italy, Sicily, Sardinia, & numerous other islands; a republic since 1946, formerly a kingdom * Rome area 116,313 square miles (302, 251 square kilometers), pop 57,844,017” [11]. This way of interpreting creates two different fields of understanding the concept – as a geographical object and as a country. The same double definition is suggested in the American Heritage Dictionary: “1. A peninsula of southern Europe projecting into the Mediterranean Sea between the Tyrrhenian and Adriatic Seas. 2. A country of southern Europe comprising the peninsula of Italy, Sardinia, Sicily, and several smaller islands. It was settled in antiquity by Italic tribes, Etruscans, and Greek colonists, but from the fourth century BC became dominated by Rome, eventually forming the core of the Roman Empire. After AD 476, Italy was ruled by...” [12].

The analysis of these definitions makes it possible to elicit a number of peculiarities. Firstly, some features are mentioned more or less frequently than others and it might be due to the importance of them during the perception and understanding of

the concept. The analysis of the frequency of particular patterns for formulating the definition “Italy” gives the opportunity to make a conclusion that there is a range of metonymical associations appearing in the native English mind, which comprise this concept:

- 1) territory;
- 2) administrative area;
- 3) political area;
- 4) population;
- 5) international activity;
- 6) historical importance;
- 7) native speakers of a certain language;
- 8) religious centre;
- 9) cultural value.

Secondly, the order of the facts in the process of defining a concept in the dictionary creates a logical chain, where it is easy to observe the direction of the mind and consciousness from the common and objective to concrete and subjective in the process of perception of the concept. This interrelation between different components of the concept V. I. Karasyk calls “*the inner structure according to the field principle which includes an interpretational field, an informational content and a sensory image*” [4: 9]. This three-component structure is also mentioned in A. M. Pryhodko’s paper, where they are called the notional, the perceptual and the valorative components [13: 21]. According to these principles, the linguoconcept “Italy” will have the following structure:

Interpretational field:

territory, country’s structure, a number of people;

Informational content:

inner structure, origin, international relations;

Sensory image:

acoustic association (language), mindset (religion and beliefs), cultural values.

This structure shows that reading the definition of “Italy”, the mind focuses mainly on the understanding of it as a territorial unit and an administrative area with

definite borders. Then the attention transfers to the historical importance and a number of people living there and talking a specific language. Finally, the image of common lives of these people and their culture and beliefs are given.

As a result, we can see that “Italy” is a multi-component and structured in a complicated way linguocultural concept, further research of which is considered to be perspective. Thus, the way of linguocultural concept “Italy” has not only informative content, but also builds a certain way of world understanding by the English native speakers that can be observed by analyzing the frequency of particular word patterns to define “Italy” in different dictionaries’ entries.

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Asyndetic noun phrases in the Canadian newspaper headline corpus

Abstract: The specific goal of this research lies in exploring asyndetic noun phrases in headlines of Canadian newspapers at the interface of corpus analysis. The publication focuses on their structure, semantics and ability to present substantial context in a compressed way.

Keywords: asyndetic noun phrases, colligation, modifier, determiner, context, extra-linguistic reality.

Asyndetic noun phrases constitute a substantial part of word combinations in English. They function as grammatical sets of words with a head noun as a key component and optimize the headlines relevance by requiring the minimal amount of processing effort – by being short, clear, unambiguous and easy to grasp the idea of the article.

Newspaper headlines accumulate the main plot of the article. They seek to perform two main functions: to summarize the full text newspaper article and attract attention of a reader. Consequently asyndetic noun phrases widely operate across them. Noun phrases aim at the contextual informing bearing in such a way the main communicative loading of the utterance. This ability to concentrate in itself the main information is the phenomenon of language economy, as it makes possible to present substantial context in a compressed way.

When we speak about asyndetic noun phrases we mean word combinations (phrases) which consist of at least two nouns (with or without determiners) with an asyndetic type of connection between the components. The term *asyndetic* used in the title refers to asyndetic coordination, i.e. a kind of coordination with no overt coordinating conjunction or preposition which in the English language would mean the absence of *and*, *or*, *but* and *of*. This restrictive understanding of asyndeton is reflected in Quirk [11], where the notion is discussed as a type of coordination.

Language means which name a thing, a person, an action, a process, an event or the relation to extra-linguistic reality constitute the system of the nominative means of the language. It is obvious that nouns have a dominant position among the parts of speech in respect of their nominative aspect as they are based on the meaning of substance or thing in a broad meaning [1]. As nouns are the nominations of objects and phenomena by a certain characteristics they present little information about the denotate, the nomination through a noun is not sufficient enough to convey a certain meaning [2]. So there is a tendency of nomination with the help of a phrase, asyndetic noun phrase in particular, as it emphasizes the subject which is the nuclear component of a phrase and puts the accent on some peculiarities of the object expressed by the nucleus (head) [8].

Most linguists [8; 10] refer both a phrase and a word to the nominative units of the language. Words and phrases as nominative units have a lot in common which is vividly seen in such aspects:

1. Syntactic function of a phrase in a sentence can be seen via the function of the key word of a phrase;
2. For many free phrases especially noun ones some equivalent words can be found;
3. In all languages there is a tendency to lexicalization of phrases and their changing into words or at least phraseological complexes which are functionally synonymous with the words.

Those linguists who support the idea of the nominative structure of a noun phrase think that it is based on the expression of one complex meaning. That idea was advocated by Halliday [6]. Another group of linguists assert that phrases convey one but broken meaning [7]. Taking into account the fact that any combination of words doesn't present a sum of meanings but new ones, there are all reasons to consider the meanings conveyed by asyndetic noun phrases synonymous with the key word but more precise. The main function of a noun phrase lies in limiting the certain nominative meaning [14]. The key component of a noun phrase expresses the gender meaning, the dependent component – the typical diversity. Any word highlights only one characteristics of an object, but within a phrase there is a possibility to define other significant features with the help of the dependent components so that the meaning becomes clear and definite. The objects of reality have got a lot of

features which are not expressed in words explicitly [4]. So, any object of reality can be defined through the nominal noun phrase by enumerating its own characteristics.

Many specific variants of approach to the semantic diversity of nominal phrases have been developed in recent years. One of them is the theory of nominalization by Siloni [13] according to which all nominal phrases refer to the two main semantic classes: 'result nominals' and 'event nominals'. The scholar advocated the theory according to which the verbs and their corresponding deverbal nouns appear to share some basic semantic properties [13].

If we compare two phrases:

- a) *Pete's construction of the building* and
- b) *Pete constructed the building*

we will see that the noun *construction* tends to bear the same semantic relation to the nouns *Pete* and *building* as the verb *construct* does. The issue of the relationship between verbs and their corresponding deverbal nouns constitute an important position among the inquiries in the earliest works in generative grammar. Leech [9] generated deverbal nouns as clauses and mapped them onto a noun phrase structure by a series of nominalization transformations. This led to the fact that the context in which a verb and its derived noun appear are closely related. The differences between the two categories were accounted for ordering certain rules of the nominalization transformations.

Following the influential study of the nominal system Grimshaw [5] establishes clear diagnostics to discriminate between the two types of nominals: event nominals (also known as process or action nominal) and result nominals (sometimes concrete or simple nouns). He emphasizes that only event nominals share their argument structure with the corresponding verbs. Result nominal do not entail an event and do not have an argument structure. Lexical entries involving an event (a verb or a noun) have an event structure and an argument to satisfy. The term 'event' is used here in the broad sense: it is the aspectual dimension associated with the argument structure similar to the verbal counterparts and must therefore realize their internal arguments [5]. While all verbs, whether verbs of change, action verbs or statives have this dimension (an event position) and obligatory take arguments. So, nouns are divided into argument taking nouns and nouns with no argument. A noun takes an argument if it refers to an event, and hence has an event structure. Result nominals are noun phrases that do not involve an event and hence do not have an argument structure to

satisfy. Here are the vivid examples of the above mentioned nominals from the corpus explored:

Event nominals:

- *The world's most complex savage operation (The Globe and Mail, Oct.6, 2012)*
- *Ex Bin Laden driver conviction (The Globe and Mail, Oct.17, 2012)*
- *BMW's pre-winter check (The Globe and Mail, Oct.6, 2012)*
- *A daredevil's record-smashing dive (The Globe and Mail, Oct.17, 2012)*

Result nominals:

- *University defends decision (Edmonton journal, Oct.4, 2012)*
- *Defail HUB shooting chaos (Edmonton Journal, Oct.4, 2012)*
- *August manufacturing rebound (The Globe and mail, Oct.17, 2012)*
- *Economy development agreement (The wind speaker, Febr.11, 2012)*

The labels 'event' and 'result' may not clearly reflect the range of relevant cases. The same phrase is often ambiguous between the two interpretations. Obviously there is the need of the deeper insight into the context of the nominal noun phrases and thorough analysis of their key component which is the head (nucleus).

One of the reasons headedness has proved a rather elusive notion is that it can be, and has been, defined at a number of levels. In traditional grammar the term 'head' was used to capture linguists' intuition about what constituted the most important part of a phrase and was consequently described in semantic terms [11]. More theoretically inclined linguists on the other hand, felt the need to couple this notion to the formal behavior of the elements in question; as a result certain morpho-syntactic tests came to be used to establish headedness. Unfortunately, however, there proved to be numerous cases where the two approaches would select different heads. The third type of test for headedness, based on pronominalization, also failed to provide conclusive evidence [8]. Thus the choice more or less remains between rather vague, but intuitively appealing, semantic approach and more systematic, but also more abstract and semantically less revealing, formal approach. Not surprisingly, traditional grammars, as well as functional and cognition-based grammars, largely opted for the former approach; formal theories focusing on syntax, such as generative grammar, opted for the latter. In addition proposals have been made to regard certain problematic constructions as containing either two heads, or no head at all [9].

The head-modifier distinction was originally used to reflect the intuitive idea that within each phrase one element was somehow more important than the others. This idea of the head as the most important or primary element within the noun phrase can still be found in many recent characterizations of the term. But what does it mean to be the most important, primary or central part of a noun phrase? The answer to this question is usually given in terms of the designation (denotation) of a noun phrase. In Keizer's investigation we read that "within the nominal phrase, a noun is typically the syntactic and semantic head, defining the type of entity involved [8]. Similarly in Leech's *Communicative Grammar of English* [9] it is the profile of the head that prevails at the composite structure level (the head is the 'profile determinant'), where the profile of an element is determined by its denotation.

On the basis of this general semantic characteristics, it became possible to define a number of operational tests. The first of these consists of the requirement that the head be distributionally equivalent to the composite construction; the second defines the head as the obligatory constituent. In most cases, the operational tests of obligatoriness and distributional equivalence suffice to establish headedness, selecting that part of the construction as the head which also defines the type of entity referred to [8]. In other cases determining headedness may be less straightforward. In applying the test of obligatoriness, for instance, one is faced with the problem that in noun phrases with singular, countable heads the determiner cannot be left out either. So, the semantic meaning of the head (nucleus) is the only criterion due to which one may classify noun phrases according to the semantic function they render in the utterance. Having explored more than 4000 noun phrases from the headlines of such Canadian newspapers as *The Globe and Mail*, *Edmonton Journal*, *Wind Speaker* we singled out the following semantic classes of heads (nucleus):

1) Denotative proper names:

Life mates Canada (Edmonton Journal, Sep.7, 2012)

2) Denotative-significative names where the class notion is rendered through the certain representative of that class:

a) the names of people (relative and functional): *member, owner, candidate, leader, spokesman, activist, operator...*:

World Trade Centre owner (The Globe and Mail, Oct.17, 2012)

b) the names of objects, substances, subjects: *land, area, country*:

Paul Pyan's home town (The Globe and Mail, Oct.11, 2012)

c) the names of objects and things, created by people, including institutions: *station, room, camp, weapon, factory...*:

New liquor warehouse (Edmonton Journal, Sept.8, 2012)

3) Significant—denotative names where the relative reference prevails over the denotate:

a) Collective nouns which denote groups of people: *commission, committee, group...*:

Canada's reserve community (Wind Speaker, Febr.11, 2012)

b) Collective class nouns: *funds, goods, meals....*:

Life-changing restaurant meals (The Globe and Mail, Oct.11, 2012)

c) Names defining the mental activity of people: *law, bill, act, figures...*:

Health authorities issue appeal (Edmonton Journal, Oct.5, 2012)

d) Names of processes: *attack, invasion, support, movement...*:

National College Health Assessment survey (Edmonton Journal, Sept.8, 2012)

e) Names of events: *congress, rally, festival, demonstration...*:

The world's most complex savage operation (The Globe and Mail, Oct. 6, 2012)

f) Names of states: *unity, solidarity, security, ambition, disease, increase...*:

Superbug infection rates rise (The Globe and Mail, Oct.13, 2012)

g) Names of characteristics: *cruelty, kindness, honesty, pride.*

Presidential debate envy (The Globe and Mail, Oct.6, 2012)

Structural peculiarities of noun phrases are predetermined by the amount of information they have to summarize and render. From the explored corpus it is revealed that the basic word order of the asyndetic noun phrase is the structure N+Nh (Nh- is a head noun) or Adj+N+Nh. Very often noun phrases are structured by 'determiner+ modifier +head noun'. In this case 'a determiner' can be either a 'descriptor', a 'classifier', a 'possessor', or a 'demonstrator'. In analyzing the word order distribution of noun phrases extracted from newspaper headlines the results disclosed several common and irregular patterns in terms of the most frequent structures. All of them can be grouped into two-componental, three-componental and multi-componental depending on the number of nouns within each phrase.

Two-componental phrases can be of the following types:

- N+Nh (noun modifier+ head noun):

Road congestion, pipeline propaganda (Edmonton journal, Oct.4, 2012)

- Np+Nh (possessive noun modifier+head noun):

soldier's story, eskimo's offence, Rams' view (Edmonton Journal, Oct.5,2012)

- A+N+Nh (adjective modifier+noun modifier+head noun)

Native education reform, incredible Whistler vacation, (The Globe and Mail, Oct.6, 2012, indigenous community development (Wind speaker, March,2012)

- N+A+Nh (noun modifier+adjective modifier +head noun):

Community legal assistance, power engineering magazine (Wind speaker, Aug.2012), museum new focus (The Globe and Mail, Oct.17,2012)

It's worth mentioning that the level of the semantic conjection between the elements of the two-componental asyndetic noun phrases is very high. In some cases one may even notice the formation of collocations which are widely used outside the particular context: *interest rate, security guard, exchange bill.*

Three-componental noun phrases can be as follows:

- N+N+Nh (noun modifier+ noun modifier+head noun):

Enhancement water act, custom election Code, economy development agreement (Wind Speaker, Feb, 2012)

- A+N+N+Nh (adjective modifier+noun modifier+noun modifier+head noun)

Annual treaty education conference, Independent assessment process application (Wind Speaker, Feb, 2012)

- Np+A+N+Nh (possessive noun modifier+adjective modifier+ noun modifier +head noun):

Canada's great intelligence test (The Globe and Mail, Oct.6, 2012)

Bombardier's Chinese Series supplier (The Globe and Mail, Oct.17,2012)

Within multi-componental phrases the following types are observed:

- N+N+N+Nh (noun mod.,+noun mod.,+noun mod.,+head noun)

Vancouver metro transportation system (The Globe and Mail, Oct.6, 2012)

Manitoba child death inquiry (Edmonton Journal, Sep.6, 2012)

- Nc+N+N+Nh (compound noun+noun mod.,+noun mod.,+head noun)

Non-Christian prison chaplain face (Edmonton Journal, Oct.,5,2012)

- N+N+N+N+Nh (noun mod.,+noun mod.,+noun mod.,+noun mod.,+head noun)

Health Services preferential access inquiry (The Globe and Mail, Oct.13, 2012)

- A+N+N+N+Nh (adj.mod.+noun mod.,+noun mod.,+noun mod.,+head noun)

National College Health assessment (Edmonton Journal, Oct.5, 2012)

- *Np+N+N+A+Nh (possessive noun+noun mod., +noun mod., +adj. mod., +head noun)*

Alberta's Top Selling Condo Builder (Edmonton Journal, Oct.6, 2012)

The modifiers which usually constitute the additional information about the head are flexible and can be positioned anywhere to suit the intended message of the headline. Such determiners as articles, numerals, possessive or demonstrative pronouns usually proceed the noun determiners. But the head noun should be the final element within the whole noun phrase. In the corpus analyzed we came across the rare cases of noun headline phrases which provide extra information about the whole article in the newspaper due to the determiners:

- Our best performing all-in-one music system (The Globe and Mail, Oct. 6, 2012)

- Ronaldo's three levels Real Madrid's thrashing (Edmonton Journal, Oct. 4, 2012)

- Western Canadian First Nations Administrators Education Symposium (Wind Speaker, March, 2012).

The findings reveal that the only criterion for the semantic classification of the noun phrase is the meaning of its head noun which is supposed to be the nucleus of the phrase. Additional information about the head is provided by various modifiers and determiners which reflect the details of extra linguistic reality. The sphere of noun phrases functioning is rather wide which is conditioned by the high concentration of valuable context. Words alone can also perform the function of nomination, but noun phrases have the ability to concentrate sufficient information to optimize the relevance of newspaper article headlines.

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Psychological features of teacher's role fulfillment: theoretical aspects

Abstract: The article deals psychological especially of roles, theory roles and its meaning. Characteristics and influence social roles from forming professions a teacher.

Keywords: role, teacher.

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Психологічні особливості рольової самореалізації вчителя: теоретичний аспект

Анотація: У статті розглядаються психологічні особливості ролі, теорії ролей та їх значення. Характеристика та вплив соціальних ролей на формування професії вчителя.

Ключові слова: роль, вчитель.

На сучасному етапі розвитку науки вітчизняні та зарубіжні дослідники приділяють велику увагу аспектам соціальних ролей, рольовій самореалізації, професійній значимості вчителів. Зазначені аспекти проявляється у всіх соціально значимих ситуаціях життєдіяльності особистості. В межах педагогічної психології значний акцент ставиться на роль вчителя під час будь-якого контакту зі школярами, колегами, керівництвом та ін.

Рольові теорії мають великий нереалізований потенціал. Поняття «ролі» активно використовується не лише в соціологічних, соціально-психологічних та

психотерапевтичних концепціях, а й у концепціях особистості. В феномені «ролі» відображено як соціальні, так і індивідуальні особливості особистості, взаємодія внутрішніх та зовнішніх детермінант її розвитку і, певною мірою, її біосоціального дуалізму.

Сучасні соціально-педагогічні орієнтири вітчизняної системи вищої педагогічної освіти передбачають якісне підвищення соціально-професійної підготовки вчителя. Найважливішою соціальною функцією вищої педагогічної школи в цьому зв'язку постає функція формування особистості гуманістичного типу, справжнього інтелігента, здатного не тільки професійно, але і творчо й цілісно підходити до розв'язання завдань соціального й фахового змісту.

Розв'язання проблем педагогічної професійної освіти в кінцевому підсумку залежить від якісних показників формування соціально-професійних цінностей та інтересів вчителя, що лежать в основі його ставлення до власного професійного зростання, потреби у безперервній освіті й творчій особистісній самореалізації. Отже, особистісна самореалізація вчителя обов'язково містить його активну життєву позицію й може ефективно формуватися лише в тісному взаємозв'язку виховання та самовиховання, в постійному прагненні самої особистості до досягнення вищих рівнів саморозвитку.

Зазначене вище, а також наявність суперечностей у підходах щодо ролі, місця, значення та специфіки діяльності педагога в суспільстві дає нам підстави констатувати, що рольова самореалізація вчителя є саме такою його характеристикою, яка забезпечує інтенсивне соціально-професійне функціонування.

Науковий інтерес до рольової самореалізації вчителя в професійній діяльності розкривається у розгляді ролей вчителя (одягання масок відповідно до ситуації та учасників ситуації) відповідно до ситуації з якою зіштовхнеться вчитель у професійній діяльності.

Велика кількість вітчизняних та зарубіжних вчених психологів та педагогів розглянули певні аспекти нашої проблеми, а саме: дослідження рольової поведінки (Дж.М. О'Ніл, Т.А. Бір, Дж.Т. Спенс, Р.Л. Хелмріх, Ю.Дж. Фoa, Е. Фoa, С.Л. Бем, Дж.А. Дойл, Р.Дж. Мур), дослідження закономірностей соціальних ролей (функціонально рольова теорія, теорія символічного інтеракціонізму, структурно рольова теорія, організаційно рольова теорія та когнітивно рольова теорія: Т. Парсонс, Дж. Мід, Г. Блумер, Р. Лінтон, Н. Гросс, Р.Л. Кан, Я. Морено, М. Шеріф, Дж. Роттер, Ж. Піаже), дослідження рольових відношення до концеп-

цій особистості (Б.Дж. Біддл, У. Айкес, Е.С. Ноулес, Р.Ф. Кідд, Ш. Страйкер, Ч. Гордон), дослідження поняття «ролі» вітчизняними дослідниками (І.С. Кона, В.Б. Ольшанського, І.О. Мартинюка, Н.І. Соболевої, В.О. Єхало, Ю.Є. Альшиною, К.В. Лекторською, О.С. Кочаряном та іншими).

Аспекти дослідження самореалізації вчителя та вчительки як професіоналів були розглянуті у руслі державних концептуальних підходів щодо мети освіти та виховання найбільш універсальною на наш погляд, є концепція особистісно орієнтованої освіти (І.Д. Бех, С.У. Гончаренко, І.А. Зязюн, О.Л. Кононко, Н.Г. Нічкало, О.Я. Савченко, О.В. Сухомлинська та інші).

Дослідження окремих аспектів соціального самовизначення здійснювали В.Л. Лебедева, В.А. Матусевич, Г.П. Ніков, В.Ф. Сафін та інші.

Дослідженням проблем формування різних аспектів соціальної активності особистості займалися К.О. Абульханова-Славська, В.С. Бакіров, Т.О. Ільїна, Т.М. Мальковська, В.О. Сластенін, Н.В. Кічук та інші.

Дослідження концепції формування професіоналізму педагога (Н.В. Кузьміна, К.М. Левітан, А.К. Маркова, Л.М. Мітіна).

Аналіз розвитку людської культури дозволяє вказати на тривалий та послідовний процес використання, а відповідно, і вивчення «ролі» і «особистості» та її значення у духовній та матеріальній культурі. Існує багато визначень поняття «роль». Слово роль (спільне для більшості європейських мов) походить від латинського слова *rotulus*, що означає паперовий згорток, тобто рулон паперу, на якому записаний текст сценічної ролі для актора.

Значення історичних та культурних коренів рольового підходу у вивченні особистості можна умовно розділити на дві групи: це наукові розробки та людська практика. Людська практика є набагато соліднішим за віком і ґрунтується на категорії «гра», яка є дуже цікавим феноменом культури. Вона виражає синтетичну форму активності, характеризує такі сторони буття, в яких втілюються багаті сутнісні характеристики прояву особистості. За словами нідерландського історика культури Й. Хейзинга: «гра старша за культуру, оскільки вона притаманна ще світу тварин» [4]. Такі форми гри, як драматична гра, рольова презентація, в яких в символічній формі представлені уявлення про дійсність, є чисто людськими формами гри і нероздільно пов'язані з розвитком людської культури.

За словами Горностая П., одним із багатючих джерел сучасних рольових підходів є міф, який взагалі визнається як одне з найпотужніших джерел не ли-

ше людської культури, а й суспільної науки та практики. В самій основі міфу закладена драма, рольова вистава, драматичний конфлікт, який виражає протиріччя природного та соціального світу [1].

За дослідженнями Горностая П., одним з джерел рольових підходів вивчення особистості є релігія. Релігійні обряди, як форми міфу, є, з одного боку, театралізованими виставами, що виражають різні сторони релігійної картини світу, місце людини в цьому світі та людську мораль, з іншого – це практика, яка має своєю метою психологічний (в тому числі – психотерапевтичний) вплив на особистість, чому є безліч прикладів починаючи з фігури самого Ісуса Христа [1].

Соціологи досить давно і плідно досліджують закономірності соціальних ролей і створили ряд наукових рольових теорій, серед яких можна виділити п'ять найбільш значущих:

1) функціональна рольова теорія (Р. Лінтон, Т. Парсонс, Е. Шілз, Ф. Батс, С. Харві) зосередила увагу на характерних формах поведінки людей, що займають соціальні позиції в межах стійкої соціальної системи. «Ролі» розглядаються як функції, як розподілені, нормативні очікування, що пропонують і пояснюють ці види поведінки;

2) структурна рольова теорія (Р. Лінтон, М. Леві, С. Надел, Р. Барт, М. Мандел, Г. Уайт, С. Уіншіп) – математично виражена, аксіоматична теорія щодо структурованих відносин ролі. Увагу зосереджено на «соціальних структурах», задуманих як стійкі організації наборів людей («соціальні позиції» або «статуси») що поділяють ті ж самі зразки поведінки («ролі»), які спрямовані до інших наборів людей у структурі;

3) організаційна рольова теорія (Н. Гросс, Р. Л. Кан, М. Ван-Селл, Е. ван-де-Вліерт та ін.) досліджує соціальні системи, що попередньо плануються, орієнтовані задачею та ієрархічні. Ролі, прийняті в таких організаціях, зв'язані з ідентифікованими соціальними позиціями і створені нормативними очікуваннями, але норми можуть змінюватися серед індивідуумів і можуть відображати як офіційні вимоги організацій, так і тиск неофіційних груп;

4) когнітивна рольова теорія - зосередилася на відносинах між рольовими очікуваннями і поведінкою. Увага приділялася соціальним умовам, що викликають очікування, методам для вимірювання очікувань, і впливу очікувань на соціальну поведінку. Багато когнітивних рольових теоретиків також цікавилися спо-

собами, якими людина сприймає очікування інших і впливом цього сприйняття на поведінку;

5) теорія символічного інтеракціонізму бере початок з робіт Дж. Г. Міда, насамперед, його головної праці «Розум, самість та суспільство». Теорія розглядає значення ролей індивідуальних акторів, еволюцію ролей через соціальну взаємодію, та різні когнітивні поняття, за допомогою яких соціальні актори розуміють і інтерпретують власну поведінку та поведінку інших.

Наше визначення соціально-психологічних ролей є теоретичним узагальненням найкращих визначень, запропонованих різними авторами. За Я.Л. Морено, роль – це «синтетичний досвід, у якому поєднуються особисті, соціальні та культурні елементи» [2]. М. Атей і Дж. Дарлі визначають роль як систему або набір «компетентностей взаємодії» [3]. Б. Біддл і Э. Томас стверджують, що в самому загальному визначенні роль – це набір приписань, які визначають, якою повинна бути поведінка члена соціальної позиції (тут мова йде переважно про соціологічне тлумачення соціальної ролі), а в різних контекстах роль визначає приписання, опис, оцінку та дію; в ідеї ролі знаходять висвітлення приховані та явні процеси, поведінки себе та інших, поведінки, що ініціює індивід, і поведінки, яка спрямована на нього [3].

У своїй теорії рольової самореалізації особистості Горностай П. виявив та описав певні характеристики ролей. Рольові детермінанти - це фактори, що визначають роль: позиція особистості, статус, соціально-психологічні настановлення тощо. Рольові атрибути – це речі, необхідні для виконання ролі. В актора – це грим і одяг. Атрибутом може бути все, що допомагає відтворювати ситуацію ролі. Прикладом рольових атрибутів може вважатися імідж. Рольовий фетишизм – це надання речам ролі та властивостей, якими вони фізично не володіють. Як людина відіграє роль у соціальному середовищі, так і річ має привласнену їй «роль» тільки серед людей. Річ перетворюється на символ. Яскравим прикладом є гроші, які не мають своїх властивостей поза людським суспільством. Рольова ситуація – це сукупність обставин, що супроводжують виконання ролі, свого роду рольове оточення [1].

Як результат вище зазначеного Горностай П. виділив певні психологічні якості ролі на які ми спираємося у нашій роботі:

1. Роль як поведінкова модель соціальної позиції.
2. Роль як норма.

3. Роль як функція.
4. Роль як символ.
5. Роль як цінність.
6. Роль як психічний стан.
7. Роль як особистісний модус.
8. Роль як установка.
9. Роль як відношення.
10. Роль як ресурс.
11. Роль як захисний механізм [1].

З позицій рольового підходу особистісний розвиток неможливий без безперервної зміни в системі психологічних ролей особистості. Розглядаючи життєвий шлях людини, необхідно виділити такі найважливіші поведінкові комплекси, що є опорними на життєвих стадіях людини і називаються життєвими ролями. Життєвими ролями ми називаємо такі особистісні ролі, які пов'язані з важливими життєвими функціями людини і мають велике значення в її життєвому шляху. Життєвий шлях – це періодична зміна життєвих ролей, що безупинно формуються, розвиваються і, навпаки, руйнуються зникають, або відкидаються людиною, як непотрібні, що втратили своє значення. Зміна життєвих ролей відбувається протягом усього життя людини, бо інакше вона не може розвиватись.

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***Replacement of the component of a phraseological unit:
specification of meaning (on the material
of the English “yellow” press)***

Abstract: The paper deals with research of the linguistic and extra-linguistic factors while choosing the language and speech correlates in the device of replacement of the component of a phraseological unit. The paper studies impact of the structural changes on the semantic ones in specifying the meaning of a phraseological unit on the material of the English “yellow” press.

Keywords: English “yellow” press, language and speech correlates, replacement of the component of a phraseological unit, specification of meaning, writer’s associations.

The English “yellow” press shows a great potential for manipulating the reader’s conscience. The phraseological units appear to be a powerful tool in speech manipulation. Their high level of anticipation is abruptly lowered by their deformation. Occasional transformations adapt means of phraseology to the strategies of the English “yellow” press. The most widespread device of phraseological deformation in this kind of press is replacement of the component of a phraseological unit (PU). This linguistic problem was investigated by S.P. Volosevich, Y.V. Dinova, O.V. Kunin, A.S. Naciscione, I.Y. Tretyakova, N.L. Shadrin and others.

Nevertheless, a detailed analysis of this phenomenon in terms of its applied character in the course of discourse approach facilitates the development of the general problem and, therefore, is a matter of current interest.

With replacement of the component of a PU the correlates can manifest relationships in language or those in speech. The latter are generated by the speaker’s/writer’s cognitive associations evoked by his/her intentions or a definite speech situation.

An association is a regular natural link between two contents of conscience, psychic phenomena existing in an individual's experience, if one actualized, another arises [1, p. 24]. Associations are based on similarity, contrast, contiguity in space and time, comprising the subclass of simple mechanistic ones. Another subclass encompasses logic associations that reflect cause-and-effect and genus-species relationships [2, p. 158]. Every human-being builds his/her own experience uniting it with social and universal or common to humanity. The associations resting on the human and social experience are likely to be more or less universal. Their conventional pattern implies relative objectivity. The subjective associations are difficult to be predicted as they are stipulated by an individual's world perception and life experience.

Any structural changes in composition of a PU lead to semantic ones. Changes in semantics of a PU can specify, explicate, intensify and literalize its meaning [3, p. 21–22]. Specification of meaning is known to be the leading function performed by semantic changes of PUs.

The aim of this paper is to investigate what types of the language changes in the composition of a PU function in specifying its meaning and how the associative mechanism works while choosing a speech correlate.

It should be stressed that the ties between the language correlates are defined as paradigmatic i.e. the correlates are synonyms, antonyms, hyponyms, paronyms, homonyms.

Due to synonymic replacement of the component of a PU it is possible to add new elements to its meaning:

Treat smb as/like mud/a dog/dirt/muck/the dirt beneath/under one's feet — to treat unfair, bad: "Despite being obsessed with Sarah, he treated her like crap and cheated on her. "She's treated the hired help like garbage for years" [4, p. 6].

Crap (=smth that is very bad or of bad quality) replaces mud/muck (=smth that is unpleasant and of bad quality), increasing the negative contents (comp.: unpleasant and very bad). Alternatively, garbage (=smth that is no longer needed and has been thrown away) brings new shades of meaning, namely uselessness, inappropriateness, some worn resource.

To have a roving eye — to always be looking for a chance to have romantic relationships: We've also detailed her battles with her husband, "the Voice" star Blake Shelton, over his wandering eye [5, p. 7].

Synonyms “rove” (=travel from one place to another) and “wander” (=walk slowly without a clear direction or purpose) differ in purpose-oriented character of the action and speed of taking it. One of the meanings of *wander* (if the man’s hands wander he touches the body of a woman he is with, esp. where she doesn’t want him to) has the same of movement without a clear direction or purpose. Replacement of *roving* by *wandering* dispels the myth of a romantic relationship.

Keep one’s hands off — used to tell someone not to touch someone or smth: Michelle went gunning for Kerry Washington — and now she’s warned Gwyneth Paltrow to keep her mitts off her man [6, p. 26].

Worship the (very) ground smb threads/walks on — to admire or love someone so much that you cannot see their faults: But I know my husband isn’t a cheater. He cherishes the ground I walk on [7, p. 60].

Hands is a neutral word and *mitts* belongs to informal style, though *worship* expresses a definite sacramental attitude compared to a more neutral *cherish* (=love someone or smth very much and take care of them well).

Substitution of any component of a PU for an antonym brings about the opposite meaning acquired by this PU thereby specifying its meaning:

On solid ground — confident because you are dealing with a subject you are sure about or because you are in a safe situation: Deni, 52, and the Dead Sara drummer, 28, have been dating for nearly two years and as *The ENQUIRER* has reported, their relationship was already on shaky ground [8, p. 4].

Because of limited morphological means available in English the antonymic replacement of prepositions in the composition of phraseological units is widespread:

Go/walk down the aisle — to get married: Conservative Party chairman Grant Shapps said; ‘Ed Milliband and the SNP have signed the pre-nup and are now half-way up the aisle’ [9, p. 7].

Replacements by hyponyms involve variations in quantity, size, material type, food, clothes, body parts, temperature, color, natural phenomena etc. [10, p. 12]. Accordingly, such variations specify the meaning of a PU expanding it:

Fifth wheel — odd: Courteney’s been welcoming of Justin, but he’s realized she and Jen (Jennifer Aniston) share a stronger bond than he’ll ever have. Jen confides in Courteney, not Justin!’ He feels like the third wheel to Jen’s girlfriends when it comes to nailing down the wedding or anything else! [11, p. 13];

Be in smb's good books — used to say that someone is pleased with you or your work: It was quite simply the best entertainment of the year so far, with enough self-important, small-time, petty characters to keep Ricky Gervais in scripts for life [12, p. 21].

The character (Justin) is the last who has influence on his fiancée after her two girl-friends, but he doesn't feel odd. The new component “*scripts*” specifies the professional sphere of a doer/agent of the action.

Replacements by homonyms and paronyms are crucial as means of specification of phraseological meaning as well, for example:

Free and easy — very informal and relaxed: Spree and easy [13, p. 56];

To show/prove ones mettle — to be ready to try as hard as possible with courage and determination: I know the weather stinks at the moment, but everyone should show a bit of metal like they did in the IRON AGE [14, p. 41].

Mettle is substituted for homophone “*meta*” with a view to adding new shades of meaning, in particular, endurance and tenacity; and *free* is replaced by *spree* so that to specify the informal manner of behavior.

It should be noted that the choice of a word in replacement of the component of a PU for the purpose of specification of its meaning can be made off the limits of the language rules and relationships. Consequently, it is grounded on the speaker's/writer's associations triggered by a speech situation.

The mankind has already established certain associative links between separate elements of the surrounding world where there is a space for a human-being. By way of illustration human life is associated with movement which in its turn is linked with a road by the contiguity in space:

Come to /roar into/splutter into life — to suddenly start working: But before that, the minute he became famous, Robin roared into the fast lane [15, p. 38].

An associative link on the level of direct literal meaning of the words “*life*” and “*lane*” is transferred to that of their figurative ones (*fast lane = an exciting way of life that involves dangerous and expensive activities*). As a consequence, the occasional phraseological unit gains the meaning “to actively spend time in a way that involves dangerous and expensive activities” specifying the manner of the action.

However, the associations created on the basis of people's social experience are known to be more complex for perception and interpretation. Substitutions made

in a definite society, not necessarily nationally marked, can be unfamiliar to strangers:

To beat smb to the draw/punch — to do or to get smth before anyone else does: Ladbrokes spokeswoman Jessica Bridge said: “At odds of 1-5 it’s impossible to see Jim being beaten to the crown” [14, p. 4].

Variants “draw” and “punch” are tied by the seme of gaining victory in a competition. By means of replacement *crown* is associated with casino “CrownPoker”. The fragment of the article deals with Jim Mullen who in 2013 — 2014 (the article dated from the 29th of January, 2013) was one of the claimants to the position of executive director of Ladbrokes — the British bookmaker’s company. The company’s secretary (Jessica Bridge) is convinced that it is Jim who will get this position before anyone else. Phraseological unit “*beat smb to the draw/punch*” has this meaning; furthermore, *crown* specifies the sphere of success — the gambling business. It should be stressed that Jim Mullen became the head of the company-giant in 2015.

If the subjective associations predominate in the relationship between two correlates then substitutions are difficult to predict but they can be recognized and understood:

Lock horns — to argue or fight with someone: On May 10, the two were spotted locking lips at Nobu restaurant in Malibu [16, p. 2].

The writer compares the pair’s kissing with fighting by similarity of the motor actions.

No matter what type of associations arises between the speech correlates, replacement of the component of a PU results in adding new semes to the semantic structure of a PU specifying its meaning:

Lead smb by the nose — to influence someone so much that you can completely control everything that they do: Most people give you cocaine when you are famous. It gives a certain control over you... You are being led around by your nostril [15, p. 31].

Substitution in the example given above indicates drug addiction as the cause of influence.

Replacement of *do* by *diet* specifies the purpose of the action that lies in keeping the weight off:

Do or die — used to say that someone is determined to do smth very brave or dangerous even if they die attempting it (to win or to die): It's "diet or die' time for Hollywood HEAVY — weight Jonah Hill! [15, p. 26].

Replacement of *make* by the verbs "waltz", "eat", "force" emphasizes the manner of the action, whereas the substitution by the verb "eat" demonstrates omission of the sense of successful promotion:

To make one's way — to go towards smth, especially when it is difficult or takes a lot time; to make a career: JON GOSSELIN wants to waltz his way back on-to TV — and show up his ex-wife Kate in the process! [17, p. 50];

Her friends are concerned that Star is eating her way into the hospital. They have previously told the ENQUIER she's a self-confessed foodaholic. Star's love to food had already contributed to her open heart surgery in 2010 [18, p. 28];

Moyes knows United will have to play a lot better than this if they are to force their way into the top four — and Liverpool's emphatic win over Everton means they again failed to make in-roads into the six-point gap between them and their old foes [19, p. 69].

The next example shows how the characteristic is given to the doer of the action in terms of replacement of *life* by *money*:

To run/flee for one's life — to run as quickly as possible as if to save one's life: Bolton boss Dougie Freedman said: "I'm very proud. We gave a top side a run for their money [19, p. 66].

The team coach boasts that they have made the opponents run a lot and work off money to be paid. Thus, they play for the sake of earning money not of presenting a game.

Substitutes can specify the object of the action:

To mend the matters — to manage the things, make the things or situation better: She just wants to talk face to face and mend their broken friendship [17, p. 13];

After all they have been through, having the baby would be a perfect reason for them to unite and mend their marriage" [4, p. 37].

Sometimes the writer directly states the sense of a situation without using any associations:

Lost/ rapt/ shrouded/wrapped in mystery — unknown, undefined: His death was shrouded in controversy as Travolta subsequently accused an ambulance driver and a Bahamian politician of a \$25 million extortion plot [20, p. 5].

Replacement of *mystery* by *controversy* stresses the writer's awareness of the father's serious accusations related to his son's death unaccepted by the officials to unravel the mystery of this case.

In conclusion it is worth pointing out that the function of occasional specification of the meaning of a PU while replacing its component is performed equally by the language and speech correlates. The language correlates are linked by synonymic, antonymic, paronymic, hyponymic, homonymic relationships. The choice of the speech correlates depends on the situation that triggers the definite speech associations based on the universal, social and individual experience.

The results of this investigation are of great value to researchers in studying the device of replacement of the component of a PU as a means of the speech manipulation in the English "yellow" press.

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Metaphorical representation of ideology in American political discourse

Abstract: The article deals with the role of metaphorical phrases in American political discourse. We analyzed the role and importance of metaphors in political life of the USA. The metaphorical or metonymical phrases are usually selected by the politicians in that way, in order to cover all the events and emphasize the role of this events in the history of the formation of the government.

Keywords: political discourse, metaphorical phrase, ideology, "New Deal".

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Метафорическая репрезентация идеологии в американском политическом дискурсе

Аннотация: В данной статье мы подчеркнули роль метафорических выражений в американском политическом дискурсе. Мы проанализировали роль и важность метафорических выражений в политической жизни США. Метафорические и метонимические выражения подобраны так, что охватывают все события и подчеркивают роль и важность данного события в истории государства.

Ключевые слова: политический дискурс, метафорическое выражение, идеология, «Новый курс».

Идеологический анализ языка и дискурса широко практикуется учеными и критиками. При изучении дискурса, как объекта когнитивной и социальной пси-

хологии, а также в целом гуманитарных наук, мы не можем точно определить насколько глубоко идеология выражается дискурсом или насколько идеология влияет на формирование дискурса [1, с. 136].

Политика является неотъемлемой частью социальной жизни общества. Согласно Чилтону, политика это социальная деятельность, в первую очередь как борьба за право, между теми кто правит и теми кому хотелось бы, хотя в то же время политику можно определить как совокупность стратегий для решения многих социальных конфликтов [2, с. 3].

Согласно определению Энквиста; дискурс означает текст плюс контекст, где контекст вбирает в себя ситуативные компоненты. Текст и контекст являются двумя главными факторами, так как без них не может быть и дискурса [3, с. 372].

Различные риторические стратегии определенных грамматических, лексических и стилистических приемов широко используются в политическом дискурсе, в первую очередь привлекая внимание читателей или слушателей.

В нашей статье, мы рассматриваем метафорические слова и выражения, как одну из важных риторических приемов. Метафорические и метонимические выражения играют вполне значимую роль в политическом дискурсе, так как она помогает определить скрытое значение различных субсистем, которые функционируют в данной системе [4, с. 69-75].

Анализ метафоры является центральным звеном в анализе политического дискурса [5]. Политический дискурс, в первую очередь строится используя концепции которые отображают взгляды на мир, идеология же в свою очередь неразрывно связана с концептом социальная дифференциация.

Каждый политик, создавая свой текст, в первую очередь думает о своей аудитории, и в особенности об их идеологических и культурных взглядах своих реципиентов. Главной целью политического дискурса это создать консенсус среди граждан [3, с. 4]. Обычно, считается что политики знают свою потенциальную аудиторию и согласно этому создают свою речь и используют определенные риторические приемы для привлечения внимания слушателей.

Процесс глобализации также повлиял и на современную аудиторию слушателей или читателей политического текста в американском дискурсе. Из-за глобального интереса к американской политике ситуация в американском политическом дискурсе становится все более сложной с точки зрения учета инте-

ресов различных слоев населения внутри страны, а также интересов различных регионов и государств мира. Политикам приходится тщательно выбирать слова и строить свой политический дискурс так чтобы оправдать надежды, а также соответствовать ожиданиям своих слушателей. Речь политика является его главным оружием, с помощью которого он должен суметь не только убедить аудиторию, но иногда и манипулировать ею [4, с. 73].

Политический дискурс в первую очередь строится путем использования таких концептов которые являются глобальными. Главной задачей здесь является как вербализировать эти концепты в различных политических дискурсах, которые относятся к различным культурам, и как решить конфликт между культурой, личностью и глобальными ценностями, так как восприятие, выводы и передача одного и того же концепта может отличаться, как внутри одной культуры так же и между разными культурами.

В политическом дискурсе, метафорические и метонимические выражения это весьма вполне значительные элементы, который помогают ассоциировать эксплицитную информацию с имплицитным значением.

Метафора и другие стилистические приемы считаются более эффективными и убедительными, а также одним из важных приемов политиков. Такие лингвистические приемы важны и даже являются необходимым звеном политического дискурса, так как именно метафоры помогают передать и понять различные политические процессы, и почувствовать себя частью этих процессов. Общество не всегда может следить или оценивать происходящие политические процессы, и вот в этом случае именно благодаря стилистическим приемам используемые политиками в своих речах, помогают слушателям или аудитории оценить и сформировать свою точку зрения о происходящих политических процессах.

Согласно определению Ван Дайка, убеждение это процесс где слушатель может изменить свое мнение под влиянием дискурса. Весьма очевидным фактом является то что говорящий влияет не только на сознание слушателей, а также на их последующие поступки и роль в обществе (7, с. 355).

Это доказывает то, что язык играет не мало важную роль в убеждении и управлении, а также является одним из важных средств контроля и доминирования (господства).

Рассмотрим следующий пример;

“Senator Mc Cain just doesn’t get it - he doesn’t get that, this crisis on Wall Street hit Main street” (B. Obama, President Election, 2008).

В американском дискурсе ранее для дифференциации социальных групп использовались фразы “White Collar” и “Blue Collar”, которые позднее были заменены фразами “Wall Street” “Main Street”. В данном тексте отправитель использует метафорическое выражение «Main Street», которая концептуализирует идеологию.

Идеология представляет собой треугольную форму, которая соединяет общество, дискурс и социальное сознание. [8] Согласно этому подходу, идеология является основой для организации социального сознания разделяемый членами различных групп, организаций. Концепция идеологии позволяет соединить группу людей которые разделяют одинаковые мнения, веру, взгляды и имеют одинаковые социальные ценности. Другими словами, идеология находится между социальной структурой и структурой мышления членов общества. Они позволяют им передать свои социальные ценности, которые создают модели повседневной жизни. Идеология это не просто система идей, она также формирует сознание человека, сознание общества, а также имеет когнитивную и социальную функцию.

В литературе метафора также определяется не только как «стилистический прием» но также и как «метод убеждения». В первую очередь метафора помогает передать политические процессы более ярким и понятным методом. Во-вторых, позволяет создать связь между логическим и эмоциональными формами убеждений.

Согласно Лакофф и Джонсону [9] сущностью метафоры является понять и передать смысл одного слова посредством другого слова. Метафоры это стилистические приемы, охватывающие все виды дискурса.

Одной из главной цели политического дискурса является найти и использовать ту метафору, которая передаст мнение общества. Политики обычно используют метафору чтобы передать скрытую точку зрения, и таким образом создают символические или закодированные фразы.

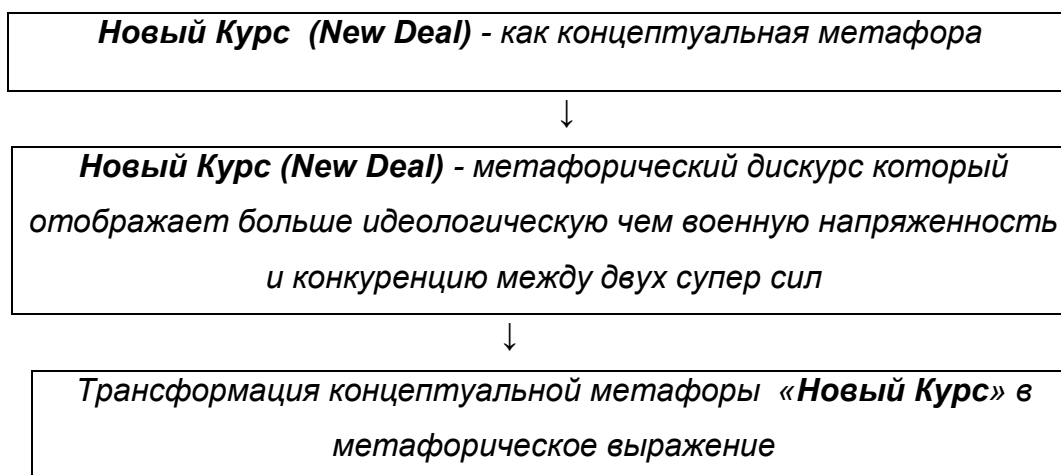
Для любого политического дискурса, идеология является основным принципом. Согласно В. Дайк, каждая идеология, несмотря на ее глобальную сущность, ее основное свойство зависит от того, в какой конкретной политической культуре она существует.

Согласно мнению Эдельмана, метафора это средство передачи информации, он считает, метафорические и метонимические выражения дают не только широкое, но и более упрощенное название проблемам или вопросам которые пробуждают внимание [10; с. 65]. Метафоры становятся символом более широких проблем. Например, Франклин Рузвельт в один из самых сложных периодов в истории США, «Великая Депрессия», в своей речи призвал народ к соучастию в новой, разработанной им политической стратегии «Новый Курс»;

“I pledge you, I pledge myself, to a “New Deal” for the American people” (Franklin Roosevelt, July 2, 1932, Capitol Plaza, Presidential Elections).

В этот период когда все надежды были исчерпаны, специально-разработанная программа, названная метафорическим выражением «Новый Курс», показала свою силу во всех сферах страны. За короткий период уверенность в стране возросла, и Соединенные штаты удачно перетерпели эти сложные годы «Великой Депрессии». Политика «Нового Курса» стала спасительной и новой стратегией, давший толчок развитию экономики, и многих других сфер США. Это метафорическое выражение, из локальной стала глобальной, в разные периоды многие страны также пережили свой собственный «Новый Курс». Согласно Эдельману, метафорические и метонимические выражения особенно важны в период общественного беспокойства, когда общество нуждается быть убежденным в том, что есть пути решения проблем и правительство этим занимается. И это является еще одной причиной почему метафорическое выражение «Новый Курс» был удачным.

Функционирование данной метафоры мы можем проследить по следующей таблице.



Метафорические и метонимические выражения помогают слушателям воспринимать тексты политической речи, и узнать цель политиков, а также как они соотносят себя с народом, насколько они заинтересованы мнением общества, так как всякий политический текст обладает информативным значением.

Анализируя речь политиков, мы можем заметить, что адресуя свою речь большой аудитории, политики используют в два или больше раз метафорических или метонимических приемов, чем если речь адресуется малой группе. Так как если обращаясь большой группе людей, речь должна охватывать интересы и мнения всей аудитории, и поэтому для убеждения и поддержки, политики обращаются к метафорам. Преимуществом речи обращенной малой группе является то, что здесь обе стороны разделяют общие интересы, и целью политика не является убедить свою аудиторию, они лишь делятся общими интересами.

Метафора ранее считалось как прием для литературного языка, особенно в поэзии. Но в своих работах, лингвисты, как например Лакофф и Джонсон [9], убедительно настояли и доказали что это неправильный подход. Метафоры соответствуют практически всем сферам и всем видам дискурса. Нужно учесть то, что метафорические и метонимические выражения, способны влиять на понятийную систему человека и на его поведение, поэтому вполне очевиден интерес не только политиков, но также деятелей многих других сфер к метафорическим и метонимическим выражениям.

Главной целью данной статьи является выявить, показать неотъемлемую роль метафор в политической жизни государств. Важные исторические моменты государств, запоминаются путем метафорических или метонимических выражений, которые подобраны так, что охватывают все события и подчеркивают роль и важность данного события в истории государства.

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Social and Pedagogical Analysis of the Particularities of Socialization of Adolescents

Abstract: The article provides an analysis of the theoretical basis of socialization of adolescents and reveals the particularities of the process of socialization of adolescents. The research shows that the process of socialization of adolescents has specific features, which include a variety of forms of behavior distinguished by the pretenses at being an adult, increased sensitivity and vulnerability, heightened arrogance, need for grouping, unstable interests, etc.; the research also takes into account the particularities of adolescence as a period of formation of the value system, behavioral orientations, personal and social characteristics and qualities.

Keywords: process of socialization, adolescents, society, pedagogical support, youth organizations.

Introduction

At a current stage of societal development the issue of socialization is highly relevant; ultimately, it concerns the socialization of adolescents because it is this period of life that lays the foundation of a personality, his/her ability to adequately evaluate social processes and to apply gained experience to one's own life activities.

Problem Statement

With social and cultural transformation of the Ukrainian society and a shift of the country to the democratic model of governance, recent years have seen a dramatic change in traits of adolescents. Modern adolescents are characterized by increased mobility, cognitive activity; over a short period of time, in their environment they can adopt various attitudes, which define to a certain degree the orientation of a personality towards life.

We based our analysis of the theoretical basis of socialization of adolescents on the research by R. Vaynola, N. Zaveryko, I. Zvereva, A. Kapska, L. Koval, etc. Notably, the research by L. Koval, I. Zvereva, etc. deals with the particularities of

organization of social and pedagogical work with children and youths; the studies by R. Vaynola, N. Zaveryko, A. Kapska, etc. are devoted to social and pedagogical work in a youth and adolescent environment. Today's practice strongly requires a specific research oriented on the target consumers of respective social and pedagogical knowledge, which, in our case, turn out to be youth organizations, their leaders, educators, government officials that deal with the issues of children and youths.

The aim of the research is to carry out a social and pedagogical analysis of the particularities of socialization of adolescents.

With regard to the aim we set out the following **tasks**:

- specify the terminology of the problem in this research;
- research psychological readiness of adolescents for socialization;
- characterize the particularities of socialization of adolescents and define the specifics of the process of socialization of adolescents as a social and pedagogical issue.

Nature of the Process of Socialization of Adolescents

Nowadays the term 'socialization' is used as a scientific category of philosophy, sociology, pedagogy, psychology, anthropology, etc. Nevertheless, the analysis of the references proves that the notion 'socialization' was first used in Western sociology in the late 19th c. to denote the main pattern of interaction of one individual with another and with society as a whole [1]. The representatives of French social studies, namely É. Durkheim, M. Mauss, S. Bouglé, etc. made a substantial contribution into the research of the issue of socialization.

According to A. Kapska, "socialization is a bilateral interdependent process of interaction between an individual and a social environment which presupposes his/her inclusion into the system of social relations both via acquisition of social experience and independent recreation of these relations which form a unique, one-of-a-kind personality" [2].

Exploring the phenomenon 'socialization' V. Picha defines it as a complex, constant process of assuming social roles and cultural heritage, "which starts in early childhood and ends in advanced age (with the death of an individual)" [3].

The dictionary and handbook for social teachers and social workers gives one of the interpretations of the notion 'socialization' that describes socialization as "an individual process of gaining social experience, social connections and relations", which "enables inheritance and transformation of personal social experience into

one's own attitudes, orientations, knowledge, skills, etc. Non-socialized people who live and act in society do not exist" [4, p. 189].

Today, when dealing with a certain social and pedagogical task, we must take into account that socialization is, first of all, interaction of an adolescent with a large number of various conditions and influences of the environment — the factors of socialization that are more or less reflected in his/her development and formation. The first group includes megafactors (space, planet), the second — macrofactors (ethnic group, society, state), the third — mesofactors (region, city, village), the fourth — microfactors (family, school, neighbors, peers, after-school educational establishments, religious, private, public, countersocial NGOs, micro-society). Depending on the intensity of mega-, macro-, meso- and microfactors, the researchers identify different kinds of socialization [5].

Successful socialization, according to V. Lisovsky, guarantees the development of a personality, ability to think and act independently; and the unsuccessful provokes a psychological state of anxiety, insecurity of the future, inability to define one's social role [6]. Adolescents are not only the object of action of society; they must become an active subject of social life. Maturity of their consciousness, level of politeness, social activity, acquirement of values, formation of personal qualities to a great extent define the end result of socialization: the adolescent must establish him/herself as a personality.

A modern adolescent lives in a socialization environment, complex in its content and trends; he/she suffers from social, economic and moral instability and injustice more often than the representatives of other age groups. Therefore, it is necessary to ensure that the environment positively influences on socialization of adolescents.

Nowadays, Ukraine obviously provides a lot to create such an environment: this involves, first of all, a whole range of various social institutions (cultural and educational centers, sports and fitness clubs, public and private child and youth centers, NGOs, etc.).

It is undeniable that in the process of socialization the adolescent acquires certain experience that is reflected both in positive and negative consequences of his/her development. Positive consequences include: self-confidence, 'becoming one's own person', formation of self-consciousness, career choice, first manifestations of skills, shaping of one's worldview. Negative consequences of development

are characterized by: a sense of inferiority, vague social role, uncertain career path and attitude to life, loneliness, obscure sense of further life activities.

Adolescence is the hardest and most difficult of all ages of an individual since it is the time of personality development. This is the most important period as it is adolescence that creates the foundation of spirituality, moral stance, attitude towards oneself, other people and society [7]. During this 'transitional' coming-of-age accompanied by a dramatic development, adolescents feel the transience of this state and want to take a respective place in the social structure as soon as possible and achieve a certain social status [8]. It is these defining aspects of socialization that the adolescents look for in the activities of various youth organizations, associations, groups, and groupings.

Psychological readiness of adolescents for action often faces vague goals, lack of life experience, inconsistency, and inability to channel the energy for a good cause. The process of acquisition of social qualities by adolescents first reveals their independent actions and initiative that, at this stage, are characterized by variety and 'dispersion' of interests and needs [8]. This complicates the process of socialization and raises numerous social and pedagogical issues. It should be noted that the researchers view adolescence as a period of individualization when boys and girls want to stand out among others, critically treat social norms of behavior, and have more inclination to asocial and even antisocial displays. Adolescents negatively react to various remarks and demands. Failures drastically change their mood; they feel guilty, anxious, inferior, dejected, and powerless. At the time they acutely sense any tension or insincerity in relations with their parents, relatives, educators, and consequently look for communication outside their usual circle of family and school. 'Coming out into the street' the adolescent wants to belong in the company of his/her peers or young people; they have an extremely high sense of community ('we'), that's why they look for and establish contacts with various youth and adolescent groups, groupings, children and youth organizations, etc.

Exposed to positive influence of powerful pressure from various people and conditions during his/her development and the preconditions for gradual adaptation to the environment, the adolescent thus gains experience. Undeniably, a modern youth and adolescent environment has certain negative processes and deformations going on, such as unreasonably intense advocacy of the material over the spiritual which leads to weakened morality and values of the new generation.

The activities of youth organizations have an enormous educational and socializing potential for stimulating social activity and development of the adolescent, his/her personal qualities. Yet, nowadays there are not only socially useful (prosocial) youth organizations, but also asocial and antisocial organizations (associations, groups, groupings) that have a negative influence on the process of socialization of adolescents and pose a serious social and pedagogical problem. In this respect, there is an urgent need for pedagogical insight into the activities of various youth organizations as a social and pedagogical pattern of socialization of adolescents.

Research Results

The analysis has shown that in the process of socialization of adolescents it is necessary to take into account: firstly, the fact that a modern adolescent lives in an environment of socialization, complex in its contents and trends; he/she suffers from social, economic and moral instability and injustice more often than the representatives of other age groups, and this serves as a foundation for all the other subsequent stages of socialization which provides a basis of his/her personal fulfillment in society; secondly, specific traits of adolescents; thirdly, that the activities of prosocial youth (formal and informal) organizations provide real possibilities for efficient socialization of adolescents; fourthly, that we should look for a scientific basis to improve the process of socialization of adolescents in the activities of youth organizations through fundraising of external and internal resources of social and pedagogical work.

Conclusions

1. The analysis of the references has proved that the notion 'socialization' is regarded by the researchers as a complex manifold social phenomenon with its specificity reflected through various social conditions and diversity of its content and procedural sides.

2. The theoretical analysis of the references allows us to argue that psychological readiness of adolescents for action often faces vague goals, lack of life experience, inconsistency, inability to channel the energy for a good cause. This incoherence results in numerous social and pedagogical issues; and spontaneous socialization, which is most typical of adolescents, has a negative influence on their development and formation.

3. The process of socialization of adolescents in youth organizations can be adequately understood only on the basis of the studies into a general socialization

process and specific traits characteristic of adolescents; this process will be more successful on condition that they will be engaged in the activities of various youth associations which combine collective, educational, cognitive, occupational, organizational and other types of activities.

Thus it can be argued that there is an overwhelming need for the increase in the number of prosocial youth (formal and informal) organizations, their pedagogical support and public recognition as full-fledged social institutions. The abovementioned positions provide a necessary basis for producing social and pedagogical recommendations aimed at enhancing the efficiency of the process of socialization of adolescents in the activities of youth organizations.

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Connotative marking of the concept DOG in the English language

Abstract: This article deals with the study of the particularities of the concept DOG implementation taking into account the semantic connotations in English sphere of concepts.

Keywords: concept, sphere of concepts, connotation, zoonym, phraseological unit, English worldview.

The problem of connotation refers to the basic problems of linguistics that do not disappear from the sight of researchers, but at different times is solved in different ways. In linguistics the study of meaning of lexical units was raised by the authors of grammar such as A. Arno and K. Lanslo. Unlike logicism, the authors of Port-Royal grammar, who provided only adjectives with the meanings, modern linguistics considers that potentially all parts of languages can contain associative meanings.

Today the problem of rational and emotional, general and personal, subjective and objective in the language is still actual. As Charles Bally noted, «live speech in all its manifestations reveals the rational and emotional sides, presented in very different proportions depending on the mental state of the speaker, the specific situation and social environment» [2, 29].

The problem of rational and emotional in language became the subject of the research in the works of V. I. Hoverdovskyy, G. V. Kolshanskyy, V. Z. Panfilov and other linguists. In modern linguistics the rational component – denotation – was studied quite extensively. As to emotional in language, connotation – this component remains poorly studied. V. M. Telia notes that the connotative meaning continuously remained on the periphery of linguistic studies through the optionality of this component for the meaning of the units of language inventory, as not all words have connotations, especially that the connotation not so much deals with semantics, i.e. the relation of signs to the world, as to pragmatists – the attitude of speakers to the

means of world designation – or rather, the choice of the means to make a communicative effect [5].

Another reason is the crudity of the notion of expressiveness and lack of means description in linguistics to achieve this expressiveness. Therefore, the topicality of the article deals with the study of the connotative aspect of semantics that is one of the tools of the conceptual language description that restores with the help of language material the dominant image of the world, and the identification and systematic connotation description can detect certain patterns in the perception of extra-linguistic phenomena and processes of object categorization in human consciousness. The topicality is also determined as a result of insufficient studying of this problem exactly in English sphere of concepts with zoonym elements. The purpose of the article is studying the particularities of the concept DOG implementation taking into account semantic connotations in English sphere of concepts. According to the defined purpose there are following tasks: 1) to define the notion of connotation; 2) to justify a leading role of connotation in phraseology meaning; 3) to consider the evaluative zoonym concept DOG taking this into consideration the semantic connotations in English worldview.

The term «connotation» first gets a linguistic status in the works of L. Bloomfield. According to L. Bloomfield, each linguistic form has its emotional characteristics peculiar to a particular speech community. Among all other linguistic terms, connotation is as a matter of fact a stylistic term. The issue of emotionality, evaluation, strengthening occupies a significant place in the works of O. M. Wolf, E. M. Galkina-Fedoruk.

Yu. D. Apresyan believes that connotation of the words more or less stable essence that has usual nature, according to his remark that "connotations should be recorded in a special pragmatic or connotative places of the corresponding dictionary article and serve as a base during the interpretation of the figurative meanings of words that have no common semantic features with the main word [1, 68].

M. G. Komlev has another point of view, he speaks about the dependence of the scope of word-sign connotations of different people and at different stages of social development. «Even words of one person, used at different times, may have different connotations» [3, 121]. Most linguists (V. V. Vinogradov, C. Bally, K. O. Erdmann, L. M. Vasiliev, Yu. P. Solodub, N. I. Boiko and others) interpret connotation as a particularly important component of the word semantic structure as part of

meaning, connected with the characteristics of reality, the situation of speaking, certain attitude of the speaker to the subject of speech and so on. Connotation is a multicomponent unit, elements of which are evaluative, emotive, expressive and stylistic macrocomponents. Emotiveness is a verbal expression of emotions. Expression is a deviation from the norms and standards with the aim to strengthen the expressiveness and impact of the statements. Estimative component indicates positive, negative or ambivalent attitude of the speaker to the subject. The stylistic component reflects the social representations concerning the use of words in a given context.

Analyzing different definitions of connotation, we can conclude that this multifaceted phenomenon, undoubtedly, has both collective and highly individual components. According to Yu. M. Skryebnyev, a connotation of a linguistic unit, as a part of its meaning (its content, its designatum) at the same time is something external, alien in fact to the lexical meaning, something extra and extraneous, as a kind of label attached to things, proprietary label, indicating time and place of product manufacture and its cost [4, 21]. According to this point of view, connotation is a part of lexical meaning, i. e. a linguistic category, and also has extralinguistic background of appearance. Summarizing all above, we note that according to the notion of «connotation» there are two basic views: broad and narrow understanding of the term. In a broad sense, any component complements the subject-conceptual (or denotative) and grammatical meaning of language unit and gives it an expressive function based on information correlated with empirical, cultural, historical, philosophical, moral and aesthetic knowledge of native speakers with their emotional or value attitude to the depicted surroundings. In a narrow sense it is a component of word meaning that serves the secondary function of its notion that complements its objective meaning with associative - imaginative images of the denoted reality based on the understanding of the internal form of notion, in other words, signs related to the literal meaning of trope or figures of speech that motivated the rethinking of expression.

Most papers, dealing with the consideration of language evaluation, made within the cognitive approach to language studying. Cognitive methods can detect the connection of linguistic forms with structured knowledge and human experience, as well as reveal the mechanisms, underlying on the base of cognitive processes. Among the terms of the cognitive approach we can distinguish the notion of

«evaluative category» and «evaluative categorization». In capacity of the cognitive base of evaluative categories, evaluative concepts can be recognized, which in turn get a particular interpretation only within the interaction with the concepts of evaluated objects. At the base of this interaction there is the prototypical approach, i. e. detachment of the prototype (prototype structure) [6], simile, metaphor, metonymy. Taking into account the achievement of the linguo-cognitive direction towards the study of evaluative categories and evaluative concepts, we consider evaluative concept as an independent mental formation. We also take into account the fact, that evaluative concept does not belong completely to consciousness of the separate individual subject, but it is a part of the conceptual picture of the native speakers of the corresponding language, in other words, it belongs to the determined linguoculture. Therefore, in our work we consider the evaluative zoonym-concept DOG, which, depending on a particular situation, expresses the evaluation of certain stereotypes or values and is formed due to conceptualization of reality in the context of value, that means the system position of opinions and people's evaluation. Thus, the analysis of evaluative meaning implementation plays an important role in consideration and modeling of linguistic world-image.

Beside such zoonym units as *horse, cow, cat, hare, donkey*, a zoonym dog belongs to the key words in the English worldview.

Bright semantic specific character of the words appears in their connotations. Many peripheral denotative signs because of their specific content are closely related to emotion and evaluation. Knowledge of people's cultural connotations is a very important constituent in the study of language world view and conceptual structures. In relation to the animals in everyday life we can even trace the history of the formation of English society.

The lexical unit «dog» appears in English approximately in the 13th century. By the 18th century dogs in Britain were used only for hunting and protection. However, a social activist John Evelyn in his book «Diary» (1684) indicates the popularity of dwarf dogs among the English aristocrats. Expressions with the component DOG became the part of English culinary art. *Spotty dog* – duff, *dog's breakfast / dinner* – mess, *dog's nose* – a mixture of beer and gin.

The image of a dog is available in many cultures and associated with a specific variety of symbolic associations that are repeated at different times and in different nations. All this can be seen in English sayings, phraseology, idioms and

expressions. The analysis should highlight the following main aspects of the concept DOG: 1. fellow man; 2. pursuer; 3. guardian; 4. unworthy person; 5. worthless, despicable person. When characterizing any part of life there are the following meanings: something inappropriate, unsuitable for any purpose; 2. something heavy; 3. something humiliating. The meaning of «lad», «boy» we find in the following expressions: *big dog* - an important and dominating person; *lucky dog* - a fortunate person; *lazy dog* - a lazy person. The image of a dog as a guard or a pursuer, reflected in such sayings and expressions: to dog somebody - to follow someone closely and continuously; wake a sleeping dog – to put out of temper; let sleeping dogs lie – not to touch upon unpleasant issues.

Many English proverbs reflect general Indo-European notions of a dog as a criminal who has no right to human relationship: *a staff (or stick) is quickly found to beat a dog with; if you want a pretence to whip a dog, say that he ate the frying-pan.* «Dog» with a meaning of «worthless, despicable person» - is also a very widespread image. For example, the following expression can clearly demonstrate this meaning: *dog-trick, give (someone) the dog to hold, keep a dog and bark oneself, dog it, to dog away time.* Dog in a figurative meaning - is something inappropriate, unprofitable for any purpose. This is reflected in the following statements: *a dead dog, give (or throw) to the dogs, to be a dog.* The last expression can refer exceptionally to an unattractive or boring girl: *She's not a movie star, but she's not a dog either.*

In English phraseology there is a huge layer of phraseological units, proverbs, comparisons, in which a zoonym-concept DOG is used with the meaning of «humiliating, unworthy person». For example, *a dog's life, dog-rough, dog sleep, dog-nap, in the dog-house, on the dog-watch, dog day afternoon, dog-basket, dog's soup.* The analysis of the pragmatic orientation indicates that many phraseological units are stratagems that allow people to feel confident in modern world. The following expressions demonstrate these ideas: *Let sleeping dogs lie, barking dogs seldom bite, beware of a silent dog and still water, better be the head of a dog than the tail of a lion.* Some expressions show the living conditions of a person, his or her professional skills: *dog's life, watch dog.*

Phraseological units with an element DOG mark negative qualities of a person, manifestation of everyday hostility. *Dead dog, to put on the dog, dog-and-pony show, The black dog is on one's back (the black dog is on one's back (have the*

black dog on one's back), *Dogs of war*, *(As) sick as a dog*, *to go to the dogs*, *to throw to the dog*, *Every dog has his day*, *to help a lame dog over a stile*.

Thus, we see that English phraseological fund illustrates the presence of many units that represent the concept DOG, many of them carry expressive and emotional marking with a negative meaning, with a shade of irony, contempt and distrust. Representatives of the English linguoculture are indulgent, showing pity on a dog, but without feeling of admiration. The nature of the relationships develops according to the model «master-servant» unlike in Russian or Ukrainian worldview «master-friend».

Taking into account all mentioned above, it becomes clear the functional detachment of the key word «dog». Semantic and linguistic range of its use is quite common. This fact is reflected in analyzed examples, which are most depicted in the consciousness of English society. Research of the phraseological aspect of language, composed of zoonym-concepts in terms of connotative marking, gives us an idea of the national mentality, because phraseological units are defined by the specific outlook manifestation of people, which is formed as a result of many factors. The whole set of problems along with other peculiarities of zoonym-concept research is a task for our further scientific work.

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Qualification of unfinished crime

Abstract: The article is devoted to the qualification's features of unfinished crime. Set lacks of criminal and legal regulation of the types of unfinished crime and criteria of dissociation of preparation to the crime from encroaching (complete and unfinished) upon a crime. The expounded suggestions (governed) are in relation to qualification of unfinished crime and its kinds.

Keywords: qualification, unfinished crime, preparation to the crime, encroaching upon a crime.

A crime is an act (action or inactivity) that in or other measure lasts in time. At the committing of such act possible passing of row of implementation of criminal intent of person phases (stages) that carry out it. At the same time, on occasion this intention can be and unrealized to the end. At that rate the question is about an unfinished crime the certain specific, conditioned by those compositions of complete crimes are foreseen in the articles of Special Part of Criminal law, takes place during qualification of that.

In a criminal and legal doctrine distinguish: a) the stages of development of crime (criminal activity) (from five to seven stages), in particular, forming of intention on the commission of crime, exposure of intention, decision-making on the commission of crime, preparation to the crime, encroaching upon a crime, complete crime, disposing of criminal result); b) the types of crimes are after the degree of their completeness (complete and unfinished crimes); c) the stages of commission of crime (from two to three stages), for example, preparation to the crime, encroaching upon a crime and complete crime. At the same time, in scientific literature expounded and positions in relation to impossibility to acknowledge preparation to the crime, encroaching upon a crime and complete crime by the stages of crime. Unity of opinions of scientists touches only a question about expedience of selection of complete and

unfinished crime. Consider that after the degree of completeness crimes are divided into complete and unfinished, and last, in turn, it is possible to divide into kinds: preparation to the crime and encroaching upon a crime.

In accordance with P. 1 Article 13 of the Criminal Code of Ukraine (farther is CC) an act that contains all signs of corpus foreseen by the corresponding article of Special part of CC delict confesses a complete crime. According to P. 2 Article 13 CC an unfinished crime are preparation to the crime and encroaching upon a crime.

Thus, it is necessary to set during qualification of committed by a person act, that it accomplished a complete or unfinished crime. It should be noted that in the criminal legislation of determination of unfinished crime is not contain, and its kinds are only marked. System interpretation of Criminal Law grounds to reason, that an act that *does not contain* all signs of corpus foreseen by the corresponding article of Special Part of CC delict acknowledges an unfinished crime. At the same time, or is it possible to assert that absence of any sign of corresponding element of corpus foreseen by the article of the Special Part of CC delict testifies that a person accomplished an unfinished crime? For example, in opinion of Eu. V. Blagov, not establishment of corresponding sign of act can testify not to the presence of unfinished crime, but about absence of crime in general [1]. For this reason, most scientists assert that an unfinished crime takes place, when intention guilty not fully realized, the objective side of such corpus delict is not developed, real harm of object of encroachment is not caused. That is why, for example, absence of reason or aim, as signs of subjective side of certain corpus delict, testifies to absence of this crime in general, but not about an unfinished crime. Thus, it is possible to assert that absence only of certain signs of corresponding elements of corpus delict can testify that a crime is unfinished.

In a criminal and legal doctrine position spoke out also, that at an unfinished crime some sign of objective side of corpus delict is never enough [2]. With the brought approach over it is impossible unanimously to agree, as at preparation to the crime in general absent signs of objective side of corpus delict foreseen by Special Part of CC. The brought determination over can touch only to the crime attempted with material composition, and preparation to the crime with formal composition.

Consider that during qualification of committed act by a person, first of all, it is necessary to find out, what certainly complete crime a person gathered (tried) to accomplish, and then set or there are all signs of this corpus delict in its act. In a crimi-

nal legislation absent criteria of dissociation of unfinished crime are from complete. It follows to admit the general signs of unfinished crime: a) commission of intentional act, b) not leading crime to the end, c) on reasons that does not depend on will of a person.

In addition, for providing of correct qualification of unfinished crime clear dissociation matters: a) preparation to the crime from the exposure of intention (establishment of initial and eventual moments of preparation to the crime), b) preparation to the crime from encroaching upon a crime (establishment of initial and eventual moments of encroaching upon a crime), c) complete from the unfinished encroaching, d) attempt upon a crime from a complete crime (establishment of completion' moment of certain corpus delict).

In accordance with P. 1 Article 14 CC preparation to the crime are seeking out or adaptation of facilities or instruments, seeking out of accessories or plot on the commission of crime, removal of obstacles, and also other intentional conditioning for the commission of crime.

It should be noted that the use is in the law of approximate list of types of acts that present preparation to the crime, not very a legislative construction pretended for the criminal and legal adjusting. In opinion of separate scientists it is better to foresee or exhaustive list of such acts, or generalized private concept that would embrace all possible variants of preparatory actions. As overcoming all variety of preparatory to the crime acts is impossible, expedient will be a construction of norm with the generalized private term is conditioning for the commission of crime. Only after formulation of such concept possibly for the orientation of inquisitional-judicial practice to point the approximate list of such acts.

For correct qualification of preparation to the crime it is necessary to set initial and eventual its moments with the aim of clear dissociation from the exposure of intention and encroaching upon a crime. An initial moment of preparation to the crime is a commission of any act sent to conditioning for the commission of certain complete crime (in case of exposure of intention the certain actions sent to realization of this intention are not accomplished). The eventual moment of preparation is the successful conditioning for the commission of crime, which is why completion of such creation as a result, but not as begun, however completed process. Thus, for preparation there is characteristic absence of act that is described in disposition of the article of Special part of CC, and the anymore absence publicly hazard effects. Acts,

that inherent to preparation to the crime, are outside the objective side of complete corpus delict. For this reason, in scientific literature of preparation to the crime distinguish from encroaching upon a crime on the criterion of beginning of implementation of objective side of corpus delict that a person decided to do. However the use of this criterion is possible only at additional explanations in relation to that exactly it follows to consider beginning implementation of objective side of corpus delict.

In this connection a question appears about qualification of preparation to the crime with reference to the article of Special Part of CC, that foresees a complete crime, as an objective side of preparation to the crime is fully described in the norms of General Part of CC and only informatively related to the norms of Special Part of CC.

In accordance with P. 1 Article 15 CC encroaching upon a crime are commission by a person with direct intention of act (to the action or inactivity), directly sent to the commission crime foreseen by the corresponding article of Special Part of CC, if here a crime was not carried through on reasons that did not depend on its will. Is there a question at interpretation of this legislative formulation, which it follows to understand under the act directly sent to the commission of crime? In opinion of separate researchers an orientation of act is not encroaching upon a crime, but preparation to the crime, as is conditioning for his commission, because at encroaching upon the crime of act guilty is the direct commission of crime [3].

It should be noted that in case of crime attempted part of objective side of complete corpus delict is executed. If a person does not begin to execute an act ponderable in the corresponding article of Special Part of CC, committed at no terms it is impossible to characterize as encroaching upon a crime. That is why, unlike preparation, the objective side of encroaching upon a crime is described both in the norms of General and in the norms of the Special Parts of CC.

For qualification of encroaching upon a crime the construction of corpus delict that a person tried to do has an important value, as at that rate it follows to establish the incompleteness of objective side of certain corpus delict – absence publicly hazard effects or complete act in crimes with material composition or incompleteness of act in crimes with formal composition. For this reason, confession of commission by a person act first of all depends a complete or unfinished crime on the features of legislative construction of corpus delict. An attempt is possible both on a crime that is ac-

complished by an action (active behaviour) and on a crime that is accomplished by inactivity (passive behaviour).

In a criminal legislation, encroaching upon a crime is divided into two kinds. So, in accordance with P. 2 Article 15 CC a crime attempted is complete, if a person produced all actions considered that necessary for bringing to an of crime conclusion, but a crime was not complete on reasons that did not depend on its will. According to P. 3 Article 15 CC a crime attempted is unfinished, if a person on reasons that did not depend on its will did not accomplish all actions considered that necessary for bringing to an of crime conclusion.

In the theory of criminal law the debatable is remained by a question about a criterion that is posited division of encroaching upon kinds. Separate researchers suggest to acknowledge to such a subjective criterion – own presentation of guilty about a degree implementation of act at the commission of crime. Other scientists suggest for dividing of attempt into kinds to use an objective test – degree of implementation of objective side of corpus delict. Consider that an objective test is not quite suitable for dissociation unfinished from a complete attempt, as objectively at the commission of any type of attempt always are absent or publicly hazard effects, or not fully commission act, as a sign of objective side of complete corpus delict.

The initial moment of commission of encroaching upon a crime is beginning of act (to the action or inactivity) that is directly sent to the commission of crime, that is why beginning of commission of the action or inactivity, marked in disposition of the article of Special Part of CC. The eventual moment of attempt is: for a crime with material composition is a commission of the act marked in disposition, that did not entail a dangerous consequence publicly; for a crime with formal composition is breaking of commission of act, that is why its partial commission (for an unfinished attempt) and moment of establishment of unsuccessful attempt to accomplish a complete crime (for a complete attempt).

In accordance with Article 16 CC criminal responsibility for preparation to the crime and encroaching upon a crime comes after the Article 14 or 15 and after that article of the Special part of CC, that foresees responsibility for a complete crime. Consider that the use at that rate of term "responsibility" is not quite logical. Firstly, qualification of crime is preceded to bringing in of person to criminal responsibility. Secondly, the marked norm of CC decides a question not about criminal responsibility, but sets the rules of qualification of unfinished crime. Thirdly, the commission by a

person of preparation to the crime of small weight is subject to qualification, however it pulls criminal responsibility (P. 2 Article 14 CC). Finally, the criminal act of person must be skilled, however from criminal responsibility it can be exempt in the order set by a law.

In opinion of L. D. Gauchman a necessity of application is during qualification of unfinished crime of the articles, that regulate preparation and attempt conditioned by that foreseen signs of unfinished corpus delict in them, what absent in the articles of Special Part of CC [4].

Position speaks out in scientific literature in relation to possibility of commission of unfinished crime that comes true with indirect intention or from carelessness. At establishment of orientation of intention of guilty on a commission crime an important value has taking into account of reason and aim committed, as they testify to the presence of direct intention. It follows notices also, that an unfinished crime from a subjective side is characterized guilt only in the type of direct intention. First on this circumstance specified only when the question was about encroaching upon a crime, however in future this position was widespread on preparation to the crime.

Deem it wise to set forth the separate rules of qualification of unfinished crime.

1. Establishment for the person of careless form of guilt at the commission of crime eliminates its qualification as unfinished.

2. Establishment for the person of indirect intention at the commission of crime eliminates its qualification as encroaching upon a crime.

3. Establishment of all signs of complete crime, by general rule, eliminates qualification of act as an unfinished crime. An exception is a presence of certain types of actual error in the act of person, that is why in case of wrong idea of person about the actual objective signs of committed by it.

4. It is necessary to set for qualification of unfinished crime that a crime that a person gathered (tried) to do was not carried through on reasons that does not depend on its will.

5. Every stage of commission of intentional crime comes true consistently and embraces by itself the previous stages within the limits of one corpus delict (encroaching upon a crime embraces by itself preparation to the crime; a complete crime embraces by itself unfinished crime). At that rate qualification of commission act comes true only taking into account the last stage.

6. If a person wished to accomplish a certain crime and actually commission answers all signs of this corpus delict by it, then even during partial realization of intention, act characterized as a complete crime. If a person wished to accomplish a certain crime, however it is actually commission by her does not answer all signs of this corpus delict, then commotted is characterized as an unfinished crime.

7. If intention of person contained an offensive publicly of the hazard effects, foreseen by the article (by part of the article) of Special Part of CC, that sets responsibility for more grave crime, than it is actually caused, committed it is necessary to characterize as a crime attempted.

8. If intention of person contained an offensive publicly of the hazard effects foreseen by the same article of Special Part of CC, that and actually caused, then committed it is necessary to characterize as a complete crime.

9. If acts committed a person at preparation to the certain crime or encroaching upon his commission contain the signs of other complete crime simultaneously, all committed it follows to characterize after totality of crimes, one of that is unfinished, and other complete.

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Sub-dialects of evens of Yakutia: experience of linguistic and geographical research

Abstract: This paper attempts to describe some dialects of the evens of Yakutia in linguistic and geographical aspects. The paper presents new data of sociolinguistic, ethnographic and linguistic studies.

Keywords: even language, dialect, speech, area, lingvogeografiya, evens, interference.

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Говоры эвенов Якутии: опыт лингвогеографического исследования

Аннотация: В статье предпринимается попытка описания некоторых эвенских говоров Якутии в лингвогеографическом аспекте. В работе приводятся новые данные социолингвистических, этнографических и лингвистических исследований.

Ключевые слова: эвенский язык, наречие, говор, ареал, лингвогеография, эвены, интерференция.

Эвены являются одним из малочисленных народов Севера и Сибири Российской Федерации. В научной литературе известны как ламуты, что означает «приморские жители». Эвены живут на территории Северо-Востока Азии

локальными группами в 13 улусах Республики Саха (Якутия); в Ольском, Северо-Эвенском, Омсукчанском, Тенькинском, Ягоднинском районах Магаданской области; в Охотском районе Хабаровского края; в Билибинском, Анадырском районах Чукотского автономного округа; в Быстринском районе Камчатской области; в Пенжинском, Олюторском, Тигильском районах Корякского автономного округа.

Рассматривая этногенез эвенов, один из исследователей В.А. Туголуков отмечает следующее: «Ламутов, или теперешних эвенов, мы рассматриваем как особую ветвь тунгусов, чьи антропологические, лингвистические и этнографические особенности обусловлены их развитием на северо-востоке Сибири. Формирование указанных особенностей объясняется поглощением ламутами в процессе их расселения по Северо-Восточной Якутии, Чукотке и Камчатке части пеших коряков и большинства юкагиров» [1].

В последнее время в эвенской диалектологии предпринимается попытка исследования говоров лингвогеографическим методом, которая дает возможность привлекать новые лингвистические материалы и также материалы по этнографии и социолингвистике.

Ареалом распространения рассматриваемых говоров является территория Республики Саха (Якутия), где в культурном, этногенетическом, социально-экономическом взаимодействии проживают представители 5 коренных малочисленных народов Севера, относящиеся к различным генетическим группам: эвены и эвенки - к тунгусо-маньчжурам; чукчи и юкагиры – к палеоазиатам; якуты и долгане – к тюркам, различающиеся по культуре, языку, традициям.

В настоящее время известны 3 классификации эвенских диалектов и говоров. В.И Цинциус в своей книге «Очерк грамматики эвенского (ламутского) языка» (1947) [2] выделила в эвенском языке 11 диалектов и говоров. По этой классификации к восточному диалекту входят: ольский, колымско-омолонский (Среднеколымский район ЯАССР), камчатский, охотский, верхнеколымский (Среднеканский район), индигирский (Момский район ЯАССР), томпонский. В группу западных говоров входят: саккырырский (Саккырырский, Булунский, Жиганский районы ЯАССР), ламунхинский и юкагирский (Усть-Янский район ЯАССР). Особняком стоит арманский диалект.

Согласно классификации К.А. Новиковой (1960) [3] в эвенском языке три наречия: восточное, среднее, западное. В восточное наречие она включает го-

воры крайнего северо-востока Азии, в среднее наречие относит все эвенские говоры эвенов Якутии, кроме двух говоров: ламунхинского и тюгесирского, которые включены в западное наречие.

В «Сравнительном словаре тунгусо-маньчжурских языков» (1975-1977) [4] указаны 15 наименований эвенских диалектов и наречий: быстринский, андырский ольский, охотский, колымско-омолонский, пенжинский, северо-эвенский говоры (восточное наречие), анюйский, аллаиховский, томпонский, момский говоры (среднее наречие), саккырырский, тюгесирский и юкагиский говоры (западное наречие) и арманский диалект.

По утверждению А.А. Бурыкина: «Состояние проблемы на сегодняшний день таково, что практически все классификации, представленные выше, нуждаются в серьезном пересмотре и требуют уточнений и дополнений» [5].

На сегодня хорошо изучен лишь восточный ареал проживания эвенов (Камчатка, Чукотка, Магаданская область, Хабаровский край), на территории же Якутии диалектологические исследования далеки от завершения. Поэтому характеристика говоров и диалектов эвенов Якутии, выявление ареала распространения, лингвистических особенностей, систематизация и классификация имеющихся данных, отличающих данные языковые формации друг от друга, имеет большое значение для описания исчезающих языков коренных малочисленных народов Севера. При этом важно учесть специфику функционирования языка в современных условиях [6].

В последние годы с 2003 г. по 2015 г. нами были проведены лингвистические экспедиции в места компактного проживания эвенов. В ходе поездок были собраны новые социолингвистические, этнографические и диалектологические материалы по нижнеколымскому, верхнеколымскому, ламунхинскому, усть-янскому и томпонскому говорам эвенов, которые лягут в основу планируемого диалектологического атласа эвенского языка. Полученные результаты нашли также отражение в работах С.И. Шариной [7, 8, 9, 10], Р.П. Кузьминой [11, 12, 13, 14].

Для большинства эвенов республики исторически характерно эвенско-якутское двуязычие, а в XX в. – эвенско-якутско-русское трехязычие, а в некоторых районах проживания эвенов, в частности, у эвенов Нижней Колымы отмечается многоязычие, кроме родного языка, они используют якутский, русский,

юкагирский, чукотский языки. По языковой формации нижнеколымский говор следует отнести скорее к западному наречию эвенов.

Данная этническая группа эвенов в Нижнеколымском улусе проживает в трех населенных пунктах: п. Черский, в с. Колымское и с. Андриюшкино. Самоназвание нижнеколымских эвенов – «илкан», что означает «настоящий». Численность эвенов-илкан в улусе составляет 520 человек, из них в п. Черский - 44 чел., в с. Андриюшкино - 375 чел., в с. Колымское - 101 чел. Самоназвание данной этнической группы эвенов – «илкан» - означает «настоящий». Эвены-илканы занимаются традиционным хозяйством - оленеводством. В с. Андриюшкино эвенский язык изучается в школе и в детском саду как учебный предмет.

Территорией проживания ламунхинских эвенов является северо-западное Верхоянье Якутии п. Себян-Кюель Кобяйский улус. Этнический состав данных эвенов довольно неоднозначный, представляющий собой сложное административное образование, включавшее долганов, тугочеров, алданских буюксийров, а также оламученных якутов-хоринцев.

По данным переписи 2016 г. населения села составляет 754 чел., из них 647 эвенов. Ламунхинцы являются этнической группой, сохранившей язык, материальную и духовную культуру эвенов. Традиционным хозяйством ламунхинских эвенов является оленеводство, охотничий промысел. Эвенский язык преподается в дошкольном учреждении и в общеобразовательной школе с 1 по 11 классы, в которой обучается на сегодняшний день 158 учащихся. Также в селе функционируют больница, детский сад, отделение связи и другие учреждения.

По классификации говоров и диалектов эвенского языка ламунхинский говор отнесен исследователями в западное наречие. По всем своим показателям язык ламунхинских эвенов представляет несомненный интерес своими фонетическими, морфологическими и лексическими особенностями, существенно отличающимися его от говоров восточного наречия и литературного эвенского языка. В настоящее время уровень владения родным языком среди ламунхинских эвенов довольно высок, все представители этого говора свободно говорят на своем родном языке, а также в повседневной речи используют якутский и русский языки.

В Верхнеколымском улусе Якутии эвены компактно, в количестве 95 человек, проживают в одном населенном пункте - в с. Утая. В селе имеются общеобразовательная школа, фельдшерско-акушерский пункт, детский сад, дом культуры, сельская библиотека. Основной хозяйственной деятельностью эвенов данной локальной группы является оленеводство.

В результате полевых исследований были собраны языковые и этнографические материалы данной этнической группы. Информантами выступило старшее поколение эвенов в возрасте от 62 до 78 лет. В ходе лингвистических исследований обнаружилось, что интерференция наблюдается на всех уровнях языка. Особенно это заметно в области фонетики и лексики. В речи верхнеколымских эвенов отмечается использование значительного количества лексем, заимствованных из якутского языка. По дифференциальным признакам данный говор следует отнести к группе переходных говоров, вобравшей в себе черты говоров восточного и западного наречий.

Согласно проведенным социолингвистическим исследованиям, язык верхнеколымских эвенов подвергся ассимиляции. Среди эвенов данной локальной группы на родном языке говорит только старшее поколение. Число владеющих языком не превышает 10 человек. Носители эвенского языка все чаще предпочитают использовать в быту якутский язык. Данная тенденция наблюдается не только у представителей исследуемой группы эвенов. Нужно заметить, что по всей территории, где проживают эвены, происходит полный переход с эвенского языка на якутский.

В научной литературе язык эвенов Усть-Янского улуса Республики Саха (Якутия) принято называть юкагирским говором эвенского языка. По исследованиям в области фонетики, морфологии и лексики усть-янскому говору присущи черты говоров западного наречия эвенов.

Представители данного говора эвенов локально проживают в п. Депутатский, Уянди и Сайылык Усть-Янского улуса Республики Саха (Якутия). Эвены Усть-Янья имели в прошлом следующие родо-племенные названия: деллянкин (Суздаловы), мэмэ (Голиковы), кукуюн. По данным предоставленным Ассоциацией эвенов Усть-Янского района Якутии на территории района проживает 567 эвенов. Число владеющих родным по району составляет 39 человек, в с. Уянди - 11 человек, в с. Сайылык - 14, в п. Депутатский - 14. В с. Уянди и Сайылык

эвенский язык изучается с младшего дошкольного возраста до одиннадцатого класса средней школы.

В Томпонском районе Якутии эвены компактно проживают в одном населенном пункте – в с. Тополиное. Население села составляет 913 человек, из них 749 эвенов. В прошлом томпонские эвены имели следующие родоплеменные названия: годнинкан, мэмэ, кукуюн, гэрбэнкэн. Традиционным хозяйством томпонских эвенов является оленеводство. Эвенский язык преподается в селе в общеобразовательной школе.

При сборе лингвистических и фольклорных материалов респондентами выступили 13 эвенов в возрасте от 76-ти лет до 46-ти лет. Также в ходе полевых исследований было проведено социолингвистическое анкетирование среди населения села. В ходе анкетирования было выявлено следующее: эвенский язык бытует в основном в бытовой речи и в производственных коллективах, т.е. в оленеводческих бригадах; среди молодого поколения эвенов основным средством общения является русский язык; среди респондентов старшего возраста отмечено трехязычие, владение эвенским, русским и якутским языками.

Томпонский говор отнесен исследователями в языковую формацию под названием «западное наречие эвенского языка». Язык томпонских эвенов отличается своей неоднородностью, но в последнее время различия в речи среднего поколения представителей упомянутых выше родов годнинкан, мэмэ, кукуюн, гэрбэнкэн нивелируются, но при этом сохраняются в речи старшего поколения. Язык старшего поколения аллах-юньских эвенов, предки которых переселились в Томпонский район из Аллах-Юня, а прежде в Аллах-Юнь – с Охотского побережья, близок к восточному наречию эвенского языка. Язык адыччинских эвенов по своим фонетическим особенностям наиболее близок к среднему наречию эвенского языка. Язык бараинских эвенов имеет сходство с ламунхинским говором западного диалекта эвенского языка.

Таким образом, исследования показали, что на территории Якутии сформировалось лингвистическое пространство, испытавшее сильнейшее влияние якутского языка, отчасти и юкагирского, явившееся следствием культурных и языковых контактов.

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Aesthetical comfort of the restaurant room as a basis of service culture in public catering institutions

Abstract: The article is devoted to the researching of the aesthetic comfort where the functional «cooperation» between rest and public catering dominates. The interior space unites different parameters, which are little researched in their complex.

Keywords: aesthetics, interior, public catering, restaurant, rest, comfort.

Service culture is a rather wide and complex concept. It is viewed as a complex of measures concerning ethical and aesthetic norms, keeping the technologies of serving, security standards and decoration of the interiors inside and outside. Every institution can form its own culture. The culture is defined by such factors:

- Staff's knowledge of moral standards and observance of them;
- Knowledge and observance of the rules, standards and technologies of service;
- Aesthetics of an interior, a creation of the comfortable conditions of service.

So, service culture is a feature of the conditions of guest service. It manifests itself in ethics of staff's communication with consumers and comfort of aesthetic environment. It consists of corporate communication culture and professional ethics.

Thus, service culture is an integral part of the general enterprise culture. In our opinion, it must be considered as a level of the service process development (or a level of its improvement). It is characterized by psychological ethical aesthetical organizational technical aspects etc. At the service enterprises, they are interconnected and determined by each other [3].

The ethical aspect of the service occupies the important place in the enterprise work of restaurant business. The high ethical culture is an obligatory feature of each worker of the hospitality industry. It is the most important moral requirement. Brutality, intolerance, ruddiness are inadmissible in any work sphere.

Any activity, particularly a communication, linked with comfort, is impossible without fixing its grounds. Among them, the moral-ethical aspects play the important role. They are special ethical categories, based on the ethical theories and conceptions. The last ones form the worldview basis of the morality; explain its origin and sense; create the conceptions of moral ideals as the highest moral values and purposes.

The interior is responsible for the improvement of welfare, convenience and effectiveness of the daily work, security and creation of the relax atmosphere. Moreover, an interior provides us with aesthetical tastes by the expressive decorative aesthetics.

Thus, we have general demands to an interior. They are aesthetical beauty, art style, provision of the rest and psychological comfort. The first one is made by the decorative activity. The second one creates the aesthetical attraction. The third one is managed by the effective interactive solutions. The last one does its best to make people feel good.

Making an interior project of a public catering institution it is very important to find the harmony between functionality and aesthetics. The creation of the exclusive design of the place (institution) depends on many of factors but clients pay their attention only to details. It can be a special atmosphere of the comfort and a pleasant interior design, matched the institution's style from point of view of the visitor. It can be any special detail of the café's design, pleasant lighting, comfortable chairs and tables. But we can't explain all sympathies with a restaurant by services and prices. A client can also see chairs, tables, dishes, walls, floor etc. All of them can influence a client [4].

Certainly, service belongs to the main indicators of a comfort in restaurant business. Analyzing this indicator, we have to find out how the interior of the catering room and other restaurant rooms meet the fixed requirements. We also need to know whether there are too many things in the rooms, they have too many decorative elements, or how they meet the requirements of the exploitation and modern aesthetics.

The quality of the restaurant service is a complex concept, connected with the consumption of two relations – material and immaterial. The immaterial elements of the restaurant services are an atmosphere, an attractive environment, aesthetics, affability, hospitality, calmness and a high level of the communicative culture. The

restaurant room, goods, equipment, other material resources and technologies of service presentation belong to the material side of the restaurant business [5].

Aesthetics of the services is characterized by the harmony of the architectural planning and colouristic solutions of the premises and conditions (rules) of service. The anthropogenic resources are rated according to cultural-historical and biosocial aspects from the side of decoration of the restaurant and settlement of the environment of hospitality.

The architecture of the modern enterprises differs by its functionality and aesthetical expression. Creating them architects show their professional skills, a great care after people and their comfort. You see the excellent art things make people feel good, cheer up consumers, impress visitors and forms an aesthetical taste of public catering workers and consumers [4].

All elements of the interior have to be linked with the planning-technological solutions – lighting, colour gamma, appearance of the equipment, furniture and tableware. They must match the fixed form of the service; create the single ensemble and underline the peculiarity of an enterprise. The interior decoration of rooms has to match the modern standards, be attractive aesthetically, technological, strong and economical. The functional and aesthetical interior decoration of the rooms in the public catering institutions makes people feel good and creates a pleasant environment for people' rest.

The decoration of public catering rooms is the organization of interior space in restaurant to provide comfortable conditions for the visitors dining and a high level of the services. The general comfort of the interior space of the public catering institution consists of functional, ecological and aesthetical comfort.

The functional comfort means the convenience using of any rooms in the restaurant and the realization of man's functional processes such as eating, resting, a personal hygiene and business meetings etc.

The ecological comfort is being created by the optimal physical characteristics of the interior space of the restaurant for an organism. It's the unity of temperature, humidity, sun rays, wind strings.

The aesthetical comfort is the result of harmony of the visual and spatial environment, achievements of entireness and coordination of all elements of the furniture, using of the decorative means of the interior, decoration of the surface and planting etc [4].

The design of an interior includes not only image objects, which are the fundament for the organization of the interior space with combination of different ac-

cents. For example, in the internal environment the centre of composition can be an unusual chandelier, a special system of ventilating pipes, an unique decorative vase in the corner of the restaurant room. The important elements of the aesthetical functional organization of the interior space of the public catering are also thin-ceramic porcelain sets and glass tableware in ensemble, presented on tables.

In particular, the porcelain tableware is perfect from the aesthetical point of view. It is the pleasant hygiene material on touching and easy for using in life. The colorful gamma and decoration of the tableware, the coordination of its shape with ornaments or anecdotal painting, the relation of the different styles of products with shapes and lines of the environment. The examples of high porcelain, put on the tables as the decoration of the central part of a table or furniture, have to correspond to other elements of the interior design, make feel people better and call an appetite.

The very elegant porcelain tableware of the high quality with gold painting, arms and shields, dynasty emblems and heraldically compositions in white field or their combinations with cobalt, purple and blue will not only to facilitate the impressions of the art synthesis but also to be an image accent of forming of the restaurant space.

In our opinion, the aesthetical-beautiful tableware belongs to the aesthetical comfort. The porcelain is the most pleasant for touching and useful in life. The colour of the tableware also influences the client's on emotional condition. It can cheer us up or put us out of humor, make a hearty meal or spoil it. Moreover, the gamma of the tableware' colours can be manifested in our mood and influence on a man's aesthetical comfort [6].

The furniture plays the important function in the design of the public catering rooms. The effective reasonable furniture is provided by the furniture's functionality. So the furniture must correspond to the functional space of room and standards of the quality and aesthetical comfort.

The level of the comfort is determined by the quality of the furniture, supplying and their size. In addition to it, the general comfort of the restaurant enterprise interior space is made by the decoration. It is connected with the colour gamma, decoration of surfaces, design, lighting, planting etc.

The important element of the restaurant rooms is the lighting. In hotels it has to make convenient conditions for living and contribute to effective service of the guests.

The works of art play the great role in the decoration of the restaurant interior space too. They are sculptures, ceramics, planting etc. The last one is a special

component of the decorative design which does aesthetical and utilitarian functions in the restaurant interior. We use planting to improve the art expression and its functional organization. The utilitarian function of plants means the creation of the proper microclimate in the building.

The order of the furniture in the self-service rooms must be simple and fixed. It provides free access to tables for consumers and staff of the public catering institution. Today, we use rectangular tables because they are more comfortable than round ones and allow rationally using the rooms' space.

Having made the review of the literature, we can conclude that the works, concerning the aesthetical comfort of the restaurant room as the basis of the service culture in the public catering institutions in Ukraine is little researched. Thus, we can state that the restaurant interior has developed according to architect-art tendencies. In addition, we have to underline that the comfort reflects as "the environment of act" as "the environment of the reflection".

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An institute of participation in an International criminal law and Criminal law of Ukraine

Abstract: In the article the general questions of institute of participation in an International and national Criminal law on the example of Criminal Code of Ukraine 2001 (further CC of Ukraine) are examined and the most meaningful international criminal and legal acts; genesis of institute of participation taking into account the variety of sources of international criminal law is presented.

Keywords: international criminal law, crime, participation, performer, competitor, organizer, instigator, accomplice, group of persons, organized group of persons, criminal organization, criminal society, criminal responsibility.

Intent attention to the questions of participation presently not by chance, as an amount and variety of the crimes, accomplished by two and more than persons beforehand arranging about it, increase steadily, or in general by groups with the different variants of organization of activity, with the high degree of danger as the transnational organized crime. An institute of participation, thus, is the legal instrument of fight against the organized crime, both in national and in international criminal law.

To the questions of criminal responsibility for criminal participation the Division VI of General part is devoted in CC of Ukraine that is named "Criminal Participation" and consists of 6 reasons of regulating the questions of criminal responsibility for joint criminal activity. It should be noted that separate norms, touching the institute of participation, are contained and in other divisions General and Special parts of CC of Ukraine.

CC of Ukraine contains common determination of concept of participation. By criminal participation in accordance with Article 26 CC of Ukraine is intentional joint participating of a few subjects of crime in the commission of intentional crime. The presence of legislative determination of concept of participation provides possibility of

unambiguous decision of row of questions. In particular, participation maybe only at presence of two or more than subjects of crime. Participation is tits intentional joint participating in the commission of crime. An only intentional crime can be accomplished in participation.

The analysis of legislative determination of participation allows distinguishing its objective and subjective signs. So, from an objective side participation is characterized quantitative and quality signs. At participation a few subjects (physical persons) (two or more) accept direct participation in the commission of crime, attaining age of criminal responsibility and were responsible in the moment of commission of crime. It is a quantitative sign of participation. The quality sign of participation is community of actions of accessories, consisting in the following: firstly, activity of each of accessories is associated and sent to the achievement of single criminal result. Secondly, publicly-dangerous consequences (in crimes with material composition) are single and indivisible for all accessories, that, regardless of role that each of them executed, must be responsible for committed crime on the whole. Thirdly, presence of objective stipulating connection between the actions of accessories and crime that was accomplished by a performer, as conscious activity of performer, depends on previous activity of other accessories, assisting the achievement of general criminal result.

The subjective signs of participation consist in the intentional joint participating in the commission of intentional crime. Intention of accessories includes: 1) mutual awareness of accessories about criminal activity each or one of them; 2) realization each of accessories that it by the actions together with actions other are accomplished by a crime or assists its commission; 3) desire or conscious assumption of offensive of single criminal result. Thus intention of accessories must be general and fastened in an achievement between them conspiracy. Such agreement can be verbal (oral), verbal or writing, outspoken by means of the use of technical equipment (telephone, Internet) and other. The method of achievement of conspiracy does not matter, a leading role is played by intention. By general rule, intention at participation of line. However at participation indirect intention is possible, in particular at criminal activity of organizer and accomplice at the commission of crime with material composition. Reason and aim of activity of accessories cannot coincide, that for the decision of question about a presence or absence of criminal participation value does not have, although can influence on qualification.

CC of Ukraine contains the separate article of criminal law, in that the types of accessories are clearly enumerated with subsequent legislative determination (Article 27 CC of Ukraine). Founding for such differentiation is a functional role of accessories, character of executable by them actions, and also degree of their participating in the commission of crime. So, a performer (sub-executor) is a person, that in participation with other subjects of crime directly or by the use of other persons that under the law is not subject to criminal responsibility for committed, committed crime, ponderable tits Code (P. 2 Article 27 CC of Ukraine). Legislative determination of performer of crime is plugged in itself by three varieties:

- a performer is a person, directly committing crime;
- sub-executor is a person directly participating in the commission of crime together with other persons (sub-executors);
- a mediocre performer is a person, committing crime by the use of other persons, under the law not subject to criminal responsibility.

In Article 28 CC of Ukraine is foreseen the forms of participation, distinguished depending on stability of subjective connections between sub-executors, namely: 1) group of persons; 2) group of persons on a previous agreement; 3) the organized group; 4) criminal organization.

In the theory of criminal law of Ukraine also distinguish the special questions of responsibility for participation, to that belong participation in crimes with the special subject, provocation of crime, excess of sub-executor, failed participation, voluntary abandonment of accessories.

Institute of criminal participation well known to the international criminal law too. The concept of participation in an international crime follows from the general concept of the participation, folded in a criminal and legal doctrine, legislation and practice of many countries. Traditionally under participation intentional joint participation is understood two or more than persons in the commission of crime. Unity of two signs is fixed in basis of understanding of participation, namely help (mutual help) of accessories that shows up in an assistance, that each of them renders or can render to other at the commission of crime and intentional guilt of accessories, that includes realization circumstance that a subject operates not alone, and together with other persons, renders assistance to them and (or) can expect for help from their side.

International and legal acts usually do not distinguish the separate types of accessories – specified more often in them, that any person, that "takes part as an

accomplice of any person that accomplishes or tries to commit" crime (d. "b" P. 2 Article 1 International convention about a fight against an capture of hostages, 1979), is subject responsibility; or simply "is sub-executor of person", accomplishing an act or encroaching upon an act (d. "b" Article 1 Convention about a fight against the illegal capture of air ships, 1970).

Article 6 Charter of the Nuremberg tribunal says directly about existence of such types of accessories, as a leader, organizer, instigator and accomplice.

Participation on an international criminal law has also certain kinds and forms that not always are straight specified in sources. For the beginning of consideration of this question it is necessary to appeal to one of major documents - to Charter of the International military commission for a court and punishment of chief war criminals of the European countries of axis from August, 8 1945 [1]. So, in Article 6 this charter the next types of accessories are certain: leaders, organizers, instigators and accomplices, participating in drafting or in realization of general plan or plot, directed to the commission of any of the crimes indicated in this charter. They bear responsibility for all actions accomplished by any persons for realization of such plan.

Charter of the International tribunal on Rwanda from November, 8 1994 in P. 1 Article 6 defined the personal criminal responsibility of person, that planned, instigated to, ordered or by another character assisted or won to planning, preparation or committing crime, indicated in this charter [2].

Roman statute of the International criminal court accepted in 1998 [3] in P. 3 Article 25 attaches criminal responsibility and punishment of physical person for a commission to them crime falling under jurisdiction of the indicated court, in next cases:

- if committed crime individually, together with other person or through other person, regardless of whether this person of criminal responsibility is subject or no;
- if a person orders, instigates to or induces to accomplish such crime, if this crime is accomplished or encroach upon its commission;
- if a person pander for the facilitation of commission of crime, instigates to or by another character assists to its commission or encroaching upon it, including giving facilities for its commission;
- if person, any by another character assists to the commission of crime or encroaching upon its commission by the group of persons operating with a general aim, thus some assistance must appear or intentionally, or for support of criminal ac-

tivity or criminal purpose, when it is related to committing crime, falling under jurisdiction of the International criminal court, or with realization of intention of group to commit crime;

- in regard to the crime of genocide or at direct and public instigation other to the commission of genocide.

Thus, for the institute of participation concordantly, to the Roman statute of the International criminal court next signs are inherent participation: person together with other person commits crime or encroaching upon a crime; at the commission of crime by the group of persons, its participants operate with a general aim; a person realizes a common design "intention of group" on the commission of crime.

In accordance with Article 25 the Roman statute a person that is subject to criminal responsibility: commits crime individually or with other persons; orders, instigates to or induces to commit crime; on purpose to facilitate the commission of such crime pander or by another character assists to its commission or encroaching upon it, including the grant of facilities for its commission.

The said allows drawing conclusion, that such types of accessories, as performer, organizer, accomplice, instigator, are foreseen in an international criminal law.

Forms of participation also can be different, that it contingently character and types of committed crime, features of subjective side. These can be the forms of participation, presented by the criminal statute of Ukraine: group of persons, group of persons on a previous agreement, organized group, criminal organization. Thus criminal responsibility of person can come both individually and as a member. So, for example, normative determination of two possible forms of participation is given to in Convention United Nations (THE UNO) against the transnational organized crime (Palermo, December, 13 2000): the structurally executed group is a group that did not by chance form for the immediate commission of crime and in that the roles of its members are formally certain not necessarily, continuous character of membership is specified or the developed structure is created; the organized criminal group is the structurally executed group in composition three or more persons, existing in the flow of certain period of time and operating concertedly with the purpose of commission of one or a few serious crimes or crimes, confessed by such in accordance with Convention of the UNO against the transnational organized crime from December, 12 2000, with that to get, straight or by implication, financial or another material benefit.

The "group of persons" is mentioned in the sources of international criminal law, but pointing is here absent on that, whether there is a previous agreement in such group or no.

In the Roman statute in Article 28 [3] the features of responsibility especially make a reservation in regard to commanders, persons, effectively operating as a military commander, and other chiefs, when criminal responsibility falls for the crimes included in jurisdiction of the International criminal court, if they are accomplished by forces or inferiors, that are under an effective command, power or control, as a result of unrealized control above such forces or inferiors in situations, when:

«... – such military commander or such person either knew or, in the circumstances folded on at that moment, must know that these forces accomplished or intended to accomplish such crimes;

- it is such military commander or such person did not accept all necessary and reasonable measures within the framework of its plenary powers for prevention or suppression of their commission or for the transmission of this question in competent organs for investigation and criminal proceeding;

- it is a chief either knew or consciously ignored information, that obviously specified on that inferiors accomplished or intended to accomplish such crimes;

- crimes affected activity falling under effective responsibility and control of chief;

- a chief did not accept all necessary and reasonable measures within the framework of its plenary powers for prevention or suppression of their commission or for the transmission of this question in competent organs for investigation and criminal proceeding".

Scientists distinguish the special form of participation - plot [4]. In this case subjects can be on territories of the different states, but their activity however will be strictly co-ordinated. For plot duration of preparation, plugging in the number of its participants of public agents, secrecy of activity, trenching, is characteristic upon the most essential international relations, up to the capture of power in a nation-state. Histories are also known examples of plot of the states at the commission of international crimes, for example in the period of Second world war, when the association of Germany, Italy and Japan in the conditions of the armed conflict happened.

The national criminal statute of the different states differently behaves to the problem of participation that it contingently, including, by determination of circle of subjects, to the number of that both physical and legal persons can be taken, as provided, for example, in the Criminal code of France. It is thus marked that "responsibility of legal entities does not eliminate such for physical persons - performers or accessories of the same acts", and term "sub-executor" is determined as a person that is conscious the help or assistance facilitated its preparation or completion, and a person, that by means of gifts, promises, threats, requirements, is equal, miscommissions or by plenary powers were provoked by a criminal act or gave pointing on its commission".

Thus, at committing crime, according to international, and also to the national criminal law of the different states, there can be simple forms of participation (for example, at the commission of piracy, contraband goods and etc.) and difficult forms with distribution of roles (for example, at terrorism, soldiery crimes and other acts), that allows to mark the wide aspects of study of institute of participation in an international law at the commission of international or conventional crimes, their reflection in the norms of national criminal law, and also their realization in practical activity.

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Casualties in the Rear of the Great Patriotic War ***(on the Yakut ASSR Content)***

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Людские потери в глубоком тылу ***Великой Отечественной войны*** ***(на материалах Якутской АССР)***

Великая Отечественная война была сопряжена с чрезвычайным напряжением всех сил населения Советского Союза как на фронтах, так и в тылу. Эта статья подтверждает тезис о единстве фронта и тыла. Весь советский народ сплотился для отражения фашистской агрессии. И малые народы, где бы они не проживали, не были исключением и внесли свою лепту в дело Победы.

Этой проблеме - проблеме людских потерь в Якутии, посвящено значительное количество трудов разного плана: статьи, публикации материалов Национального архива Республики Саха (Якутия), Территориального органа Федеральной службы государственной статистики по Республике Саха (Якутия), многотомное издание книги "Память" с пофамильным списком пропавших без вести, погибших на фронтах и вернувшихся с фронта, мемуары, монографии и т.д. [1]. Однако на каком этапе сейчас находятся эти исследования? Все ли досконально изучено?

Целью статьи является изучение состояния проблемы определения размеров людских потерь Якутии (в сжатых рамках этой статьи, на сегодняшний

день). Задачами являются: основываясь на достоверных статистических данных, выявить имеющиеся варианты людских потерь, а также, по возможности, сопоставить их с аналогичными показателями регионов страны.

Прежде чем изучить вопрос людских потерь республики, отметим, что в настоящее время существует проблема определения числа мобилизованных в армию и на трудовой фронт.

По данным исследователя Д.Д. Петрова, размеры мобилизации могли составить около 57,6 тыс. или 59,3 тыс. человек [2]. Известны и данные в 59238 чел., опубликованные в коллективной монографии сотрудников Института гуманитарных исследований «Народ саха от века к веку». В ней же утверждается, что всего на фронте погибло свыше 20 тыс. человек [3].

Некоторые итоги проделанной кропотливой, многолетней работы по публикации книги "Память" (с 1992 г. вышло 9 томов) подводит М.П. Габышев. Основываясь на методах подсчета Всероссийской Книги Памяти, он рассчитал безвозвратные потери Якутии, выразившиеся в цифры - не более 31-32 тыс. воинов [4].

В публикации Ю.Д. Петрова (доктора политических наук, проф., сына первого исследователя боевых потерь Якутии в Великой Отечественной войне Д.Д. Петрова) "Нести правду о войне" общее количество участников Великой Отечественной войны составляет уже 65386 человек, а вернувшихся - 15754 человек. В итоге, безвозвратные потери воинов-якутян на фронтах у него составили 49632 воинов [5]. Однако своих источников Ю.Д. Петров не называет.

Следовательно, могло пропасть без вести, погибнуть на фронтах до половины всех мобилизованных на фронт (боевой и трудовой). Проблема выявления реальной цифры людских потерь по республике в 1941-1945 гг. до сих пор актуальна. Надеемся, что будущие исследования ученых смогут приблизиться к реальным показателям потерь как на фронте, так и в тылу. Отметим, что по вновь обнаруженным нами данным Российского государственного архива социально-политической истории (РГАСПИ), с момента демобилизации и вплоть до 1 декабря 1947 г. в Якутию смогло вернуться лишь 13986 чел. [6] (число демобилизованных возросло и позже 1947 года).

Несомненно одно - Якутия потеряла лучших своих отцов, сыновей - будущее республики.

В тылу же положение было тяжелым. Оставшимся женщинам, пожилым людям и детям выпала нелегкая доля вынести на своих плечах все невзгоды, связанные с напряженным трудом, лишениями военного времени, неурожаем и жестоким голодом. Отсутствие кормильцев, ушедших на фронт, усугубляло их положение.

Сплошная коллективизация, обобществление крупного рогатого скота и лошадей, создание новых поселков (ранее якуты жили по аласам (якут.) - полугосклонная, плоскодонная котловина или ложбина размером от десятков кв.м. до нескольких десятков кв.метров, на днище которой формируется природный территориальный комплекс озер, болот, лугов. Образуются при потеплении климата и вытаивании подземных льдов. Распространены в областях развития многолетней мерзлоты (равнины Центр. Якутии) [7]), занимаясь традиционным скотоводством) накануне войны при отсутствии альтернативных источников пропитания (огородов, благодаря чему и выживало в голодные годы войны колхозное крестьянство России) послужили резкому повышению смертности сельчан. Впоследствии на естественном движении (смертность, рождаемость) городского населения это также отразилось - продуктивное снабжение, поступавшее из сел, фактически прекратилось. Смерть косила население сел и городов.

Чтобы представить более полно сложившуюся в Якутии демографическую ситуацию, я буду руководствоваться данными защищенной мной в 2014 году диссертации на соискание ученой степени доктора исторических наук. Итак, сравним показатели смертности населения Якутии с уровнем смертности тылового населения Сибири, Урала и РСФСР по таблице 1.

Таблица 1

**Состояние смертности тылового населения Сибири, Урала,
РСФСР и Якутии в 1941-1945 гг., % [8]**

Годы	Сибирь	Урал	РСФСР	Якутия
1941	21.2	22.8	-	37.7
1942	26.0	26.0	-	45.6
1943	18.4	17.6	16.5	42.0
1944	12.9	17.9	15.1	23.5
1945	9.9	10.5	14.1	17.5

В Якутии показатели смертности на 1000 чел. были выше в 1.9 раза смертности в Сибири и на Урале, в 2.2 раза выше смертности в РСФСР (по неполным данным). В то время как число смертных случаев в Якутии возрастало, в Сибири и на Урале оно сокращалось (за исключением 1942 г.).

Для полноты картины можно сопоставить известные показатели смертности в Бурят-Монгольской АССР с аналогичными данными по ЯАССР. Так, смертность (на 1000 чел.) в 1941 -1943 гг. в БМАССР составила 22,3, 22,4, 18,0, тогда как в Якутии (указано выше) – 37,7, 45,6, 42,0. А за 10 месяцев 1944 г. в БМАССР – 10,6, тогда как в Якутской республике за весь 1944 г. – 23,5. Превышение уровня смертности в Якутии над смертностью в Бурятии, зарегистрированной в 1942 – 1943 гг. (в самый сложный период Великой Отечественной войны) составило более чем в 2 раза [9].

Определенный интерес также представляют данные уровня смертности сельского населения в 1942-1945 гг. в Европейском Севере России - Вологодской области, которые были выше, чем уровень рождаемости и, следовательно естественный прирост оказался отрицательным (чел.): -28440, -22068, -8416, -1816. Однако, как отмечает исследователь О.В. Ильина, в данном отрицательном приросте сельского населения Вологодской области большое влияние оказало падение рождаемости, а не рост смертности [10].

Естественный прирост населения в Якутии в годы войны в основном имел отрицательную величину, исключение составил только 1945 г. Особенно значительным снижением показателей естественного движения оказалось в 1942 и 1943 гг. за счет высокого уровня смертности и низкой рождаемости.

Демографические последствия войны можно рассчитать по возможному естественному приросту за 1941-1945 гг. Если принять его на уровне четырех довоенных лет с 1937 по 1940-ой (примерно по 6938 чел. в год), то прирост за пять лет должен был составить 34690 чел. ($6938 \times 5 = 34690$). В таком случае потери составят 48,6 тыс. чел. ($34690 + 13872$ – отрицательный естественный прирост за 1941-1945 гг.) [11].

Оценку потерь в войне можно произвести и по отношению к ежегодному приросту численности населения. Так, если ежегодный прирост численности жителей республики за период с 1937 по 1939 гг. составил в среднем 13485 чел., то при сохранении темпов его роста число якутян достигло бы 486,4 тыс. чел. к 1.01.1946 г. ($13485 \times 5 = 67425$; 419000 – численность населения на

1.01.1941 г. + 67425 = 486425) [12]. Разница между фактической численностью и прогнозом составит дефицит в 121,7 тыс. чел. или 33.4% от действительной численности по состоянию на 1.01 1946 г. Итак, если бы не было войны, численность жителей Якутии могла бы увеличиться примерно на треть.

Таким образом, на сегодняшний день появились конкретные цифры возможных размеров людских потерь Якутии в Великой Отечественной войне. Будущие исследования, надеемся, смогут более подробно осветить эту проблему, а также уточнить некоторые аспекты касательно безвозвратных потерь на фронтах.

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Principle of the semantic anticipating of information of text as one of main at educating to reading

Abstract: The features of principle of the semantic anticipating of information of text open up in the article, his methodological bases, methodical features, are characterized. A ground overof his leading role is brought in educating to reading of scientific text.

Keywords: principle, semantic anticipating, speech activity scientific text, under-standing of information.

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Принцип семантического предвосхищения информации текста как один из главных при обучении чтению

Аннотация: В статье раскрываются особенности принципа семантического предвосхищения информации текста, характеризуются его методологические основы, методические особенности. Приводится обоснование его ведущей роли в обучении чтению научного текста.

Ключевые слова: принцип, семантическое предвосхищение, речевая деятельность, научный текст, понимание информации.

I. Введение. Деятельностный подход к обучению, в том числе к обучению иностранным языкам, предопределил необходимость более подробно рассмотреть некоторые стороны речевой деятельности и более четко определить лежащие в ее основе психологические механизмы. Одним из важных общефункциональных механизмов является механизм, основанный на действии универсального закона опережающего отражения действительности и являющийся объектом особого внимания исследователей.

Роль вероятностного предвосхищения, или антиципации, по мнению Б.Ф. Ломова, Е.Н. Суркова, определяется, тем, что оно является важнейшим и неотъемлемым *компонентом активности мыслительной деятельности* человека, «забегающей вперед» работе мозга [1]. Сам феномен мышления – это «важный психологический компонент в антиципации индивида» [2].

Важность механизма опережающего отражения при обучении пониманию смысла научного текста делает *актуальным* рассмотрение обоснования принципа семантического предвосхищения текста в процессе обучения.

II. Постановка задачи. *Цель статьи* – показать обоснование принципа семантического предвосхищения текста при обучении пониманию научного стиля речи.

Задача статьи – 1) проанализировать методологическую основу принципа семантического предвосхищения текста; 2) обозначить место вероятностного предвосхищения текста в кругу проблемы предвосхищения в речевом поведении; 3) показать вероятностное предвосхищение как механизм «регуляции понимания» в контексте речевой деятельности; 4) показать механизм предвосхищения при обучении выявлению смысловых связей научного текста. Четвёртая задача предполагает: а) анализ уровней структуры деятельности с акцентом на предвосхищении; б) показ прогностических умений в выявлении смысловых связей научного текста.

III. Результаты. Итак, проанализируем поставленные задачи.

3.1. Рассмотрим методологическую основу рассматриваемого принципа. Разработанная П.К. Анохиным в советской физиологической школе теория опережающего отражения действительности [3] явилась наиболее полной методологической основой для объяснения ряда однопорядковых явлений. Их природа изучалась Н.А. Бернштейном (модель потребного будущего) [4], Е.Н. Соколо-

вым (нервная модель стимула) [5], Д.Н. Узнадзе (теория установки) [6], Фрумкина (модели будущего, адекватность и неадекватность прогноза) [7] и др.

Сущность теории установки состоит в том, что все формы органической материи (от простейших до высших) обладают выработанной в результате длительной эволюции способностью передавать по определенным начальным сигналам дальнейшее наиболее вероятное развитие событий, готовиться к нему и упреждающе на него реагировать. Способность к прогнозированию реализуется на основе учёта наличной ситуации, а также накопленного или генетического опыта, что имеет огромное приспособительное значение для жизни в вероятностно структурированном мире.

Понятие опережающего отражения применимо к любой ситуации, к любому действию, совершаемому человеком. Оно предполагает наличие в качестве психофизиологической основы особого механизма в системе регуляции деятельности – вероятностного прогнозирования, без которого никакая целенаправленная деятельность невозможна. Вероятностное прогнозирование, по мнению Фейгенберга, определяется как «способность сопоставлять поступающую информацию о наличной ситуации с хранящейся в памяти информацией о прошлом опыте и на основании всех этих данных строить гипотезы о предстоящих событиях, приписывая им ту или иную вероятность» [8, с. 8].

Такое понимание механизма вероятностного прогнозирования относится и к речевой деятельности, поскольку все закономерности опережающего отражения распространяются и на нее. Истоками исследований явления опережающего отражения в речевой деятельности являются работы С.Л. Рубинштейна, Н. И. Жинкина, Л. Р. Зиндера, Е. М. Линова.

Для обозначения опережающего отражения в речевой деятельности используется ряд терминов: антиципация, апперцепция, предвидение, предвосхищение, прогнозирование, упреждение. Далее для обозначения опережающего отражения в речевой деятельности в целом используем родовой термин *предвосхищение* как наиболее нейтральный и отражающий в наиболее общем виде сущность явления.

В контексте речевой деятельности сущность механизма вероятностного предвосхищения состоит в выдвижении гипотез при восприятии речи, соотношении их с реально действующим стимулом, подтверждении или отклонении

выдвинутой гипотезы (З.И. Клычникова, И. А. Зимняя, Р. М. Фрумкина, Л. М. Хадарцева, Н. С. Харламова и др.).

3.2. В психолого-методической литературе нашли отражение следующие аспекты проблемы предвосхищения в речевом поведении:

– специфика исследования феномена антиципации в речевой деятельности (Фролова А.В.);

– основные вопросы вероятностно-статистической организации словарного запаса у среднего носителя языка (Р. М. Фрумкина, А. П. Василевич);

– влияние индивидуальных и ситуативно-контекстных экстралингвистических факторов на вероятностное предвосхищение (И. А. Зимняя, Л. Р. Мошинская);

– сравнительное изучение функционирования вероятностного предвосхищения на родном и иностранном языках (В. И. Ильина, З. И. Клычникова);

– разработка методик, определяющих уровень владения вероятностным предвосхищением (И. М. Курдюмова, J. W. Oller, P. Meara, P. Pimsleur);

– взаимодействие механизма вероятностного предвосхищения с другими механизмами рецепции (Э. Г. Волчков, Л. И. Апатова);

– разработка путей формирования механизма вероятностного предвосхищения (Н. И. Гез, Л. М. Хадарцева, И. Н. Алексеева).

Обратим внимание на то, что в кругу перечисленных аспектов предвосхищения речевого поведения в последнее время, с одной стороны, разрабатываются аспекты в связи с проблемой адаптации студентов 1 курса [9, 10, 11]. С другой стороны, разработка речевого поведения осуществляется в связи с проблемой механизма вероятностного предвосхищения в процессе понимания содержания иноязычного текста [12, 13, 14, 15 и др.]. Оба аспекта неразрывно связаны. Поднятые проблемы механизма предвосхищения при научении и, в частности, при обучении чтению также свидетельствуют об *актуальности* принципа семантического предвосхищения информации текста.

3.3. Вероятностное предвосхищение – это механизм *«регуляции понимания»*, так как способствует правильному и более глубокому пониманию сообщения (Г. Г. Сабурова, Н. В. Елухина, P. Angelis, G. Brom, K. Goodman, W. Livers, H. Rubenstein, P. Sewell). Последнее связано с выдвиганием гипотезы: чем точнее гипотеза, тем более объективно и более глубоко реципиент понимает развитие мысли в тексте. По мнению многих исследователей, отсут-

ствие у реципиента какой-либо гипотезы свидетельствует о непонимании текста.

Наличие способности к предвосхищению свидетельствует в определенной мере о *зрелости реципиента как чтеца* (С.К. Фоломкина, 1974; Н.С. Крейленштейн, 1979; Дж. М. Хьюз, 1974). На первых этапах обучения чтению на иностранном языке способность к предвосхищению позволяют чтецу синтезировать текст в единое целое, а при аудировании обеспечивает слитность, *что ускоряет процесс декодирования сообщения*. Декодирование сообщения и на последующих этапах становится более эффективным благодаря тому, что при осмыслении предвосхищение *является важным компонентом стратегии реципиента* как при аудировании, так и при чтении [16].

Выбор стратегии текста с опорой на предвосхищение развития информации в нем очень важен при моделировании речевого сообщения, когда идет работа по выявлению основных внутритекстовых связей, помогающих понять развитие внутритекстовой информации. Кроме того, существует мнение, что даже ошибочное предвосхищение стимулирует активность реципиента и делает процесс восприятия целенаправленным и осмысленным, а также способствует большей подвижности мыслительных операций [17, с. 228].

Разносторонняя и очень важная роль механизма вероятностного предвосхищения позволяет сказать, что *одной из задач методики обучения рецептивным видам речевой деятельности является разработка специальных приемов*, обеспечивающих целенаправленное развитие механизмов вероятностного предвосхищения, и формируемых на его основе *прогностических умений* в рецепции.

При моделировании научного текста вероятностное предвосхищение имеет большое значение, что экспериментально доказано [18, с. 209-214; 19, с. 62-68]. Как показал констатирующий эксперимент, в работе с текстом иностранные студенты, как правило, последовательно извлекают содержащуюся в нем информацию, без предварительных гипотез. Такая стратегия не является оптимальной и не дает желаемой результативности. Когда же система обучения работы с текстом была ориентирована на его моделирование, при котором активно использовалось предвосхищение смысла, положительные результаты возросли в 2-3 раза. При этом использовалось предвосхищение

коммуникативной задачи текста, его микротем, направления развития новой информации текста, выводов или обобщений.

Вышеприведенные доводы по поводу роли предвосхищения текста в рецепции, а также данные констатирующего эксперимента позволили нам выдвинуть в качестве частнометодического принцип, названный нами принципом семантического предвосхищения текста.

Под *принципом семантического предвосхищения информации текста* при его моделировании понимается свойство мышления строить вербальные гипотезы развития информации в тексте, предвосхищать в нем развитие мысли еще сенсорно не воспринятой [там же].

Предвосхищение информации текста при его моделировании осуществляется на основе лингвистического опыта, знания системы языка и правил структурно-смыслового построения текста – основ его моделирования. Этот принцип связан с ассоциативным приемом и основан на воссоздании ассоциативных связей данной и новой информации текста.

Принцип вероятностного предвосхищения, по мнению некоторых ученых, в большей степени характеризует процессы зрительной рецепции по сравнению со слуховой, чему способствует характер письменного текста, обуславливающий наличие таких опор, как обозримость текста, развернутость повествования, нормативность языковых средств, меньшая по сравнению с аудированием зависимость от субъективных факторов, связанных с личностью говорящего (Н. Левашов). В основе указанного принципа заложено предвосхищение развития мысли в тексте.

Исследования предвосхищения проводили Л.И. Каплан, Н.М. Божко, А. Э. Венделанд и др. Процессу предвосхищения, или предвидения, антиципации в структуре деятельности посвящено исследование Б.Ф. Ломова и Б.Н. Суркова (1980), в котором авторы различают пять уровней: сенсомоторный, перцептивный, уровень представлений, речемыслительный, субсенсорный. Если говорить о понимании текста как деятельности, то целесообразно выделить три уровня: а) перцептивный, б) уровень представлений, в) речемыслительный.

3.4. Интерпретируем уровни структуры деятельности, приведённые выше, применительно к работе с научным текстом и сделаем акцент на механизме предвосхищения.

Среди параметров *перцептивного уровня*, выделяемых Ломовым и Сурковым, нас интересует выделение задачи. Выделение задачи обычно понимается широко. Применительно к пониманию научного текста такой задачей, по нашему убеждению, является выделение коммуникативной задачи текста.

Интерпретируя уровень представлений относительно понимания научного текста и его моделирования, можем сказать, что это **уровень выявления коммуникативной задачи текста**. Не приходится доказывать, что без понимания задачи общения, поставленной автором, невозможно представить себе, предвосхитить, как может развиваться содержание научного текста. На этом уровне первостепенное значение имеет *предвосхищение коммуникативной задачи текста*. Поскольку это умение синтезированное, оно включает ряд других умений: 1) умение определять предмет описания; 2) умение предвосхищать особенности характеристики предмета описания; 3) умение предвосхищать коммуникативную задачу текста; 4) умение выявлять предложение, передающее коммуникативную задачу текста; 5) умение находить смысловой центр коммуникативной задачи [там же].

Уровень представлений, по мнению авторов, предполагает активное использование “структурных” схем, хранящихся в оперативной и долговременной памяти. На этой основе возникает особый специфический “*эффект панорамного предвосхищения*” [1, с. 38]. (Курсив наш, Вишнякова С.В.).

Интерпретируя уровень представлений относительно понимания текста и моделирования, можно назвать его **уровнем общего представления модельных схем**. Если попытаться спроецировать данную идею на процесс понимания научного текста, то, по нашему мнению, «структурными» схемами, хранящимися в оперативной и долговременной памяти, могут быть те общие схемы предвосхищения научного текста, в результате которых создается общий каркас модели любого научного текста. Он представляет собой фрейм, состоящий из темы, коммуникативной задачи, данной информации текста, микротем, новой информации. Пониманию перечисленных элементов модели текста, их взаимосвязи и соответствующим им умениям, конечно, необходимо обучать иностранных студентов, с тем, чтобы такая структурная схема хранилась в долговременной памяти для конкретного использования в конкретной текстовой ситуации.

Речемышлительный (вербально-логический) уровень, то есть уровень преимущественно интеллектуальных операций, связан с еще большим усложнением интеграции психических процессов и появлением других, качественно новых форм предвосхищения. На данном уровне становится возможным более глубокое и широкое *обобщение*, а также *классификация* ситуаций, что связано, по мнению авторов, с усилением влияния семантического фактора. На этой основе осуществляется внеситуационное, заблаговременно упреждающее планирование действий до наступления ожидаемых событий (Ломов, Сурков, 1980).

Интерпретируя речемышлительный уровень относительно проблемы понимания текста и его моделирования, можно сказать, что это **уровень логических операций по осознанию текста**. Предвосхищение смысла текста происходит в обобщенном виде – в виде основных логико-семантических связей, прогнозирующих модель текста. При этом важное значение имеет *упреждающее планирование действий* по пониманию того, как будет раскрываться смысл текста. Данный уровень предполагает умения: 1) предвосхищение деления текста на микротемы в зависимости от коммуникативной задачи текста; 2) предвосхищение новой информации текста, раскрывающей, поясняющей его коммуникативную задачу по типу научно-учебного текста. Контроль правильности прогностических умений при моделировании текста осуществляется по модели текста, построенной в виде схемы.

Прогностические умения могут быть и другого плана. Их наличие предполагается при выполнении разнообразных упражнений. Приведем пример упражнения с фрагментом учебного текста подъязыка медицины.

Упражнение. Каковы должны быть тема, коммуникативная задача и план текста, если вывод из него следующий:

«... Таким образом, в организме существует сложная система, регулирующая специфическую защиту и поддержание иммунологического гомеостаза, состоящая из лимфоидных клеток различных типов: лимфоидных стволовых клеток, т-лимфоцитов, в-лимфоцитов, макрофагов».

Каким образом можно прогнозировать ответы на задания упражнений, исходя только из вывода? Обобщение, вывод всегда делается по определенной теме соответственно той задаче, которая ставилась автором текста. Это дает основание по контексту вывода составить представление о теме, о том аспекте, в котором тема освещалась, т. е. о коммуникативной задаче текста, и

очень часто о последовательности разбираемых в тексте вопросов – плане. Например, прочитав вывод приведенного выше упражнения, можно сказать, что темой текста является гомеостаз; коммуникативная задача текста – поддержание иммунологического гомеостаза; план текста: лимфоидные стволовые клетки; т-лимфоциты; в-лимфоциты; макрофаги.

Предвосхищению, или предвидению (термин Б.М. Теплова), принадлежит важнейшая роль. Б.М. Теплов писал: «Предвидение – это высшая ступень превращения сложного в простое, умение выделять самое существенное» [20, с. 208]. Для обучения иностранных студентов пониманию текста «превращение сложного в простое», а также обучение умению «выделять самое существенное» являются теми важными факторами, которые способствуют оптимизации работы с научным текстом.

IV. Выводы. Таким образом, подводя некий итог, можно отметить, что в статье приведены размышления по поводу *принципа семантического предвосхищения информации* текста, которые позволяют сделать следующие выводы:

4.1. Предвосхищение является важным компонентом стратегии текста при его моделировании, выявлении основных внутритекстовых связей.

4.2. Разносторонняя и очень важная роль механизма вероятностного предвосхищения проявляется в регуляции понимания текста, в зрелости реципиента как чтеца, в ускорении процесса декодирования сообщения, сокращении мыслительных операций, в стратегии понимания текста. Это позволяет выдвинуть частнометодический принцип семантического предвосхищения текста.

4.3. Под принципом семантического предвосхищения текста понимается свойство мышления строить вербальные гипотезы развития информации в тексте, предвосхищать в нем развитие мысли еще сенсорно не воспринятого.

4.4. Принцип семантического предвосхищения информации текста реализуется в предвосхищении коммуникативной задачи текста, его микротем, развития новой информации текста, выводов или обобщений.

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Confidence in law enforcement and judicial authorities as a part of legal consciousness in the modern Ukrainian society

Abstract: The meaning of confidence as a part of legal consciousness and precondition of the behavior of the subjects in the legal sphere of society are analyzed in the article. It is defined, that the performance appraisal of law enforcement authorities can be defined by the level of confidence to them. The main principles of the low level of confidence in law enforcement and judicial authorities, which has been found during a number of empirical sociological studies are analyzed. It is defined the course and perceptions of police reform and change of tendencies in confidence to it.

Keywords: legal consciousness, structure of legal consciousness, confidence, law enforcement authorities, deformations of legal consciousness, police reform, confidence in law enforcement authorities.

Побудова та утвердження в Україні правової держави, демократії та верховенства закону потребує високого рівня правосвідомості як у масовому, так і індивідуальному вимірі. Правосвідомість є складним переплетінням знань, ідей, поглядів, переконань, оцінок щодо правової дійсності, що мають вияв у правомірній чи протиправній поведінці соціальних суб'єктів через формування мотивів та установок.

Структуру правосвідомості можна зобразити як єдність трьох елементів:

1) когнітивного (знання юридичних норм та можливостей їх застосування, знання принципів функціонування правової системи, органів юридичної сфери),

2) оціночного (оціночне сприйняття правової дійсності (діяльності правоохоронних та судових органів, рівень довіри до них, оцінка засобів задоволення своїх законних потреб та захисту інтересів, сприйняття права як цінності і ін.),

3) поведінкового (установки та мотиви, що є основою поведінкових моделей особистості та готовністю до дії).

Без сумніву всі компоненти між собою тісно пов'язані, зокрема знання формують оціночні ставлення, а останні в свою чергу є основою мотивів поведінки (правомірної чи протиправної) соціальних суб'єктів [9, с. 234].

У сьогоденних соціально-політичних реаліях одним з ключових механізмів забезпечення порядку та легітимності усіх гілок влади стає поняття довіри. Події 2013-2014 років, зокрема діяльність деяких представників міліції, прокуратури, судів, певним чином дискредитували існуючу систему. Незаконні затримання та слідство, винесення неправомірних вироків, зухвала поведінка та перевищення повноважень яскраво висвітлювались ЗМІ та обговорювались експертами і громадськістю, що вплинуло на рівень довіри до системи загалом.

Довіра до правоохоронних та судових органів, з однієї сторони, є одним з факторів, що визначатиме рівень правосвідомості та можливі прояви її деформації, а з іншої – віддзеркаленням функціонування усіх правових інститутів суспільства.

У роботах філософа І.О. Ільїна вперше йдеться про роль довіри у формуванні правосвідомості особистості. Вчений зазначає, що втрата довіри до органів влади може стати основою кризи правосвідомості [6, с. 513-514]. На думку А.Н. Кокотова, довіра - поведінковий вираз порядку і справедливості, головне свідоцтво їх наявності. Якщо в суспільстві є стійка довіра між людьми, владою і населенням, значить, люди приймають громадський порядок, що склався та схильні сприймати його як справедливий (умовно, безумовно), готові йому слідувати і його підтримувати. Тим самим вони легалізують фактичний порядок [7].

Відомий сучасний мислитель Ф. Фукуяма визначає довіру як очікування членами суспільства передбачуваності від усіх оточуючих, підтримання ними «фундаментальних цінностей» (наприклад справедливості), в тому числі «професійних стандартів і корпоративних кодексів поведінки» [16, с. 52].

Загалом поняття довіри детально визначається як почуття надійності і безпеки, що людина відчуває по відношенню до об'єктів та суб'єктів оточуючого світу і засноване на вірі в їх позитивний характер [13]. Тобто довіра має оціночний характер і формується на основі сприйняття поведінки та діяльності об'єкта.

Соціальний характер довіри обґрунтовано Ф. Тьоннісом у праці «Спільнота та суспільство». Він пише: «Ми не знаємо машиніста поїзда, на якому їде-

мо..., в більшості випадків ми не знаємо ... адвоката, якому доручаємо вести наші справи, а тим більше суддю ... У всіх цих випадках ми покладаємося на те, що людина, що користується нашою довірою... може і «хоче нам допомогти» [14, с. 210]. Тобто йдеться про певну делеговану, не персоніфіковану, певним чином авансовану довіру, що виникає в межах суспільних відносин.

Ніклас Луман в книзі "Довіра і влада" (1979) зазначив, що довіра стає необхідною умовою суспільного розвитку в силу наростання невпевненості людей у майбутньому, пов'язаного зі збільшенням складності і непрозорості сучасних суспільств [18].

Довіра населення до міліції визначається як сприятлива (позитивна) оціночна реакція груп населення до міліції, яка виявляється в думках, почуттях та цілеспрямованій поведінці [1, с. 333]. Довіра є категорією, яка має подвійний характер: з одного боку, в її основі лежать моральні засади співробітництва, коли майбутня поведінка партнера авансовано отримує характеристики, які відповідають очікуванням, з іншого – її виникнення зумовлене знаннями про партнера, його репутацію [2, с. 69].

Загалом оцінка ефективності діяльності правоохоронних органів може визначатись рівнем довіри до них.

Довіра до правоохоронної та судової систем протягом останніх років залишалась на вкрай низькому рівні, однак і дані найсвіжіших опитувань свідчать про те, що ці тенденції у суспільстві зберігаються (див. табл. 1).

Таблиця 1

Якою мірою Ви довіряєте наступним інституціям? (липень-2015)¹

	Зовсім не довіряю	Переважно не довіряю	Переважно довіряю	Цілком довіряю	Важко сказати	Баланс довіри-недовіри
Міліції	40,3	34,7	16,1	2,1	6,8	-56,8
Службі безпеки України	32,7	28,7	23,7	3,6	11,3	-34,1
Судам	51,4	28,8	10,4	2,4	7,0	-67,4
Прокуратурі	51,4	28,2	9,9	2,8	7,7	-66,9

¹ Дослідження провели Фонд «Демократичні ініціативи» імені Ілька Кучеріва та соціологічною службою Центру Разумкова з 22 по 27 липня 2015 року. Було опитано 2011 респондентів у віці від 18 років у всіх регіонах України, за винятком АР Крим та окупованих територій Донецької і Луганської областей. Теоретична похибка вибірки не перевищує 2,3%.

Отже, можна зробити висновок, що рівень довіри до правоохоронної та судової систем є вкрай низьким, а це може мати наслідком низький рівень правосвідомості та прояви неправомірної поведінки чи розуміння такої поведінки як допустимої та безкарної.

На нашу думку, саме явище недовіри до усієї правової системи, та правоохоронних органів зокрема, має соціокультурне підґрунтя. Ця недовіра та моделі поведінки, пов'язані з нею, склалися протягом останніх десятиліть та вкорінювались у масовій та індивідуальній свідомості. Молодь, що виросла у цих соціокультурних умовах сприймає такий стан не як патологію, а як норму, що в результаті веде до можливостей протиправної поведінки та правового нігілізму як деформації правосвідомості [10].

Окрім цього, в українському суспільстві за часів незалежності панує анонім на деморалізованість та соціальний цинізм, заснований на недовірі до оточуючих. Українці, за даними масових опитувань, схильні погоджуватись із твердженнями про те, що більшість людей нечесні, егоїстичні та не заслуговують на довіру [3, с. 52].

Для пояснення причин виникнення деформації масової свідомості та правосвідомості, зокрема, ми також вважаємо за доцільне використати неоінституціональний підхід, зокрема напрацювання Д. Норта. Інститути він визначає як "правила гри" (формальні та неформальні) у суспільстві, або створені людиною обмежувальні рамки, що організують взаємовідносини між людьми. В нашому випадку формальними правилами виступають законодавчі акти, Конституція, рішення суду і ін., а неформальними - соціальні (в т.ч. моральні) норми, звичаї та «кодекси» поведінки. Ми погоджуємось з думкою Д. Норта про те, що найбільш сталими та соціально підтримуваними є саме неформальні обмеження та правила. Вони швидко передаються у часі та просторі, тобто стають загальноновживаними. При цьому більшість з них формується під впливом особистісних, а не суспільних інтересів [11]. Ці правила формують моделі поведінки, що починають переважати у соціумі (при цьому не завжди законні). До прикладу такими моделями можуть бути виплата зарплати «у конверті», «хабарництво», «тіньовий», в тому числі злочинний, бізнес і ін. Ці моделі в кінцевому результаті стають культурним спадком того чи іншого суспільства на нормою для його членів та діяльності соціальних, в т.ч. правових, інститутів.

Польський соціолог Петро Штомпка звернув увагу на те, що клімат довіри в суспільстві порушується саме в період радикальної реорганізації політичних і соціальних інститутів [17, с. 365]. Саме така ситуація характерна для сучасного українського суспільства, яке перебуває в стані постійних змін і нестабільності.

П. Штомпка виділяє сім адаптаційних реакцій, захисних механізмів у відповідь на руйнування довіри в суспільстві: провіденціалізм, корупція, надмірний ріст пильності, надмірне сутяжництво, "геттоїзація", патерналізм, екстерналізація довіри [15, с. 10]. Ці прояви можна також спроектувати на прояви правосвідомості і аналізувати їх з точки зору його деформацій.

Ф. Фукуяма також наголошує на культурному підґрунті довіри, маючи на увазі переважно етичну складову як навик, що передається від покоління до покоління в якості традицій та норм у процесі соціалізації [16]. Аналізуючи його концепцію, Дементьєв І.О. зазначає, що для суспільств з низьким рівнем довіри характерний фамілізм - акцент на сімейних зв'язках, які вважаються єдиною опорою індивіда, основою соціальних взаємодій. У таких суспільствах люди довіряють тільки родичам і не довіряють людям поза сім'єю. Неможливість розширення радіусів довіри за межі сім'ї найчастіше є наслідком відсутності ефективних законів та недотримання принципів справедливості [5, с. 44].

Саме ці процеси ми спостерігаємо у сучасному українському суспільстві, зокрема кумівство, кругова порука породжують хабарництво і стають деструктивною основою діяльності правоохоронних органів.

У зв'язку з трансформацією українського соціуму та усіх соціальних інститутів виникла потреба реформування правової та правоохоронної систем задля оптимізації роботи зокрема міліції, прокуратури та суду. На нашу думку, ефективність усіх інновацій та роботи системи загалом визначатиметься рівнем довіри населення. Варто зазначити, що сама потреба у реформуванні підтримується громадськістю. Більшість громадян вважають реформування міліції дуже або "скоріше" актуальним (66%). Найважливішою реформою для українців є антикорупційна – так вважають 65%. До того ж у списку пріоритетних реформ респонденти часто згадували реформу органів правопорядку (58%), пенсійну реформу та реформу системи соціального захисту (40%) і реформу сфери охорони здоров'я (36%). З цих результатів бачимо, що вдосконалення правоохоронної системи для населення є першочерговим завданням, навіть по відношенню до реформ у соціальній сфері.

Проте, переважна більшість українців не вірить в успішність реформ, які зараз намагається здійснювати влада: 32% мають певну надію, однак загалом не вірять у це, а 30% зовсім позбавлені такої віри. Натомість, лише 30% в цілому вірять, що реформи увінчаються успіхом. Майже половина українців (48%) вважає, що нова українська влада не досягла ніякого прогресу у здійсненні реформ² [4].

Так, за результатами соціологічних досліджень Центру Разумкова, громадяни оцінюють перебіг реформи правоохоронної системи в Україні у 2,6 бала за 10-бальною шкалою. У травні 2015 р. оцінка перебігу реформи знизилася до 2,5 бала. При цьому, станом на травень 2015 р., майже третина (65%) опитаних повідомили, що не відчують впливу реформи; 21% – засвідчили її негативний вплив, і лише 14% – позитивний [12, с. 37].

Варто відзначити, що оцінювати ефективність реформування системи правоохоронних органів ще зарано, адже довіра до міліції має дещо «запізнілий» ефект, тобто оцінка діяльності її представників здійснюється не на основі теперішньої роботи, а минулої.

Проте, за даними міжнародного фонду IFES новоутвореній поліції довіряють 52% українців. Ці дані вражають порівняно з попередніми, проте дані КМІС дещо відрізняються. Згідно дослідження, проведеного у грудні 2015 року Національній поліції (колишня міліція) довіряють 14,9% (баланс-довіри та недовіри – -31,2%), Патрульній поліції - 20,7% (баланс-довіри та недовіри – -14,4%)³.

Пошук способів оцінки діяльності нової поліції та підвищення рівня довіри до неї декларується на державному рівні як одне з ключових завдань. Зокрема, у «Концепції "100 днів якості національної поліції України"», що представлена на офіційному сайті МВС, зазначається, що усі структурні підрозділи Національної поліції по всій країні двічі мають пройти перевірку якості своєї роботи з урахуванням таких показників: а) результати зовнішнього соціологічного опитування населення; б) результати оцінки ефективності роботи поліції бізнес-середовищем; в) результати внутрішнього опитування працівників Національної поліції; г) оцінка результатів виконання пріоритетних завдань [8].

² Дослідження провели Фонд «Демократичні ініціативи» імені Ілька Кучеріва та соціологічна служба Центру Разумкова з 22 по 27 липня 2015 року. Було опитано 2011 респондентів віком від 18 років у всіх регіонах України, за винятком АР Крим і окупованих територій Донецької та Луганської областей. Теоретична похибка вибірки не перевищує 2,3%.

³ Київський міжнародний інститут соціології провів власне опитування громадської думки «Омнібус» з 4 грудня по 14 грудня 2015 року. Опитування проводилося у 110 населених пунктах (PSU) в усіх областях України, окрім Автономної Республіки Крим, за стохастичною вибіркою, репрезентативною для населення України віком від 18 років. Методом інтерв'ю опитано 2022 респонденти. <http://www.kiis.com.ua/?lang=ukr&cat=reports&id=579&page=1>.

В межах цієї програми дослідницький центр «SPHERA» провів опитування⁴ присвячене довірі та ставленню українців до нової поліції. Метою дослідження було отримати якомога ширший спектр думок та оцінок населення стосовно нової поліції, вивчити рівень довіри до неї, позитивні та негативні сторони її роботи, які вже побачили громадяни, а також впевненість українців щодо спроможності поліції вплинути на криміногенну ситуацію. За результатами дослідження переважна більшість респондентів швидше довіряють новій поліції, проте довіра не є абсолютною. Опитані частіше говорили радше про кредит довіри, який вони надають новій поліції. Серед позитивних рис поліції респонденти відзначають постійну і видиму присутність на вулицях, чуйність та намагання допомогти громадянам, переважання молодих людей, високу мотивацію, настанову на рівність усіх перед законом. Негативними аспектами, на думку респондентів, є недостатня професійна підготовка недостатня фізична форма та навички сумніви в тому, що поліцейські зможуть захистити громадян від дійсно небезпечних злочинців.

Гаврилюк Т. виокремлює характеристики довіри населення до міліції, які ми можемо використати як методологічну основу для дослідження довіри до правоохоронних органів загалом:

- 1) «відставання» довіри в часі;
- 2) «інерційність» довіри – виявляється у випадках, коли, незважаючи на уже сформовану думку про роботу міліції та відповідні очікування, громадяни стикаються з іншою ситуацією;
- 3) стійкість, «узвичаєність» довіри – сформований негативний рівень довіри в суспільстві має здатність тривалий час залишатися без змін;
- 4) «авансованість» довіри;
- 5) «дієвість» довіри – саме довіра змушує людину діяти в умовах невизначеності, оскільки є тим фактором, покладаючись на який, особа розраховує на позитивний результат своєї діяльності [2, с. 70-71].

З даних результатів можна зробити висновок, що громадськість все ж таки налаштована на реформування та очікує позитивних змін у правоохоронній системі. Більшість висловили віру у те, що поліція діятиме в рамках закону.

⁴ Опитування проводилось методом фокус-груп у Києві, Львові, Одесі та Харкові. Період проведення дослідження: 12-21 жовтня 2015 року <http://soc-sphera.com/novini/31-rezultati-doslidzhennya-dovira-ta-stavlen-nya-do-novoji-politsiji>.

Проте неоднозначною є оцінка способу такого реформування, зокрема не-тривалий час підготовки нових поліцейських, що породжує сумнів у їх компете-нції та професійних можливостях.

Завданням соціологів, на нашу думку, стає супровід інновацій та реформ у сучасному суспільстві з метою підвищення їх соціальної ефективності. Для цього необхідним є виявлення рівня довіри та пояснення чинників, що зумовили його, а також підвищення рівня правосвідомості громадян як основи функціонування правової держави та громадянського суспільства.

Реалізація означеного завдання вимагає розробки індикаторів для емпіричних вимірювань. На початку статті ми уже окреслювали структуру правосвідомості та місце довіри у ній. Ми також з'ясували, що необхідною умовою комплексного дослідження є з'ясування причин, що зумовили такий рівень правосвідомості та довіри.

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Syntax means in the system of expressive means of language

Abstract: This article is dedicated to clarifying the place of syntactical means in the system of expressive means of language. The publication discusses the various approaches to the typology of language expressive means and to the separation of syntactical means.

Keywords: stylistic syntax, syntactical means, expressive language means, figures of speech.

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Синтаксичні засоби в системі виражальних засобів мови

Анотація: Статтю присвячено з'ясуванню місця синтаксичних засобів у системі виражальних засобів мови. У публікації розглядаються різні підходи до типології виражальних засобів мови та до виокремлення синтаксичних.

Ключові слова: стилістичний синтаксис, синтаксичні засоби, виражальні мовні засоби, фігури мови.

Вивчення експресивного синтаксису в сучасному українському мовознавстві пов'язано переважно з іменем В. Виноградова, який трактує експресивне в синтаксисі як спеціальний засіб мовлення, розрахований на особливо дієву силу впливу (комунікативно-прагматичну потужність). Відомо, що виражальним засобом є маркований член стилістичної опозиції елементів мови певного рівня [1, с. 137]. Мовознавці послуговуються такими термінами на позначення стилістичних мовних засобів: виражальні засоби [2, с. 43; 3], експресивні засоби [4, с. 7], зображально-виражальні мовні засоби [5, с. 44], фігури [6, с. 321; 7, с. 327], художньо-мовні засоби [8, с. 69] тощо. Ще в античних теоріях були намагання об'єднати майже всі виражальні мовні засоби навколо поняття фігури. Подекуди й сьогодні в широкому витлумаченні стилістичними фігурами вважають будь-які мовні засоби, що служать для створення та посилення виразності мовлення [9, с. 452].

Різні засади досліджень у сучасних класифікаціях зумовлюють виокремлення неоднакової кількості виражальних мовних засобів. Основні угруповання, на думку Б. Тошовича, складають такі фігури: риторичні; ораторські; стилістичні / стильові; естетичні; фігури мовлення / мовленнєві фігури / фігури дикції; фігури мови / мовні фігури; граматичні; фігури думки; фігури слова / тропи. За іншого підходу, зауважує вчений, фігури поділяються на дві основні групи – фігури мови та фігури художнього мовлення. Під фігурами мови розуміють тропи та граматичні фігури. Фігурами художнього мовлення традиційно вважаються естетичні, ноєстетичні (фігури думки) та фонетичні [10, с. 22].

Значну увагу класифікаціям стилістичних мовних засобів приділяють у розвідках зі стилістики. І. Гальперін до виражальних мовних засобів відносить лексичні, морфологічні, синтаксичні та фонетичні мовні засоби, що служать для емоційного й логічного посилення мови [2, с. 43, 46]. В. Ващенко вирізняє фонетичні, лексичні, граматичні, з-поміж останніх – синтаксичні виражальні засоби [11, с. 356].

Інколи поняття «фігури» охоплює три типи виражальних засобів мови: 1) фігури заміни, заміщення (тропи); 2) фігури сумісності; 3) фігури протилежності. У визначеннях фігури стилісти вважають домінантними такі ознаки: по-перше, це певна форма, у якій виражена думка; по-друге, це свідоме відхилення в думці або вираженні від звичайної, простої форми. Суть свідомого відхилення полягає в тому, пояснюють науковці, що на денотативний зміст мовних

одиниць накладаються ще елементи виразності, які виникли внаслідок операцій тотожності, схожості, суміжності, контрасту і які є тим образним субелементом, що дає «прирощення» значення [7, с. 327].

О. Сковородников, Г. Копніна вважають, що виражальні засоби всіх мовних рівнів сприяють точності, логічності, ясності, експресивності (емоційності, оцінності, інтенсивності й образності) та забезпечують повноцінне (максимально наближене до розуміння закладеної в тексті інформації) сприйняття мовлення адресатом. Дослідники диференціюють такі виражальні мовні засоби: фонетичні, лексичні, словотвірні, граматичні (синонімія частин мови, синонімія синтаксичних конструкцій), тропи та стилістичні фігури [9, с. 38].

На думку В. Приходько, стилістичний мовний потенціал поділяється на фонетико-фонологічні, лексичні та морфологічні засоби – тропи, синтаксичні – фігури мовлення [4, с. 4–5, 7]. За іншою класифікацією, до виражальних мовних засобів належать тропи (переносне вживання мовних одиниць) і стилістичні фігури (зображально-виражальні засоби), а також одиниці всіх мовних рівнів і невербальні засоби (жести, міміка, пантоміміка) [3].

О. Квятковський під поняттям «фігура» розуміє особливі стилістичні звороти, що виходять за межі практично потрібних норм, мають на меті посилення виразності. Лінгвіст подає такі різновиди виражальних мовних засобів: тропи, градація, паралелізм, еліпс, силепс, солецизм, анаколупф, хіазм, анафора, епіфора, умовчання тощо [6, с. 321].

М. Гетьманець розподіляє зображально-виражальні засоби образного відтворення дійсності за трьома групами: фонетичні, або звукові; лексичні, або тропи; синтаксичні, або фігури [5, с. 44].

Отже, система виражальних мовних засобів складається з фонетичних, лексичних, словотвірних, граматичних (синонімія частин мови, синонімія синтаксичних конструкцій), синтаксичних засобів, а також тропів. Попри всі розбіжності у визначеннях і розподілі виражальних мовних засобів, сучасні лінгвісти одностайні при виокремленні з-поміж них виражальних засобів синтаксису. При цьому дослідники послуговуються різними термінами: зображально-виражальні мовні засоби (Т. Плещенко); зображально-виражальні синтаксичні засоби (М. Гетьманець); конструкції експресивного синтаксису (Г. Мартинович); риторичні фігури (О. Ахманова, С. Єрмоленко, М. Кожина, Г. Мартинович, Ж. Ніколаєва, Г. Онуфрієнко); прийоми виразності (В. Приходько); стилістичні прийоми

(М. Брандес, О. Мороховський); фігури мови (Л. Струганець); фігури мовлення (О. Ахманова, М. Кожина, Ж. Ніколаєва, В. Приходько); фігури поетичного мовлення (М. Гетьманець, С. Оліфіренко); фігури слів (Л. Мацько). Найуживанішими назвами є «виражальні засоби синтаксису» (І. Арнольд, М. Брандес, О. Мороховський, В. Приходько) і «стилістичні фігури» (Ю. Арешенков, Д. Баранник, І. Білодід, В. Ващенко, М. Гетьманець, С. Єрмоленко, М. Кожина, О. Мороховський, Ж. Ніколаєва, О. Пономарів, Л. Струганець).

Дослідники дотримуються спільних поглядів на природу стилістичних фігур. Виражальні засоби синтаксису мають синтагматичну природу, оскільки частини лінійно розташовані, і ефект залежить саме від їхнього розташування. Більшість мовознавців відзначає відносно формалізований характер (наявність синтагматичної схеми, моделі) синтаксичної фігури, що відхиляється від звичайного синтаксичного типу й дає оригінальну форму для увиразнення висловленого [12, с. 55; 8, с. 40; 1, с. 138; 9, с. 452; 11, с. 357 та ін.]. Стилістична фігура виникає, якщо свідомо порушується звична, загальноприйнята організація висловлювання, тобто коли мовна одиниця використовується там, де вона не очікується і опиняється в незвичному оточенні. Відтак, уважає Б. Тошович, ідеться про неконвенційний спосіб лінійної (горизонтальної та вертикальної) організації висловлювання, про неочікуване розміщення та комбінування [10, с. 22].

Лінгвісти сходяться на тому, що виражальні засоби синтаксису посилюють виразність мовлення та підвищують його емоційність, зокрема в художніх і публіцистичних текстах, у розмовному мовленні (І. Арнольд, В. Виноградов, І. Гапєєва, Н. Гетманчук, І. Голубєва, С. Єрмоленко, Л. Струганець та ін.). Стилістичні фігури покликані індивідуалізувати авторське мовлення, надати йому образності. При цьому, зазначають В. Ващенко, С. Оліфіренко й інші дослідники, можливі порушення мовних норм, незвичності слововживання. За допомогою стилістичних фігур підкреслюється, посилюється, актуалізується інформація (Б. Тошович), мовлення набуває особливого афективного заряду (Ш. Баллі).

У всіх стилях мови, насамперед у науковому й офіційно-діловому, стилістичні фігури використовуються як засіб логічного підкреслення і впорядкування тексту, а також потужний та ефективний засіб впливу. Текст, у якому їх вдало використано, вирізняється наочністю, затримує увагу читача, сприяє кращому засвоєнню авторського задуму, посилює позицію автора, підкреслює особливості різних деталей або дій. Експресивні засоби ближчі до зображуваних подій,

ніж неекспресивні, і це пояснює небайдужість суб'єктів до вибору мовних засобів.

В. Чабаненко наголошує на тому, що ступінь експресивності тексту значно збільшується, коли мовець (автор) зі стилістичною метою вдається до суміщення виражальних засобів синтаксису, наприклад, парцеляції й ампліфікації, приєднання й ампліфікації, парцеляції, приєднання та градації тощо [13, с. 177–178]. Загалом задля виконання єдиної стилістичної функції можуть узаємодіяти фонетичні, словотвірні, лексичні, синтаксичні (охоплюючи фігури) засоби мови (Г. Худоногова). Поєднання виражальних засобів синтаксису зумовлює складність і синкретизм виконуваних ними функцій.

Як слушно зазначає В. Ващенко, різноманітні фігури стилістичного синтаксису виступають важливим показником мовного стилю. Стилістичні фігури синтаксису глибоко врастають у всю мовну структуру, вони додаються, добудовуються до лексичних, фонетичних, до інших граматичних засобів, зливаються з ними [11, с. 356]. А відтак виражальні засоби синтаксису мають синтагматичну природу, характеризуються незвичністю побудови. Стилістичні фігури покликані посилювати виразність висловленого, сприяють підвищенню прагматичної ефективності висловлювання та мовлення загалом.

Функціонуванню виражальних засобів синтаксису присвячена низка монографій. Так, О. Сковородников описує досвід системного дослідження експресивних синтаксичних конструкцій на матеріалі художнього, публіцистичного, ділового, наукового, науково-популярного функційних різновидів мови [14]. Більшість монографічних досліджень ґрунтується на художньому мовленні (В. Виноградов, І. Ковтунова, Н. Патроєва, О. Потебня, Г. Солганик та ін.). Широко досліджують мовознавці стилістичні фігури в публіцистичному мовленні (В. Богатько, Я. Пінегіна, І. Пуленко й ін.). Спостерігаємо звернення лінгвістів до текстів публіцистичного стилю при аналізі, наприклад, таких виражальних засобів синтаксису, як парцеляція (Л. Конюхова) та градація (Т. Подуфалова). Розглядаються також виражальні можливості синтаксису розмовного стилю (О. Лаптева, Н. Шведова). Деякі науковці вважають, що синтаксис може бути виразним і в мові наукової літератури (Е. Геллер).

Отже, різні погляди на класифікацію мовних виражальних засобів зумовлені тим, що дослідники приймають різні засади їхньої систематизації. До того ж значною мірою різняться між собою позиції тих науковців, що працюють у царині

стилістики, поетики та риторики. Більша частина відомостей про стилістичні фігури, звичайно, уміщена в монографіях та інших працях зі стилістики, експресивного синтаксису, а також певною мірою в лінгвістичних словниках. При описі мовних фігур мовознавці враховують такі основні чинники й ознаки: роль і функція в тексті; кількість одиниць мови та їх комбінації; які фігури переважають у текстах певних стилів, жанрів, колоритів, їх специфіка й міра використання; тенденції в розвитку фігур на різних етапах історії літературної мови з урахуванням впливу різних художньо-естетичних напрямків культури.

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Transformation of conceptions of man in modern science

Abstract: This article is devoted to consideration of new theories about the origin of man, as well as changes in the parameters of health, life expectancy, effect on human factors of the external environment and internal self-organization.

Keywords: health, biotechnology, genetics, evolution, aging, hygiene, antibiotic, ecologia.

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Трансформации представлений о человеке в современной науке

Аннотация: Данная статья посвящена рассмотрению новых теорий о происхождении человека, а так же изменениям параметров его здоровья, продолжительности жизни, влияния на человека факторов внешней среды и внутренней самоорганизации.

Ключевые слова: здоровье, биотехнологии, генетика, эволюция, старение, гигиена, антибиотик, экология.

Происходящие в современной теории эволюции человека изменения в том числе сводятся к попыткам сближения на биологическом уровне человека и шимпанзе. Многие исследователи считают, что теория Ч. Дарвина полностью подтверждается современной наукой (А.А. Зубов), как генетикой, так и антропологией. Американский ученый М. Гудмен в 2000 г. провел колоссальную работу

по пересмотру всей систематики отряда приматов с точки зрения генетики. В результате в род НОМО он поместил и шимпанзе, и человека. «Специалисты считают, в том числе и генетики своими методами подтверждают, что общий предок у человека и шимпанзе действительно был, но очень давно, примерно 7 млн. лет назад» [1. 225]. Этот вывод подтверждает кенийская находка 2000г, сделанная французскими учеными под рук. Б. Сеню. До этого считалось, что предки людей австралопитеки появились 4,5 млн. лет назад. Мировой сенсацией стало известие о том, что они передвигались уже на двух ногах. То есть прямохождение – не достояние австралопитеков, которые взяли в руку палку 4 млн. лет назад. Большинство ученых, включая автора данных строк, считают данные выводы преждевременными и в большей мере гипотетичными, чем научно достоверными.

Сегодня наблюдается небывалый расцвет биологических наук и медико-биологических технологий, применяемых к человеку главным образом генетических технологий. Ф. Фукуяма в книге «Наше постчеловеческое будущее» выделяет три вида технологий, помимо генетических, способных влиять на будущее человека. К первым относятся технологии психофармакологического воздействия, меняющие поведенческую природу человека – антидепрессанты «прозак» и «риталин», снижающие синдром гиперактивности. Второе направление – нейрофизиология, успехи которой позволяют уже сейчас оказывать воздействие на те, или иные функциональные участки мозга, приводящие к изменению поведения, коррекции личности. Повсеместно используемая нейроимплантатная технология существенно улучшает способности познания и восприятия. Речь идет, прежде всего, о тех же препаратах прозак и риталин, имеющих и явно социальное назначение контроля над поведением детей. По утверждению Фукуямы, они лишь первое поколение психотропных препаратов, способных при применении снизить уровень социальной ответственности людей за действия и поведение. И третье направление – это технологии продления жизни, ставшие популярными в условиях старения населения ряда развитых стран. Это вызывает дискуссии ученых всего мира, поскольку в целом это приводит не только к искусственной медикализации населения, но и непосредственно влияет на биологическую природу человека, приводит к его модификации. В целом последствия многих новых технологий остаются неопределенными, моральные издержки этих технологий посчитать не просто. По мнению, Ф. Фукуямы, по-

пытка пойти на поводу искушений новыми технологиями может дорого обойтись человечеству [4].

Как показывают современные исследования – средняя продолжительность жизни землян постоянно растет с 1840 года. За последние 50 лет жители тридцати развитых стран мира вдвое чаще стали пересекать рубеж 80 лет. Ученые прогнозируют, что более половины младенцев, рожденных в развитых странах в наши дни, доживут до 100 лет. В каменном веке средняя продолжительность жизни составляла 18-20 лет, в Средние века 30-40 лет. И только с конца 19 века (средняя продолжительность жизни 35 лет) до конца 20 века продолжительность жизни увеличилась до 70-75 лет. Изменился и биологический возраст по возрастной шкале Всемирной организации здравоохранения (ВОЗ) [5]. От 25 до 44 – это молодой возраст, 44-60 лет – это средний возраст. 75-90 – это старческий возраст, а после 90 – долгожители. Ученые не относят сдвиг биологического возраста к заслугам цивилизации, а считают данный факт следствием глубинного развития, которое претерпела материя – интеллектуальная биомасса, которой по сути является человек. Тем не менее четыре прошедшие в медицине революции, безусловно продлили средний возраст человека уже на 40 лет: гигиена (XVII век); появление антисептиков (XIX век); вакцинация (XIX век) и открытие антибиотиков (XX век).

Помимо этого, на данном этапе эволюция заинтересована не просто в развитии и увеличении численности человечества, а в приумножении старшей возрастной группы. При дряхлеющем теле продолжает и становится необходимым качественный мозг, интеллект и опыт. Численность старшей возрастной группы с 60 до 90 лет увеличивается в 4-5 раз быстрее, чем общая численность населения Земли. *Старение определяется как ухудшение работы биологической структуры, среди которых выделяются органы – «недолгожители». Так, на первом месте – истощение резервов сердечно-сосудистой системы – около 40 лет, на втором – остеопороз: около 30% женщин в 50 лет и более 50% в возрасте 75-80 лет страдают остеопорозом. Третий фактор – снижение функций иммунной системы, что является причиной развития инфекционно-воспалительных осложнений и опухолей в организме. Четвертая значительная группа заболеваний – диабет и гепатиты, имеющие в результате серьезные осложнения и приводящие к преждевременному старению.*

На здоровье оказывают влияние и происходящие изменения климата, имеющие в том числе техногенный характер. Политики многих стран выделяют государственные гранты с целью изучения глобального изменения климата. С 2010 года Конгресс США выделяет по 200 млн. долларов ежегодно для изучения здоровья населения и новых угроз в связи с глобальным изменением климата. Уже созданы мультидисциплинарные комплексные программы обучения в этой новой области медицины, находящейся на стыке с экологией. Выделяются два наиболее существенных для здоровья человека аспекта проблемы: глобальное потепление и сохранение источников чистой питьевой воды. Современная нестабильная экология приводит к нарушению устойчивости экосистемы, органный и клеточный гомеостаз нарушается. Как пишут авторы статьи, к 2100 году повышение средней температуры на Земле достигнет +5, при этом на 13% снизится поглощение CO_2 из атмосферы. Это приведет к росту инфекционных эпидемий, что является одним из качественных индикаторов и одновременно количественным показателем неблагополучия здоровья нации. На сегодня в проекте Центра здоровья и глобального окружения Гарвардской медицинской школы сформулированы главные причины экологически зависимых заболеваний:

1. Возникновение новых мобильных очагов распространения малярии, энцефалитов, гельминтозных заболеваний;
2. Нарастание краткосрочных эпидемий;
3. Уменьшение лесных зон, что ведет к снижению антибактериальных средств в почве, воздухе и воде;
4. Сокращение объема планктона – важного дезинфектора приводит к развитию эпидемий в океане.
5. Глобальное потепление активизирует гибель устриц в силу появления новых вирусных эпидемий.

В своем стремлении управлять природными процессами, человек не ведет, какими трагическими последствиями это может для него обернуться.

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Ekzogenetic features landscapes of high mountains of the Greater Caucasus with in Azerbaijan Republic

Abstract: This article is devoted to the possibility of predicting changes in the landscape structure of the Greater Caucasus highlands within of the Azerbaijan Republic. Also considered ekzogenetic features of subnival-nival, alpine, subalpine landscapes.

Keywords: ekzogenetic, landscapeforming, geodynamic process, landslide areas, interpretation.

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Экзогенетические особенности ландшафтов высокогорий Большого Кавказа в пределах Азербайджанской Республики

Аннотация: В работе анализируются возможности прогнозирования изменения ландшафтной структуры высокогорий Большого Кавказа в пределах Азербайджанской Республики. Также рассматриваются экзогенетические особенности субнивальных-нивалных, альпийских и субальпийских ландшафтов.

Ключевые слова: экзодинамические, ландшафтообразующие, геодинамические процессы, оползнеопасные территории, дешифрирование.

Горные территории Азербайджанской Республики характеризуются контрастностью естественных ландшафтов в широком диапазоне – от нивальных до полупустынных, сменяющихся в зависимости от высотной поясности. Контрастность ландшафта обусловлена интенсивными дифференцированными тектоническими движениями, приведшими за новейший этап – верхний иоцен-четвертичный период - к воздыманию гор Большого и Малого Кавказа на 3200 – 4000 м (без учета денудационного сноса) над недокомпенсированно – прогибающейся Кура – Араксинской базисной равниной [10].

Вопросы выявления причин геодинамических процессов – осыпей, россыпей и оползней многие годы находятся в центре внимания географической общественности страны по причине пагубных последствий этих явлений для социальной сферы и хозяйственной деятельности всех горных регионов [1,2].

Южный и Северо-восточный склон Большого Кавказа отличаются сложным геоморфологическим строением, проявляющимся в сложной структуре чередования водопроницаемых слоев пород, переплетением тектонических нарушений, а также высокой сейсмичностью, довольно часто являющейся малозаметным, но решающим фактором сползания и обрушения масс пород.

Существенное влияние на развитие оползневых процессов оказывает наклон земной поверхности, скапливающий в себе значительную энергию всей массы пород склона. Известно что, большие уклоны склонов не всегда приводят к оползням, даже на близко расположенных к оползневым массивам участках. Так, склоны с твердыми материнскими породами являются устойчивыми, склоны же с чередованием слоев рыхлых пород и глин являются наиболее подверженными воздействию геодинамических факторов. Большие уклоны склонов, особенно характерные для южного склона Главного Кавказского хребта приводят к оползням обвального характера, в корне изменяющим облик ландшафта данного участка [3,4].

По степени устойчивости к воздействию оползневых процессов территории горных массивов подразделяются на относительно устойчивые, средне активные и активные участки. В пределах горно-луговой зоны устойчивые в оползневом отношении участки характеризуются наличием ясно выраженных субальпийских и альпийских ландшафтов. Такие участки могут быть подвержены влиянию других экодинамических процессов – почвенной эрозии, накоплению и перемещению осыпей и россыпей, представляющих не меньшую опасность для ландшафтной и всей экологической ситуации [8].

Юго-восточная оконечность Большого Кавказа, являющаяся активной с точки зрения схода оползней, всегда привлекала внимание исследователей различных дисциплин. За это время были определены главные оползневые массивы, литологический состав пород оползневых склонов, основные ландшафтные элементы отдельных крупных оползней.

Дешифрирования аэрокосмических изображений дает возможность их интерпретации для выявления геоморфологических и ландшафтных особенностей последствий оползней и их пространственную и временную динамику при наличии снимков разных лет. В Азербайджане многие годы проводились работы по созданию и совершенствованию различных средств и методов интерпре-

тации аэрокосмических данных для определения направлений развития пагубных природных явлений [5].

По мере увеличения абсолютной и относительной высоты рельефа, связи с динамичным развитием экзогенных процессов снижается устойчивость ландшафта, вследствие чего снижается и степень присутствия человека, выражающаяся в сокращении площадей обрабатываемых земель и селитебных комплексов [10].

В этих целях в горно-луговой и субнивальном-нивальном зонах были выбраны характерные ключевые участки, в разной степени подверженные деградации, физическому выветриванию и денудации. Эти участки охватили крупные высокогорные массивы в центральной части Южного склона Главного Кавказского хребта, в Юго-восточном склоне Главного Кавказского хребта, в бассейне реки Гирдыманчай, на Северо-восточном склоне Большого Кавказа в бассейнах рек Гудиалчай и Гусарчай. На этих массивах наблюдаются различия во взаимодействии природных и антропогенных факторов, связанные в первую очередь, различной степенью расчлененности поверхности, приводящего к дифференциации [9] уклонов поверхности. На локальном уровне карты-схемы отдельных участков в масштабе 1:25000, а на региональном уровне карта-схема всей исследованной территории в масштабе 1:100000 в состоянии охарактеризовать эти процессы.

В то же время, предпринимаются попытки мелиорации оползневых массивов, которые являются малоэффективными. Они, в основном, направлены на выравнивание поверхности и восстановление сомкнутого почвенно-растительного покрова, в том числе, путем осуществления лесопосадок.

Данные меры приводят к временной стабилизации геодинамической ситуации, что на самом деле, является началом нового цикла в развитии оползневого процесса. Посадка деревьев улучшает почвенно-экологическую, но не геолого-геоморфологическую ситуацию, так как корни деревьев не способны в достаточной степени сдерживать движение масс пород. Примером могут послужить многочисленные оползни в пределах горно-лесного пояса Большого Кавказа в пределах Азербайджана, сильно изменившие весь облик ландшафта, принося до того не встречающиеся элементы в ее горизонтальную структуру [8].

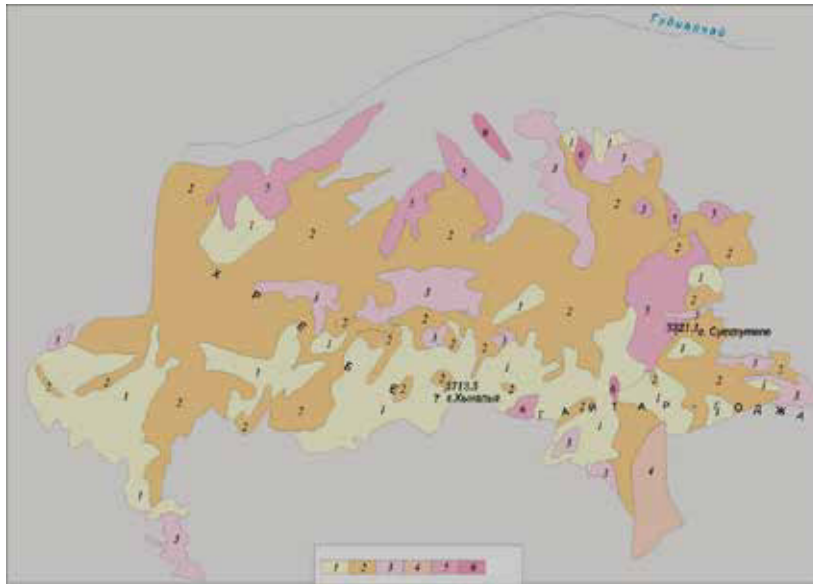


Рис. 1. Карта-схема субниважно-ниважноной зоны вокруг вершины Хыналыг (3713,5 м). 1. Сплошные снежники. 2. Снежники с кристаллическими выходами 3. Языки снежников, покрывающие склоны скал. 4. Сильнорасчлененные склоны субниважноной зоны с выходами скальных пород и осыпями, с небольшими пятнами снежников. 5. Сильнорасчлененные склоны субниважноной зоны с выходами скальных пород, осыпями и с языками снежников. 6. Склоны субниважноной зоны с пятнами снежников.

В этой связи возникает острая необходимость в крупномасштабной инвентаризации высокогорных массивов с учетом изменяющихся геоморфологических и ландшафтных условий, подразумевающей составление детальных ландшафтных, геолого-геоморфологических, почвенных и геоботанических картосхем, в том числе, с использованием материалов аэрокосмической съемки. Картографические материалы должны быть дополнены метеорологическими данными, включающими информацию о годовом ходе температуры воздуха, количестве, характере и режиме выпадения осадков, среднегодовых и среднемесячных температурах воздуха.

Накопление и обработка большого объема данных может позволить провести сопоставление вероятных факторов, обуславливающих процесс схода оползней и выявить ключевой фактор, не учтенный при первоначальном рассмотрении, с целью поиска возможностей его нейтрализации. Такой подход способен дать больший экономический эффект, чем осуществление целого ряда мероприятий, порой не дающих желаемого результата.

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Education for All in Low-Income Countries: A Crucial Role for Cognitive Scientists

ABSTRACT

Donor funding has helped enroll in school most children of low-income countries. However, students get little schooling and few opportunities to encode and consolidate information. Many fail to learn and automatize the small units needed for more complex skills, such as reading. As a result, many children remain illiterate and drop out in the early primary grades. However, donors and governments often focus on the socioeconomic difficulties of the very poor and have limited insights on how to teach students who get no academic preparation before grade 1. Furthermore, staff experiences with middle class schools may promote complex instructional methods and raise unrealistic expectations regarding the performance of the very poor. In principle cognitive scientists could provide technical assistance and conduct research on issues relevant to learning for the very poor. In practice, however, essential memory functions needed to explicate the knowledge gaps have little value added in high income countries and receive less attention in academia. Few cognitive scientists are sufficiently exposed to them, while education faculties similarly do not teach them. The question arises how to engage cognitive scientists in international development. There is a need for intellectual leadership in this field. New avenues of collaboration are needed between those who research learning and those who plan the education of the very poor.

Keywords: education for all; low-income countries; cognitive science; neuroscience; reading; working memory; observational learning; elaboration; encoding specificity; automaticity; chunking; international education; perceptual learning; policy advice; teacher training.

ACRONYMS

DFID - Department for International Development; FTI - Education for All Fast Track Initiative Secretariat; GPE - Global Partnership for Education; RTI - Research

Triangle Institute; UNESCO - United Nations Educational, Cultural, and Scientific Organization; UNICEF - United Nations International Children's Education Fund; USAID - United States Agency for International Development.

1. TRIUMPHS AND TRIBULATIONS OF EDUCATION IN LOW-INCOME COUNTRIES

About 60-72 million children are of school worldwide. Ensuring their education, particularly in low-income countries¹, is an important goal of the international donor community. The United Nations agencies and affiliated organizations have devoted much thinking and resources in the last 20 years to improve access to good-quality education for low-income populations.

In 1990, a worldwide initiative was instituted to ensure that by 2015 all children in the world should complete primary school. The Education for All initiative [1,2] has become a high-profile operation aimed at raising the funds needed to close the gap between national budgets and the investments needed for universal primary enrollment. The funds pay for budget items such as school construction, curriculum development, textbook production, teacher training and hiring, management information systems, student assessment, and evaluation capacity development. Efforts have borne fruit. Some of the poorest countries, such as Niger, Burkina Faso, Ethiopia, or Cambodia increased enrollments by multiples between 2000 and 2010 (See statistics at www.globalpartnership.org; Education for All Fast Track Initiative, 2010).

Annually about US\$13.5 billion are needed to educate the children of low-income countries [3,4]. This herculean task is being financed by scores of donor agencies and partners. There are United Nations organizations, such as UNESCO and UNICEF; multilateral institutions such as the World Bank, African Development Bank, the Organization of American States, and others; bilateral donor agencies, such as United States Agency for International Development (USAID); many national and international non-governmental organizations, such as Save the Children, Oxfam, or Actionaid; civil society groups that advocate for education. Many consulting companies are also involved that vie for contracts to implement various initiatives. Partners

¹ *The World Bank defines country groups in terms of per capita gross national income, using the Atlas method. In 2011, thresholds were: low income, \$1,025 or less; lower middle income, \$1,026 - \$4,035; upper middle income, \$4,036 - \$12,475; and high income, \$12,476 or more (retrieved from www.worldbank.org).*

have worked hard to harmonize their procurement and accounting rules to ease the reporting burdens of low-income countries. Thousands of very dedicated staff work in these agencies, managing the bureaucracy and providing advice to governments and donors.

So, do schools in low-income countries teach students the needed basic skills that will help them rise out of poverty? Unfortunately not. Many of the enrolled students learn very little and fail to reach even minimal competencies [5,6]. Early-grade reading fluency tests in the primary grades show that in some countries 90% of the second or third graders fail to read even a single word, and many do not even know individual letters [7,8]. As a result, students abandon school early and remain illiterate; in sub-Saharan Africa, only about 67% of the beginning cohort graduate from primary school, and many of the graduates are functionally illiterate [9]. The Africa Learning Barometer (supported by the Brookings Institution) reported that overall 53% of poor children and specifically 43% of children from rural areas fail to learn basic literacy and numeracy skills [10]. Similar data are reported from other low-income countries, such as Yemen, Papua New Guinea and East Timor.

Failures are not just limited to basic reading or the poorest countries of Sub-Saharan Africa; they extend to higher grades of lower-income countries. International comparison tests such as TIMSS and PIRLS² show large performance differences among the 49-63 countries that participate. (Most low-income countries do not participate.) For example in grade 4, the 2011 PIRLS score for Hong Kong was 571 compared to 310 for Morocco and a scaled score of about 330 for Botswana and South Africa [11, p. 45]. Similarly in the 2011 TIMSS, the 4th grade average score for Singapore was 606 compared to 238 for Yemen.

TIMSS and PIRLS socioeconomic data have showed large score differences by parental levels of income and education. For example overall students of many resources scored in TIMSS an average of 535, and those of few resources scored 415 [12, p. 13]. The students who could do early numeracy tasks very well when they began primary school scored 524 compared to a score of 451 for those who could not do them well. On the basis of these and other data, it was found [13] that children in low-income countries are able to answer correctly only about 30 percent as many questions as children in upper-income countries. It has been estimated [6,11,13] that the learning of the average child assessed in low-income countries is at about the 5th percentile of children in upper-income countries.

² *Trends in Mathematics and Science Study, Progress in International Reading Literacy Study (TIMSS).*

It appears, therefore, that many lower-income countries are raising a generation of nominally schooled but illiterate students. Organizations such as UNESCO have raised alarms (e.g., [14]). Some publications and blog articles describe the situation as a “learning crisis” [15].

In some respects, the learning crisis should not come as a surprise. Many students lack the skills necessary for performance. They often go to school without pre-school experience or home preparation for academic tasks. They may have limited vocabulary even in their own languages; they may have developmental delays and poor executive control. Many suffer from malnutrition and diseases that are known to compromise skills acquisition [16,17]. These students can certainly learn, but they need specific inputs and extra teaching time to master preliminary tasks. In high-income countries, such students would get individualized attention by well-educated teachers, a surfeit of materials, and follow up at home. In many low-income countries, the only available option would be private tuition [18].

Another important reason for failure is limited instruction and little or no feedback. To implement Education for All, public schools of countries such as Malawi or Congo Democratic Republic must admit massive numbers of children with very limited class space or staff. In cities like Lilongwe, classes may have over 100 students in the early grades [19]. The teachers may have the equivalent of 4th grade education, may not know how to teach, and may be absent on average 20% of the time. Schools often start late in the school year and end early [20]. Countries that lack sufficient buildings and teachers may reduce class hours to fit all students in multiple shifts. As a result of all these constraints, the students may only get 39% or less of the instructional time given to first graders in higher-income countries [21]. And when teachers teach, they may interact with the few who can do the work and ignore the rest [22,23]. Nonperformers may attend sparsely until they drop out.

Multilingualism further complicates the picture. In many low-income countries citizens speak numerous languages; so many governments have adopted English, French, Portuguese or Arabic as their language of instruction. Nearly all countries of Sub-saharan Africa and the South Pacific face this complexity. Students must learn the official languages during class at the same time as reading. The above languages happen to have complex spelling systems, which may take two or

three years to master. In addition, textbooks are usually imported, expensive, scarce, or inappropriate for the students' knowledge level. Without them, class time is largely spent copying incomprehensible texts from the blackboard. Scant instruction suffices only for those few who are inordinately intelligent or the better off who get help at home. Thus, Education for *All* becomes in fact education for the gifted.

Clearly the above circumstances reduce the opportunities to obtain new information, elaborate it, practice basic tasks to the point of effortless execution, get feedback. Despite systemic limitations, certain classroom activities could be modified to increase precision, timing, or frequency of some inputs. However, classroom issues receive limited attention. Instead, sociocultural factors are emphasized such as child marriage, child labor, or the effects of income inequalities, emotional and physical well-being in schools, safety issues in conflict-affected countries, or gender (e.g., [24, 25, 26, 27]). Attention to sociocultural complexity may detract attention from instructional variables³, or result in conflicting advice about educational quality and use of funds.

These exigencies are directed at government and donor staff who are burdened with the complex financial and logistical problems involved in expanding their school systems. Procurement events, disbursement schedules, budget meetings, contracts have clear deadlines and take up much of officials' time. Multiple and complex demands for accountability may push learning issues low on the agenda.

Given the exigencies of political economy and the extreme limitations of low-resource schools, how can students learn more and perform better? Whose advice to governments and donors is most likely to achieve results? The article presents some aspects of this very complex topic and suggests how research on memory and cognition can be used to improve learning outcomes for the poor.

One note is important on documentation. Many cited reports by donor agencies and consultants are work documents that may not necessarily meet rigorous academic standards. Also, certain topics that are well-known in international development have

³ For example one draft consultant report about Ethiopia stated in 2013: "Learning outcomes depend on a variety of factors, both on the side of educational provision, and with regard to sociocultural, environmental, and individual factors. Any assessment of the impact of higher teaching quality on learning outcomes must take account of this complexity".

not necessarily been documented, such as the academic background of staff. However, the issues are critical and merit publication.

To illustrate the knowledge needed, some real-world questions are presented below.

2. THE LEARNING CRISIS AND POLICY ADVICE DILEMMAS

A foreign service officer from a European country manages the bilateral aid program of her country in certain African countries. Citizens in these countries speak 15-37 languages, so instruction takes place in English, French, or Portuguese. Textbooks are scarce, so most classroom time is spent on transcription; and about 85% of students remain illiterate. In the course of a week, the following topics require input. What policy advice could be offered and on what basis?

- Many donors advocate that children should learn in a language they know best, so one government developed a policy of teaching children in local languages for the first three years. One colleague wonders why it is necessary to delay English-medium instruction. His children went into French immersion class and did very well. Which research studies can be used to facilitate decisions?

- A team of economists spent about a million dollars for a randomized experiment that tested whether better school management improves learning outcomes. The answer was negative. (See for example [28]). The economists searched for answers, but they did not think of examining the grade 1 reading book used in that country. The book started with entire sentences in English and no obvious attempt to teach letter sounds. How important was the textbook vis-a-vis school management?

- The primary education director in the Ministry of Education is preparing new books for grade 1 reading but gets contradictory advice. Some specialists believe in phonics and others in the whole word approach. Some suggest that instruction should start with entire sentences, then words, then letters, and others believe in the opposite order. Which research could be used to predict likely outcomes of each viewpoint?

- Many students completing primary school can barely decode, so the government was advised to start youth centers that would teach "flexible" 21st century skills. A consultant will develop competency-based curricula that will minimize teaching of facts and focus instead on critical thinking and catalytic communicative skills. Does existing research suggest that this will work?

- To develop creativity among students, one government plans to buy one million inexpensive laptops. Most students are illiterate, and the computers do not include software for teaching basic skills. (See for example [29]). Proponents say that computers will improve 'lateral thinking'. Should this low-income government spend scarce revenues to buy laptops for all children?

The above questions are hard to answer and are rarely encountered in higher income countries. Governments and donors must decide on certain solutions that are reasonably effective and politically acceptable, and then dedicate taxpayers' money to them. Many decisions have far-reaching consequences for citizens and typically involve millions of dollars. They must often be made in a matter of days or weeks, so research studies are out of the question. It is important therefore to follow the most reasonable advice available at a given moment.

Which body of knowledge can effectively advise governments and donors on how to improve learning in low-income classrooms? No clear contender exists. Staff who work in international development typically have advanced degrees in a wide variety of fields, which typically offer no learning-related coursework: Economics, finance, statistics, political science, international relations, comparative education, education policy, sociology, political science, or literature. Not surprisingly, donor agencies tend to recommend policies that reflect the academic preparation of employees. Few documents offer actionable instructional advice (e.g., [30,31]). Instead, agencies produce countless documents attributing learning problems to low incomes, gender biases, psychosocial development, community conflicts, social theory, or malnutrition [32,33].

Economic and management advice may also detract attention away from classroom learning. Certain economists consider the classroom a "black box" and they posit that if teachers are made accountable, they will somehow find means to make more students learn. To improve quality, governments are urged to invest in school-based management and give grants to schools under the supervision of citizen committees [34]. Countries are also advised to invest in merit pay and training, in hopes that incentives will increase attendance and teaching quality. To assess and evaluate the results of various interventions, the donors have heavily invested in statistical data collection and international comparative tests [35].

Added to the varied academic backgrounds of donor agency staff is the human tendency to interpret unfamiliar situations through easily available memories (e.g.,

availability bias [36, pp. 65, 129-136]. Few studies have explored the educational beliefs of staff (e.g., [37, p. 71; 38]). But whenever instructional advice is given, it seems to reflect a middle-class perspective of well-trained children who have been learning academic content since birth. As shown above there are large test score differences across socioeconomic strata; the better-off students may be better prepared to study more complex topics, and they are more likely to have better educated teachers. These may be reasons why education advisors often condemn memorization and recommend “modern” discovery methods over “traditional” routines. They may recommend a child-friendly classroom climate, “active learning”, child-centered learning, constructivism, transformative education, teaching that is individualized and relevant to children’s lives (e.g., [39,40]). They may expect teachers who are barely literate to carry out reflective practices and complex classroom activities [41], [24, pp. 54, 110]. Some expect all teachers to use computer technology, discounting the training and procurement problems likely with large-scale applications.

Since there is no clear corpus of research that guide on difficult issues, large-scale consultations are sometimes held to arrive at “best practices”. Certain organizations may invite hundreds of staffroom international agencies and organizations involved in education and ask them to comment on various questions until a consensus emerges. For example, the Interagency Network for Education in Emergencies (INEE) has conducted hundreds of workshops seeking advice from persons involved in education on how to teach conflict-affected children. The consensus resulted in about 70 variables to be used as Minimum Standards for education in emergencies (www.ineesites.org). The theoretical framework created by these standards emphasizes community involvement, security, human rights, emotional healing, and teaching according to cultural context. The Brookings Institution also led a large consultation in 2012-13 to determine what the students of the world should know and how to measure their achievement [42]. In the first two phases of the study, nearly 1,000 people in 84 countries informed task force recommendations. However, few of the participants had experience in teaching school or studying memory research. The document with the initial findings uses in 101 pages the words ‘learn’ or ‘learning’ about 209 times and ‘teach’, ‘teaching’, or ‘teacher’ about 26 times. However learning research is rarely cited in conjunction with these⁴.

⁴ *Another document on the education of marginalized children uses the word “learn” or “learning” 153 times in 35 text pages. It also uses “teach” and “teaching” 18 times, but it does not refer to any research or propose means for students to learn better [27].*

Overall, the chorus of advocates about the education of the poor rarely includes people with expertise on how people learn. Few if any staff working in international development have studied cognitive psychology, cognitive neuroscience or related disciplines. If expertise in learning were more widely available, information processing principles could be used to advise governments. An international strategy to make learning more efficient could focus on the information processing commonalities of humans rather than cultural and individual differences: encoding, consolidation, retrieval, forgetting [43]. The environment certainly modifies some aspects of learning and cognition [44]. However, similarities of cognitive development across cultures at about the same age suggest applicability of basic information processing functions to children [45]. It could be possible to optimize classroom activities of low-income countries and increase efficiency in encoding, consolidating, and retrieval of needed information.

Research suggests that people must first learn to execute essential skills fast and automatically, so that they can devote their working memory to more challenging and complex cognitive tasks. Fluent performance in various skills results from practicing and automatizing progressively larger chunks of information [46,47,48,49]. Students must also acquire networks of well-connected knowledge that will effortlessly arrive in working memory to help reach conclusions and make decisions [50]. As mentioned earlier, many students in low-income countries fail to master fundamental skills, and subsequently perform poorly in the more advanced skills. This pattern suggests failures to learn what might be called for a lack of a better collective term, “simpler” cognition:⁵ perceptual learning, chunking, mapping letters to sounds, reading and math automaticity, executive control. To put it simply, it is difficult for students to analyze the meaning of text when they can hardly lift it “off the page”. It is hard to engage in critical thinking and transformative learning when students must consciously search their memory for essential information items. Survivors able to tackle more complex concepts do so years later than students of the same grades in better off countries.

⁵ “Lower-level” processes are not simple, but the term ‘simpler’ cognition is used as a placeholder, given the frequent use of the term “complex cognition”.

Government and donor staff have not sufficiently focused on these prerequisite skills. The “simpler” cognitive functions are largely unconscious, so people have limited insights about them [51, p. 47]. Also middle-class children, with whom donor staff are familiar, learn them quickly. This may be one reason why documents often lament the lack of basic skills but rarely drill down into the specific variables that must be reinforced.

These variables could come sharply into focus if an information processing framework guided educational decisions. It would emphasize in all cultures the acquisition of speed and automaticity in basic skills, such as reading, writing, or math [52]. Without this focus, advice to low-income countries can be misleading. The following section offers some examples.

2.1 Reading Instruction for the Very Poor

Reading is the skill that falters most often in low-income countries. Early action is crucial because often students drop out in grades 1 and 2. Fluency acquisition by the end of grade 2 at the latest may help them stay in school; and if life circumstances force dropout, fluent readers may continue to decode environmental print and thus retain the skill [53]. To teach such high-risk populations governments should aim for efficiency. Teaching methods should target the weaker students and aim to teach nearly everyone to read.

Reading neuroscience helps point to the important variables and activities that may speed up automaticity. Visual perception research suggests that simpler visual patterns are faster to automatize and critical spacing affects reading speed [54]. Practice with corrective feedback reduces reaction time and links letters into increasingly larger chunks [55]. Eventually, the visual word form area is activated, enables recognition of entire words [56], and makes it possible to process multiple letters in parallel. Many psychological and educational studies suggest that teaching individual letters matched with sounds may efficiently automatize reading (e.g., [57, 58]). In consistently spelled languages, which constitute the vast majority of the world’s languages, fundamental instruction requires only about 100 days in most scripts [59]. By contrast, literacy instruction in the complex orthographies of English or French takes about three years and requires some learning of whole words [58]. Word shapes constitute more complex patterns that take longer to automatize.

Unfortunately low-income countries often get garbled advice. Reading specialists tend to come from high-income Anglophone countries and may have ambivalent

feelings about phonics, given that instruction in English cannot completely rely on them. And since middle-class children progress quickly, curricula are often designed to focus on textual meaning rather than teach the script [60, pp. 2, 116].

However, to understand, students must read fast enough to input sufficient text into working memory and retain it long enough to make sense out of it. If they know the words, they may understand their literal meaning [59]. The relationship between speed and comprehension has been documented repeatedly in education [61,62,63], but without understanding working memory functions, the relationship makes no sense to some education advisors. Some argue that speed should be discouraged because children may just “bark at print” [64]. Several others state that if students do not understand what they read, they are not really reading; they are merely decoding. But with limited practice, it may take years to acquire fluency. And those who manage after years of schooling may read too slowly to make sense of texts or learn much information from them [7].

Teacher training transmits these ambiguities about reading. For example, Kenyan teachers are rarely taught how to teach reading and may even use whole word techniques for consistently spelled languages like Swahili; they are sometimes advised to focus on language development, picture recognition, inferences, and prediction [65]. Another result of ambivalence with respect to speed and practice is the design of grade 1 reading textbooks. They typically have big pictures, few pages, and small amounts of text, so children whose parents cannot afford books cannot get more practice [66].

The outcome of confused beliefs about reading acquisition is evident in the textbooks of many low-income countries (e.g., [67]). Students receive whole-word instruction without textbooks in an unknown language that has a complex orthography. It seems a bizarre way to teach reading, but all over Africa it happens every day.

With political will, this fundamental cause of the learning crisis can be mitigated in about two years. Given the time limitations of low-income students and schools, curricula might prioritize fluency. To help nearly all students attain automaticity, governments are advised to adopt synthetic phonics and teach reading in local languages whenever possible, since the latter are consistently spelled. Letters are to be taught one by one, with pattern analogies, plenty of practice opportunities, phonological awareness, and writing. Grade 1 textbooks should have well-spaced letters, should maximize text than pictures, and contain substantial amounts of text since no other reading materials exist to help achieve automaticity [66]. Reading in official languages

such as English or French might best be deferred until students have acquired automaticity in the same script. During the months that students are engaged in this process, the official language could be taught orally.

Some governments agreed to implement this advice, and school-level pilots showed greatly improved student performance compared to control schools: In Cambodia, performance improved from one year to the next in all measures. For example, letters by minute rose by over 100% (from 30 to 63 letters), words per minute by 63% (from 23 to 35 words), and comprehension by 70% (from 48% to 68% answers correct; [68]). In the Gambia, only 50% of the lessons were taught on average. Still, the percentage of first graders knowing at least 80% of the letters was 69% in the Pulaar language and 57% in Wolof (target was 85% of children [69]). Following six months of application in grade 2 in Egypt, word and text reading fluency rates doubled in comparison to rates obtained two years earlier (from 7 to 15 and from 11 to 21 words per minute respectively; syllable reading tripled from 10 to 28 syllables per minute). By contrast, the same measures in control schools improved only by about 27%. The percentage of students reading 0 correct words was cut by half in project schools (from 44% to 21%) while in control schools it improved only by 10% [70]. The Cambodian and Egyptian programs have been scaled up nationwide by the third year of implementation.

Learning research also helps predict and improve outcomes of teacher training. Poorly educated teachers have been hard to train, and methods imported from middle-income countries have given limited results [71]. Knowledge gaps may impede the retention of unfamiliar pieces of information, and efforts to bring consciously much material in mind may result in cognitive overload [72,73]. In addition, inservice training often is offered through intense brief courses given at training centers. Under such circumstances state-dependent learning and spaced learning research would predict limited recall for long-term use [74,75]. Thus when teachers return to their classrooms, the content may become a vague memory and without reviews, it may fade as work urgencies take over. However, observational learning research findings suggest that teachers may remember better to carry out activities they watched, particularly if they also visualized themselves executing them in class [76,77,78]. Thus, videoclips of the desired behaviors may effectively help train teachers of limited education. These and other learning concepts can help use donor funds more effectively when teachers are trained.

The need to execute effortlessly the building-block skills before engaging in more complex problems seems applicable at all educational levels. Methods that skip preliminary steps or assume that students will learn them rapidly on their own may succeed in teaching mainly those who are better off. Also methods that require little-educated teachers to make multiple rapid decisions and keep track of many items simultaneously may be abandoned. For governments this implies revision of curricula to ensure fluency in component skills, affordable textbooks for all students to facilitate formation of cognitive networks, use of classroom time for practice and elaboration of knowledge, training of teachers to engage students in relevant tasks, and remediation at public expense to those lagging behind.

To disseminate and apply these concepts on a large scale in lower-income countries, experts are needed who understand these principles in detail and can clearly enunciate them. But very few exist. The following section discusses the reasons and proposes some solutions.

2.2 Attracting Cognitive Scientists to International Development

Most studies exploring chunking, automaticity, working memory capacity, or conditions that optimize retention are old. Hundreds of publications from the 1940s to the 1990s explored elementary memory operations. (See for example [79]). The findings have been taught in cognitive psychology courses for decades. Over time, research has specified variables better and measured them more exactly, while neuroimaging has succeeded in linking some cognitive functions to brain functions. Overall, the information processing framework remains valid.

This older body of research has considerable utility for low-income schools. Often nonsense words were used in order to limit knowledge about a subject, and in some ways the paradigms resemble the poor students' limited knowledge. For example, the relationship between instructional time and practice can be clarified by using the cognitive psychology experiments of that period (see for example [80]).

For the education of high-income countries, however, elementary memory operations offer little added value. Students enter grade 1 with much academic knowledge and move quickly beyond basic skills towards issues of greater cognitive complexity [81]. With parents attentive to children's learning at home, the relationship between classroom time and outcomes becomes muddled. Thus fundamental topics such as chunking have become less interesting, and they get less space in cognitive science syllabi. And as complexity increases, the earlier paradigms may appear

simplistic. For example, Daniel Reisberg's 2001 edition of undergraduate cognitive science had informative illustrations of nodes and links of cognitive networks, but by the 2009 edition, they had been omitted [50,82]. Lack of opportunities in explaining and applying these concepts may make it hard for cognitive scientists to identify potential applications and advise low-income countries.

Psychologists may be leaving these concepts behind, but colleges of education have rarely taught them. Traditionally, educators and psychologists have rarely collaborated [83,84,85,86]. Faculties of education have constructed theoretical frameworks on the basis of practices and philosophies of educators such as John Dewey, Lev Vygotsky, Maria Montessori, or Paulo Freire. These luminaries exerted their influence before most cognitive research was carried out. Some contemporary educators discuss learning in terms of ultimate results, as in transformative learning [87, p. 3-4]. Specific or intermediate memory processes seemed to have been locked in a black box. Few know where to find the key, and there is limited interest in looking for it.

Moreover certain education professors express caution against cognitive science or neuroscience. Some believe that information processing is a reductionist framework that leads to narrow and mechanistic prescriptions [88,89,90,91]. Similarly certain textbooks that teach reading to university students caution against using cognitive science [92]. Such beliefs are inevitably transmitted to students who are the next generation of workers in international development. It is difficult to base justifications on concepts that specialists have learned to ignore.

To mitigate the learning crisis in low-income countries therefore, the challenge is considerable. The existence of building-block cognitive concepts must be demonstrated, often to skeptical audiences. The concepts must become attractive to teach in seminars or training events aimed at government or donor decisionmakers. Potential middle-class biases must be discussed diplomatically, and somehow decisionmakers must be trusted to remember and use explanations that run counter to their beliefs.

Thus solutions with a high payoff for the poor may be mired in perennial philosophical disputes among academics and lie unused. Arguably, the standards of higher-income countries create obstacles for the education of the marginalized.

Can cognitive scientists fill the needed role of learning specialists in international development? Graduates are relatively few and are usually absorbed in the job markets of higher-income countries. When they conduct research, it is funded by institutions as the National Science Foundation that are interested in topics pertinent to

high-income countries. So cognitive scientists are unfamiliar with donor agencies, and the latter are similarly unfamiliar with what cognitive scientists can do.

And the cognitive scientists who are interested in international development need preparation. They must become familiar with the learning needs of very constrained environments. It is hard for inexperienced people to conceive of students dropping out in grades 1-3 or of the need to make children literate by the middle of grade 1. There is a need to understand international development issues and the functions of various donor agencies. There would also be a need to function in foreign languages such as French, Portuguese, or Arabic. Coursework and internships in bilateral or multilateral organizations would fulfill these needs. Thus, interested professionals would become able to function as consultants or full-time staff of donor agencies or contractors.

Some cognitive scientists might collaborate productively with departments of comparative and international education. These departments focus mainly on sociocultural and economic issues of education across countries and offer no courses in learning. However, the faculty and students often conduct field research in low-income areas, sometimes observing classes for months in rural Sub-Saharan Africa. Joint research might be most useful in addressing priority topics on improving learning efficiency for the poor. And it may encourage international education departments to introduce coursework on learning.

3. PRIORITY LEARNING RESEARCH FOR LOW-INCOME COUNTRIES

The research on the building blocks of learning is broadly applicable to all humans, but the studies were mainly conducted with college students in the U.S. Findings are being used translationally to formulate hypotheses. However, new rigorous research is needed to unravel the learning issues that hold the very poor back at all stages of education.

Of primary importance are topics pertaining to the acquisition of automatized perceptual and performance skills by children and adults. Crucial are visual pattern recognition features that can help speed up literacy acquisition in children and unschooled illiterate adults [93,94]. To help determine the easiest methods to teach basic reading to nearly all students, parameters for chunking might also be developed, picking up where older research left off (e.g., [95]).

For fluent and effortless performance in basic math, there is a need to understand better how to develop the number sense and the Weber fraction of poor students, particularly given the limited instructional means of poorly resourced schools [96].

One risk of dropout in the early grades could be referred to as *literacy attrition*. If a student drops out soon after acquiring reading automaticity, is that lost? Research suggests that 6 year olds forget more information than 9 year olds [97]. But is automaticity as forgettable as episodic information? A 1986 study [53] found that Egyptians who dropped out fluent readers in grade 4 maintained and improved their skills, while those who could not read well forgot what they knew. As with language attrition, children may forget how to read, but the parameters are not known. Variables influencing the permanence of automaticity could be aggregate hours of practice, maximum reading speed attained, practice intervals, age at abandonment, or something else.

Countries with large numbers of languages are often advised to offer reading in a subset of languages that are used for regional communication. Residents often learn them from casual interactions, such as commercial transactions. Community learning is certainly important [98]. However, the parameters of learning languages from the environment are unknown. On average how much do students learn across time? How does language knowledge limitations affect their reading automaticity?

Some people ask why it is worth using a regional lingua franca rather than use English from the beginning. The consistent spelling seems to confer an advantage over English and French, so one small study showed benefits [99]. But how big are they and what are the costs? Languages are learned through interaction, so children cannot learn a language merely by watching TV [100, pp. 133–144]. However, does a broadcasting teacher in a class constitute an intermediate situation? These issues must be explored.

Students' knowledge is limited by teachers' information processing capacity. To succeed in training teachers who have limited education, many questions ought to be answered. For example, what are the most effective ways to improve teachers' automaticity in basic math calculations so that they can check students' work instantly and effortlessly? Insights are also needed on how many and how complex tasks these teachers can comfortably carry out and how to estimate these empirically. To use

observational learning protocols in teacher training, information is needed on the optimal “dosage” that would maximize the probability of executing in class the behaviors presented through videos.

Some officials expect that marginalized students will somehow learn acceptable skills despite scant instruction. To provide some realism, older studies of learning rates could be repeated with low-income populations. For example, what would be the lowest amount of time spent engaging in a task, and what would be the optimal distribution of practice sessions that would enable 85% of learners to attain reading rates of 60 words per minute in two school years? Similarly, what would be the minimum amount of time and optimal distribution that would enable 85% of the students to carry out correct arithmetic operations on 10 or more digits per minute in grades 1-3? [59]. The questions are not limited to primary education. For secondary or higher education students who have spent their school lives without textbooks (as in Mozambique), there is a need to research how to optimize the remaining time and teach efficiently the basic concepts they have missed. The contribution of technology must be studied from this perspective, though large-scale remediation programs have been limited.

An important advantage of engaging cognitive (neuro) scientists in this research is training in neuroimaging and instruments such as event-related potentials. To optimize instruction in difficult circumstances, it is insufficient to collect mere paper and pencil data. There is a need for eye trackers, experience sensing devices, or psychophysics displays. fMRI⁶ can be realistically used mainly in countries such as South Africa or India, but eye tracking and event-related potentials equipment have become portable. These would provide valuable insights in the workings of children who read and count under circumstances that have probably never been researched.

One difficulty with the needed research is that such studies have limited relevance to higher-income countries; therefore funding has been nearly impossible to get. However, donor agencies are becoming more interested in financing learning research. A partnership led by the World Bank has been developing parameters for various topics. It is hoped that suitable amounts of funding can become available. Research targeted on learning basics is urgently needed if the Education for All initiative is to succeed.

⁶ *Functional magnetic resonance imaging (fMRI).*

4. FUTURE PROSPECTS IN THE EDUCATION OF THE VERY POOR

The learning outcomes of the very poor clearly demonstrate why it is important for the donor community to understand better the principles of learning. Certainly, economic and other socioeconomic factors must be mitigated so that children can enroll, attend, and stay in school. But when children come to class, they must process information according to certain biologically determined requirements. One of them is a need to learn the fundamental components first and perform them with sufficient speed to undertake sequences of operations within the capacity limits of working memory.

In high-income countries, students usually get plenty of elaboration and practice opportunities, so they become adept at basic skills and can quickly progress to more complex tasks. Tackling more complex concepts may help students become more efficient learners, so the amount of information that higher-income students can abstract, organize, and retain increases exponentially [101]. But in low-income countries, the limited prior knowledge and instruction make it hard for learning rate to take off. Delays in acquiring the basics delay the acquisition of complex information. Limited practice with reading, writing, and math may make work slow and tedious and limit what children can achieve. Each operation may require extra milliseconds, and these add up. But operations must nevertheless be conducted inside a working memory window that has limited capacity. Thus, processing speed can affect whether a test item can be answered correctly, incorrectly, or just abandoned. Small but systematic differences in basic skills performance may add up over the grades and result in large performance differences between the higher and lower-income countries in international comparisons.

Differences in learning rate may explain to some extent the findings that the average child of lower-income countries performs at the 5th percentile of wealthier countries [13]. The score difference in PIRLS between Hong Kong and Morocco suggests that very roughly fourth graders in Hong Kong may get 150% more information than Moroccans, given an equivalent text and same timeframe. Fourth graders in Singapore may do roughly three times more arithmetic operations than fourth graders of Yemen.

Scores of tests like TIMSS are analyzed through sophisticated procedures and extensively discussed in various countries and the donor community. Much is made of the differences in international comparison tests, but insights about their evolution are

rather limited. Certainly home background is important, but in some respects it is distracting. Educational systems cannot educate homes; they must concentrate on what can be done in class.

The author has found a few cross-cultural studies on reaction-time [102]; but no studies have been found that tracked performance on variables leading to those test scores, such as response time to simpler and more complex tasks and amount of information retained over weeks or months of school. Possibly response times to simple reading passages and math operations could follow a logistic S curve, with low-income countries at the bottom. But without a good handle on information processing variables, government and donor decisionmakers find it hard to focus on the critical variables to improve during school. And without a valid causal chain, it is not easy to remedy deficits.

Intellectual leadership is therefore needed to explain issues convincingly and open new areas for research. Such leadership might best be provided by scientists who understand the how memory works. If governments focus curricula on the automaticity of small information chunks, the performance gap between the poorer and richer countries may be reduced. Without expertise on information processing, such an outcome is unlikely. Colleges of education produce legions of PhDs every year who lack the training to deal with information processing. And there is no evidence of imminent change in this respect.

Due to a lack of expertise, the education of the children who live on a dollar pay day may be compromised by the very people who aim to help them. Education specialists in low-income countries routinely design curricula that seem aimed at average rather than lower scores of international tests. The curricula cover large amounts of material, expect students to read several pages on their own per day, develop reading textbooks on the basis of whole-language methods, assume that students somehow have learned thousands of English and French words by grade 4, and leave much to the discretion of poorly educated teachers [103]. Therefore students get little if any exposure to the preliminary knowledge needed for learning the more complex materials. This is how middle-class standards may rob the poor of the scant learning opportunities that international donors put at their disposal with so much effort.

As things stand in 2013, the academic community that once generated the basic memory principles has moved on. But the mission to educate the millions of students who live on a dollar per day is barely underway. To serve them, we must

reintroduce the 20th century research pertinent to simpler cognition. Teaching and re-searching essential memory principles might produce better informed policies and learning outcomes. Without them, pouring billions of dollars into the budgets of low-income countries is tantamount to dropping food packages on isolated villages and hoping that some will fall into cooking pots. Disappointment may reduce donor investments or divert them from education to other sectors (See for example [104]).

The challenges to disseminate and apply these concepts are significant but if suitably prepared cognitive scientists become engaged, there is hope. To teach the poor efficiently and fulfill children's UN right to education, human cognitive commonalities offer unique opportunities. In all countries, governments must offer students dense and well-connected networks of knowledge, with automatized basic skills. Thus human capital can be optimized worldwide. And some currently obscure psychological research can be shown to have worldwide implications.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Mathematics, Technologies & Engineering

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Effect of Tb³⁺ Doping Concentration on Luminescent Properties of Sr₃B₂O₆ Phosphor

ABSTRACT

The Sr₃B₃O₆:Tb³⁺ phosphors with different concentration of Tb³⁺ were prepared by combustion method combination with heating at high-temperature. Results of the crystalline structure measurement indicate that the Sr₃B₂O₆: Tb³⁺ phosphors have a rhomboidal single phase. The excitation spectra show that the phosphors can be excited by ultraviolet light of near 379 nm. The emission spectra under 379 nm excitation includes several narrow lines, which is ⁵D - ⁷F (j = 2, 3, 4, 5, 6) transitions of Tb³⁺ ion in the lattice.

The emission intensity of Tb³⁺ in Sr₃B₂O₆ is influenced by the Tb³⁺ doping content and optimum concentration is 3% mol. The concentration quenching of Tb³⁺ in this phosphor occurs when Tb³⁺ concentration is over 3% mol. The concentration quenching mechanism was determined dipole-quadrupole (d-q) interaction by using Dexter's theory.

Keywords: Terbium; Sr₃B₂O₆; combustion method; concentration quenching.

1. INTRODUCTION

The development of luminescent materials doped with rare-earth activator is subject of extensive researches for a long time, including such applications as fluorescent lamps, light emitting diodes, field emission displays and many others. In the field of white light emitting diodes (wLED), wLED was obtained by using a blue LED chip and the yellow-emitting phosphor [1]. Besides, many efforts have been made in the search of a phosphor, which can convert ultraviolet (UV) or blue light into a combination of red-green-blue light to obtain white light emission. For this reason, it is necessary to develop green emitting phosphor in the field of optical materials. Among the green emitting phosphors, Sr₃B₂O₆: Tb has main emission wavelength at 542 nm, it has potential application for UV-convertible green phosphors in wLED.

Until now, there are not yet many reports on the spectroscopy properties of the Tb^{3+} doped $Sr_3B_2O_6$ phosphor. In recent years, the detail studies on Tb were realized in the several materials: $K Gd (PO)_4 : Tb^{3+}$, $Y Al O_4 : Tb^{3+}$, $Ca BO_3 Cl : Ce^{3+}, Tb^{3+}$ [2-4]. On the other hand, the luminescent materials base on $Sr_3B_2O_6$ lattice have only prepared by solid-state reaction method [5,6], sol-gel method [7]. This paper presents the synthesis of the $Sr_3B_2O_6 : Tb^{3+}$ phosphors by combustion method, the studies the effect of Tb^{3+} ion concentration on luminescent properties and the concentration quenching mechanism in this phosphor.

2. EXPERIMENTAL DETAILS

The $Sr_3B_2O_6 : Tb^{3+}$ phosphors with different concentration of Tb^{3+} were fabricated by urea nitrate solution combustion method combination with heating at high-temperature. The raw materials include $Sr(NO_3)_2$ (Merck), H_3BO_3 (AR), Tb_4O_7 (Sigma). Terbium oxide was been nitrified to become nitrate solution of Terbium. Urea (NH_4NO_2) was used to supply fuel for combustion process.

Aqueous solution containing stoichiometric amounts of nitrate metals and urea was mixed and heated at $70^\circ C$ by magnetic stirrer in 2 hours to become a gel. Next, the gel was combusted at $590^\circ C$ in 7 minutes then it was decreased down to room temperature, the powder was obtained. The powder was heated at $900^\circ C$ in air within 1 hour, the final obtained product is white powder.

The phase structure of the products were characterized by X-ray diffraction (XRD) using a Bruker D8-Advance X-ray diffractometer. The emission and excitation spectra were recorded by a Fluorog 3-22 (Horiba Jobin-Yvon) with the 450 W Xenon excited lamp at room temperature.

3. RESULTS AND DISCUSSION

To demonstrate the pure phase and structure of the $Sr_3B_2O_6 : Tb^{3+}$ phosphors, powder X-ray diffraction (XRD) measurements of these samples were carried out and shown in the (Fig. 1). The similar diffraction patterns were observed for each sample, which indicates that doping a little Tb^{3+} content does not affect the crystalline structure of the $Sr_3B_2O_6$ lattice. (Fig. 1a and b) show the XRD pattern of $Sr_3B_2O_6 : Tb^{3+}$ (1% mol) and $Sr_3B_2O_6 : Tb^{3+}$ (3% mol), respectively. It is clearly observed that all samples have Rhombohedron single phase.

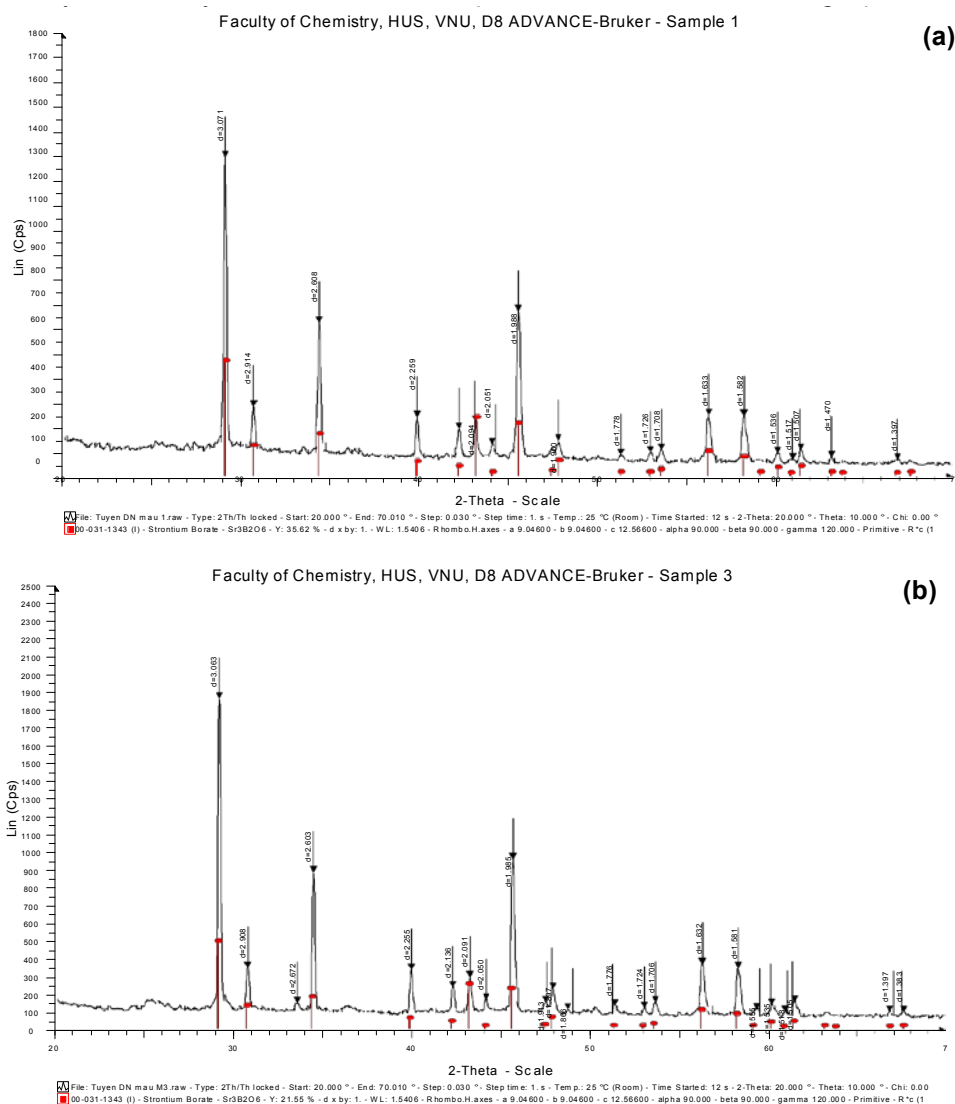


Fig. 1. XRD of $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ (1% mol) (a) and $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ (3% mol) (b)

The photoluminescence excitation (PLE) spectra monitoring at ${}^5\text{D}_4 - {}^7\text{F}_5$ (541 nm) transition of $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ (3% mol) sample is shown in (Fig. 2a). The PLE spectrum is sharp lines in the region 300-400 nm corresponding to the 4f-4f transitions in Tb^{3+} ion.

The photoluminescence emission (PL) spectra of $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ (3% mol) sample under excited radiation $\lambda_{\text{ex}} = 379$ nm is shown in (Fig. 2b). The emission spectra presents four narrow lines at around 486 nm, 541 nm, 592 nm and 611 nm, which originate from the transitions between the excited ${}^5\text{D}_4$ level and ${}^7\text{F}_j$ ($j = 6, 5, 4, 3$) ground levels of Tb^{3+} ion, respectively. The $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ phosphor has the green light emission which due to the strong ${}^5\text{D}_4 - {}^7\text{F}_5$ transition. The PLE spectra of all

samples with different concentration of Tb^{3+} ion are shown in (Fig. 3). All spectra have the same shape and reach the maximum intensity at 3% mol.

(Fig. 4) presents PL spectra of $Sr_3B_2O_6: Tb^{3+}$ with different concentration of Tb^{3+} ion. Accordingly, we can observe that the wavelength of $^5D_4 - ^7F_5$ (541 nm) transition in these samples don't change, it located at 541 nm. But emission intensity changes over Tb^{3+} concentration. The emission intensity increases with the increasing of Tb^{3+} doping content, and reaches a maximum at 3% mol, then decreases. The result was shown in (Fig. 5). The phenomenon of decrease in emission intensity after a certain concentration is called concentration quenching and is attributed to energy migration among rare earth ions.

As a representative on the (Fig. 5), concentration quenching was observed when Tb^{3+} content was over 3% mol. Non-radiative energy transfer from one Tb^{3+} to another Tb^{3+} ion may occur as a result of an exchange interaction, radiation re-absorption or multiple-multiple interaction [8]. The exchange interaction is generally responsible for the energy of forbidden transition [4,9,10]. The mechanism of radiation re-absorption comes into effect only when a broad overlap of the fluorescent spectra of the sensitizer and activator appears [8]. Due to there is not sensitizer in this phosphor, the overlap does not exist. It means that the mechanism of exchange interaction and radiation re-absorption plays no role in the energy transfer between Tb^{3+} ions in $Sr_3B_2O_6$. So the concentration quenching mechanism of Tb^{3+} must be the electric multiple-multiple interaction as suggested by Dexter.

According to Dexter's theory, if the energy transfer between the same sorts of activator, the multipolar interaction can be determined from the change of the emission intensity. The dependence of the luminescent intensity on the activator concentration can be described by the equation (1) [4,11]:

$$\frac{I}{x} = K [1 + \beta x^{Q/3}]^{-1} \quad (1)$$

Where, the constant β refers to the quenching mechanism by multipolar interaction. The parameter Q is different for different types of interaction: 6, 8, 10 for dipole-dipole (d-d), dipole-quadrupole (d-q) and quadrupole-quadrupole (q-q) interaction, respectively. The value Q has been determined graphically from equation (2):

$$\log\left(\frac{I}{x}\right) = c - \frac{Q}{3} \log x \quad (2)$$

Where I is the emission intensity of $\text{Sr}_3\text{B}_2\text{O}_6:\text{Tb}^{3+}$ phosphor, and x is the Tb^{3+} content. (Fig. 6) presents the plot of $\log(I/x)$ as a function of $\log x$. The Q value for $^5\text{D}_4$ transitions in this phosphor was calculated by linear slope, the slope calculated from plot is about -2.8. Therefore, the value of Q can be calculated to be 8.4. This result suggested that the concentration quenching mechanism in $\text{Sr}_3\text{B}_2\text{O}_6:\text{Tb}^{3+}$ is the d-q interaction.

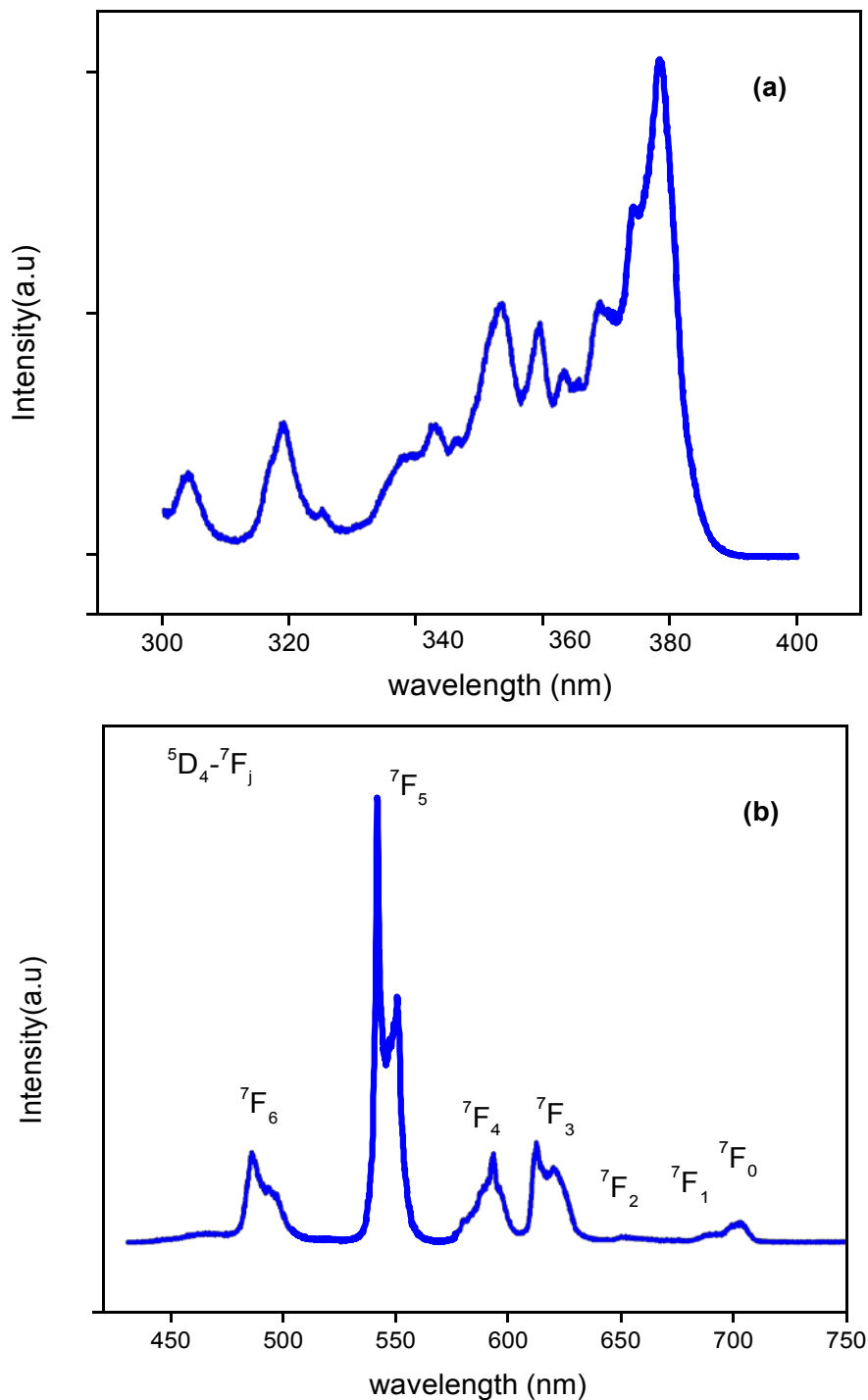


Fig. 2. PLE (a) and PL (b) spectra of $\text{Sr}_3\text{B}_2\text{O}_6:\text{Tb}^{3+}$ (3% mol)

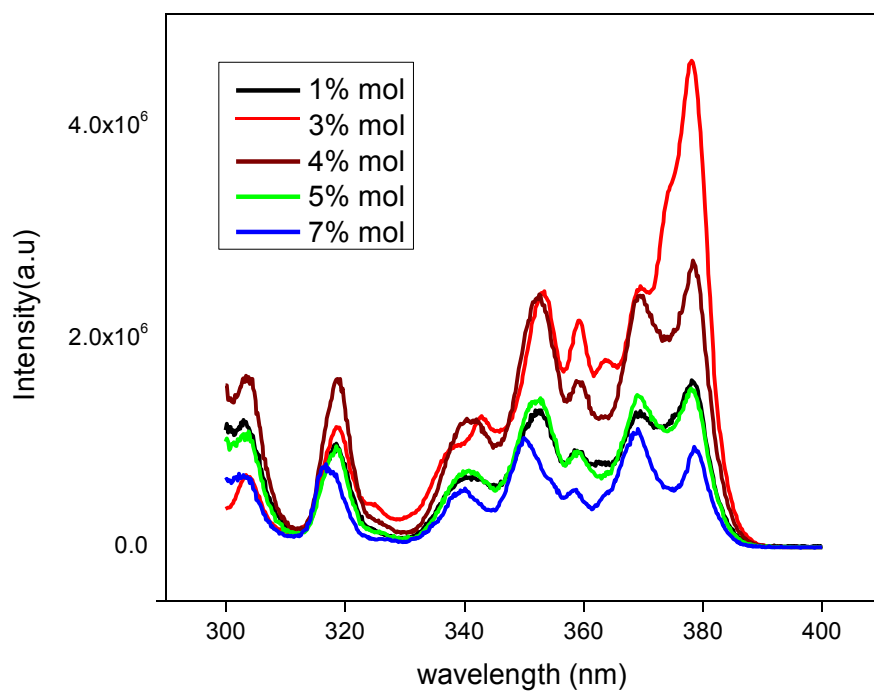


Fig. 3. PLE spectra of $\text{Sr}_3\text{B}_2\text{O}_6:\text{Tb}^{3+}$ phosphors with various Tb^{3+} concentration

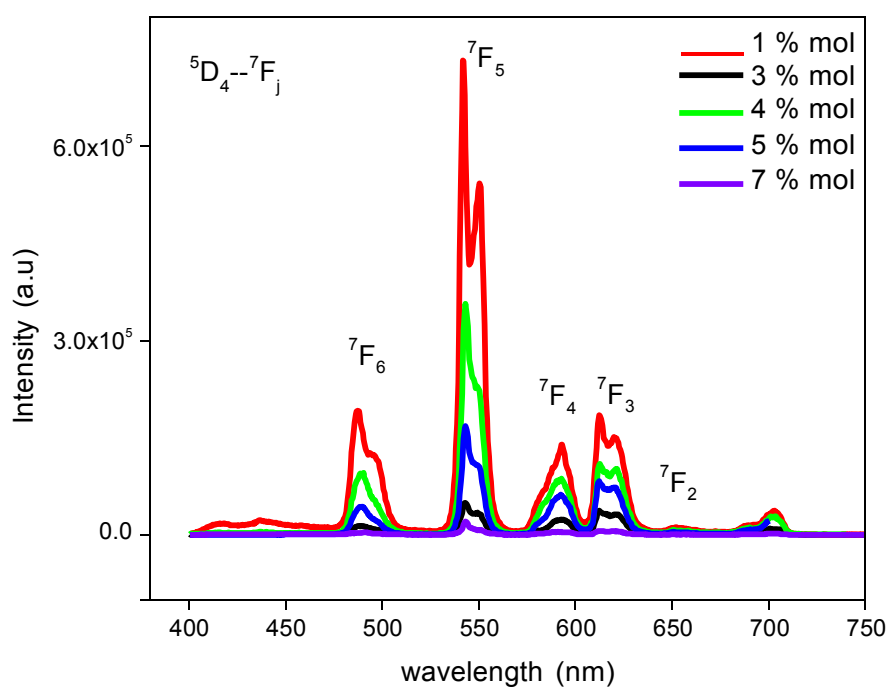


Fig. 4. PL spectra of $\text{Sr}_3\text{B}_2\text{O}_6:\text{Tb}^{3+}$ phosphors with different concentration of Tb^{3+} ion

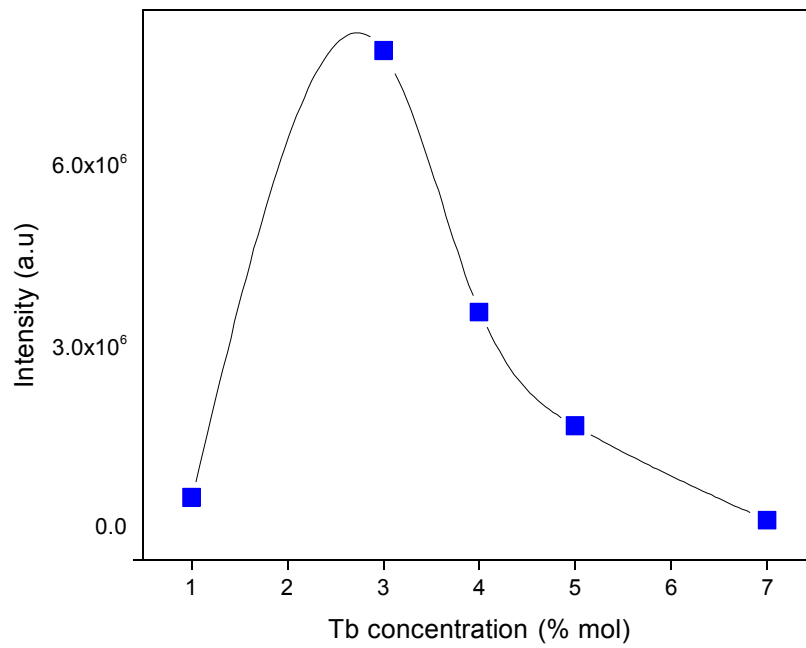


Fig. 5. The plot of intensity (5D_4 - 7F_5) versus Tb^{3+} ion concentration

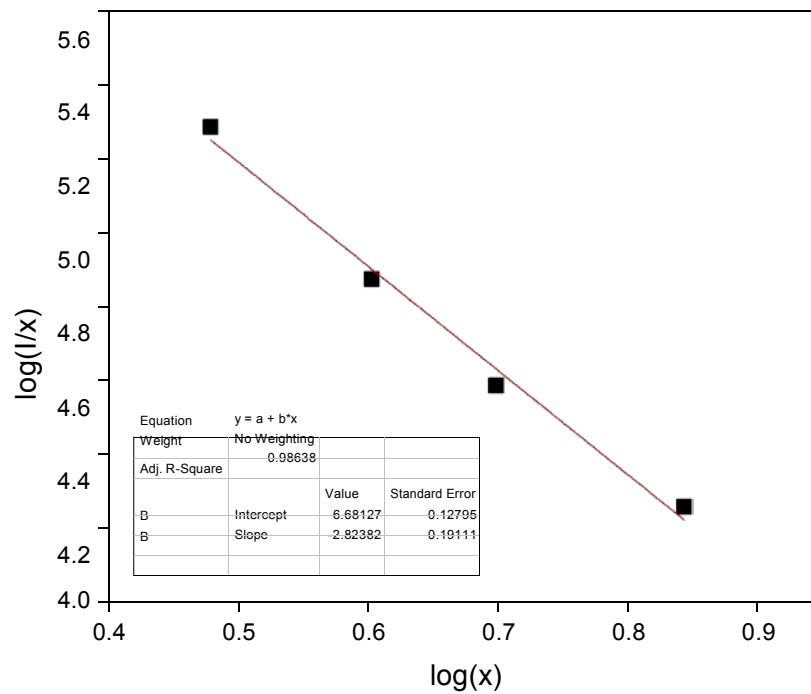


Fig. 6. Plot of $\log(I/x)$ versus $\log x$ in $Sr_3B_2O_6: Tb^{3+}$ phosphors

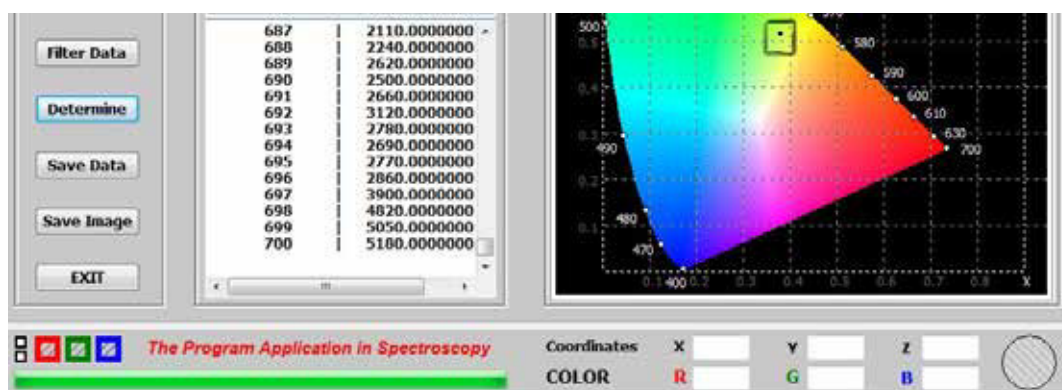


Fig. 7. CIE chromaticity diagram for $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ (3% mol) phosphor

Fig. 7 shows the CIE chromaticity coordinates of $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ (3% mol) under 379 nm excitation. The CIE coordinates are $x = 0.38$, $y = 0.52$, $z = 1.10$, it can be found in the yellowish-green region. It shows that $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ convertible green phosphors in wLED.

4. CONCLUSION

In summary, $\text{Sr}_3\text{B}_2\text{O}_6: \text{Tb}^{3+}$ green emitting phosphors were prepared by urea-nitrate solution combustion method, after combustion process samples were annealed at 900°C in air within one hour. These phosphors have rhomboidal single phase structure. The results of PL and PLE spectra indicate that the emission intensity changes over concentration of Tb^{3+} ion. The emission intensity increases with the increasing of Tb^{3+} doping content, and reaches a maximum at 3% mol. The concentration quenching was observed when Tb^{3+} content over 3% mol and the concentration quenching mechanism in the phosphors was determined dipole-quadrupole (d-q) interaction by using Dexter's theory.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Novel Data Mining Techniques for Incomplete Clinical Data in Diabetes Management

ABSTRACT

An important part of health care involves upkeep and interpretation of medical databases containing patient records for clinical decision making, diagnosis and follow-up treatment. Missing clinical entries make it difficult to apply data mining algorithms for clinical decision support. This study demonstrates that higher predictive accuracy is possible using conventional data mining algorithms if missing values are dealt with appropriately. We propose a novel algorithm using a convolution of sub-problems to stage a super problem, where classes are defined by *Cartesian Product* of class values of the underlying problems, and *Incomplete Information Dismissal* and *Data Completion* techniques are applied for reducing features and imputing missing values. Predictive accuracies using Decision Branch, Nearest Neighborhood and Naive Bayesian classifiers were compared to predict diabetes, cardiovascular disease and hypertension. Data is derived from Diabetes Screening Complications Research Initiative (DiScRi) conducted at a regional Australian university involving more than 2400 patient records with more than one hundred clinical risk factors (attributes). The results show substantial improvements in the accuracy achieved with each classifier for an effective diagnosis of diabetes, cardiovascular disease and hypertension as compared to those achieved without substituting missing values. The gain in improvement is 7% for diabetes, 21% for cardiovascular disease and 24% for hypertension, and our integrated novel approach has resulted in more than 90% accuracy for the diagnosis of any of the three conditions. This work advances data mining research towards achieving an integrated and holistic management of diabetes.

Keywords: data mining; missing value imputation; diabetes management; classifiers; diagnosis accuracy.

1. INTRODUCTION

There has been a growing interest in understanding the applications of data mining for clinical decision support in metabolic syndrome and diabetes mellitus type 2 due to its clinical complexity and its association with an increasing risk for heart disease and stroke, and hypertension [1-3]. Many studies have consistently reported suboptimal diabetes control outcomes despite improvements in clinical information and self-management support systems that have been recently established [4-9]. This is in part due to missing clinical data which reduces the information content for accurate decision making. The rationale of the study is that, given appropriate algorithms for imputing missing values, the accuracy of diagnosis based on clinical data should improve. The prime objective of this study is to propose novel imputation techniques in data mining to improve the predictive accuracy of diabetes, hypertension and cardiovascular disease (CVD) from clinical data.

A naive approach to dealing with a record having one attribute value missing involves deleting the entire record. However, the removal of records may leave too few examples covering specialized subsets of data and compromises the analytics. Another approach involves restructuring the dataset into smaller sets, where each new set has minimal missing values [10]. However, the decomposition of the data mining task into a series of smaller interconnected tasks can impose a structure that reduces the associations that can be discovered across all attributes. An alternative is to substitute the missing values with imputed values. Experts familiar with diabetes can conceivably impute missing values manually but this is rarely practical for assembling a large diabetes dataset as the amount of missing data may be extensive and the method is subjective and therefore not repeatable.

Common approaches to imputation involve filling in missing values with the mean values of corresponding attributes. This is computationally easy to apply but can compromise generalisation because the record with the missing values may not be representative of all records. However, if the mean is calculated solely from those records that have the same class value as the record with the missing value, predictive accuracy can be expected to increase.

The approach presented in this study involves two strategies we call *Incomplete Information Dismissal* and *Contextual Data Completion by Mode*. *Incomplete Information Dismissal* involves eliminating features and records that do not contribute to a classification. This involves a formally specified feature ranking algorithm. In [11], each class is considered as a cluster of data points in the problem space. The cluster centre represents a signature for the class. A new instance is classified by selecting the cluster centre closest to the point representing the new instance. The least important features for a class are those that cause data points to be closer to centres of other classes. With nominal/discrete data, it is more convenient to use feature ranking based on association measures, particularly Information Gain (IG). However, the approach described in [11] is conceptually the same.

The *Data Completion* involves the imputation of missing values. In this approach, a set of points closest to the missing value point are selected, so that the class was the same. Each possible replacement value is evaluated to identify the replacement that will make the missing value instance closest to the others. This approach is dependent on other missing values, so the algorithm iterates through successive imputations. Other approaches to missing value imputation involve use of a classification algorithm where the data set is prepared so that the class is the attribute with the missing value. A classification algorithm such as a decision tree induction exemplified by C4.5 is trained using records with known values and run to predict the attribute's missing value. Imputation using classification algorithms in this way is computationally expensive because a model for each attribute must be trained. Values imputed by our algorithm involving the *Data Completion* approach are finely tuned to more likely lead to high predictive accuracies when the dataset completed with imputed values is used for classification. In addition, we propose a novel integrated approach where the classes are defined by *Cartesian Product* of class values for underlying problems, namely diabetes, cardiovascular disease (CVD) and hypertension so as to set up a super problem that would classify diabetes, CVD and hypertension at the same time - a step toward a holistic management of diabetes.

Some diabetic prediction studies conducted recently [12] have achieved good classification accuracies with a weighted sum approach compared to other data mining models such as logistic regression and neural networks. However, the highest accuracy level achieved to predict diabetes or prediabetes was only 77.87% based solely on traditional risk factors and results are not presented in a clinical useful way.

This paper reports that common data mining algorithms can demonstrate higher accuracies for classification of diabetes, CVD and hypertension if incomplete clinical data is managed appropriately by including a two-stage approach of *Incomplete Information Dismissal* and *Data Completion* with convolution (*Cartesian Product*) of class values of the three problems.

1.1 Background

Diabetes Mellitus (DM) is a metabolic disorder of multiple etiology. It is characterized by chronic hyperglycemia and disturbances of carbohydrate, fat, and protein metabolism resulting from defects of insulin secretion, insulin action, or a combination of both [7-8,13]. The most common types of diabetes are type 1 diabetes (insulin sensitive due to cellular-mediated autoimmune destruction of the β -cells of the pancreas in 90% of cases and is idiopathic in 10% of cases), and type 2 diabetes (insulin insensitive due to pancreatic β -cell dysfunction and insulin resistance) [14]. Uncontrolled diabetes leads to a risk of microvascular (retino-, nephro- and neuropathy) and macrovascular (cardio-, cerebrovascular and peripheral vascular) health problems. Diabetes is increasingly reported as a primary cause of death, and the risk of death for people with diabetes is twice as high as for the general population with similar age [15].

While many clinical tests consider various standard factors such as age, blood pressure (BP), age at clinical onset, body weight, family history, urinary blood sugar levels and ketones, there is much more investigation required into how traditional and emerging biomarkers combine for optimal control of diabetes [16,17]. As clinical tests become more sophisticated, there is a huge amount of data collected from each patient on various attributing factors including inflammatory, oxidative stress and genetic biomarkers that need to be integrated into a comprehensive clinical decision making model. However, analysis may be hampered or may not give the correct results when information is missing.

The way a data mining algorithm presents results for interpretation by an analyst depends, to a large extent, on the algorithm. The ID3 classifier described by [18] generates a decision tree where nodes are attributes, arcs represent possible values, and leaf nodes represent data to be classified, as illustrated in Fig. 1. Decision trees can readily be understood by clinicians, however decision trees generated from many variables are typically very large and cannot easily be interpreted [19]. Fig. 2

depicts the weighted sum visualization (AWSum) output [20]. The horizontal bars depict the influence a pair of features has on a classification of diabetes on the right side of Fig. 2 compared with one of no-diabetes on the left side. A clinician can readily ascertain that the propensity toward diabetes for females with a cardiovascular risk of 15-20% is quite high despite gender and CVD risk category not contributing on their own to this conclusion.

Although data mining algorithms that present data visually in ways that enhance insight, as exemplified by Figs. 1 and 2, are emerging, their usefulness is limited by the extent to which missing values impede the classification.

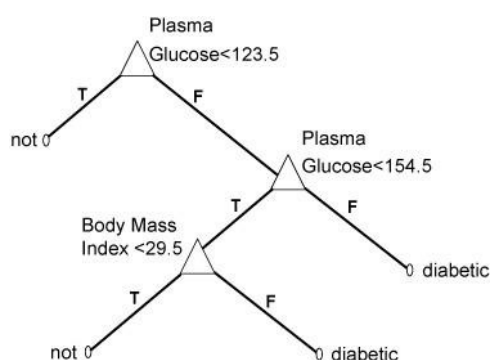


Fig. 1. Conventional decision tree

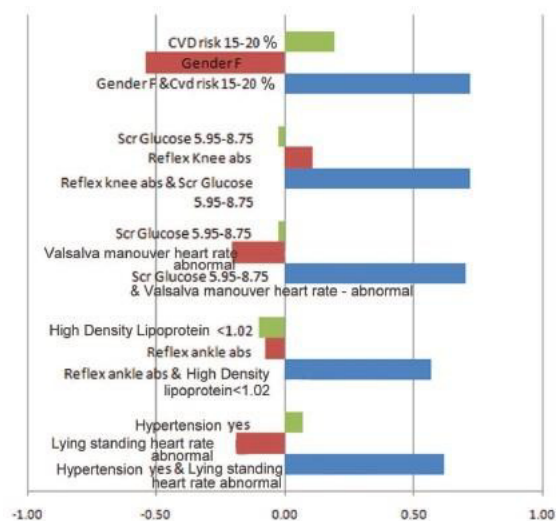


Fig. 2. Weighted sum visualization

1.2 Missing Value Imputation Techniques

Most techniques for the imputation of missing values treat numerical and categorical attributes differently, so the same technique cannot be used when both numerical and categorical features are present. A review of the imputation of numerical values including techniques based on the Nearest Neighbor approach, Linear Interpolation, Cubic Spline Interpolation and Neural Networks is provided by [21,22]. In general, these approaches use the numerical values in a distance function that represents the degree of similarity between records. In [23,24], approaches based on modeling of a data probability density function using kernels such as Gaussian were evaluated, allowing the relationship between attributes to be exploited. In this connection, [25] discusses the Expectation Maximization algorithm (EM) introduced by the authors

of [26], which relies on the data mean and covariance matrix. Generally, a model of data can be fit to a sample. Many statistical software packages (SPSS, SAS, to name a few) implement derivatives of EM and the alternative technique of Multiple Imputation (MI) from the authors of [26]. A review of MV imputation methods in classification is also given in [27]. A more recent missing value imputation technique using an entropy based decision tree algorithm provides better results for datasets having higher correlations among attributes [28]. However, attributes in medical datasets may not necessarily be highly correlated and these methods are therefore still not optimal.

In dealing with incomplete medical data, some researchers have attempted to use missing value imputation with general practice data [29-31], and longitudinal dietary data [32,33]. However, pitfalls in adopting a single technique have been reported by [34]. In [35], less than forty studies that had applied data mining techniques to diabetes were found in a recent systematic review of the literature. The relative paucity of studies can be explained by noting that the performance of an effective data mining study in diabetes requires the assembly of an appropriate dataset, comprehensive approaches for preparing the data for mining from both discrete and continuous data, and presentation of results in a manner that can be meaningfully understood by diabetes analysts.

As clinical tests become more sophisticated and numerous, there is a huge amount of data collected from each patient on various attributing factors. Virtually all patient datasets are replete with missing values for various reasons: equipment used for measurements sometimes malfunctions; a value could be missing because data was never collected – eg HbA1c test was never obtained or the patient was unable to complete the test. In other situations, the value was simply not available at the time of collection but may have become available subsequent to the assembly of the dataset.

This paper addresses the issues of missing values (MV) in clinical data sets, and as a first step proposes novel data mining techniques to deal with, and impute missing values to provide an improved and reliable diagnosis and management of diabetes.

2. MATERIALS AND METHODS

In this section, we describe how clinical datasets were collected and organized, and the proposed methods adopted for the experimental study. We provide below

details of how our approach discretizes continuous variables to nominal values and deals with missing values MVs using 3 classifiers: Decision Tree (DT), Nearest Neighbor (NN) and Naive Bayesian (NB).

2.1 Clinical Datasets

The dataset used in this study is derived from the Diabetes Screening Complications Research Initiative (DiScRi) conducted at a regional Australian university [36]. It is a diabetes complications screening program in Australia where members of the general public participate in a comprehensive health review. The DiScRi community screening concentrates on diabetes, cardiovascular disease and hypertension as a triad of diseases. There are no explicit groupings for retinopathy and neuropathy provided in the database and therefore these were not considered in the current investigation. The screening clinic has been collecting data over ten years and includes over one hundred features such as demographics, socio-economic variables, education background and clinical variables. Clinical variables included blood glucose level, HbA1c, cholesterol profile, inflammatory and oxidative stress markers, other medical history, body mass index, peripheral vascular function, and ECG derived variables. Data on 273 attributes from approximately 2500 attendances of nearly 900 patients have been collected in recent years. The dataset has been used in several data mining applications [37-39]. Application of the Data-driven Decision Guidance Management System (DD-DGMS) approach to this dataset is discussed in the following subsections. Currently, the project is still continuing to collect data, and therefore the dataset is not yet made public until completion of the project.

The database of 2429 records underwent compression to instantiate patients instead of attendances. The latest data in chronological order was used to initialize patient records. Any MVs in 102 applicable attributes were sourced from previous attendances leading to approximately one-fourth of MVs being restored. Altogether, the 824 instances included patients not diagnosed with diabetes mellitus of any type (594), those diagnosed with T2DM (211) and T1DM (19). Type 1 instances were later excluded as the feature-set was not discriminating T1DM enough from control and T2DM, and due to the small T1DM sample. Fig. 3 provides a typical dataset snapshot of the attributing factors collected from the clinical trials of patients diagnosed with diabetes, cardiovascular disease and hypertension. The database includes patients'

demographic information that form pre-determined data along with the main clinical data as well as derived data.

The diabetes dataset assembled for this study contained 97 attributes, of which 65% were incomplete, and 805 instances, of which none was complete, with 32% values missing across all data, as appears in Table 1. The class structure for the current classification problem is shown in Table 2. For example in row one, Type II Diabetes is the diagnostic class (Class 1), anything else is in Class 0.

In this work, with many nominal attributes in the data, we adopt an approach based on continuous attributes discretized.

2.1.1 Even frequency discretization

We discretize any continuous attribute using an algorithm we call *Even Frequency Discretization*, so methods that work with all-nominal data could be applied. The technique is an interpretation of the Fixed Frequency method [40]. Real-valued data is distributed into intervals to accumulate frequencies of corresponding discrete values. The frequencies are targeted to be as even as possible. Due to the limited precision in obtaining data, a value, even though perceived as unique, may repeat. The number of intervals is same for all attributes discretized. The adopted approach has proved being reliable in many applications.

Table 1. Diabetes dataset

All	Attributes		Instances		Values
	Numerical	Incomplete (%)		Incomplete	Missing
97	56	65	805	100	32

Table 2. Data subdivision by class

Problem	Classes (%)		
	Unknown	0	1
Diabetes mellitus	0	74	26
Cardiovascular disease	28	54	18
Hypertension	20	32	48

'Unknown' – instances not having class attribute set; *'0'* – control class; *'1'* – diagnostic class

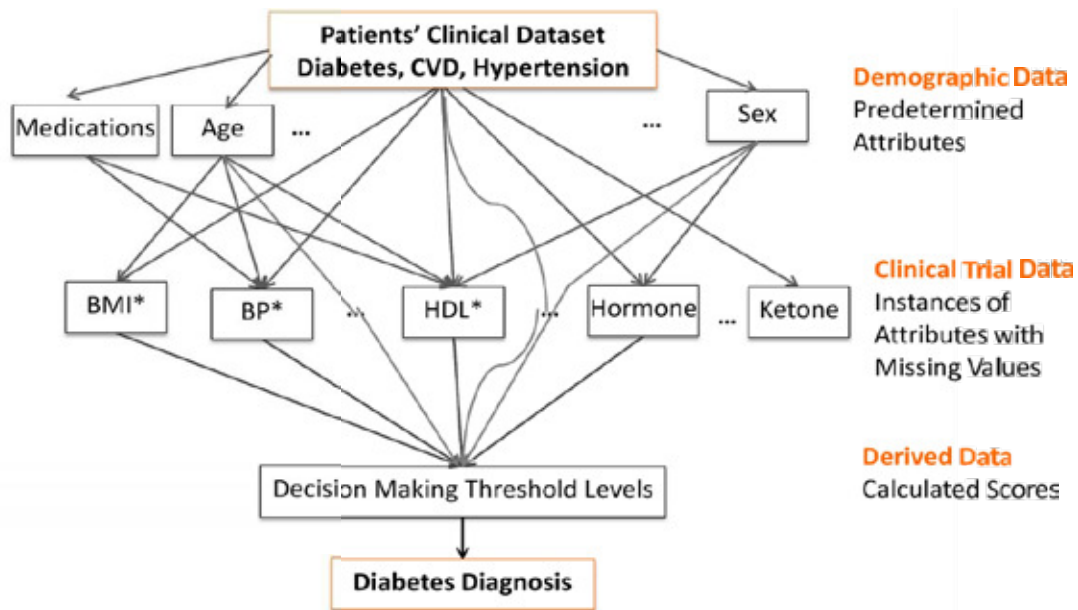


Fig. 3. Typical clinical dataset model

**BMI-Body Mass Index; BP-Blood Pressure; HDL- High Density Lipoprotein*

2.2 Classifiers

2.2.1 Decision tree

The tree induction algorithms ID3, C4.5, C5 advanced by [18] partition data in a hierarchical manner in the form of a tree where branches are represented by values of a particular selected attribute. An optimal tree is formed by selecting a feature at each node that gives the highest Information Gain (IG). Highly mixed partitions are nominated for further subdivision. In this work, we pursue a simpler version of DT where no model of data is learned but an appropriate leaf is directly accessed by mining through the training set. It is appropriate to call this DT variety - Decision Branch (DB).

2.2.2 Nearest neighbor

The NN algorithm used in this study is an adaptation of the well-known k-NN technique [41] for nominal data. It uses the Hamming loss for a distance function in the pseudo-space of data attributes. The loss, which normally counts dissidence of attribute values of two compared instances, is weighted by Information Gain (IG) to make the space metric conform better to the data [42,43].

2.2.3 Naive Bayes

This is a classical method and widely used on nominal data despite the limiting assumption of attribute conditional independence, given a class [44].

2.2.4 Classifying with MVs

The NB classifier is easily adaptable for data with MVs since any test instance can be evaluated with some attributes withheld. However, this property also holds for NN and DB methods. This feature of classification algorithm implementation is the short memory, or lazy learning mode, whereby the learning is carried out anew for every test instance. Indeed, this mode offers a general method of obviating MVs when classifying any new data.

2.3 Filling-in the Blanks

For a discrete or categorical variable with MVs, some dummy value can be assigned to denote the missing value (e.g. "MV"). However, such an assignment of a dummy value outside the attribute's domain cannot be carried out as elegantly with numerical features. Statisticians are known to have resorted to the insertion of dummy data (e.g. "999.999") that invariably distorts distance metrics underpinning classifiers. The distortion of results when using distance metrics then provides an additional rationale to discretize continuous attributes in mixed attribute type domains. If MVs are sparsely distributed, they can be ignored during the learning and generalization steps of the algorithm. However, this is not possible for the data in this study because of the highly expressed attribute patterns of MV inundation.

Some condensation of incomplete data can also be achieved by discarding instances or attributes replete with MVs. However this cannot be a general method as only the training set can be dealt with in such a manner. Therefore incomplete information dismissal is proposed as a pre-processing step in the next section and is the first part of our approach for MV handling.

2.3.1 Incomplete information dismissal

Data layers, namely instances or attributes, are eliminated one by one, whichever currently conveys the least information, until a predetermined data reduction effect is achieved. Attribute information is calculated using IG, and is associated with any value unless it is missing. An attribute may be dismissed, even though it may have no MVs, which doubles as a feature selection step [11].

A data completion algorithm as proposed in this research utilizes the ability of classification algorithms to classify data without referencing MVs. The knowledge of class of an instance being dealt with provides a clue to MV substitution from applicable

ranges. However, it is not required to label all of the classifier training dataset. Data completion forms the second part of the proposed technique.

2.3.2 Data completion

Our algorithm performs completion and classification of test instances at the same time by substituting the attribute modes for MVs from an applicable sample of training data, which a classifier accesses to make the prediction. It is necessarily an iterative process of tuning instances in turn to the rest of the set that requires at least one valued instance per attribute per class. MVs are substituted from the subset with the same class label as the test instance within the extracted sample, whether the predicted class is the same or not. In the case where the test instance is not labeled, the respective classification algorithm is used to set the label. The iteration ends when the introduced values stop changing or a limit for the number of cycles is reached. The goal is to achieve the highest possible classification accuracy, which the training set assumes, even though the instances may be rare.

2.4 Assembling an Appropriate Dataset

Despite the preponderance of patient data collected in digital forms, assembling an appropriate dataset to explore efficient diabetes management methods is inherently difficult because of a paradox in the formulation of the analytics exercise: on one hand, one cannot readily frame a question of interest without knowing what data is available, and on the other, one cannot identify what data is required without knowing the question of interest. The paradox presents itself in data mining process models such as Cross Industry Standard Process for Data Mining (CRISP-DM) [45], where the need to identify business objectives is advanced as a first step so that appropriate questions can be formulated to guide the selection of data. There are no clear 'business' objectives in diabetes mining, as the questions of interest are usually framed as high level questions such as "Identify risk factors for diabetes", or "Predict blood glucose level" that cannot inform the selection of data, because variables that might be relevant are not known. In this study we advance the claim that the paradox inherent in assembling a dataset for diabetes mining necessitates the use of an extensive set of features that not only consists of features relevant only to diabetes but covers a range of other health and clinical indicators.

3. RESULTS AND DISCUSSION

3.1 Classifier Performance

The performance of Naive Bayesian (NB), Decision Branch (DB) and Nearest Neighbor (NN) classifiers in diagnosing diabetes, CVD and hypertension when applying the traditional model in Fig. 4 with MVs skipped, is compared to the accuracy after MV imputation using different strains of the proposed method in Fig. 5. The strains are denoted as NB, DB, and NN - same as the classifiers at the core of the principal method. The accuracy is calculated using leave-one-out cross-validation which is a conventional technique when a comparison is involved.

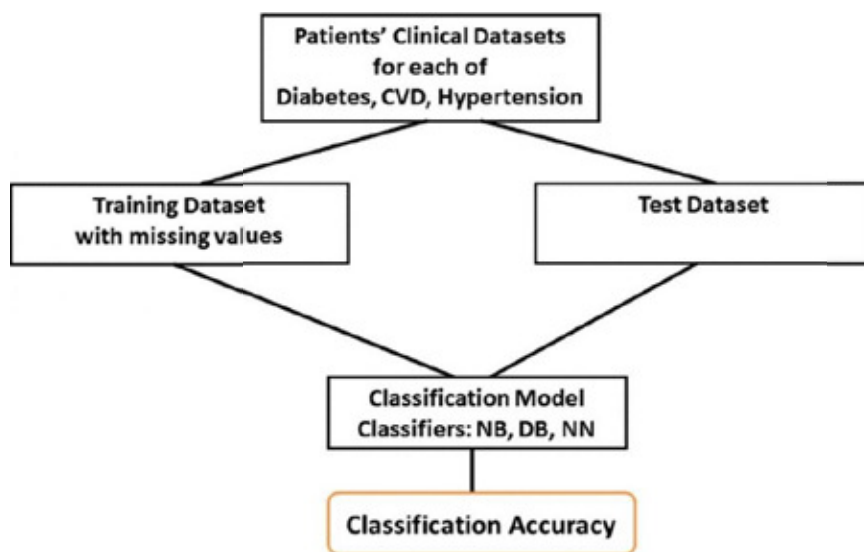


Fig. 4. Traditional classification model with missing values

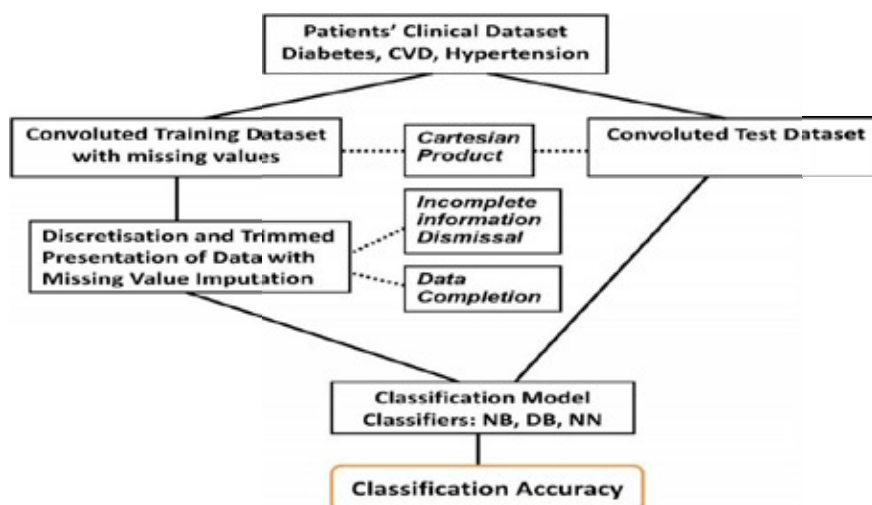


Fig. 5. Proposed classification model with missing value imputation

Fig. 5 provides an overview of the proposed classification model using our novel MV imputation techniques. The transformation of the training and test set involves convolution of class values for diabetes, hypertension and cardiovascular disease using *Cartesian Product*. The *Incomplete Information Dismissal* and *Data Completion*, after having any continuous features discretized, are performed prior to exposure of the dataset to the three classifiers. These three moments form the main novelty of our proposed model.

To evaluate the performance of our proposed *Incomplete Information Dismissal* method, we obtain a smaller dataset by reducing the amount of data by 50%. Fig. 6, used for illustration, provides the overall, any-class accuracy for both full and reduced datasets after performing data completion using the DB strain of the proposed method. It is evident from Fig. 6 that the reduction not only does not impact on the diagnostic ability, but also gives an improvement in some cases. At the same time, about 40% of MVs have been dealt with, without having to fill them. Different results pertain to different sub-problems featured within the DiScRi data.

To illustrate the performance of our proposed *Data Completion* method, the accuracy of the three classifiers when sidestepping MVs and after entering them using the DB strain of the principal method is compared in Fig. 7. For example, with DB substituted MVs, the NN classifier achieved 97% accuracy for CVD diagnosis with the full dataset as compared to 98% with the reduced dataset. High accuracies were also achieved for the diagnosis of diabetes (94% to 95%), with some exception for hypertension (90% to 89%), which had a minor decrease, using this combination. Similar results were obtained for NB and NN based completion methods for each of the three classifiers.

3.2 Benchmarking

We staged a super problem where classes are defined by *Cartesian Product* of class values for diabetes, CVD and hypertension: this is a novelty of our approach that complements our unique imputation techniques of *Incomplete Information Dismissal* and *Data Completion*. For example, an instance may have the new attribute value as YNY (Yes for diabetes, No for CVD status and Yes for hypertension). This 'additional' class is used to take advantage of the nearest points formulation to cater for incomplete information dismissal and data completion. The advantage is that MVs on other attributes are imputed in a way that exalts the new triple attribute.

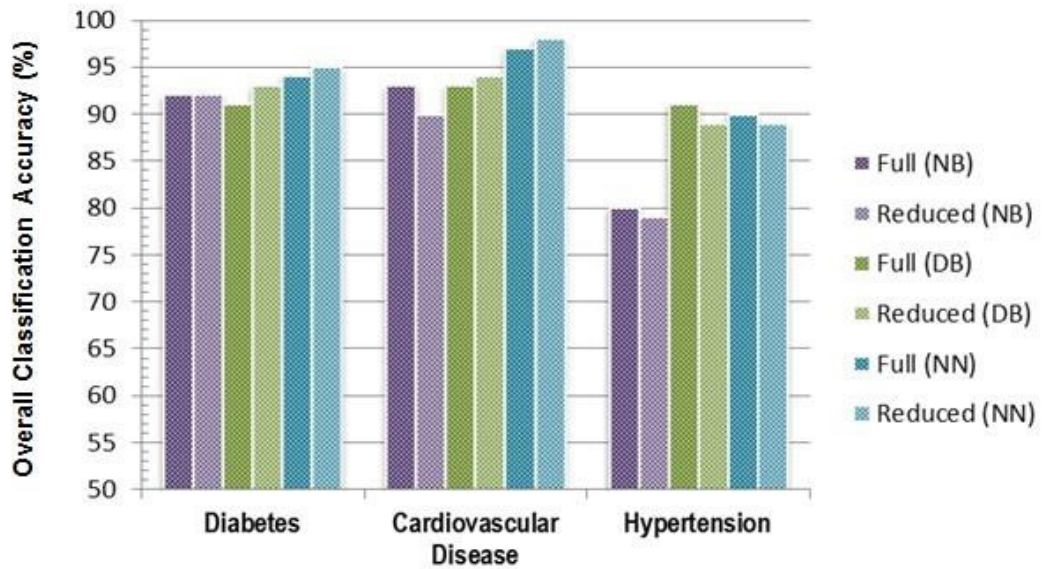


Fig. 6. Overall classification accuracy (%) on full and reduced datasets – by different classifiers (NB, DB, NN) after substituting MVs with Decision Branch inspired surrogates

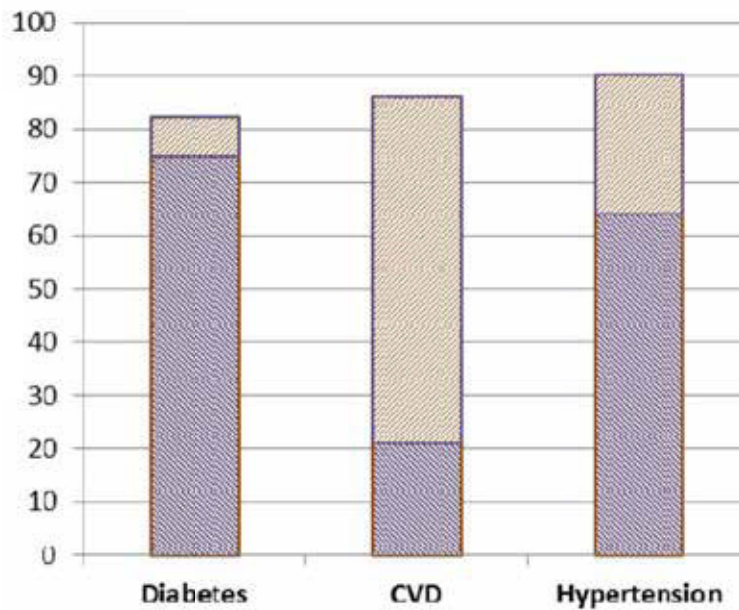


Fig. 7. Improvement of diagnostic accuracy after MV submission after applying the cartesian product

Dark portion: Class 1 diagnostic accuracy with MVs skipped; Light portion: Accuracy gain after Data Completion using the DB strain of the proposed method. The classifier is NN

The improvements in the diagnostic accuracy of our algorithm are benchmarked using the three classifiers. The results of NN accuracy for full data of Class 1 is shown in Fig. 7 for both before and after data completion by the DB based method.

3.3 Discussion

Overall, from the performance results it is evident that the diagnostic predictions are better after data completion. While each classification method has its own merits and demerits, a particular advantage of our data completion procedure is that it imparts better estimation of any involved probabilities effectively extending the feature-set.

The classifiers sidestepping MVs achieve low accuracy in the diagnosis of diabetes, cardiovascular disease as well as hypertension. Also, when MVs are ignored and replaced with dummy data, the results are similar. This is probably due to the attribute rather than instance pattern of inundation of data with MVs, as shared by the entire dataset. Hence, we can infer that the affected attributes with MVs are predominantly irrelevant.

The performance of the NB based MV submission method in the current work stands out. The algorithm not only completes the iterations much faster but also rather accurate. The breadth of mode selection in the algorithm causes high contraction of data distribution in the pseudo-space of attributes, that is, classes become identified by the distinct feature modes. The DB guided MV submission performed slower and somewhat less accurate over the NB counterpart, although any possible improvement may have been restricted due to the data. The NN based data completion method shows the least improvement, although the accuracy is still acceptable. This is quite contrary to the usual high performance of the NN classification method and has to do with choices available for MV selection that are more limited than in completion with DB.

In medical diagnostic problems, the attribute pattern of MV inundation is often prevalent. Reducing the data set by 50% leaves all instances intact, though this is not the case with the number of attributes. Our algorithm tries to withhold attributes that are either less informative or with many MVs. In either case, trimming by half appears to be safe for all diabetes linked problems as the results are almost unchanged. Nonetheless, if too many features are removed the accuracy is expected to drop.

Also, even though individual features are ranked by overall information gain, and attribute reduction occurs only for those that are least informative and found at the end of the list, improvement in accuracy may not be always guaranteed. However, the computational aspect of performance improves dramatically when such superfluous attributes are discarded.

While the results obtained are good, filling many missing entries could be misleading. The data is too flexible, and the high accuracy may be unwarranted. In this regard, the more classes are embraced by a problem, the better. However, here there are only two for any featured condition. There are no other constraints to narrow the range of MVs further. By linking the diabetes, cardiovascular and hypertension classes, additional clues can be arrived at. The three problems together interpret the same data, and so we expect the substituted values to be the same. Hence, we have used a convolution of the three to stage a super problem where classes are defined by the Cartesian product of class values of the underlying problems. Cartesian attribute products in classification were made popular by [46]. Here, each combination of the values corresponds to a class in the super problem. This forms the main novelty of our approach of MV imputation as compared to existing ones in the literature. In our model comprising the three problems with two classes, the Cartesian product generates eight classes same in all problems, thereby imposing much tougher constraints on MV ranges. This approach is innovative and provides an advancement towards an integrated and holistic management of diabetes.

4. CONCLUSION

Large clinical data collected from patients often include missing values or incomplete data, which poses a major problem for an integrated diagnosis. Data mining techniques dealing with such incomplete data problems in clinical trials become popular. This work demonstrated a considerable improvement in diagnostic accuracy after adopting the proposed methodology for missing value submission. The data completion methodology can be applied to data of any type via discretization of continuous attributes. The advancement is significant because quite high predictive accuracies, as measured with leave-one-out cross-validation resampling, appear to be achievable even when datasets contain substantial missing data.

Future work could involve the development of decision rules derived through the learning mechanism of our novel missing value handling techniques of *Incomplete*

Information Dismissal and *Data Completion* in order to arrive at a decision tree model for new patients with clinical data. This would provide an enhanced decision support system for an integrated diabetes management, despite missing values in the patient's clinical data.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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Mobile User Motion Detection and Traffic Road Management

ABSTRACT

The vision of next generation networks is to offer a real time services such that traffic situation on the major or minor roads. While 3G networks are based on wide area cell concept, 4G will be a hybrid network that use wide area network with Ad-hoc network. In this paper we propose two algorithms, the first algorithm describes how information is disseminate in our system Virtual Explore (VE). VE is a motion detection system that able to predict the mobile user destination. The second algorithm is α -path prediction algorithm that predicts the destination of mobile user based on his previous movements, we expect that our proposed system will reduce the traffic rate between (40-50%) in the case of accidents or in the congested locations. Our analytical results show that the prediction accuracy in our work will vary from 20-40% if we maintains a prediction correctness in the range 40-50%. Considering our goal the prediction accuracy is considered a good results in comparison with other works in the same context.

Keywords: received signal strength; path prediction; motion detection; traffic management; information dissemination.

1. INTRODUCTION

Next generation networks will employ hybrid network architectures using both cellular and Ad-hoc network concept.

Determining the location of mobile terminals relies on the cellular network infrastructure and protocols to provide a reliable and accurate estimate of mobile terminals position without the need of global positioning system GPS [1] or any other positioning system [2,3,4]. Using GPS for localizing the mobile terminal is an interested option for high end applications but is not well suited for all contexts. For example, in the dense urban area where some time satellites are not visible from the mobile terminal or in the country where a few information about the transport

infrastructure is available, it is necessary to find another methods to localize the mobile terminal.

Due to the importance of mobile phone in our life, it is necessary to provide a new services that make the user life more comfortable, this is the main idea behind proposing our system. It consists on providing the user a real time information about the traffic road to help in traffic management.

Our system detects and observes the movement of mobile user on the urban roads to predict with high accuracy his destination. In this paper, we propose a virtual explorer system that is hybrid system that collects information about the movement model of mobile user, analyses it, and try to predict his destination in order to give him correct information about the roads followed by him until arriving at destination. People are more likely to pass less time on the roads, sometimes the path from home to work takes longer time than expected due to interruptions, accidents, bad roads situation due to weather conditions. Knowing in precedence the condition of the road can help in providing alternative path that makes the user more satisfied. Our proposed system is composed on three parts are: mobile user (that is a passive one) where it is used the signal received from his mobile phone to define his location. Fixed base station located on the side of the road has the role to sense the entrance of mobile terminal his area and it determines his location and it calculates his velocity, and sends the information to central base station. CBS (Central Base Station) is the third components of our system have the role to predict the user destination and to provide him an alternative path if necessary.

So, our work is divided into three parts are user identification, distance estimation and path prediction. Our system to work correctly information must be disseminate between base stations and central base station, for that it is necessary to provide a routing mechanism that route the information with low cost and high speed. The rest of this paper is organized as follow: Section 2 contains description of our system and its components. Section 3, explains how VE works, user identification and distance estimation mechanisms. Section 4, presents our α -path prediction algorithm. Section 5, contains our analytical results. Then, some previous works and finally conclusion and future works.

2. SYSTEM DESCRIPTION

Our proposed system is called Virtual Explorer, it is composed of three main components are: mobile terminal, base station and MSC (Mobile Telephone Switching Center).

2.1 Mobile Terminal

Mobile terminal that represents the user that holds mobile phone denoted as A_i . It refers to physical terminal 3G mobile phone GSM with frequency 900-2100 Mhz. When the mobile phone starts working, a handshaking is done between the mobile unit and the MSC center to identify it and to assign to it the channel on which it can transmit. When the mobile terminal moves from one location to another, a handshaking is done with the base stations of the visited cells to maintain the communication during the handoff process. In VE, the mobile phone can be only in active state.

2.2 Base Station

Base station is a fixed station in a mobile cellular system used for radio communications with mobile units. They consist of radio channels, transmitter and receiver antenna mounted on a tower. Denoted as F_{ij} where i indicates its number and j indicates the company to which it belongs (MSC).

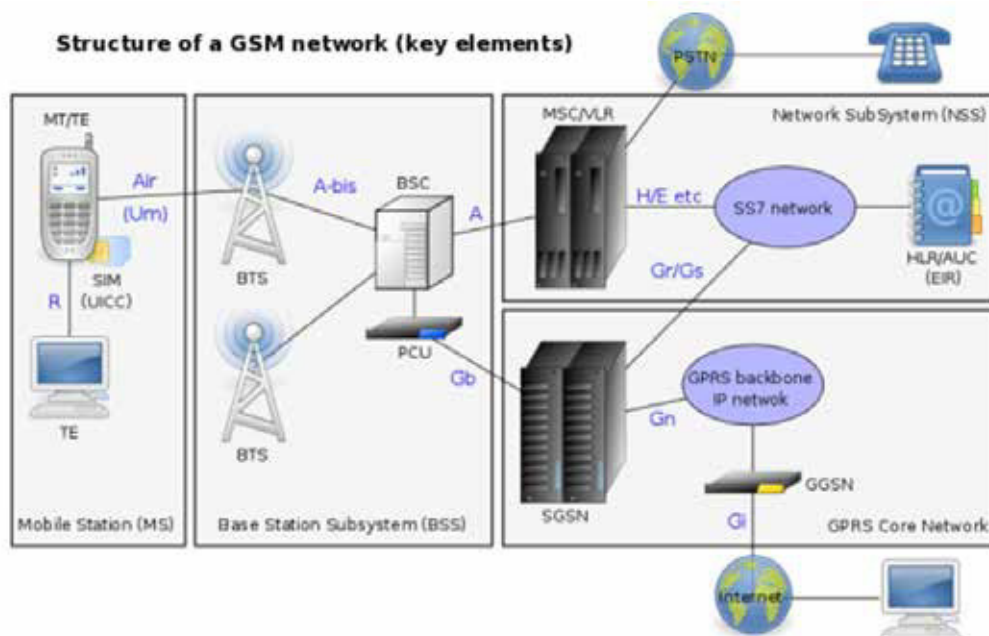


Fig. 1. Structure of GSM network

The base stations are situated on beside of the road, have the role of sensing the access of the mobile terminal in their area, identify it and send the related information to the correspondent MSC. In cities, each base station has a range up to 0.5-5 miles (0.8-8 km). All the base stations are connected to telephone exchange switches of the cellular company. In cellular system each mobile switching center serves cellular system of 50-100 cells. Base stations are supported by inter-connection to each other and to the Public Switching Telephone Networks (PTSN) via Mobile Telecommunication Switching Center (MSC), Fig. 1.

- Mobile Telephone Switching Center (MSC).

It provides links between the cellular network (composed from Mobile Terminal MT, Base Station BTS) and Public Switched Telecommunication Network (PTSN), Fig. 1. It is an information station responsible about collecting, analyzing and distributing information to/from all the system components. So, has the role to predict the path of the mobile user to provide him a service and information about the road situation.

Our system provides the implementation of prediction algorithm that takes the information received from the BS's as input and produces the destination as output. Denoted as C_j .

MTSC supports four databases:

1. Home Location Register Data Base (HLR): that stores information permanent and temporary about each of the subscribers that belongs it (Fig. 2).

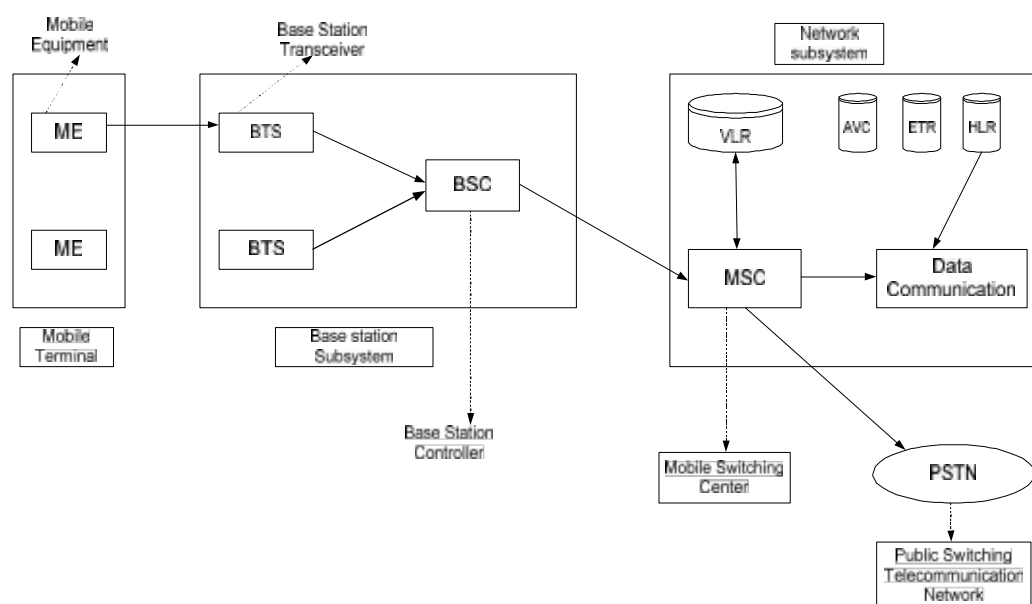


Fig. 2. Mobile Telephone Switching Center (MSC)

2. Visitor Location Register Data Base (VLR): it maintains information about subscribers that are currently physically in the region covered by the switching center. It records if the subscriber is active, and manage the call coming by identifying the both caller and receiver and identify their locations and the area covered them (Fig. 2) [5].

3. Authentication Center Data Base (AUC).

4. Equipment Identity Register Data Base (ETR).

3. HOW VIRTUAL EXPLORER WORKS?

VE starts working from the moment on which the user switches on his mobile phone denoted as A_i . During the movement of A_i a handshaking is done with the base station F_{ij} . Based on that, the base station identifies it, calculates its distance using the signal strength received (RSS) [6,7,8] and it calculates its speed. Its direction is calculated using AOA (Angle of Arriving) technique [8,9,10,11].

We speak about urban roads where the base station has a fixed location.

•At time T_1 the mobile terminal was at distance d from the base station with angle α .

The angle of arriving is calculated as follow: $\cos\alpha = d/L$ where d is the linear distance to the base station and L is the height of the base station.

•At time T_2 the mobile terminal is becoming in location at distance d_2 and angle α_2 . So, its speed is calculated as $v = \Delta d / \Delta T$. α is used to define the direction of the mobile terminal. This information (ID, v , α , T) is sent to the MSC, that is used with the references from other BSs, to predict the destination of the mobile user.

3.1 Assumptions

- our trackers (mobile phone A_i) is the central element of our system, is in active state,
- the base stations is an assistant element,
- C_j is the master element,
- Both C_j and F_{ij} are fixed nodes and the unique mobile element is A_i .

3.2 Distance Estimation

The distance between the mobile terminal and the base station is estimated using RSSI (Received Signal Strength Indicator). This method does not require

additional hardware, but it is based on estimating the distance between two entities (transmitter and receiver) by measuring the signal at the receiving side. RSSI values are not accurate, but can be oscillate due to the effects of fading and environment changes. It depends on the radio transceivers type and on the presence of obstacles. We speak about urban roads where the base stations are situated beside the roads. The distance is estimated given the following relation: $P_{rc} = P_{rt} / d^\alpha$, where P_{rc} is the received signal power, P_{rt} is the transmission power, d is the distance to the base station, and α is path loss coefficient [5].

3.3 User Identification

Each MSC center contains two data bases (as mentioned in section 2) are home location register (HLR) that is a data base that stores permanent information about each of the subscribers that belong to it. And visitor location registers (VLR) that maintains information about subscriber that are currently physically covered by it. When a foreigner user enters the area of the base station a handshaking must be done to ensure to it the connectivity during his staying in the coverage area of the base station, then it is added to the VLR (Fig. 2).

3.4 Information Dissemination in Virtual Explorer

The information collected about the mobile system must be disseminated to the correspondent MSC. When the base station collects information about a home subscriber, it routes this information to its MSC. If the user is a visitor, so the information collected must be routed by a way of MSCs or by a way of the other nodes in the network to the correspondent MSC. So, we need an efficient routing algorithm that can find the best path to the correspondent MSC in short time, in a manner that the MSC predicts his path and provides him a service before he had travelled long distance.

Our system to be able to provide the proposed service a communication between its entities must be done. So, each node must work as router. For that, it creates its routing table in which is inserted all its neighbors by which it can communicate directly. The information stored in the routing table are: the node ID of the direct neighbor, link cost to reach C_j , the cost of communication between two nodes varies given the MSCs that belong to it. Two nodes that belongs the same C_j communicate to each other with cost 0, if the two nodes belong to different C_j the

cost of communication will be 1 (the cost of communication is a cost assigned to the link between nodes).

Then, it is used A* search algorithm to calculate the short distance from any source to any destination. The best path is considered that is done with less number of hops and within base stations that belongs the same C_j . A* uses a best first search and find the least cost path from any initial node to one goal node. It uses a function $f(n)$ that represents the path cost function $f(n)=g(n)+h(n)$, $f(n)$ represents the total cost of the path and that is calculated from the routing table. $g(n)$ is the cost to reach the initial node. $h(n)$ is the cheapest cost from n to the goal [12].

3.5 Algorithm Description

VE can be represented by a graph $G=(V,E)$ where V is a set of nodes represent the base stations F_{ij} or MSC (C_j) and E is a set of bidirectional links between the nodes of the graph.

3.6 Neighbors Discovering Phase

Each F_{ij} when start working, it broadcasts a hello message to discover its neighbors and set a time out t . t is the time needed to a radio waves to travel a distance equal to the transmission range. If the time out is ended without any receiving answer. F_{ij} waits another time t and restart the discovering process until an answer message is coming from one neighbor. F_{ij} inserts the identities of the nodes that have sent an answer message in a list called neighborhood list. Used later for the construction and the update of the routing table Fig. 3.

3.7 Network Construction Phase

In this phase each node creates its routing table that is used to forward the information to the appropriate C_j . All the neighbors nodes are considered in the range and can communicate to them directly, but the cost of communication is vary based on the C_j to which they belong. To the link between the nodes that belong the same C_j is assigned a value 0, and a value 1 is assigned to the link between the nodes that belong different C_j s. After setting up the link with neighbors, each node creates its routing table.

Each node exchange its routing table with their neighbors and so constructs the path, and the cost to reach C_j (Fig. 4).

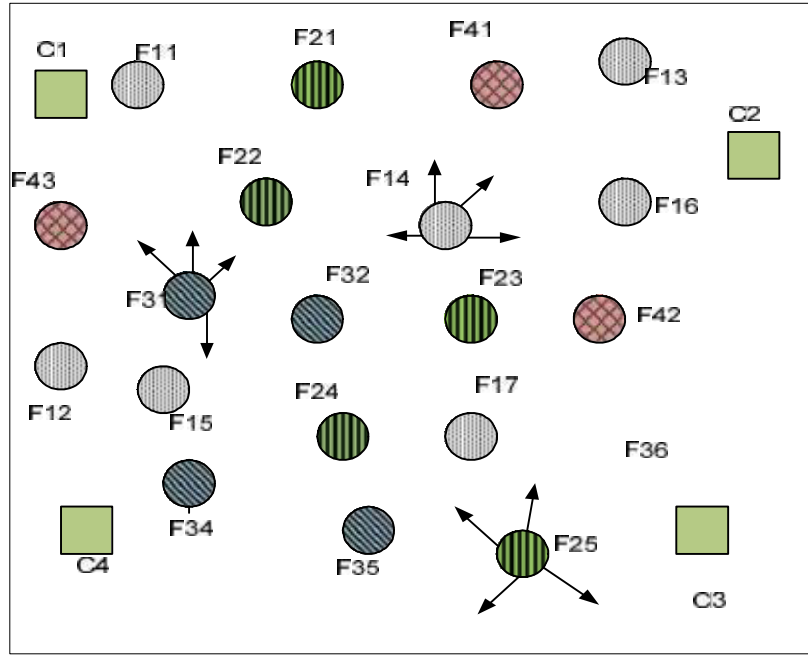


Fig. 3. Neighbor discovering phase

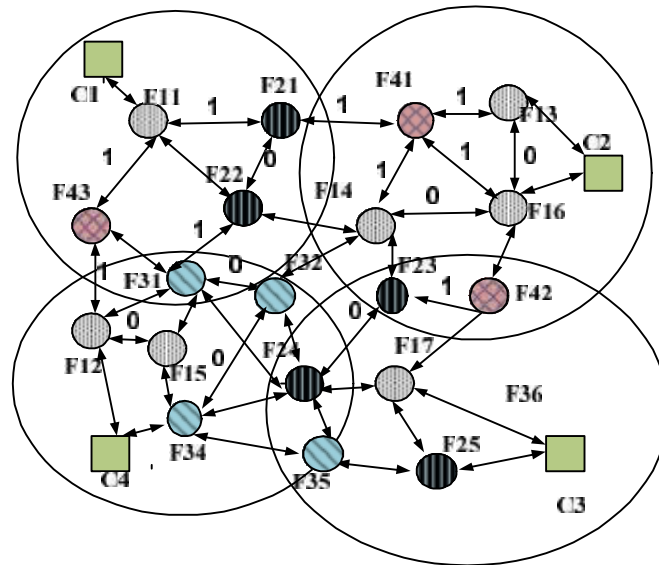


Fig. 4. Network construction phase

Example:

Considering A_i is a mobile terminal that moves from one area to another as in Fig. 5, when A_i enter the area of F43, it senses its presence and identifies it that belong to C_2 . So, F43 search in its routing table about the best path to C_2 .

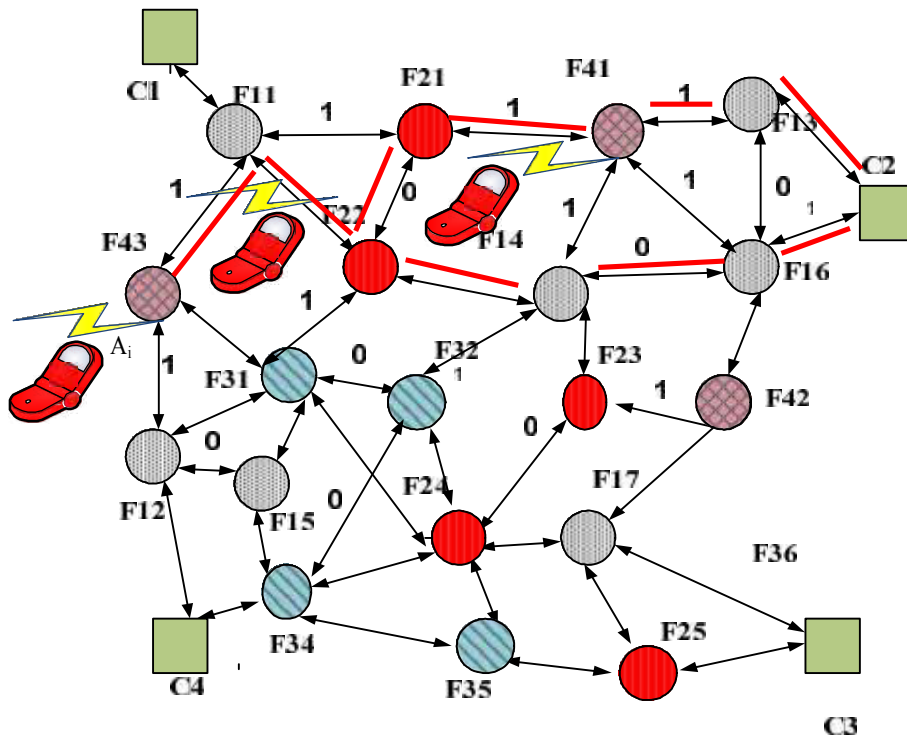


Fig. 5. Example of motion detection in virtual explorer

As is viewed in Fig. 5 two possible paths are presented. The first is by a way of F_{11} ($F_{11}, F_{21}, F_{41}, F_{13}, C_2$) with cost 5 and the second is by a way of F_{22} ($F_{11}, F_{22}, F_{14}, F_{16}, C_2$) with cost 4. The cost is calculated as follow:

$$f(n) = g(n) + h(n),$$

$g(n)$ is the cost to reach F_{22} that is 2,

$h(n)$ is the cheapest cost from F_{22} to C_2 that is 2,

So, it is chosen the second path $f(n)=4$.

During the movement of A_i , C_2 receives more information about it from different base stations presented in the path. Based on this information, it can calculate the mobile user's velocity and its destination. If some interruption is presented in his path a notification message is sent to A_i .

4. <-PATH PREDICTION ALGORITHM

We propose a path prediction algorithm that is based on Mobile Motion Prediction algorithms [13,14], it predicts the future location of a mobile user according to his movement history pattern. The MMP algorithms are based on the fact that everyone has some degree of regularity in his/her movement that consists of a random and regular movement. While we speak about user that moves on urban

roads, some regularity in the user movement is due to the topology of the roads. The random movement is represented in the choices tacked on the minor roads. So, all the random movement on the urban roads can be reduced to regular movement.

Our work considers the user's movement only regular movement defined by the urban roads maps.

An important parameter used to express the regularity of the user's movement is called.

4.1 Degree of Regularity $D_R = N_s / N(1)$

D_R is an important parameter in our work; it helps in increasing the prediction accuracy. N_s is a counter that counts the number of states that matching on the path (the states are considered a well defined indications on the road).

N represents the total number of states considered to define the path with high precision. Generally, the description of a path between two nodes is described by a set of indications between the two points. The urban roads can be considered as a graph G with N nodes. Where nodes are indications on the path, and the links between such nodes are the urban roads, Figs. 6 and 7.

α -PPA maintains information about the previous movements of the user and this information is stored in an array multidimensional $N[i][j]$ (flowchart in Figs. 8 and 9 and is updated periodically given the information received from the base stations).

The information about the user (ID) is stored in a hash table. The user that travels on the same path each day has a regular movement and its destination can be predicted quickly. Generally, when people go to work, they follow the same path every day, the presence of interruption or accident on the path can create unexpected delay. Our system can help in minimizing the delay in such cases.

α -PPA works based on the information received from the base station that is (ID, V , α , T). Where ID indicates the user ID that can be his phone number or the number of his SIM card number. Local users can be identified quickly by the HLR (Home Location Register) data base stored in the MSC [5]. However, visited users need a registration during which is identified his phone number or his SIM card number. V indicates the user velocity calculated by the base station given two measurements in the same range. T is the time on which the user is located in a given location near the base station α define the direction.

The MSC recognizes the information received in only the following two states: new user or registered one. New user that means the ID is not presented in the hash table (referred ID=0 in the flowchart). And registered one means information about him has been received from another base station previously and this information is stored in a location in the hash table (ID=1 in the flowchart).

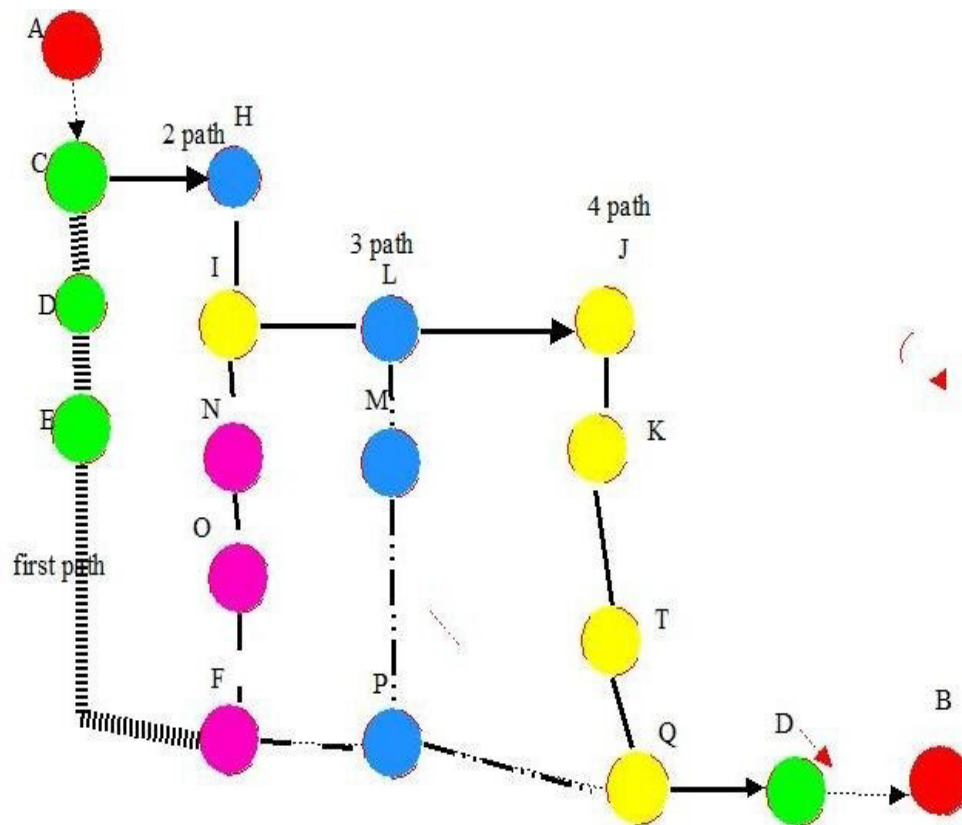


Fig. 6. Graph that represents the possible paths from Porta Lucca (pisa) to national

Notification:

- Each information received about one user, must occupy a location in the hash table denoted as X_i . n is the size of the hash table $i=0, \dots, n$.
- $N_s[i]$ represent the states that match with the registered states, for each new matching state N_s is incremented by 1.
- β indicates the location of the mobile user, considering that the location of the base stations is fixed.

4.2 Algorithm Description

1. The algorithm starts by reading information (user ID) received from the base station. If $ID=0$ that means a new user (Visited one) and he haven't an information in hash table. So, $h(ID)$ is calculated to define its location in the hash table.

2. "Path Prediction Procedure".

Path Prediction Procedure.

3. At the beginning $N_s=0$.

4. Read indication (β). If the ($\beta = 0$) is a new one, store it in the $N[i][j]$ table. Increment the counter N_s by 1.

5. Step 4 is repeated until having a good information needed to define the path with high accuracy ($N_s \geq 4$). Then is calculated the degree of regular from equation 1.

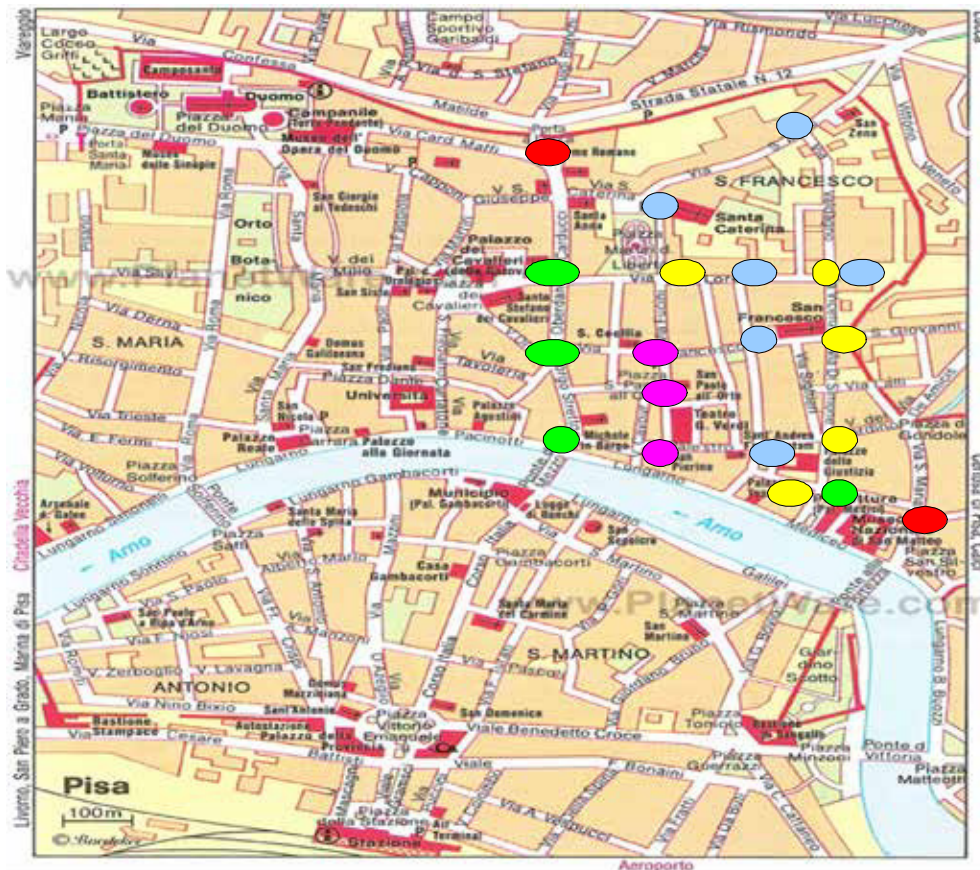


Fig. 7. Pisa (Italy) Map

6. If $D_R < 1$ the references are not sufficient, it needs more references and the algorithm turn to the step 4.

7. If $D_R = 1$ the references are sufficient and the path can be predicted.

8. If $D_r > 1$ the references are sufficient and the path can be defined with high precision.

9. Turn to step 1.

4.3 Prediction Procedure

This procedure assigns a weight to each node that is the probability of state S to be accessed after $S-1$. Each time a prediction success, the probability is increased. If another user arrives at node $S-1$ the next step can be the node with high probability. For example, in Fig. 1, to go from source to destination (A to B), each node that takes the path A-C-H-I has two probabilities to continue with L-J path or N-F-O- path.

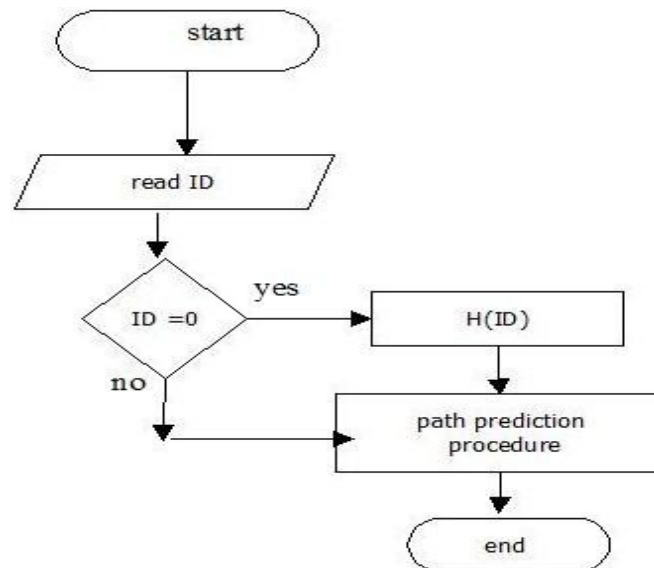


Fig. 8. Path prediction algorithm

To both L and N is assigned a probability counter that start from 0. If the user follows L, its counter is incremented by 1. When another user wants to go from A to B and passes on I, it is predicted with high probability that will follow L.

We have two tables: the first is the hash table that contains User ID and the predicted location.

$$H(ID) = 5key \text{ mod } m(2);$$

$H(ID)$ indicates the hash function used to determine the location in which is inserted the user; ID ;

M is the size of the table; Key is the SIM card number. It is used hash table because searching and insertion require $O(1)$.

When the prediction procedure end, the location predicted is inserted in the hash table to be used as reference in the next predictions.

The second table is the indications table that contains indications to be followed for each destination. It is $n*m$ table where n is the number of rows. T_{n1} (the first column in each row) must contain the location (destination) and in the other columns is inserted the indications that identify such destination. The following example explains how data is organized in our table and how prediction procedure works.

Example: considering we have the indication table as follow:

Table 1. Indication table

Destination	Indications							
A	X ₁	X ₂	Y ₁	Z ₁	X ₃	X ₄	Z ₂	Z ₄
B	Z ₄	Z ₃	Y ₂	X ₁	X ₂	Z ₁	Z ₂	Y ₃
C	Y ₁	Y ₂	Y ₃	Y ₄	Z ₁	X ₁	X ₂	Y ₂
D	X ₁	X ₂	Y ₂	Z ₂	Z ₃	Z ₄	Y ₄	Y ₃

Considering that the first indication referred about the user where X_1 that means the user maybe will reach one of the following destination: A, D or B, C (the counter of X_1 is incremented and is predicted the second indication that is X_2) this indication also matches in both destination A, D (the counter of X_2) is increased. We expect the third indication if the next indication is Y_1 so we can expect with high probability that the user destination will be A after the fourth indication the destination can be predicted correctly based on the indications stored in the previous indication table (highlighted cells indicate the predicted cells). If the third indication comes Y_2 the prediction will shifted to C and D so we wait the fourth indication to decide with high accuracy which destination the user will follow. However, if the third destination is Z_1 so it is followed the row of B for the indications.

Each time an indication is predicted correctly its counter is incremented by 1.

If the indication predicted in our example were B for example, this indication is added to the hash table in the row correspondent to the User ID.

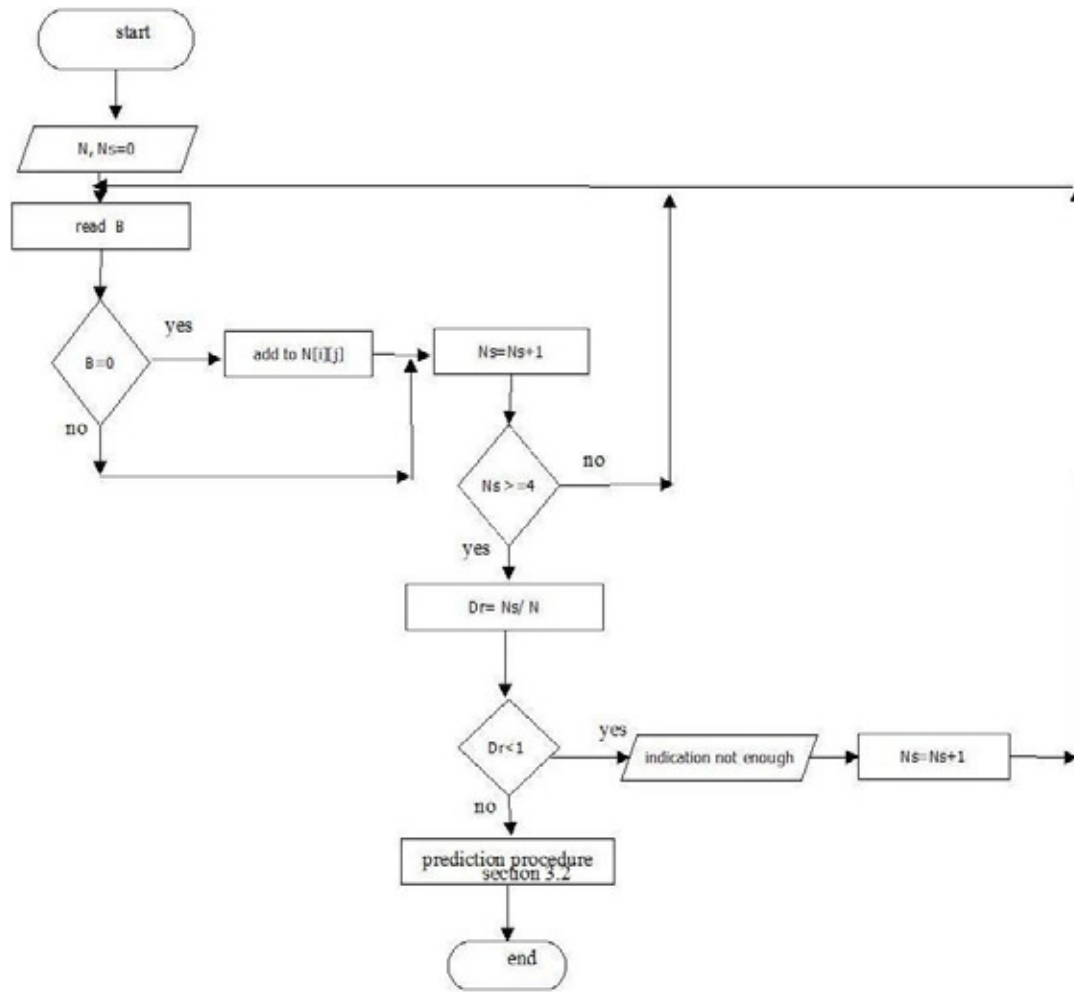


Fig. 9. Path prediction procedure

5. RESULTS

Prediction accuracy in our work is calculated based on prediction correctness that is the number of user predicted correctly to the number of user detected.

$$\text{Prediction correctness} = \frac{\text{the number of user predicted correctly}}{\text{the number of user detected}} \quad (2)$$

$$\text{And so prediction accuracy} = \frac{\text{prediction correctness}}{\text{the number of user in the network}} \quad (3)$$

Our goal is to reduce the number of cars that reach some point in the crowded cities or in the case of accident. If we obtain a prediction correctness in the interval 40-50% (that means as described in our algorithm (Fig. 9) only four indications predicted correctly can identify the path. In consequence for each 10 cars, four of them are predicted correctly) the prediction accuracy obtained by equation 3 vary

from 16% to 40%. And this result is a good results comparing it to that presented in [16] where the prediction accuracy is around 23%. Table 2, show our obtained results for prediction correctness up to 40-50%.

Table 2. Prediction accuracy results

# of user in the network	Prediction correctness 40%		Prediction correctness 50%	
	# of user predicted correctly	Prediction accuracy	# of user predicted correctly	Prediction accuracy
1000	200	20%	250	25%
	240	24%	300	30%
	280	28%	350	35%
	320	32%	400	40%
3000	600	20%	750	25%
	680	22%	850	28%
	800	26%	1000	33.3%
	920	30.6%	1150	38%
5000	800	16%	1000	20%
	1200	24%	1500	30%
	1400	28%	1750	35%
	1600	32%	2000	40%

6. RELATED WORKS

The major part of prediction algorithms for wireless networks make use of history base that has a record of the previous user movement. These algorithms take in consideration different factors such as the direction of movement, velocity. For that, regular movement can be predicted with high accuracy. In our work, user movement pattern is restricted to the road layout. For that some of previous algorithms can be useful in our work. For example, MMP (Mobile Motion Prediction) algorithm [15] and regular path recognition method [16] attempt to exploit regularity in human behavior in terms of periodic or repetitive activities. The performance of these algorithms is accurate with regular movement. However, in wireless ad-hoc networks prediction cannot be based only on past history due to dynamic topology. In [17], path prediction is considered based on the presence of link between any two mobile nodes. The authors calculate the velocity and predict the direction of motion based on link expiration time between any two nodes. Wand et al in [18], use group mobility model to predict the user movement pattern considering that velocity is not time variant in mobile ad-hoc network.

In [19], the movement pattern of mobile users is viewed in respect to the cluster that belong to it. Areas are divided into clusters and every node in the network belong to a cluster and the prediction process should be restricted to areas of high cluster

change probability. So, the location of the user id defined with respect to its position in the cluster. The cluster head has complete knowledge of each of its member nodes. Prediction accuracy is calculated by the following formula:

$$\text{prediction accuracy} = \frac{\sum \frac{\# \text{ of user executes cluster change}}{\# \text{ of predicted user cluster change}}}{\text{Total number of users in the network}}$$

In [20], a survey of vehicular mobility models is presented, where user movement is classified in four classes based on the method used to generate such movement. A comparison between different simulation methods used to illustrate relationship between network simulator and traffic generation and transportation infrastructure studied in a realistic mobility models. Realistic mobility model must take in consideration the realistic topological maps, acceleration and deceleration, obstacles, simulation time, random distribution of vehicles, intelligent driving pattern.

7. CONCLUSION AND FUTURE WORKS

In this paper, we proposed Virtual Explorer system that is a new system that detects the motion of the mobile user to be able to predict his destination.

Our system is an information system that provides the user information about the traffic on the major or minor roads to make him satisfied when travelling on such roads. We expect that our system will reduce the traffic in the congested points about 40-50%. Our results show that the prediction accuracy will vary from 20-40% and that is a good results considering our goal. Our future work is to implement our prediction algorithm to confirm our analytical results in addition we expect to develop our system to simulate a real mobile distributed system where the base station that collects and disseminates information is any car on the road.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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***Automation of the boundary conditions for the simulation
of non-stationary thermal processes
in the radio-electronic means in ASONIKA-TM***

Abstract: The article deals with the automation of the boundary conditions for the simulation of non-stationary thermal processes of printed circuit boards of radio electronic means in the automated analysis subsystem printed circuit boards designs of radio electronic means on the thermal and mechanical effects ASONIKA-TM.

Keywords: radio electronic means, modeling, thermal effect, printed circuit board, border conditions.

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Автоматизация задания граничных условий для моделирования нестационарных тепловых процессов радиоэлектронных средств в АСОНИКА-ТМ

Аннотация: В статье рассматриваются вопросы автоматизации задания граничных условий для моделирования нестационарных тепловых процессов печатных узлов радиоэлектронных средств в автоматизированной подсистеме анализа конструкций печатных узлов радиоэлектронных средств на тепловые и механические воздействия АСОНИКА-ТМ.

Ключевые слова: радиоэлектронное средство, моделирование, тепловое воздействие, печатный узел, граничные условия.

В настоящее время при проектировании радиоэлектронных средств (РЭС) обязательными требованиями технических заданий на разработку являются требования к обеспечению жестких тепловых режимов работы [1, 2]. С точки зрения теплового анализа картина представляется следующей: с одной стороны плотность монтажа и мощности растут, а с другой – повышается чувствительность элементной базы к температуре. В этой ситуации все сложнее обеспечить заданные тепловые режимы работы РЭС, что требует проведение машинного моделирования тепловых процессов РЭС.

В данной работе были разработаны математические модели тепловых процессов печатных узлов и тепловых граничных условий.

Математическая модель тепловых процессов (МТП) печатных узлов. Один из методов, позволяющих с достаточной точностью исследовать тепловые поля в конструкции РЭС с учетом особенностей их конструктивного построения и условий охлаждения, является метод электротепловой аналогии (ЭТА). Метод ЭТА позволяет представить тепловые процессы, протекающие в конструкциях РЭС, в виде эквивалентной электрической цепи, которая в дальнейшем анализируется при помощи хорошо отработанного в настоящее время математического аппарата по численному анализу электрических цепей. Математически такой прием можно представить заменой дифференциальных уравнений в частных производных, описывающих тепловые процессы в конструкциях, уравнениями в конечных разностях. Рассмотрим такой подход на

примере дифференциального уравнения Фурье-Кирхгофа в применении к твердым изотропным телам при решении стационарной задачи. Такое уравнение в декартовой системе координат имеет вид

$$\lambda \nabla^2 T + q_V = 0, \quad (1)$$

где λ - коэффициент теплопроводности материала изотропного твердого тела; q_V - удельная мощность внутренних источников энергии; T - температура;

$$\nabla = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2} - \text{оператор Лапласа.}$$

Запись уравнения (1) в конечных разностях основана на допущении возможности замены непрерывного процесса дискретным:

$$\lambda \cdot \left[\frac{\Delta^2 T}{\Delta x^2} + \frac{\Delta^2 T}{\Delta y^2} + \frac{\Delta^2 T}{\Delta z^2} \right] + q_V = 0 \quad (2)$$

Для наглядности дальнейших рассуждений разобьем условно твердое тело на ряд объемов (параллелепипедов) с размерами Δx , Δy , Δz , как показано на рис.1, а. Рассмотрим совокупность элементарных объемов в направлении оси Ox . Для этого выделим в твердом теле (рис. 1, а) объем V_0 и соседние с ним объемы V_1 , V_2 (рис. 1, б). Температуры в серединах соответствующих условно изотермических объемов обозначим T_0 , T_1 , T_2 .

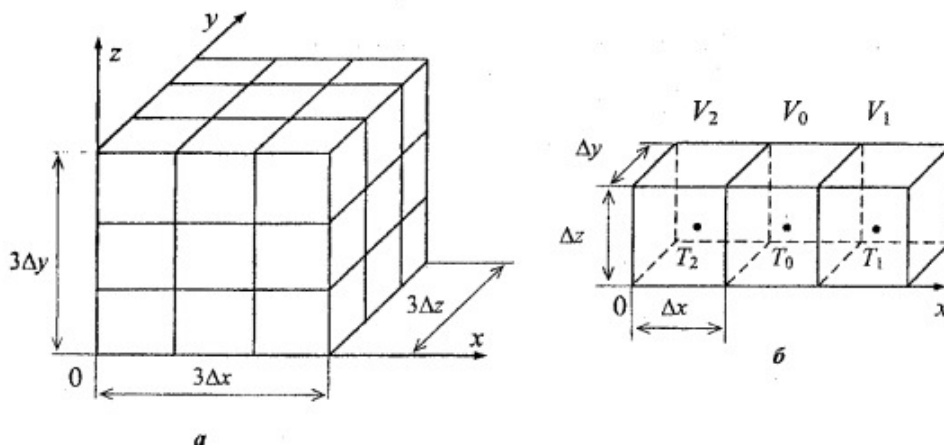


Рис. 1. Твердое тело, условно разбитое на элементарные объемы ортогональными плоскостями (а) и выделенная совокупность элементарных объемов вдоль оси Ox (б)

В объеме V_0 имеются внутренние источники энергии с удельной мощностью q_0 .

Тогда для объема V_0 составляющая по оси Ox (с использованием разности вперед) уравнения (2) примет вид:

$$\frac{\Delta^2 T}{\Delta x^2} = \frac{T_1 - T_0}{\Delta x} - \frac{T_0 - T_2}{\Delta x} = \frac{T_1 - T_0}{\Delta x^2} - \frac{T_0 - T_2}{\Delta x^2} \quad (3)$$

Аналогичным образом рассмотрим совокупность объемов по осям Oy и Oz (рис. 2). Запишем разностные аналоги для составляющих уравнения (2) вдоль осей Oy и Oz соответственно:

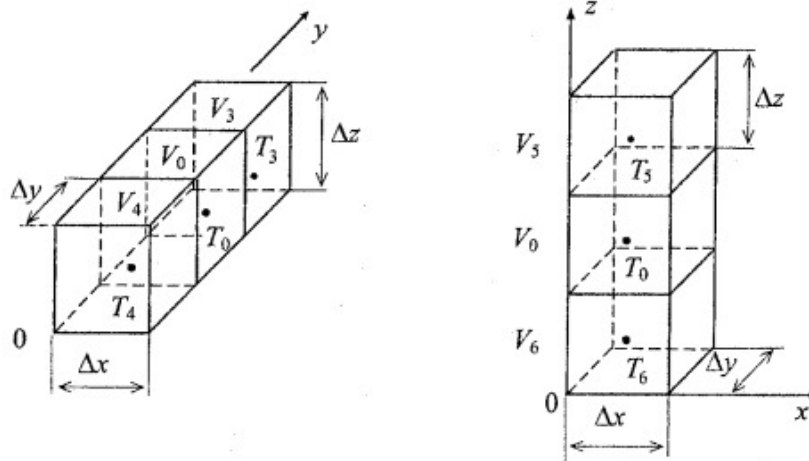


Рис. 2. Совокупности элементарных объемов вдоль осей Oy и Oz

$$\frac{\Delta^2 T}{\Delta y^2} = \frac{T_3 - T_0}{\Delta y^2} - \frac{T_0 - T_4}{\Delta y^2} \quad (4)$$

$$\frac{\Delta^2 T}{\Delta z^2} = \frac{T_5 - T_0}{\Delta z^2} - \frac{T_0 - T_6}{\Delta z^2} \quad (5)$$

С учетом выражений (3), (4) и (5) уравнение (2) можно записать в следующем виде:

$$\lambda \cdot \left[\left(\frac{T_1 - T_0}{\Delta x^2} - \frac{T_0 - T_2}{\Delta x^2} \right) + \left(\frac{T_3 - T_0}{\Delta y^2} - \frac{T_0 - T_4}{\Delta y^2} \right) + \left(\frac{T_5 - T_0}{\Delta z^2} - \frac{T_0 - T_6}{\Delta z^2} \right) \right] + q_0 = 0 \quad (6)$$

Умножим обе части уравнения (6) на объем параллелепипеда $V_0 = \Delta x \cdot \Delta y \cdot \Delta z$. Получим:

$$\begin{aligned}
& \left[\frac{\lambda \cdot \Delta y \cdot \Delta z}{\Delta x} \cdot (T_1 - T_0) - \frac{\lambda \cdot \Delta y \cdot \Delta z}{\Delta x} \cdot (T_0 - T_2) \right] + \\
& + \left[\frac{\lambda \cdot \Delta x \cdot \Delta z}{\Delta y} \cdot (T_3 - T_0) - \frac{\lambda \cdot \Delta x \cdot \Delta z}{\Delta y} \cdot (T_0 - T_4) \right] + \\
& + \left[\frac{\lambda \cdot \Delta x \cdot \Delta y}{\Delta z} \cdot (T_5 - T_0) - \frac{\lambda \cdot \Delta x \cdot \Delta y}{\Delta z} \cdot (T_0 - T_6) \right] + Q_0 = 0,
\end{aligned} \tag{7}$$

где $Q_0 = q_0 \cdot \Delta x \cdot \Delta y \cdot \Delta z$ – тепловая мощность, рассеиваемая в элементарном объеме V_0 .

Введем обозначения:

$$G_x = \frac{\lambda \cdot \Delta y \cdot \Delta z}{\Delta x}, \quad G_y = \frac{\lambda \cdot \Delta x \cdot \Delta z}{\Delta y}, \quad G_z = \frac{\lambda \cdot \Delta x \cdot \Delta y}{\Delta z}$$

Введенные параметры G_x , G_y , G_z имеют физический смысл и размерность (Вт/К) тепловых проводимостей между соседними элементарными объемами твердого тела по осям OX, OY и OZ соответственно. Уравнение (7) с учетом введенных параметров примет вид:

$$\begin{aligned}
& [G_x \cdot (T_1 - T_0) - G_x \cdot (T_0 - T_2)] + [G_y \cdot (T_3 - T_0) - G_y \cdot (T_0 - T_4)] + \\
& + [G_z \cdot (T_5 - T_0) - G_z \cdot (T_0 - T_6)] + Q_0 = 0
\end{aligned} \tag{8}$$

Конечно-разностное уравнение (8), описывающее теплообмен в элементарном объеме твердого тела, имеет аналогом уравнение, записанное на основе 1-го закона Кирхгофа для суммы токов 0-го узла электрической цепи, представленной на рис. 3.

Математическая модель тепловых процессов граничных условий.

Рассмотрим теперь граничный объем твердого тела, например, по оси OX (объем V_1 на рис. 4). На рисунке показано, что узел с номером 1 находится за границей твердого тела – в окружающей среде. Шаг Δx за границу твердого тела введен искусственно.

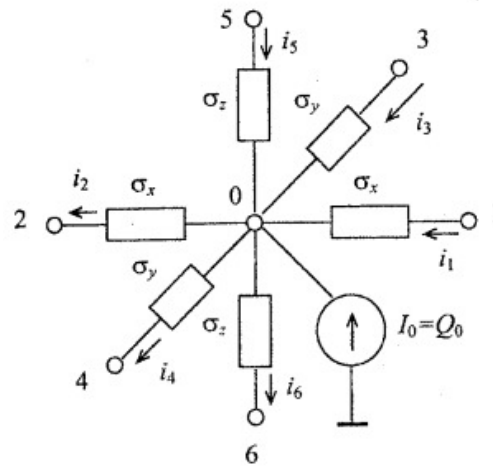


Рис. 3. Фрагмент электрической схемы, моделирующей процессы теплопередачи в элементарном объеме V_0

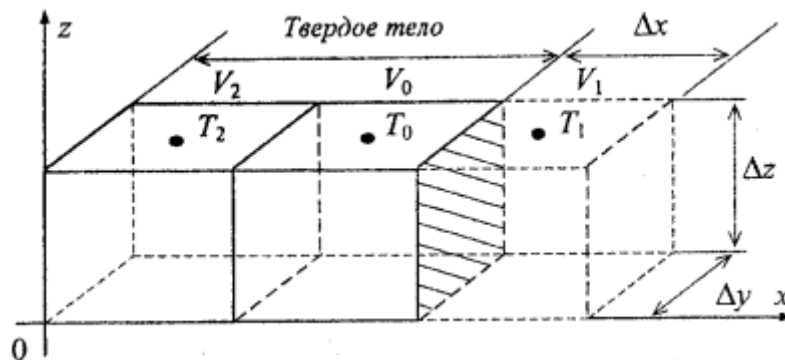


Рис. 4. Фрагмент электрической схемы, моделирующей процессы теплопередачи в элементарном объеме V_0

Уравнение (6) для граничного элементарного объема примет вид:

$$\frac{\lambda_{\Gamma} \cdot (T_1 - T_0)}{\Delta x^2} - \frac{\lambda \cdot (T_0 - T_2)}{\Delta x^2} + \quad (9)$$

$$+ \lambda \cdot \left(\frac{T_3 - T_0}{\Delta y^2} - \frac{T_0 - T_4}{\Delta y^2} \right) + \lambda \cdot \left(\frac{T_5 - T_0}{\Delta z^2} - \frac{T_0 - T_6}{\Delta z^2} \right) + q_0 = 0.$$

Здесь λ_{Γ} – коэффициент теплопроводности уже не материала изотропного твердого тела, а теплопроводность интервала, в который входит граница твердого тела и окружающей среды.

При экспериментальных изучениях теплопроводящих свойств границы раздела при определении закона теплообмена между поверхностью тела и окружающей средой определяют непосредственное отношение $\lambda_{\Gamma}/\Delta x$, которое

называют коэффициентом теплоотдачи или коэффициентом теплообмена α . Для границы твердого тела и окружающей среды могут быть заданы граничные условия различных родов.

Граничные условия первого рода заключаются в том, что задается распределение температуры на поверхности тела (T_n) как функция положения точки и времени:

$$T_n = f(x_n, y_n, z_n, t), \quad (10)$$

где x_n, y_n, z_n – координаты, t – время (для стационарного режима t исключается).

Для расчета на стадии проектирования РЭС задание граничных условий первого рода не представляется возможным, т.к. не реализована еще сама конструкция РЭС и не определены экспериментально температуры граничных поверхностей тел.

Граничные условия второго рода заключаются в задании плотностей теплового потока, проходящего через каждый элемент поверхности в функциях координат и времени:

$$q_n = f(x_n, y_n, z_n, t). \quad (11)$$

Такие граничные условия имеют место на границах ЭРИ и элементов конструкции РЭС с воздухом внутри РЭС.

Плотность теплового потока q_n можно выразить по формуле Ньютона, куда входит коэффициент α :

$$q_n = \alpha \cdot (T_n - T_{cp}).$$

Проведя с формулой (9) преобразования, аналогичные преобразованиям с формулой (6), получаем:

$$\begin{aligned} & [G'_x \cdot (T_1 - T_0) - G_x \cdot (T_0 - T_2)] + [G'_y \cdot (T_3 - T_0) - G_y \cdot (T_0 - T_4)] + \\ & + [G'_z \cdot (T_5 - T_0) - G_z \cdot (T_0 - T_6)] + Q_0 = 0, \end{aligned} \quad (12)$$

где $G'_x = \alpha \cdot \Delta y \cdot \Delta z$ – тепловая проводимость от поверхности твердого тела в окружающую среду.

Это уравнение имеет аналогом уравнение первого закона Кирхгофа для суммы токов узла схемы, представленной на рис. 5.

Граничные условия третьего рода заключаются в задании температуры окружающей среды и закона теплообмена между поверхностью тела и окружающей средой. Такие условия имеют место, например, на границе

корпуса РЭС с окружающей средой. При задании граничных условий третьего рода формула (12) примет вид:

$$\begin{aligned} & \left[G_x' \cdot (T_{cp} - T_0) - G_x \cdot (T_0 - T_2) \right] + \left[G_y \cdot (T_3 - T_0) - G_y \cdot (T_0 - T_4) \right] + \\ & + \left[G_z \cdot (T_5 - T_0) - G_z \cdot (T_0 - T_6) \right] + Q_0 = 0, \end{aligned} \quad (13)$$

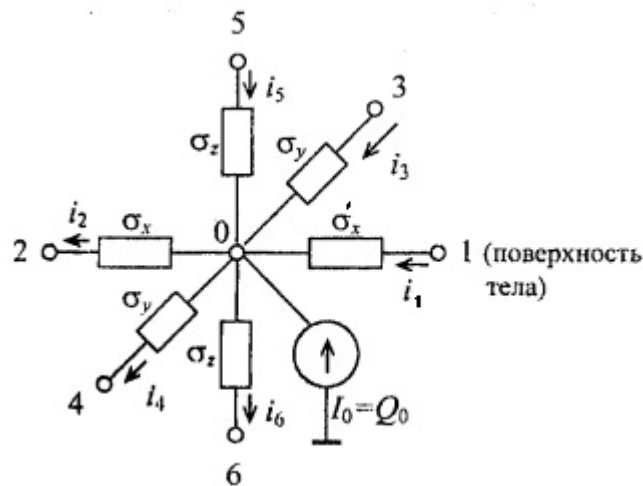


Рис. 5. Фрагмент электрической схемы, моделирующей процессы теплопередачи в элементарном объеме и на границе с окружающей средой при задании граничных условий второго рода

Отличие (13) от (12) лишь в том, что известна температура T_1 , равная T_{cp} . Это уравнение имеет аналогом уравнение первого закона Кирхгофа для суммы токов узла схемы, представленной на рис. 6.

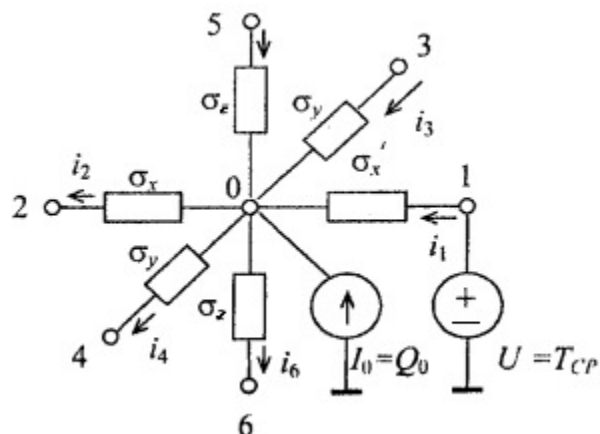


Рис. 6. Фрагмент электрической схемы, моделирующей процессы теплопередачи в элементарном объеме и на границе с окружающей средой при задании граничных условий третьего рода

Граничные условия четвертого рода заключаются в задании температур или градиента температур в месте раздела сред. Условия такого рода имеют место на поверхности соприкосновения двух или нескольких сред с различными коэффициентами теплопроводности. Таким случаем может быть контакт мощного полупроводникового прибора с теплоотводом, трансформатора с корпусом блока, соединение двух элементов конструкции и т.п.

Рассмотрим соприкосновение граничных элементарных объемов двух твердых тел с различными коэффициентами теплопроводности (рис. 7).

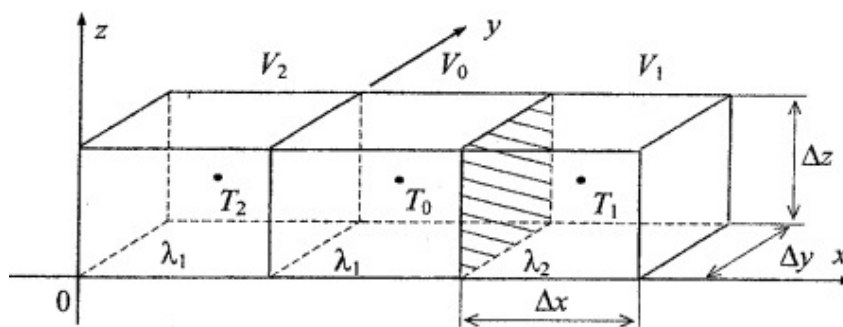


Рис. 7. Соприкосновение двух твердых тел с различными коэффициентами теплопроводности

Уравнение (6) для граничного элементарного объема примет вид:

$$\frac{\lambda_{0Г1} \cdot (T_1 - T_0)}{\Delta x^2} - \frac{\lambda_1 \cdot (T_0 - T_2)}{\Delta x^2} + \lambda_1 \cdot \left(\frac{T_3 - T_0}{\Delta y^2} - \frac{T_0 - T_4}{\Delta y^2} \right) + \lambda_1 \cdot \left(\frac{T_5 - T_0}{\Delta z^2} - \frac{T_0 - T_6}{\Delta z^2} \right) + q_0 = 0. \quad (14)$$

Здесь $\lambda_{0Г1}$ – теплопроводность интервала, в который входит твердое тело с коэффициентом теплопроводности λ_1 , граница двух твердых тел и твердое тело с коэффициентом теплопроводности λ .

Проведя с формулой (14) преобразования, аналогичные преобразованиям с формулой (6), получаем:

$$\left[G_x'' \cdot (T_1 - T_0) - G_x \cdot (T_0 - T_2) \right] + \left[G_y \cdot (T_3 - T_0) - G_y \cdot (T_0 - T_4) \right] + \left[G_z \cdot (T_5 - T_0) - G_z \cdot (T_0 - T_6) \right] + Q_0 = 0, \quad (15)$$

где $G''_x = \frac{\lambda_{0r} \cdot \Delta y \cdot \Delta z}{\Delta x}$ – контактная тепловая проводимость между двумя твердыми телами.

Уравнение (15) имеет аналогом уравнение первого закона Кирхгофа для суммы токов узла схемы, представленной на рис. 8.

При наличии идеального теплового контакта на границе раздела двух сред принимаются равными температуры граничных элементарных объемов контактирующих тел, т.е. $T_1 = T_0$.

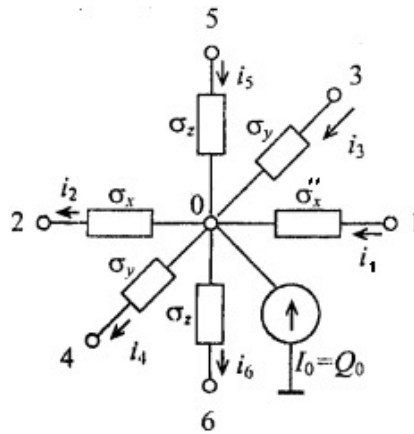


Рис. 8. Фрагмент электрической схемы, моделирующей процессы теплопередачи в элементарном объеме и на границе с другим твердым телом при задании граничных условий четвертого рода

Уравнение (15) примет вид:

$$-G_x \cdot (T_0 - T_2) + [G_y \cdot (T_3 - T_0) - G_y \cdot (T_0 - T_4)] + [G_z \cdot (T_5 - T_0) - G_z \cdot (T_0 - T_6)] + Q_0 = 0. \quad (16)$$

Фрагмент электрической схемы, для которой уравнение первого закона Кирхгофа является аналогом уравнения (16), примет вид (рис. 9).

Таким образом, процессы теплопередачи в твердом теле с граничными условиями любого рода можно смоделировать эквивалентной электрической схемой.

Используя модели элементарных объемов твердого тела и используя заданные граничные условия, можно распространить метод ЭТА на описание процессов теплопередачи во всем РЭС и перейти к его МТП. При этом

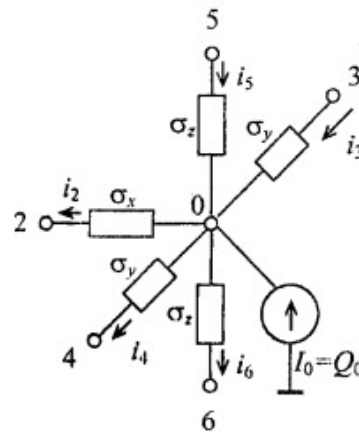


Рис. 9. Фрагмент электрической схемы, моделирующей процессы теплопередачи в элементарном объеме и на границе с другим твердым телом при идеальном тепловом контакте

наблюдается следующая аналогия: потенциал узла эквивалентной электрической схемы аналогичен температуре соответствующей этому узлу части РЭС; электрические проводимости – тепловым проводимостям; сила тока – тепловому потоку; источник тока, направленный в узел электрической схемы, – мощности тепловыделений соответствующей этому узлу части РЭС; источник тока, направленный из узла электрической схемы, – мощности теплопоглощений в соответствующей этому узлу части РЭС; источник напряжения – заданной температуре соответствующей части РЭС.

В соответствии с таким подходом, конструкция РЭС разбивается на элементарные объемы такого размера, что с достаточной точностью можно их считать изотермичными. Представление конструкции РЭС совокупностью тепловых проводимостей между всеми объемами, через которые проходит тепловой поток, приводит к электрической цепи большой размерности, которая может быть проанализирована методами, применяемыми при анализе на ЭВМ электрических схем.

При решении нестационарных задач в электрическую эквивалентную цепь вводятся конденсаторы, которые моделируют теплоемкости соответствующих условно изотермичных объемов конструкции РЭС. Наличие конденсаторов в схеме можно пояснить уравнением (1), в которое вводится соответствующая компонента, т. е.

$$\lambda \nabla^2 T + q_V - C_p \rho \frac{dT}{d\tau} = 0, \quad (17)$$

где C_p – удельная теплоемкость материала, Дж/(кг·К); ρ – плотность материала, кг/м³.

Проделав преобразования, аналогичные (6) – (8), получим:

$$\begin{aligned} & [G_x \cdot (T_1 - T_0) - G_x \cdot (T_0 - T_2)] + [G_y \cdot (T_3 - T_0) - G_y \cdot (T_0 - T_4)] + \\ & + [G_z \cdot (T_5 - T_0) - G_z \cdot (T_0 - T_6)] - C_0 \frac{dT_0}{d\tau} + Q_0 = 0, \end{aligned} \quad (18)$$

где C_0 – теплоемкость объема V_0 .

Аналогом уравнения (18) будет электрическая цепь, представленная на рис. 10.

При анализе нестационарных тепловых режимов в РЭС кроме граничных условий необходимо задать начальные (временные) условия, которые определяют температурное поле в начальный момент времени и заключаются в том, что для начального момента времени t_0 должна быть известна функция

$$T = f(x, y, z, \tau).$$

Эта функция задается в некотором интервале времени Δt , в течение которого изучаются тепловые процессы в конструкции РЭС. В дальнейшем при рассмотрении тепловых процессов, протекающих в конструкции РЭС, удобно перейти к топологической форме представления тепловых моделей.

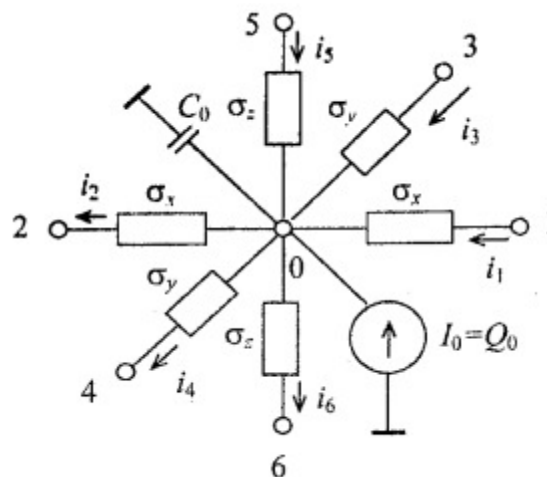


Рис. 10. Фрагмент электрической схемы, моделирующей нестационарные процессы теплопередачи через элементарный объем V_0

На основе данных моделей были разработаны алгоритмы расчета тепловых режимов работы печатных узлов с учетом граничных условий; разработано и внедрено программное обеспечение; разработаны методики моделирования тепловых процессов РЭС с учетом граничных условий.

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Regulating of the route transport network and its role in the planning system the Smolensk city

Abstract: Along with a positive role the motor transport plays in economy development there are also negative factors connected with it. Here we talk about the environment pollution, challenges in town planning caused by necessity to leave space for vehicle traffic and parking, growth of petrol products deficit, etc.

Most negative factors are car accidents and their consequences that are characterized by people death and injuries, damage to property (vehicles, cargo, road and other constructions) as well as negative impact to environment.

Keywords: planning system, the motor transport, town planning, city transport network.

The history of development of the motorway network on the territory of the Smolensk region is long. As the result of the analysis conducted by the author one can distinguish four stages of the MTC development which are different in terms of their influence on nature complexes.

At the first stage (from ancient times till the beginning of XVI century) the most difficult part was laid alongside the River Dnepr – “Trade route from the Varangians to the Greeks”, and in XV century – Smolensk animal-drawn route that further became one of the most important trade and diplomatic connection line between Russia and the whole Europe.

At the second stage (XVII– XIX centuries) – strategically important the Old Smolensk road and floating bridges across the Dnepr were built. Urban area was surrounded by a fortified wall. Building a new residential area – «Pasad», on the opposite bank of the Dnieper River. Constructed a bridge across the Dnieper River, connecting the old Smolensk and «Pasad».

The third stage (XX century) characterized by a sharp increase in the number of paved roads. Increase in traffic intensity and quantity of vehicles resulted in the wide dissemination of eco toxic substances in the air, soil and water objects.

In the 30-s years of XX century the new period of transport network development came. It was caused by the appearance of motor transport and increase in its number. In order to lower fuel consumption, transportation time reduction it became necessary to make the reconstruction including aligning of a number of old roads with a higher intensity.

The fourth stage (beginning of the XXI century) – development of transport networks in the city difficult in the absence of space, especially in the Old Town.

At all times the geographical position of the Smolensk region predetermined the existence of important transit routes on its territory. The most difficult part of the “Trade route from the Varangians to the Greeks” was placed here. A big number of the streamside roads have been preserved along the largest rivers till nowadays.

Motorways are inseparably connected with the natural territorial complexes (landscapes, geo-systems), thus, in the process of monitoring it is necessary to evaluate not only direct but also backward linkages between the contingent components.

Research methods used

The work was being performed in summer months (June-July) from 2006 till 2012. The five typical (key) city zones were selected in Smolensk. The soil cuts were made on these areas. Also the selection of soil samples was done to perform the geo-chemical analysis.

The main analytical methods for investigation are atomic absorption and bio indicator. The expert method (i.e. based on the opinion of drivers of motor cars) was applied together with calculative and instrumental methods of evaluation of situations. The software product called “The Smolensk Region. Monitoring of the route transport” was developed with the use of GIS technology.

The use of traditional methods in parallel with new geo-information and logical and mathematical technologies was targeted at development of multi factor system analysis of transformation processes in city transport network.

Relief inclinations, hollows and dumps predetermine possibility and impossibility of a road construction, cost of its building, indicators for accident rate,

etc. Soil and air pollution is spread to 100 m and in some cases even longer distances away from the motorways.

One of the main systems of urban planning is a route transport. Functioning of other fields of economic complex is dependent on its work.

The results

The analysis of routes configuration shows that linear routes are prevailing (47%) in this type of connection, radial ones comprise 29%, and the rest 24% is related with radial-loop routes.

All three administrative districts of the city of Smolensk (Promyshlennyj, Leninski and Zadneprovski) are connected with a central transport hub (railway and bus stations) by route lines. The highest load of routes is typical for Leninski district, the lowest one is in Zadneprovski. It is connected not only with peculiarities of building architecture that doesn't allow widening of the most loaded highways but also with functional division of the districts.

Car accident is the most dangerous threat for a human health and property.

Route transport plays a crucial role in organization of a city transport network as well as in development of a human personal and social safety system.

On the example of Smolensk we could observe that the route transport runs through all parts of the city and interweave in a complex traffic system that provides a safe service of passenger transportation.

The planning system of urban building is developing separately from transport network modernization. As an example of this one can take building of a new living complex "New Smolensk" at the south-eastern part of the city. The complex will consist of 20 apartment buildings, educational establishments, recreation centers and it is being established without any preliminary correction of the transport network in the district which is suffering nowadays from a traffic overload. The current state allows foreseeing even worse situation in future.

Permanent complex situation with a high level of accidents is determined by a constantly growing mobility of population when the use of private transport is increasing in comparison with public one, the imbalance between the number of cars and the size of a street road network is growing. This results in worsening the traffic conditions, jams, increase of fuel consumption, negative impact to ecological situation and growth of a number of accidents.



**Picture 1. Transport network of the city of Smolensk
(route taxis No. 3, 6, 11, 22, 27, 28, 32, 34).**

The analysis of peculiarities of accident-related injuries shows that there is a gradual increase of quantity of car accidents which lead to difficult injuries.

By decreasing the number of injuries in the system of transportation safety support it is also possible to decrease the threats that negatively affect citizens. It will have a positive impact on human stress reduction. We know that a short-term stress is safe while a long-term one has a negative influence on human well-being and mental state.

The main conclusions

The roads on plains are characterized by the biggest deformation and sensitivity to seasonal changes especially in the condition of a low degree of drainage of loam soils. Their properties (squeezing, resistivity, moisture) negatively influence on the condition of roadside techno-geo systems, provoke (especially in winter time) the formation of longitudinal and transversal cracks on the road surface and soil blowup. Depending on lithogenetic conditions, existence of slopes, level of soil watering the road surface deformations show themselves in a different way.

Negative influence of motor transport on soils of road side geo-systems of three key areas were determined according to the concentration of different chemical substances in soils. The special attention was given to evaluation of soil pollution by heavy metals. The general rate of accumulation of heavy metals in the roadside soils was the following: from 24 to 180 mg/kg (lead), from 27 to 120 mg/kg (zinc), from 10 to 177 mg/kg (copper) and from 0,23 to 1,9 mg/kg (cadmium).

Empiric-statistical connection between the values investigated (distance from the road and the quantity of pollutants in soil) hasn't always been linear. Though for separate areas the linear approximation is possible.

The air pollution was evaluated according to the CO and CO₂ concentration. Analyzing the annual report of the Russian Technical Control Agency in 2010-2011 the connections between their concentrations in the air and the traffic intensity were defined. The schematic map prepared by the author gives an overview not only of dissemination of traffic flow along the main motorways but also of the fact that the number of emissions is growing in direct proportion to the traffic intensity. The maximum of CO₂ emissions takes place in the regional center – the city of Smolensk as well as the Smolensk motorways (23 and more mg/m³). In the centers of administrative districts this level is varying within 21-32 mg/m³ with the maximum allowable content of 5 mg/m³.

The linear focal type of dissemination of the increased CO₂ concentrations in the areas attached to motorways reflects not only the spatial peculiarities of an anthropogenic transformation of roadside geo-systems but also ecological and geographical characteristics of population sickness rate. Alongside the Smolensk motorways the center for upper air passages diseases among children corresponds to the center of the highest level of air pollution [3].

Recommendations

Ways of improvement of roadside techno-geo-systems. One of the key elements of ecological development of the motor transport complex in the region is building the system of business-state cooperation which should have a clear defined structure consisting of regional, municipal authorities, companies (e.g. JSC "Smolensk Avtodor"), representatives of research and academic institutions, civil society (ecological NGOs), etc. The communication platform should be created to discuss the relevant problems of the motor transport complex, accumulate the

proposals on measures targeted at stabilizing the geo-ecological situation in a real-time mode.

One more important element of ecological development is improvement of organization of road traffic on the base of geo-monitoring, navigational communication tools and informing the drivers. Development of the effective traffic management system has successfully been implemented in a number of countries (Sweden, Germany, Japan, etc.). In Russia it would be possible to reach the positive results only on the condition of joining the efforts of research, production and administration institutions with financial support of businesses and the state.

Taking into account the role and meaning of this type of transport in vital activity of the city of Smolensk one of the main goals is its stable development with the focus on:

- meeting the needs of population and economic complex of the city by low-cost quick, comfortable and safe transportation;
- supporting the balanced development of public and private kinds of transport taking into account the urban planning, resource and technical possibilities and restrictions as well as environment conditions;
- organizing a new system of planning and financing of passenger transportation that will suppose contract approach and competitive distribution of providers of transport services.

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The research of periodic process of methane fermentation of lactoserum

Abstract: Research the process of methane fermentation of lactoserum in the periodic mesophilic mode. Established this process is not a significant source of bioenergy. Fermentation passed 45 days. During this time, emitted 0,45 m³/kg gas on dry substances. During fermentation was observed oppression of its own microflora of lactoserum. The highest intensity was achieved after 20 days of fermentation, when the total biomass reached 10⁶...10⁷ cells in 1 ml. Wherein the microorganisms used for the enrichment of the organic components serum. At the end of the fermentation the biomass constituted 10⁸ cells in 1 ml. The concentration of vitamin B₁₂ after fermentation constituted 5...6 mg/kg of mixture. Fermentative mixture is the raw material for the production of vitamin concentrates.

Keywords: methane fermentation, lactoserum, vitamin concentrate.

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Дослідження періодичного процесу метанового бродиння молочної сироватки

Анотація: Досліджений процес метанового бродиння молочної сироватки в періодичному мезофільному режимі. Встановлено, що цей процес не є істотним джерелом біоенергії. Бродиння тривало 45 діб. За цей період виділилося 0,45 м³/кг газу на сухі речовини. При бродинні спостерігалось пригнічення власної мікрофлори молочної сироватки. Найбільша інтенсивність процесу досягалась після 20 діб ферментації, коли загальна біомаса досягала 10⁶...10⁷ клітин в 1 см³. При цьому мікроорганізми використали для живлення органічні компоненти сироватки. У кінці бродиння біомаса склала 10⁸ клітин в 1 см³ lactoserum. Концентрація вітаміну В₁₂ після бродиння склала 5...6 мг/кг суміші. Бродильна суміш є сировиною для виробництва вітамінних концентратів.

Ключові слова: метанове бродиння, молочна сироватка, вітамінний концентрат.

Вступ

Молокопереробні підприємства є потенційними джерелами утворення великої кількості сироватки. Об'єми її з року в рік зростають, що пов'язане з ростом виробництва молочнобілкових продуктів і широким впровадженням мембранних способів концентрування молока, особливо, ультрафільтрацією. Ультрафільтрат молока у широких масштабах практично не використовується. Не зважаючи на високу харчову цінність молочна сироватка мало застосовується для випуску кормових і харчових продуктів і добавок. Майже половина її надхо-

дять у каналізацію, що складає серйозні проблеми при очищенні стічних вод, у охороні довкілля. Ось чому проблеми переробки молочної сироватки не втрачають своєї актуальності і тісно пов'язані із захистом довкілля [1, 2].

Науковці пропонують десятки варіантів переробки молочної сироватки, серед яких безперечним лідером є біотехнологія. Вона використовує мікроорганізми, іммобілізовані ферменти, комбінацію ферментів і мікроорганізмів. Анаеробна ферментація дає змогу отримати з сироватки етиловий спирт, пропіонову і оцтову кислоти, рибофлавін тощо. Аеробна ферментація, зазвичай, супроводжується накопиченням великої кількості біомаси. Тому на основі концентратів дріжджів можна випускати цілу низку кормових і харчових білкових продуктів [1, 4].

Особливе місце у біотехнології займає виробництво вітаміну B₁₂, який синтезується виключно мікроорганізмами, наприклад, пропіоновокислими бактеріями *P. shermanii*. Продуцентом вітаміну B₁₂ є також мікроорганізми еклектичних культур метанового бродіння [3].

Метою презентованої роботи є дослідження періодичного способу метанової ферментації молочної сироватки і накопичення у ній вітаміну B₁₂, як основи розробки технології кормового вітамінного концентрату.

Матеріал і методи

Об'єкт досліджень – молочна сироватка підприємства «ГМЗ №1» (м. Одеса). Вміст сухих речовин складав 6,5 %, у т. ч. білка – 0,9 %, лактози – 4,8 %, жиру – 0,2 %, мінеральних речовин – 0,6 %.

Виклад основного матеріалу

Сироватку пастеризували при 74...75°C з витримкою 15 с для усунення сторонньої мікрофлори. Потім вносили 15 % водної витяжки з активного мулу метантенків очисних споруд м. Іллічівська (Чорноморськ). Водну витяжку готували шляхом розведення (1:3) мулу дистильованою водою з наступним фільтруванням через папір. Сироватку з витяжкою поміщали у колбу з водяним затвором і оснащенням, що відображена на рис. 1.

Вся лабораторна установка поміщалась у термостат, де підтримувалась температура 38...40°C. Паралельно ставили такий же дослід без попередньої пастеризації сироватки. Щоденно контролювали рівень кислотності (рН 6,5...7,0). Періодично визначали масові концентрації сухих речовин, у т. ч. білка,

жиру, лактози за методиками [5]. Вміст біомаси при бродінні визначали за методикою [6], концентрацію вітаміну В₁₂ – за [7].

Лабораторна установка (рис. 1) дозволяє визначати об'єм виділеного біогазу.

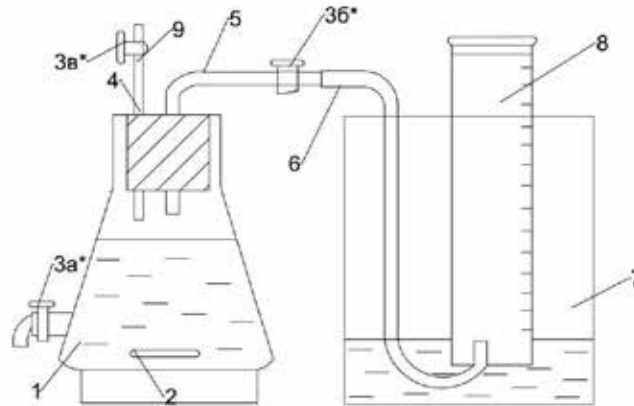


Рис. 1. Схема лабораторної установки

1. Колба; 2. Магнітна мішалка; 3 а, б, в – крани; 4. Гумова пробка;
5. Скляне коліно; 6. Гумова трубка; 7. Скляний стакан; 8. Мірний циліндр;
9. Скляна трубка з краном

У скляній колбі 1 міститься магнітна мішалка 2. Гумова пробка 4 герметизує внутрішній об'єм і має отвір для виходу біогазу через коліно 5, кран 3, гумову трубку 6 у мірний циліндр, що занурений верхнім кінцем у воду скляного циліндра 7. Мірний циліндр спочатку заповнюється водою, яка при надходженні у мірний циліндр біогазу витісняється у циліндр 7. Різниця у висоті стовпчиків рідини у циліндрах є об'ємом біогазу. Кран 3а слугує для відбору проб. Трубка 9 з краном 3в призначена для подачі реагентів.

Обговорення результатів

В таблиці 1 представлено результати вимірів об'ємів біогазу, що виділяється при бродінні.

Весь період бродіння тривав 45 діб. Кінець процесу визначався через припинення виділення біогазу. Перші 5 діб у експерименті з пастеризованою сироваткою не відзначались виділенням біогазу. У непастеризованій сироватці після внесення мулу протягом 4...5 діб активного бродіння не спостерігалось. Вказані феномени можна пояснити адаптацією мікрофлори мулу до нового жи-

вильного середовища і частковим пригніченням мікрофлори непастеризованої сироватки.

Таблиця 1. Об'єм біогазу, що виділився при бродінні молочної сироватки (см³)

Об'єкт дослідження	Тривалість бродіння, дів				
	10	20	30	40	45
Пастеризована сироватка	400	1250	2010	2550	2600
Непастеризована сироватка	450	1265	2035	2625	2650

У обох випадках інтенсивного бродіння протягом перших 13...15 дів не спостерігалось. Основний об'єм біогазу у пастеризованій і непастеризованій сироватці виділився протягом 30...40 дів і складав 2010...2035 см³ і 2035...2625 см³ відповідно.

Динаміка накопичення біомаси представлена у табл. 2.

Таблиця 2. Динаміка накопичення біомаси при метановому бродінні молочної сироватки (КУО/см³)

Об'єкт дослідження	Тривалість бродіння, дів				
	10	20	30	40	45
Пастеризована сироватка	$3 \cdot 10^2$	$3 \cdot 10^4$	$7 \cdot 10^6$	$1,3 \cdot 10^8$	$1,5 \cdot 10^8$
Непастеризована сироватка	10^2	$1,6 \cdot 10^4$	$7,3 \cdot 10^6$	$1,7 \cdot 10^8$	$1,7 \cdot 10^8$

Дані мікробіологічних досліджень доводять, що суттєвої різниці у динаміці росту мікрофлори для пастеризованої і непастеризованої сироватки немає. Вірогідно мікрофлора непастеризованої сироватки частково пригнічується, а частково включається до складу змішаних культур мікроорганізмів, які визначають основний процес бродіння.

Зміни хімічного складу бродильної суміші (сироватка з додаванням витяжки мулу) наведено у табл. 3.

**Таблиця 3. Зміни хімічного складу молочної сироватки
під час метанового бродіння**

Вміст, %	Тривалість бродіння, дів				
	10	20	30	40	45
Масова частка су- хих речовин у т.ч.:					
білок	6,20	4,10	2,30	0,75	0,75
лактоза	0,90	0,50	0,10	-	-
жир	4,20	2,90	1,50	0,10	0,10
	0,10	-	-	-	-

Представлені у табл. 3 результати свідчать про нерівномірність споживання органічних сполук мікроорганізмами, які визначають процес метанової ферментації. Жир споживається швидше, аніж інші компоненти хімічного складу. Після припинення бродіння у суміші спостерігались слідові кількості білка і незначна концентрація лактози. Мінеральна складова суміші була незмінною і складала 0,6 %.

Визначення концентрації вітаміну B₁₂ у суміші після бродіння показало вміст 5...6 мг/кг, тоді як на початку бродіння аналогічний показник становив кількість, що лежала нижче межі визначення наведеної методики.

Висновки

1. Метанове бродіння молочної сироватки під впливом мікрофлори осадів метантенків міських очисних споруд періодичним способом проходить вкрай повільно і складає 45 дів.

2. Динаміка накопичення біомаси і кількості біогазу вказує на те, що процес основного бродіння не залежить від попередньої концентрації мікрофлори у сироватці.

3. При метановому бродінні загальний об'єм біогазу, що виділився з 1 л сироватки склав близько 0,026 м³, що у перерахунку на 1 кг сухих речовин становить близько 0,45 м³.

4. Інтенсивність періодичного способу метанового бродіння сироватки у мезофільному режимі нерівномірна і найбільша за останню третину загального часу бродіння.

5. Використання періодичного способу метанового бродіння молочної сироватки як джерела енергії (біогазу) не можна розглядати як суттєве через низьку інтенсивність.

6. Зміни хімічного складу бродильної суміші доводять, що в основному мікрофлора споживає органічні сполуки, а швидше інших жири.

7. Оптимальні мікробіологічні показники можуть слугувати підґрунтям розробки промислової технології підготовки біореакторів до основного метанового бродіння молочної сироватки.

8. Визначений вміст вітаміну В₁₂ доводить перспективність метанового бродіння для отримання сировини з вмістом цінного компонента при подальшій переробці у кормові добавки, або продукти.

Подальша робота продовжується з метою реалізації дослідженого процесу через безперервний спосіб і стосується розробки технології отримання кормового білково-вітамінного (В₁₂) концентрату.

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***Calculation of the strength of the inclined sections
of the monolithic slabs, reinforced
concrete bars strained***

Abstract: This article focuses on the development of methods for calculating the strength of oblique section of monolithic slabs, reinforced with a grid of reinforcing rods and prestressed concrete bars, reinforced with high-strength reinforcement. We consider an engineering method for calculating the strength, when the first phase of the construction element is made and then a check of strength.

Keywords: strength, oblique cross section, bending, reinforced concrete, monolithic plate, rebar, reinforced bars.

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***К расчету прочности наклонных сечений монолитных
плит перекрытий, армированных напряженными
железобетонными брусками***

Аннотация: Данная статья посвящена разработке методики расчета прочности наклонного сечения монолитных плит, армированных сетками из

стержневой арматуры и предварительно напряженными железобетонными брусками, армированные высокопрочной арматурой. Рассматривается инженерный метод расчета прочности, когда на первом этапе производится конструирование элемента и затем производится проверка прочности.

Ключевые слова: прочность, наклонное сечение, изгиб, железобетон, монолитная плита, арматура, железобетонные бруски.

Конструкции неразрезных монолитных плит перекрытий и пролетных строений мостовых сооружений с армированием предварительно-напряженными железобетонными брусками в пролете и в опорных сечениях нами были рассмотрены ранее в работе [1, с. 68-74]. Было показано, что применение таких конструкций сборно-монолитных плит перекрытий позволяет значительно снизить стоимость, трудоемкость строительства.

Расчет монолитной плиты перекрытия, постоянного по высоте сечения, на действие поперечной силы для обеспечения прочности по наклонной трещине без поперечной арматуры для плит толщиной до 40 см, согласно [2, с. 128], производится из условия

$$Q \leq Q_b \quad (1)$$

где: Q – поперечная сила от действия расчетных нагрузок, расположенных по одну сторону от рассматриваемого сечения;

Q_b – поперечное усилие, воспринимаемое бетоном.

Расчетное сечение плиты приведено на рисунке 1-а. При наличии поперечной арматуры, для плит толщиной более 40 см, условие прочности записывается в виде

$$Q \leq Q_b + Q_{sw} \quad (2)$$

где: Q_{sw} – поперечное усилие, воспринимаемое поперечной арматурой пересекаемой наклонной трещиной.

Расчетное сечение плит, толщиной более 40 см приведено на рисунке 1-б.

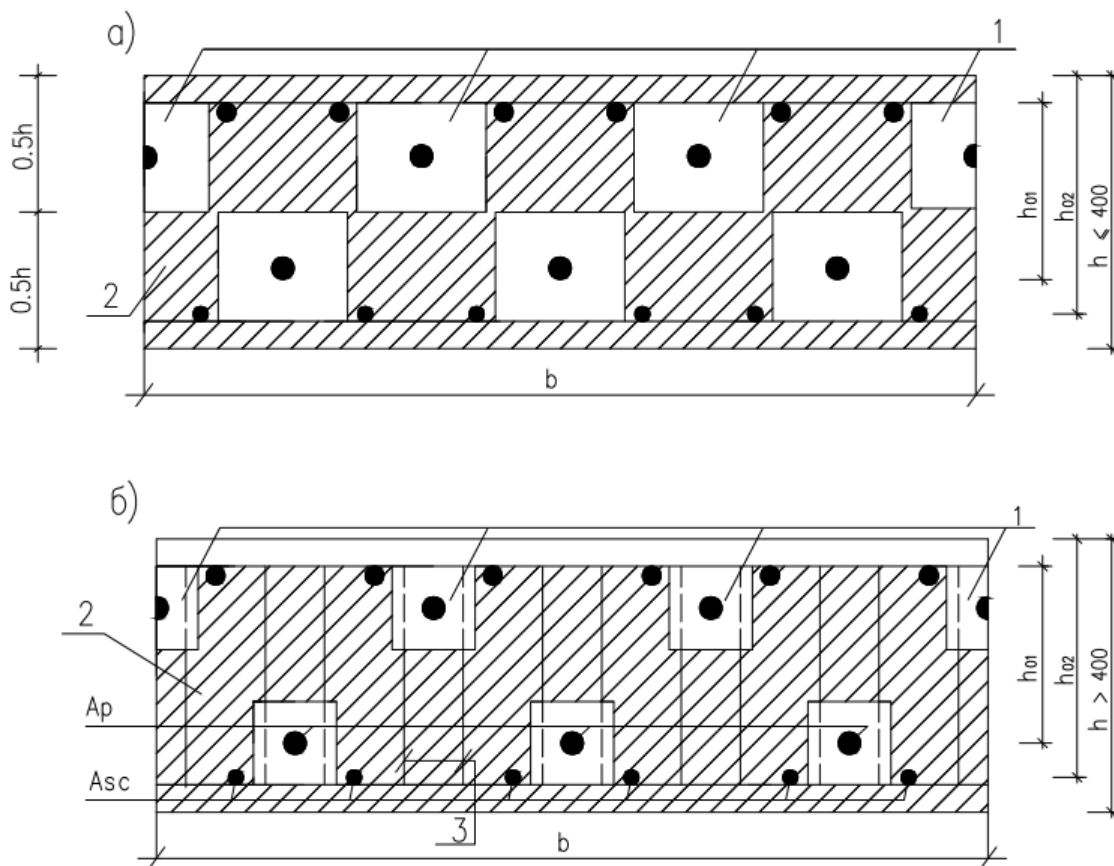
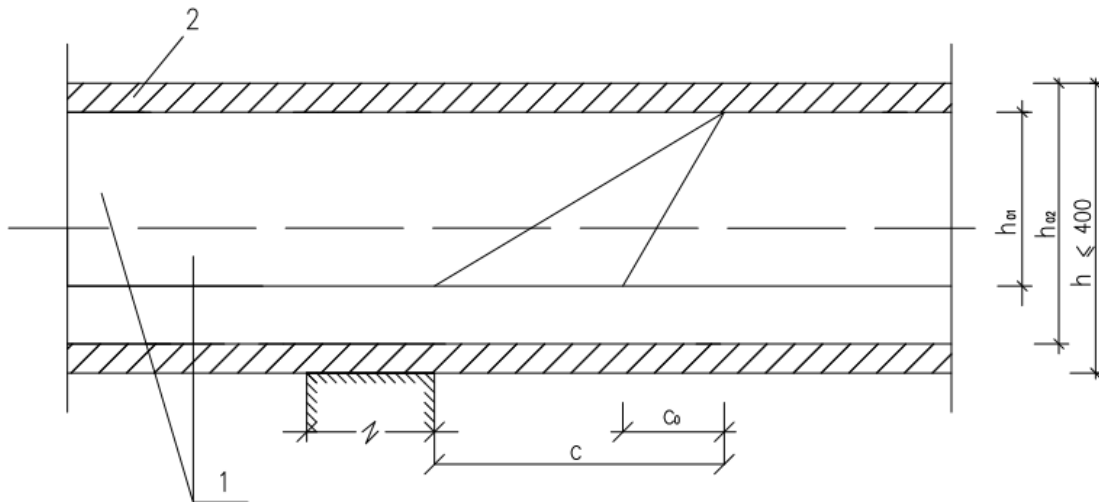


Рис. 1. Типы сборно-монолитных плит перекрытий, армированных предварительно-напряженными железобетонными брусками
а – плиты толщиной до 40 см без поперечной арматуры; б – плиты толщиной более 40 см с поперечной арматурой; 1 – напряженные железобетонные бруски; 2 – монолитный бетон плиты

Согласно рисунка 1 рассматриваются конструкции сборно-монолитных плит имеющие следующие конструктивные особенности в опорных сечениях. Предварительно-напряженные железобетонные брусочки шириной до 15 см располагаются между продольными стержнями арматурных сеток с ячейкой 20x20 см, причем верхние и нижние брусочки растянутой и сжатой зон в опорных сечениях располагаются в смежных ячейках сеток. Тогда в приведенном сечении плиты шириной $b = 120$ см суммарная ширина бетона сборных брусочков будет составлять: $n \cdot b_1$, а ширина монолитного бетона: $b_2 = b - n \cdot b_1$, где n – количество брусочков в пределах ширины приведенного сечения; b_1 – ширина одного железобетонного брусочка. Далее для упрощения расчетных формул за

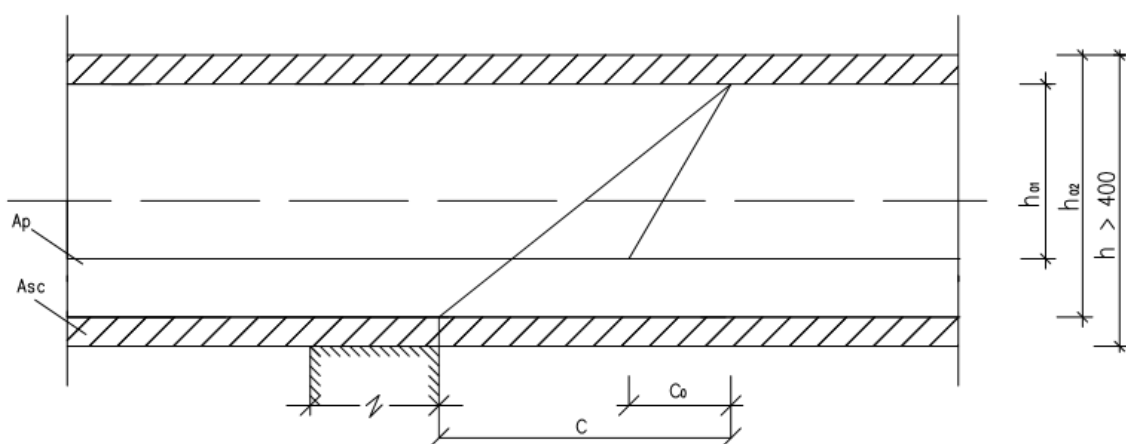
параметр b_1 будем считать суммарную ширину бетона сборных железобетонных брусьев.

На рис. 2 и рис. 3 приведены расчетные схемы наклонных сечений при расчете по рабочей высоте сборных железобетонных брусьев и рабочей высоте сборно-монолитной плиты соответственно.



**Рис. 2. Расчетная схема наклонных сечений при расчете
По рабочей высоте сборных железобетонных брусьев**

1 – железобетонные брусья; 2 – монолитный бетон; 3 – напрягаемая арматура брусьев; 4 – продольная нижней сетки армирования плиты



**Рис. 3. Расчетная схема наклонных сечений при расчете по
рабочей высоте сборно-монолитной плиты:**

1 – железобетонные брусья; 2 – монолитный бетон; 3 – напрягаемая арматура брусьев; 4 – продольная нижней сетки армирования плиты

Расчет монолитной плиты перекрытия, постоянного по высоте сечения, на действие поперечной силы для обеспечения прочности по наклонной трещине производится на основе общей методики [4, с. 20-23], с учетом особенностей применения предварительно-напряженных брусьев с напряжениями обжатия σ_b , определенными согласно формулы (5) [3, с. 96]. Для сборно-монолитных плит толщиной до 40 см без поперечной арматуры минимальное поперечное усилие воспринимаемое бетоном сборных железобетонных брусьев определяется по формуле

$$Q_b^{\min} = 0.6(R_{bt1} + \sigma_b)b_1 \cdot h_{01}, \quad (3)$$

где: R_{bt1} – расчетное сопротивление растяжению бетона брусьев;
 σ_b – напряжения обжатия бетона брусьев с учетом полных потерь;
 b_1 – суммарная ширина брусьев в расчетном сечении;

h_{01} – рабочая высота сечения железобетонных брусьев.

Минимальное поперечное усилие воспринимаемое бетоном монолитной плиты определяется по формуле

$$Q_b^{\min} = 0.6 R_{bt2} (b - b_1)h_{02}, \quad (4)$$

где: R_{bt2} – расчетное сопротивление растяжению монолитного бетона;

b – расчетная ширина плиты;

h_{02} – рабочая высота сечения сборно-монолитной плиты.

Поперечное усилие воспринимаемое хомутами

$$Q_{sw} = m_{04} \sum R_{sw} A_{sw} ; \quad (5)$$

$m_{04} = 0.80$ - коэффициент условия работы для стержневой арматуры:

$$Q_{sw} = (R_{sw} A_{sw} / S_w)h_{02} ; \quad (6)$$

где: R_{sw} – расчетное сопротивление поперечной арматуры на растяжение;

A_{sw} – площадь поперечной арматуры в нормальном сечении;

S_w – расстояние между хомутами : $S_w \leq h_0/3 \leq 15$ см.

Поперечное усилие, кН, воспринимаемое горизонтальной арматурой на участке наклонной трещины [2, с.100]

$$Q_w^s = 10 \cdot A_w^s , \quad (7)$$

где: A_w^s – площадь горизонтальной напрягаемой арматуры брусьев и ненапрягаемой арматуры, кв. см, нижней сетки армирования плиты.

Пример расчета. Размеры расчетного сечения сборно-монолитной плиты: $b = 120$ см, $h = 40$ см. Железобетонных бруски выполнены из бетона класса В50 ($R_{bt1} = 1.4$ МПа) сечением 15x15 см, которые установлены между продольными стержнями диаметром $d_s = 25$ мм нижней сетки на поперечную арматуру диаметром $d_{s1} = 12$ мм с ячейкой сетки 200x200 мм через 400 мм. Бруски армированы стержневой арматурой класса А800, диаметром 28 мм. Арматура нижней сетки класса А400; поперечная арматура нижней сетки принята диаметром 12 мм с защитным слоем «а» равным 30 мм. Диаметр нижней продольной арматуры сетки принят 25 мм. Монолитный бетон плиты принят класса В30 ($R_{bt2} = 1.1$ МПа). Железобетонные бруски имеют предварительное обжатие $\sigma_b = 4$ МПа.

Требуется определить несущую способность наклонного сечения плиты на восприятие поперечной силы.

Из уравнения (3) определяем минимальное значение поперечного усилия, воспринимаемого бетоном железобетонных брусков

$$Q_b^{\min} = 0.6(1.4 + 4)3 \times 15 \times 28.3(100) = 412.6 \text{ кН.}$$

Из уравнения (4) определяем минимальное значение поперечного усилия, воспринимаемого монолитным бетоном плиты

$$Q_b^{\min} = 0.6 \times 1.1(120 - 45)34.4(100) = 170,3 \text{ кН.}$$

Из уравнения (7) определяем значение поперечного усилия, воспринимаемое горизонтальной ненапрягаемой арматурой нижней сетки армирования плиты

$$Q_w^s = 10 \cdot 5 \times 4.909 = 245.45 \text{ кН.}$$

Тогда несущая способность сборно-монолитной плиты по наклонной трещине составит: 582.9 кН и 828.3 кН соответственно без учета и с учетом сопротивления изгибу продольной арматуры нижней сетки. Для неразрезной сборно-монолитной плиты толщиной 40 см, пролетами 24 м и с расчетной нагрузкой 40 кН/м² максимальное значение поперечной силы составит: $Q = 1.2 \times 40 \times 12 = 576$ кН. Как это видно, при наличии напряженных брусков в опорных сечениях, условие прочности выполняется с большим запасом, которое не выполняется в случае их отсутствия.

Заключение

Разработан инженерный метод расчета прочности монолитных плит перекрытий постоянного по высоте сечения, армированных сетками из

стержневой арматуры и предварительно-напряженными железобетонными брусками на действие поперечной силы для обеспечения прочности по наклонной трещине как без поперечной арматуры для плит толщиной до 40 см, так и с поперечной арматурой для монолитных плит толщиной более 40 см. Наличие сборных предварительно-напряженных железобетонных брусков из высокопрочного бетона в нижней зоне опорных сечений неразрезных монолитных плит перекрытий и пролетных строений мостов позволяет значительно увеличить несущую способность опорных сечений по прочности по наклонной трещине в 2 и более раза.

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New Properties of Determinants

Abstract: Additional research of the third range determinants with the help of computer experiment has been carried out. The regularities of the determinant distribution, composed of figures, depending on the size of determinants and numerical characteristics of these distributions have been determined. The new regularities and properties of the determinants are shown.

Keywords: determinant, computer experiment, Monte Carlo method.

1. Introduction

The concept of determinant and the related to it concept of matrix were introduced about 400 years ago. Dozens of outstanding scientists, from whom we can distinguish Leibniz, Kramer, Vandermonde, Gauss, Cauchy, Jacobi, Cayley, Sylvester, Kronecker, Weierstrass, have contributed greatly to the study of determinants and matrixes [1]. Now determinants are widely used in mathematics and physics: Vronsky's determinants, Jacobians transition from one coordinate system to another, etc. The last properties of determinants were established more than hundred years ago [2].

The emergence of computer facilities allowed approaching the problem of determinants and their properties from other point of view. In this article, distributions of the third order determinants, depending on the size of determinants S , are analyzed with the help of computer experiments.

2. The determinants with repeating figures

2.1. The exact calculation of numerical characteristics

In this part of researches, it was supposed that elements of determinant could be any figures from 1 to 9. The calculation of such determinants represents one of

the elementary tasks in the course of algebra and theories of numbers [3]. By means of combination theory, it is possible to count the number of all possible determinants of the third order – $N = 9^9 = 387420489$. For the analysis of statistical properties of determinants the following tasks were set: to find the quantity of the determinants which values are equal to zero (Δ); to find the value of maximum (S_{\max}) and minimum (S_{\min}) determinants; how many there are positive ($S+$) and negative ($S-$) determinants. To obtain determinants distribution depending on determinants values S and to find numerical characteristics of this distribution: arithmetic average (\bar{S}), average quadratic deviation (σ), asymmetry (A_s) and excess (E_k). It should be noted that analytically such task cannot be solved.

Answers to these questions have been obtained with the help of a computer experiment. Determinants, equal to zero, turned out to be $\Delta = 5902335$, or 1,5235%. The values of the maximum determinants were equal 1216. There were three maximum determinants, presented in table 1.

Table 1. Maximum determinants

1	9	9	9	1	9	9	9	1
9	1	9	9	9	1	1	9	9
9	9	1	1	9	9	9	1	9

There was an equal quantity of positive and negative determinants – 190759077 ($S_{\pm} / N = 0,49238252$). The analysis of the results of the computer experiments showed that, from minimum to the maximum values, determinants for several dozens of S values don't exist (in areas of the maximum and minimum values).

Statistical processing of the obtained data on formulas for the initial moments has been carried out. The numerical characteristics of distribution on the basis of these values have been obtained.

$$V_k = \sum_{i=1}^N S_i^k / N, \quad (1)$$

where N – the number of determinants, S_i – the value of i determinant [4]. The arithmetic average for this variation row is $\bar{S} = 0$, an average quadratic deviation is $\sigma = 147,571$, asymmetry of $A_s = 0$ and excess $E_k = 0,26606$. The additional visual

analysis of the obtained data showed the symmetry of the obtained distribution relatively to $S = 0$. The range of the frequencies is given in fig. 1. Its analysis shows that frequencies of determinants aren't monotonously increasing or decreasing functions.

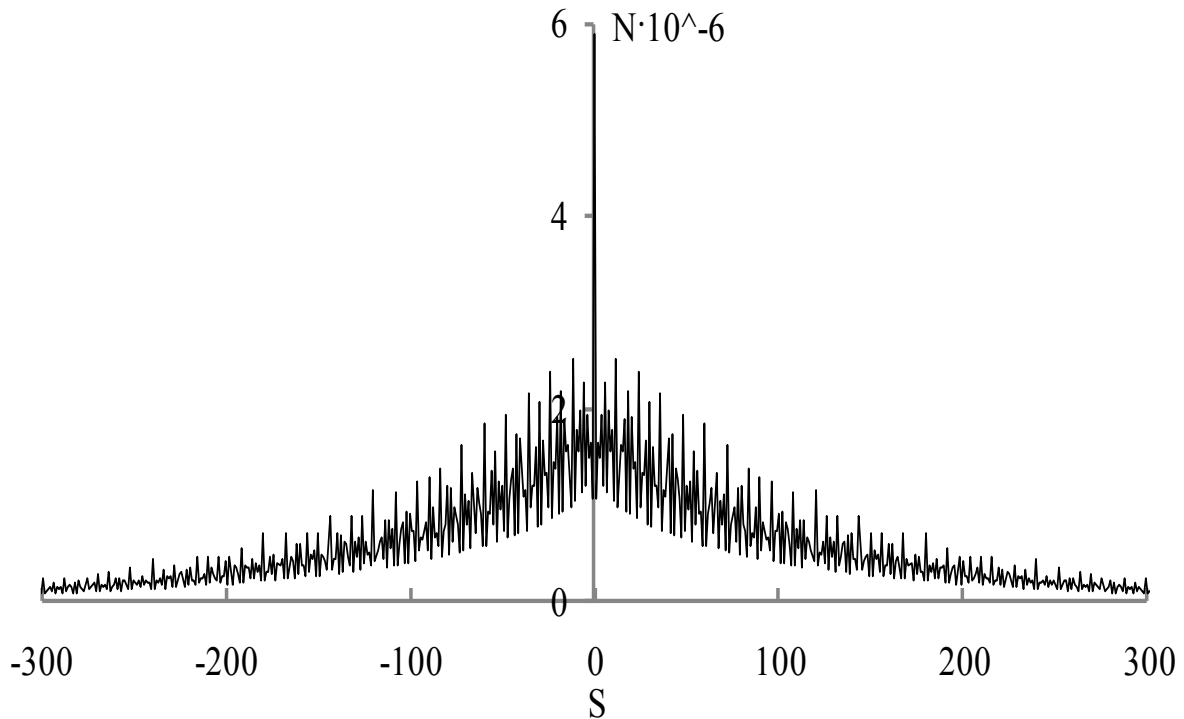


Fig. 1. The range of the frequencies

2.2. Calculation of numerical characteristics of distributions by means of the Monte Carlo method

For obtaining of determinants distribution depending on the values of determinants, the Monte Carlo method has been used. The necessity of using the Monte Carlo method is connected with that the research of determinants, even of the fourth order, requires time in billion times bigger than for determinants of the third order. The comparison of exact distribution with the distributions obtained by means of the Monte Carlo method for determinants of the third order, will allow us to understand which values are coordinated with each other well and which are not. For the analysis of accuracy of numerical characteristics, a series of computer experiments by the Monte Carlo method depending on number of played determinants N has been carried out. It should be noted that each experiment has been made only once.

In fig. 2, the rated polygons of frequencies of determinants distributions depending on the value of determinants are submitted. The distribution obtained by means of the Monte Carlo method for number of draws of $N = 100000$, practically doesn't differ from exact distribution. Even better distributions are obtained for big N since relative mistakes decrease.

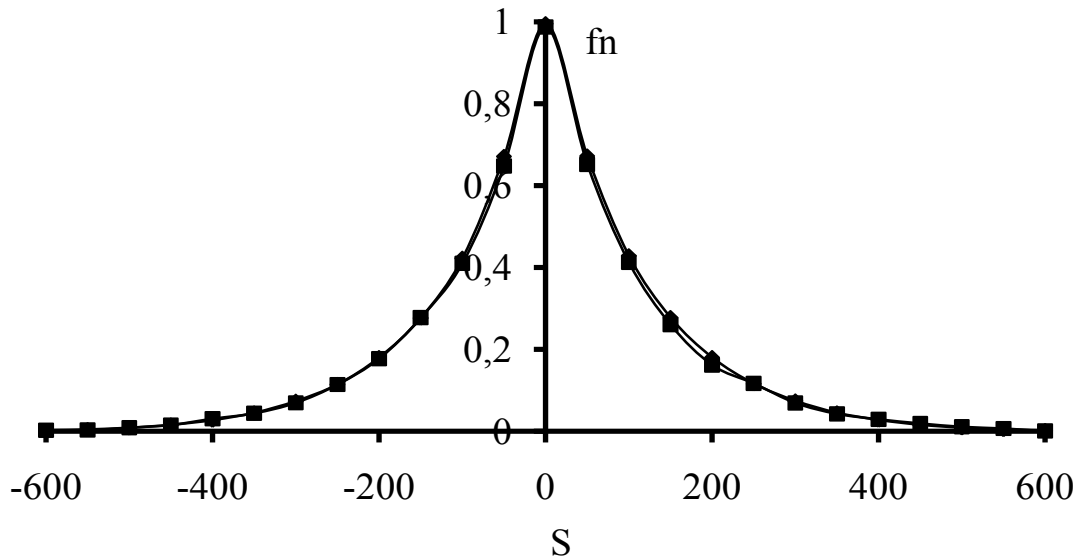


Fig. 2. Rated polygons of frequencies of determinants distributions values.

◆ – exact distribution, ■ – the distribution obtained by means of the Monte Carlo method for number of determinants $N = 100000$

The results of numerical characteristics of distribution determinants values calculations in dependence on the number of N tests are given in table 2.

Table 2. Dependences of the numerical characteristics on the number of N tests

N	10^4	10^5	10^6	10^7	10^8	10^9
$\Delta = 0$	0,016	0,01473	0,01523	0,01522	0,01523	0,01522
S_{\min}	-656	-782	-955	-1081	-1144	-1216
S_{\max}	777	928	946	1081	1144	1216
$S -$	4947	49315	492254	4925951	4924829	4924687
$S +$	4893	49212	492513	4921859	4922865	4923067
\bar{S}	-0,59210	-0,38219	-0,06337	-0,06150	-0,03729	-0,03024

σ	149,746	148,637	147,635	147,616	147,614	147,613
A_s	0,09710	0,01814	0,00851	0,00311	-0,00013	-0,00026
E_k	0,23178	0,25162	0,26408	0,26585	0,26552	0,26579

The analysis of the obtained data showed that some numerical characteristics (Δ , S^- , S^+ , σ , E_k), obtained by means of the Monte Carlo method, coincide with the exact values with a good accuracy even for rather small number of N tests. For obtaining other characteristics, the number of tests has to be more than the number of all possible determinants. The obtained exact values of distribution numerical characteristics can be used for testing of operation of random number generators.

3. Determinants with various figures

3.1. Exact calculation of numerical characteristics

In this part, the results of research, similar considered above but for the case of various values of elements, are given. In this case, the number of shifts from 9 elements (the number of all possible determinants of the third order) is $N = 9! = 362880$. Computer experiments which yielded the following exact results were made. There were 2736 ($\Delta / N = 0,75397\%$) determinants equal to zero. The values of the maximum determinants were 412. It was 36 such maximum determinants. The maximum determinants, obtained in exact calculations, are given in table 3.

Table 3. Maximum determinants

$\begin{vmatrix} 1 & 4 & 8 \\ 7 & 2 & 6 \\ 5 & 9 & 3 \end{vmatrix}$	$\begin{vmatrix} 5 & 9 & 3 \\ 1 & 4 & 8 \\ 7 & 2 & 6 \end{vmatrix}$	$\begin{vmatrix} 7 & 2 & 6 \\ 5 & 9 & 3 \\ 1 & 4 & 8 \end{vmatrix}$	$\begin{vmatrix} 3 & 9 & 5 \\ 6 & 2 & 7 \\ 8 & 4 & 1 \end{vmatrix}$	$\begin{vmatrix} 8 & 4 & 1 \\ 3 & 9 & 5 \\ 6 & 2 & 7 \end{vmatrix}$	$\begin{vmatrix} 6 & 2 & 7 \\ 8 & 4 & 1 \\ 3 & 9 & 5 \end{vmatrix}$	$\begin{vmatrix} 2 & 6 & 7 \\ 9 & 3 & 5 \\ 4 & 8 & 1 \end{vmatrix}$	$\begin{vmatrix} 4 & 8 & 1 \\ 2 & 6 & 7 \\ 9 & 3 & 5 \end{vmatrix}$	$\begin{vmatrix} 9 & 3 & 5 \\ 4 & 8 & 1 \\ 2 & 6 & 7 \end{vmatrix}$
$\begin{vmatrix} 1 & 8 & 4 \\ 5 & 3 & 9 \\ 7 & 6 & 2 \end{vmatrix}$	$\begin{vmatrix} 7 & 6 & 2 \\ 1 & 8 & 4 \\ 5 & 3 & 9 \end{vmatrix}$	$\begin{vmatrix} 5 & 3 & 9 \\ 7 & 6 & 2 \\ 1 & 8 & 4 \end{vmatrix}$	$\begin{vmatrix} 2 & 7 & 6 \\ 4 & 1 & 8 \\ 9 & 5 & 3 \end{vmatrix}$	$\begin{vmatrix} 9 & 5 & 3 \\ 2 & 7 & 6 \\ 4 & 1 & 8 \end{vmatrix}$	$\begin{vmatrix} 4 & 1 & 8 \\ 9 & 5 & 3 \\ 2 & 7 & 6 \end{vmatrix}$	$\begin{vmatrix} 3 & 5 & 9 \\ 8 & 1 & 4 \\ 6 & 7 & 2 \end{vmatrix}$	$\begin{vmatrix} 6 & 7 & 2 \\ 3 & 5 & 9 \\ 8 & 1 & 4 \end{vmatrix}$	$\begin{vmatrix} 8 & 1 & 4 \\ 6 & 7 & 2 \\ 3 & 5 & 9 \end{vmatrix}$
$\begin{vmatrix} 9 & 2 & 4 \\ 5 & 7 & 1 \\ 3 & 6 & 8 \end{vmatrix}$	$\begin{vmatrix} 3 & 6 & 8 \\ 9 & 2 & 4 \\ 5 & 7 & 1 \end{vmatrix}$	$\begin{vmatrix} 5 & 7 & 1 \\ 3 & 6 & 8 \\ 9 & 2 & 4 \end{vmatrix}$	$\begin{vmatrix} 8 & 6 & 3 \\ 1 & 7 & 5 \\ 4 & 2 & 9 \end{vmatrix}$	$\begin{vmatrix} 4 & 2 & 9 \\ 8 & 6 & 3 \\ 1 & 7 & 5 \end{vmatrix}$	$\begin{vmatrix} 1 & 7 & 5 \\ 4 & 2 & 9 \\ 8 & 6 & 3 \end{vmatrix}$	$\begin{vmatrix} 1 & 5 & 7 \\ 8 & 3 & 6 \\ 4 & 9 & 2 \end{vmatrix}$	$\begin{vmatrix} 4 & 9 & 2 \\ 1 & 5 & 7 \\ 8 & 3 & 6 \end{vmatrix}$	$\begin{vmatrix} 8 & 3 & 6 \\ 4 & 9 & 2 \\ 1 & 5 & 7 \end{vmatrix}$

2	9	4	7	5	1	6	3	8	9	4	2	5	1	7	3	8	6	7	1	5	2	4	9	6	8	3
6	3	8	2	9	4	7	5	1	3	8	6	9	4	2	5	1	7	6	8	3	7	1	5	2	4	9
7	5	1	6	3	8	2	9	4	5	1	7	3	8	6	9	4	2	2	4	9	6	8	3	7	1	5

There was an equal quantity 180072 of the positive (S+) and negative (S-) determinants. The additional visual analysis of the obtained data showed the symmetry of the received distribution to $S = 0$.

The analysis of results of computer experiments showed that determinants from minimum to maximum value for some values S don't exist. The range of frequencies is presented in fig. 3. The view of this range of frequencies is similar to the range of frequencies received for the case with repeating elements (figures). For exact distribution the following values have been obtained: the arithmetic average $\bar{S} = 0$, the average quadratic deviation is $\sigma = 154,8537$, asymmetry of $A_s = 0$ and excess $E_k = 0,274856$.

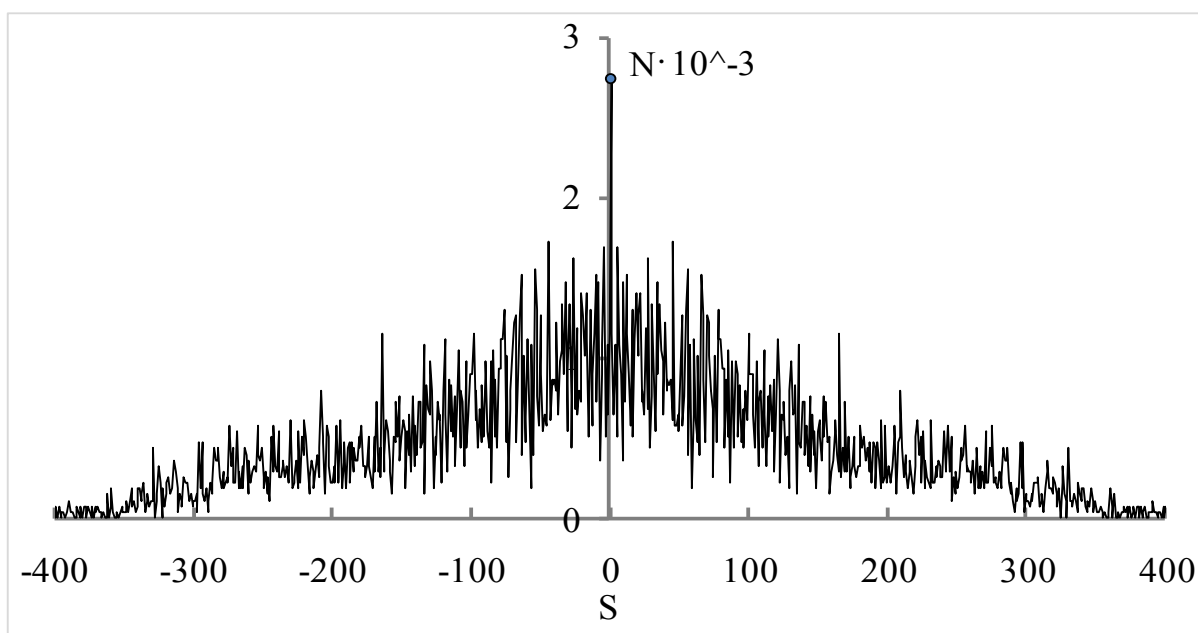


Fig. 3. The range of frequencies

3.2. The calculation of numerical characteristics of distributions by means of the Monte Carlo method

As in the previous case, a computer experiment for defining the numerical characteristics of this distribution has been carried out by means of the Monte Carlo method. In fig. 4, the rated polygon of frequencies of determinants distributions depending on the determinants values received for number of draws of $N = 937336$ is presented.

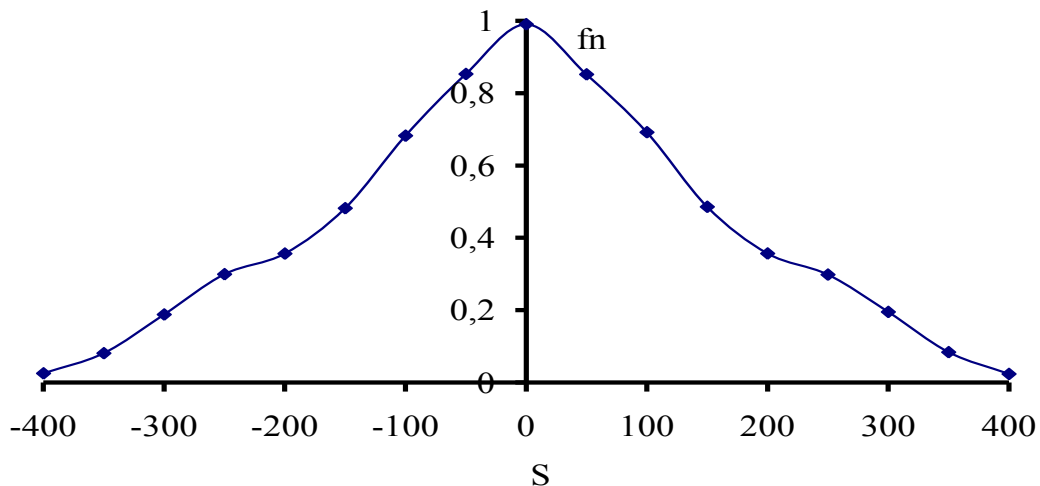


Fig. 4. The rated polygon of frequencies for $N = 937336$

In table 4, the results of calculations of numerical characteristics of distributions depending on the number of N draws are given.

Table 4. Dependences of numerical characteristics on the number of N tests

N	92	904	9303	93671	937336
$\Delta = 0$	0	10	91	701	7011
S_{\min}	-407	-407	-412	-412	-412
$S_{\max c}$	338	393	408	412	412
$S -$	47	478	4668	46562	465537
$S +$	45	416	4544	46408	464788
\bar{S}	-11,371	-8,1806	-1,2244	-0,0115	-0,0078
σ	153,88	155,11	154,89	154,99	154,85
A_s	-0,1367	0,0969	0,0071	-0,0012	-0,00024
E_k	0,1682	0,2768	0,2655	0,2778	0,2759

The analysis of the obtained results, given in fig. 1, 2, 3, 4 and in tables 2 and 4, showed that similar regularities, as in case of the elements consisting of repeating figures, and in case of the elements consisting of not repeating figures are traced.

4. Additional determinants properties

4.1. Property 1

The problem of searching determinants with the maximum and minimum values can be solved in a different way. It is possible to consider determinant S value as function from 9 independent variables a_{ij} . Having found private derivative of function S on these variables, and having equated them to zero, we will receive 9 algebraic equations. The solution of this equations system leads to system of 3 equations depending on 6 independent variables.

The analysis of these derivatives allowed us to determine the new consistent pattern connecting private derivative of determinant on the independent a_{ij} variable (a determinant element):

$$\frac{\partial S}{\partial a_{ij}} = A_{ij}, \quad (2)$$

i.e. such private derivative is equal to the corresponding algebraic addition of this element. This regularity is fair for determinants of any orders. The proof of this regularity is based on determinant decomposition on i line or j column. This element enters decomposition only once and is multiplied by algebraic addition which doesn't depend on this element.

Determinant S is a sum of integrals from algebraic additions on the a_{ij} elements

$$S = \sum_{j=1}^n \int_0^{a_{ij}} A_{ij} da_{ij}. \quad (3)$$

Definition. Derivative of determinant on an element is equal to algebraic addition of this element.

4.2. Property 2

The analysis of the maximum determinants, given in table 2, allowed us to determine one more consistent pattern. If the determinant is turned on 90° in the positive or negative direction, the sign of determinant will change on the opposite one:

$$\Delta = -\Delta \downarrow. \quad (4)$$

If to turn such determinant on 90° once again, the sign of determinant will change on the opposite sign, i.e. it will become the sign which the initial determinant had. The value of such determinant will be equal to the size of initial determinant. For example, the first determinant of the first line coincides in value with the fourth determinant of this line since their values are equal to 412. This property is fair for determinants of any orders with any elements. The proof comes easy and begins with determinants of the second order.

Definition. At determinant turn on the 90°, the sign of determinant changes on the opposite one.

4.3. Property 3

For determinants of the third order and above, the property connected with calculation of determinant value received as a result of the shift of two elements of determinant ($a_{ij} \leftrightarrow a_{ik}$ or $a_{ij} \leftrightarrow a_{kj}$) being in one line or in one column has been obtained. The value of the new determinant of S_n can be expressed through the values of these elements and their algebraic additions in the initial determinant:

$$S_n = S - (a_{ij} - a_{ik}) \cdot (A_{ij} - A_{ik}), \quad (5)$$

where S is the value of the initial determinant, A_{ij} , A_{ik} are the corresponding algebraic additions for the elements a_{ij} , a_{ik} .

For the value of new determinant of S_n received by replacement of two elements which are not in one line or a column the generalizing formula has been obtained.

$$S_n = S - (a_{ij} - a_{ik}) \cdot (A_{ij} - A_{ik}) - (-1)^{i+j+l+k} (a_{ij} - a_{ik})^2 \cdot M_{ij,ik}, \quad (6)$$

where $M_{ij,ik}$ is a minor of the second order/type. In case of determinant of the third order, it is equal to the a_{vr} element where the indexes v and r don't coincide with indexes of the rearranged elements. It is possible to enter concept of algebraic addition of the second order

$$A_{ij,ik} = (-1)^{i+j+k} M_{ij,ik} . \quad (7)$$

Definition. At mutual replacement of two elements, the value of the new determinant can be expressed through the value of the old determinant, the values of these elements and their algebraic additions.

The computer experiments, carried out for receiving determinants distribution of the third order, allowed us to obtain new unique information and regularities which difficult or cannot be obtained in the traditional approach.

The study of the determinants of the third order, executed by means of computer experiment, allowed us to obtain new information and regularities which can't be obtained at the traditional approach of determinants studying. The new regularities connected with distribution of determinants in value and shift of elements in determinant are established. The done work was useful not only from the pedagogical point of view, but also from the scientific one. The obtained results can be used in cryptography. Unfortunately, the same analysis for determinants of the fourth order on ordinary computers is impossible since volumes of calculations increase in some billion times.

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Technology of stuffings for flour confectionery with the improved microelement structure

Abstract: In article the technology of stuffings for flour confectionery is given. The chemical composition of raw materials and the maintenance of the main minerals (iron, zinc, iodine, selenium) in the developed stuffings is investigated. Expediency of use of powder of a tsistozira dried in technology of stuffings for prevention of the diseases connected with a lack of iodine of food allowances is proved.

Keywords: iodine, raspberry, pumpkin, bilberry, consistence, food.

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Технологія начинок для борошняних кондитерських виробів з покращеним мікроелементним складом

Анотація: В статті наведена технологія начинок для борошняних кондитерських виробів. Досліджено хімічний склад сировини та вміст основних мікроелементів (залізо, цинк, йод, селен) у розроблених начинках. Доведено доцільність використання порошку цистозіри сушеної в технології начинок з метою профілактики захворювань, пов'язаних із нестачею йоду в раціонах харчування.

Ключові слова: йод, малина, гарбуз, чорниця, консистенція, харчування.

Харчування є основним фактором у забезпеченні оптимального росту та розвитку організму людини, її працездатності, адаптації до шкідливої дії факторів навколишнього середовища. У процесі активного індустріального землекористування натуральні рослинні продукти помітно втратили свої споживні властивості й зараз не в змозі забезпечити потреби організму необхідним набором макро- і мікроелементів та вітамінів. Надмірна обробка їжі, збільшення термінів її зберігання внаслідок заморожування, консервації, ліофілізації, додавання хімічних інгредієнтів призводить до руйнування в продуктах багатьох біологічно активних речовин. Дефіцит у харчуванні вітамінів, тваринних білків, мінеральних речовин зумовлює зниження імунітету, інтелектуальних здібностей, розвитку остеопорозу, патології щитовидної залози, розвитку анемічних станів. Харчування сучасної людини характеризується скоріше великою масою, ніж різноманітністю [1].

Виходячи із вищенаведеного, залишається актуальною проблема пошуку біологічно цінних харчових речовин природного походження, створення на їхній основі окремих харчових продуктів функціонального призначення, які сприяють підвищенню стійкості організму до несприятливих чинників навколишнього середовища.

Одним із найефективніших заходів профілактики йоддефіцитних станів, полігіпомікроелементозів є використання в раціонах харчування спеціальних харчових продуктів та біологічно активних речовин із морськими водоростями та продуктами їх переробки. Одним із рішень цієї задачі є використання під час ви-

робництва страв, кулінарних і кондитерських виробів різноманітних фаршів (начинок).

За функціональними та технологічними ознаками начинки можна поділити на готові до наповнювання, гомогенні та гетерогенні, термостабільні для випікання разом із тістом і нетермостабільні. Начинки для борошняних кондитерських і хлібобулочних виробів різноманітні за хімічним складом. Розрізняють фруктові джеми, конфітюри, повидло, мармелад, варення і молочні начинки, крем вершковий та заварний, молоко згущене. Велика енергетична цінність начинок зумовлена вмістом простих вуглеводів, що в свою чергу впливає на зниження харчової та біологічної цінності.

Основною ознакою, яка об'єднує великий асортимент фаршевих мас в один вид продукції, є їх структура. Фарші представляють собою складну взаємопов'язану систему, в якій роль дисперсійного середовища виконує водний, частіше колоїдний розчин із розчиненими в ньому білками, ди- і полісахаридами, органічними кислотами, мінеральними та іншими речовинами, що переходять у розчин під час технологічної обробки із основного продукту та інших компонентів фаршів. Дисперсійне середовище завдяки міжмолекулярним зв'язкам, що утворюються у процесі обробки (в основному теплової) пов'язано з дисперсійною фазою – шматочками і частинками подрібнених продуктів фаршу. Внаслідок цих процесів утворюються білково-полісахаридні, ліпідні та інші комплекси, які створюють загальну структуру, що характеризується терміном «консистенція».

Поліпшенням структурно-механічних властивостей та нутрієнтного складу начинок для борошняних кондитерських виробів займаються розробники різних країн світу, в тому числі і в Україні. Науковці [2] довели доцільність використання гідроколоїдів, гуарової камеді спільно з модифікованим крохмалем, в плодово-ягідних начинках, а саме «Вишневий аромат», «Літній мікс», «Екзотик». Розроблені технології фруктових начинок на основі яблучно-чорносмородинового та яблучно-чорноплідногоповидла з додаванням залізовмісних добавок «Редгем» та «Калгем» [3].

Для поліпшення нутрієнтного складу начинок для борошняних кондитерських виробів, зокрема збивних, запропоновано технологію фруктових начинок із додаванням порошку цистозіри сушеної (ТУ У 23193636. 001 – 97).

Цистозіра має надзвичайно цінний хімічний склад, вміст золи у ній близько 20-30%, міститься 28 макро- та мікроелементів, у тому числі йод – 50 мг/100 г, селен – 20-25 мг/100 г. Загальний вміст вуглеводів у цистозірі близько 75% від сухої маси, з них – маніт складає 25%, альгінова кислота – 40-43%, загальна кількість полісахаридів – близько 55% від сухої речовини.

У роботі використані методи дослідження – органолептичні, фізико-хімічні; методи математичної обробки експериментальних даних на основі комп'ютерних технологій; повторність дослідів – п'ятикратна.

Вміст мінеральних речовин визначали атомно-абсорбційним методом на спектрофотометрі Techtron-AA-4 (Австрія).

Вміст йоду додатково визначали методом інверсійної вольтамперометрії (прилад АВА-3). Дослідження здійснюються за атестованими методиками виконання вимірювань, контроль якості проводиться на основі міжнародних стандартів якості та підтверджується порівняльними міжлабораторними випробуваннями [4].

Оскільки, при тепловій обробці або тривалому зберіганні страви кількість йоду втрачається від 20 до 80%, вважаємо за доцільне використовувати дієтичну добавку без застосування теплової обробки.

Начинки для борошняних кондитерських виробів готувалися із гарбуза, чорниці та малини. В плодах малини міститься дуже багато корисних для організму людини речовин: цукри (5-11%, фруктоза, сахароза і глюкоза), органічні кислоти (3%, в основному, яблучна, а також винна, лимонна, мурашина та ін.). Наявні також дубильні речовини (до 0,3%), клітковина (4,8-5,1%), пектин (0,6-0,9%), антоціани (160-280 мг%), лейкоантоціани (до 120 мг%), катехіни (до 70 мг%) і флавоноли (до 30 мг%). Малина багата на вітаміни, особливо вітамін С (30-70 мг%), а також Е, К₁, В₁, В₂, В₆, В₉ та мінеральні речовини, особливо залізо (2,0-3,5 мг/г), містяться також калій та магній, що необхідно для процесів кровотворення. Більш за все ягоди малини цінуються за високий вміст глюкози, яка необхідна для роботи серця та мозку, а також фруктози, що бере участь в обміні речовин. Ягоди малини містять леткі антибіотики, які мають антисептичну дію, тому ця ягода досить широко використовується для лікування різноманітних захворювань.

В ягодах чорниці містяться цукри (5-20%), органічні кислоти (близько 7%, в основному яблучна та лимонна), глікозиди, дубильні речовини (до 12%), а та-

кож у невеликих кількостях вітаміни С, В₁, В₂, Р, РР і каротин, багато пектинів та антоціанів. Ягоди чорниці володіють в'язучою, протизапальною, дезінфікуючою, кровоспинною дією; посилюють гостроту зору, зменшують втому очей.

Гарбуз є цінною харчовою та лікарською культурою. Плоди гарбуза дуже поживні та володіють цінними лікарськими властивостями. В них міститься багато цукрів (до 14%), вітамінів: С (від 10 до 40 мг%), каротину (від 1,5 до 17 мг%, в плодах з оранжевою м'якоттю його більше, ніж у моркві), В₁, В₂, РР, крохмаль (від 1,5 до 20%), багато пектину, невелика кількість клітковини. Крім того, в м'якоті гарбуза міститься велика кількість мінеральних солей (в основному калію, кальцію, заліза, міді та кобальту). Завдяки такому хімічному складу гарбуз має низку цілющих властивостей. Він володіє жовчогінною, загальнозміцнюючою, протизапальною, заспокійливою дією. Плоди гарбуза використовують для лікування багатьох захворювань, у тому числі печінки, нирок, шлунку; для профілактики хвороб серця та судин. Гарбуз дуже легко засвоюється, є низькокалорійним продуктом, тому його широко використовують у дієтичному харчуванні як дорослих, так й дітей.

Але всі вищезазначені плоди та ягоди містять невелику кількість йоду і селену. Тому з метою підвищення вмісту цих мікроелементів, було вирішено додавати до готових начинок цистозіру сушену у кількості 0,5% від маси начинки (відповідно масу основної сировини зменшували); добавку вводили у начинку після закінчення теплової обробки, аби зберегти максимальну кількість йоду та селену, оскільки ці мінеральні речовини швидко руйнуються під дією високих температур. Гарбуз попередньо запікали у жарильній шафі, потім подрібнювали до стану пюре; малину та чорницю подрібнювали в блендері, потім додавали суміш із яблучного соку та агару (змішували яблучний сік та агар і залишали на 10-15 хв., потім прогрівали суміш на мінімальному вогні, помішуючи, до розчинення агару; готову суміш злегка охолоджували) та збивали до однорідності.

Проведено аналіз хімічного складу розроблених начинок для борошняних кондитерських виробів (табл. 1).

Додавання цистозіри до начинок у кількості 0,5% до маси начинки дало позитивний результат, щодо покращення мінерального складу, зокрема появи йоду та селену, на що й були спрямовані проведені дослідження.

Таблиця 1

Вміст мікроелементів у начинках із використанням цистозіри, мкг/100 г

Найменування начинок	Показники			
	Залізо	Йод	Цинк	Селен
Начинка з чорниці (контроль)	1105,0±50,0	0,8±0,6	110,0±5,0	0,3±0,2
Начинка з чорниці з цистозірою	1260,0±60,0	235,0± 10,0	245,0± 12,0	75,0± 3,0
Начинка з малини (контроль)	1020,0±50,0	0,8±0,6	170,0±8,0	0,3±0,2
Начинка з малини з цистозірою	1175,0±50,0	235,0± 10,0	305,0± 15,0	75,0± 3,0
Начинка з гарбуза (контроль)	480,0±20,0	1,2±0,7	280,0± 14,0	0,4±0,2
Начинка з гарбуза з цистозірою	635,0±30,0	237,0± 12,0	415,0± 20,0	77,0± 3,0

Експериментально підтверджено, що якість дослідних зразків не поступається контрольним. Так, комплексні показники якості розроблених начинок значно перевищили показники якості контрольних зразків.

Результати досліджень свідчать, що підвищилася харчова та біологічна цінність у дослідних зразках, порівняно з контрольними. Завдяки додаванню порошку цистозіри до начинок можна впроваджувати нові борошняні кондитерські вироби функціонального призначення у харчуванні дорослих та дітей з метою профілактики захворювань, пов'язаних з нестачею йоду в раціонах харчування.

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Dynamic host configuration protocol and security evaluation of wireless network

Abstract: The paper handles issues of rogue dynamic host configuration protocol (DHCP) server that highly affects network resources during MCL. Introduces multi-frame signature-cum anomaly-based intrusion detection system (MSAIDS) that blocks an unlawful behavior of rogue DHCP server. The main goal of this paper is to present how to use NS2 simulation for designing wireless networks and using Cryptography algorithm as to security information.

Keywords: DHCP server, wireless network, security evaluation, network simulator.

INTRODUCTION

The rapid developments in information technologies (IT) have improvised the use of mobile devices in open, large scale and heterogeneous environments.

The mobile users are highly dependent on DHCP server for issuance of IP addresses. The DHCP server provides highly organized and useful administrative service to mobile devices.

The DHCP spoofing is another solution for detecting rogue DHCP server. Spooling method takes long time till attacker has enough time to capture the traffic and assign the wrong IP addresses.

This paper introduces MSAIDS approach supported with novel algorithms, inclusion of new rules in IDS and mathematical model to detect the malicious attacks.

Design of wireless Network uses NS2, as a base on Security evaluation, and describes the proposed model of the system and complete description of the Simulations and software program needed for implementing the Network. NS2 is a vital simulation tool for networks. Network simulators are names for series of discrete event network simulators and are heavily used in ad-hoc networking res.

PROPOSED SOLUTION (MULTI – FRAME SIGNATURE – CUM – ANOMALY BASED INTRUSION DETECTION SYSTEM)

With deployment of latest technologies, the need for automated tools has been increased to protect the information stored either on computers or flowing on networks. The generic idea to protect data and thwart the malicious attackers is computer security.

There are several forms of vulnerabilities and vigorous threats to expose the security of the systems. To take important security measures and enhancing the secure needs for organizations, several mechanisms are implemented.

Mechanisms also cause to invite the attackers to play with privacy and confidentiality of users. One of the major threats for privacy of data is intervention of rogue DHCP server (Fig. 1).

The first sign of problem associated with rogue DHCP server is discontinuation of network service. The static and portable devices start experiencing due to network issues. The issues are started by assigning the wrong IP address to requested clients to initiate the session. The malicious attackers take advantages of rogue DHCP server and sniff the traffic sent by legitimate users [1].

Rogue DHCP server spreads the wrong network parameters that create the bridge for attackers to expose confidentiality and privacy.

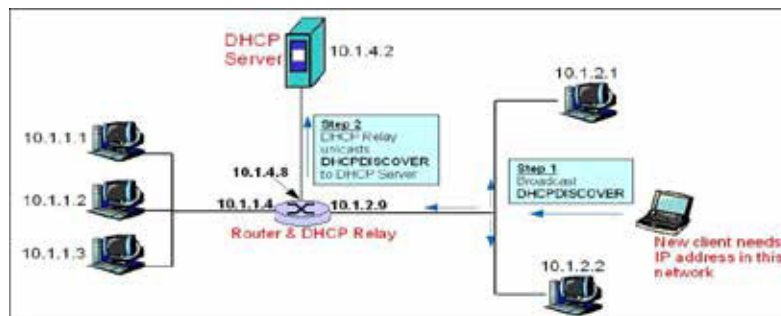


Fig. 1. Architecture Dynamic Host Configuration Protocol (DHCP)

Networks are being converged rapidly and thousands of heterogeneous devices are connected. The devices integrated in large networks, communicate through several types of protocols and technologies. This large scale heterogeneous environment invites intruders to expose the security of users. Many signature-based IDS (Intrusion Detection System) are available to detect the attacks but some of new attacks cannot be identified and controlled. Anomaly-based IDS is another option but it can only detect new patterns of attack. The multi-frame signature-cum anomaly-

based intrusion detection system (MSAIDS) supported with algorithms is proposed to resolve the issue of DHCP rogue. The proposed framework consists of detecting server (DS) that controls IDS and its related three units: (i) DHCP verifier unit (ii) signature database and (iii) anomaly database. The capturing process of DS consists of three cycles.

In the first capturing cycle, DS starts detection process on the base of algorithm 1. This algorithm supports three units of DS. Detection process starts from DHCP verifier, if any malicious activity is detected that stops the process otherwise other units starts capturing process until they continue search process whether malicious activity is detected or not. DHCP verifier determines fake process of issuance of IP address of rogue DHCP server on base of stored frame for DHCP server (FD). Signature of each legitimate DHCP server (D) is stored with FD in DHCP verifier. If $D \in FD$ then DHCP verifier does not produce any alarm if it does not match then it produces beep sound. So, verification process of DHCP server is completed [2].

In second cycle, signature database layer activates capturing process. Frame of known signatures (FS) is stored in signature based intrusion detection system. Here, $FS \subseteq SIDS$ that means all of FS must be stored in SIDS. Number & Types of attacks denotes with I. Therefore I must be $I \subseteq FS$. The signature matching process of 'I' starts until all of the FS is checked. If known attack matches, SIDS gives alarm of attack. In third cycle, anomaly database layer starts process for detecting unknown malicious activity. Frames of anomalies (FA) are stored in anomalies based IDS (AIDS). Hence, $FA \subseteq AIDS$. All attacks (I) are matched until I must be $I \subseteq FA$ in database. If 'I' match to any stored anomalies that AIDS creates alarm of attack. Therefore, process of three cycles finishes; if we get the message $I \notin FS \ \& \ I \notin FA$. It means there is malicious activity and communication is highly secured. This whole process increases the confidence level of users during synchronous and asynchronous communication, using MSCS.

Algorithm 1: Verify DHCP server and detecting the attack

1. Input: MF =(FD, FS,FA & I)
2. Output : For every strategy $I \in FA, I \in FS, D \in FD$
3. D = Each valid DHCP Server
4. IP= Internet protocol address
5. N= Number of mobile devices

6. FD= Frame DHCP server
7. If $D \in FD$
8. $IP \rightarrow N$
9. end if
10. S= Number of available signatures in signature based Intrusion detection system (SIDS)
11. FS= Frame of signatures
12. $FS \subseteq SIDS$
13. I= Number & Types of attacks
14. For ($I=S$; $I \leq FS$; $I++$)
15. If $I \subseteq FS$
16. SIDS attack alert
17. end if
18. end for
19. A= Number of signatures available in Anomaly based Intrusion detection system AIDS
20. FA= Frame of AIDS
21. $FA \subseteq AIDS$
22. For ($I=A$; $I \leq FA$; $I++$)
23. If $I \subseteq FA$
24. AIDS raises alert
25. If ($I \notin FS$ & $I \notin FA$)
26. No alert (No attack)
27. end if
28. end for

SIMULATION SETUP

This approach has been implemented using the network simulator ns2.34 RC3 on Redhat-9 Unix operating system. The scenario gives impression of realistic environment because attacker uses attacking data packets to capture the information of legitimate user. Total simulation time is 35 minutes. Attacks are generated using random function to be applied in [3].

ANALYSIS OF RESULT AND DISCUSSION

The implementation of MSAIDS is supported with sound architectural design that is robust and persistent when attack is detected. The efficiency of MSAIDS is calculated with following formula:

Here, overall efficiency = E_a ; Total generated signature based attacks = TSA;
Total anomaly based attacks =TAS;

Missed signature based attacks = MSA; Missed anomaly based attacks = MAA
& total generated attacks = TGA.

Thus, $E_a = (TSA + TAA) - MSA + MAA * 100 / TGA$.

One of the interesting factors of this research is to capture of different types of Dos attack and Probe attack. These types of attacks are hard to detect and capture.

SECURITY EVALUTION OF WIRELESS NETWORK BASED ON NS2

Network Wireless communication is used as a term for transmission of information from one place to another [4]. The widespread apprehension over network security is due to the connectivity of many. NS2 (Network Simulator version2): NS2 is a discrete event simulator targeted at networking research. It provides support for simulation of TCP, routing, and multicast protocols over all networks wireless. NS2 can be employed in most UNIX systems and windows. Most procedure processes of the NS2 code are written in C++. It uses TCL as its scripting language, Otcl adds object orientation to TCL.NS (version 2) is an object oriented, discrete event driven network simulator that is freely distributed and open source.

PROGRAMMING LANGUAGE IN NS2

The reason for having two programming languages from the aimis to have an easy to use, yet fast and powerful simulator. C++ forms an efficient class hierarchy core of ns-2 that takes care of handling packets, headers and algorithms. Object Tcl, or OTcl, is also an object oriented programming language utilized in ns-2 for network scenario creation, allowing fast modifications to scenario scripts. OTcl in ns-2 enables full control over simulation setup, configuration, and occasional actions. It is a language that compromise between speed and abstraction level offered to the user [5].

RC5 Algorithm

To design wireless network using RC5 algorithm to security of information, RC5 algorithm was developed as a parameterized symmetric encryption. RC5 parameters are: a variable block size (w), a variable number of rounds (r), and a variable key size (k). Allowable choices for the block size (w) are 32, 64 and 128 bits. The number of rounds range from 0 to 255 bits, and the key size range from 0 to 2040 bits in size. RC5 has three modules: key-expansion, encryption and decryption units.

Data-dependent rotation (RC5 incorporates rotations) whose amount is data dependent. The RC5 algorithm is designed to have the following objectives:

(1). Symmetric block cipher, (2). Suitable for hardware and software, (3). Fast, (4). Variable –length cryptography key(k) (0 -2040)bits, (5). Adaptable to processors of different word-length, (6). Variable number of rounds(r)(0-255), (7). Simple (8). High Security, (9). Low memory requirement's.

Simulation Scenario

Wireless network performance depends mainly on the end to end. This presented simulation scenario aimed at activating the network security through network throughput, packet transfer between nodes within the scenario by using cryptography algorithms; Simulator RC5 algorithm to cipher package information that transfer between nodes .

Simulation principles and strategies adopting the separated object model and using two languages C++ and tcINS2 fulfills the achievement of simulation for specific protocols and the configuration nodes and establishment of network simulation environment respectively.

Figure 9. Nam output showing nodes of wireless networks, Figure 10 refer to drop of packages when simulation finished.



Fig. 9. Nam output – Transmission



Fig. 10. Packets are dropped Security packets

CONCLUSION

The paper discusses MSCS and highlights all the malicious threats to be generated by DHCP rogue. To resolve this issue, second propose the technique that is based on novel algorithm that supports to capture both types of known and anomalies based attacks. To validate proposal, technique is simulated using ns2.

The wireless network is likely used because it is efficient especially in those areas that wiring is impossible compared to other networks. In this paper, the software tool Network Simulator, widely known as ns-2, is described and used for the simulation of selected illustrative examples of wireless networks. In general, ns2 provides users with a way of specifying network protocols and simulating their behavior. The result of the simulation are transfer information secure between nodes.

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Mathematical model of working agent distribution between gaslift wells

Abstract: In this article, gas lift performance curve and optimal distribution of working agent were showed with formulas and important explanations. Main purpose in this paper is to decrease economical loss of oil while mining fields.

Keywords: optimal; distribution; gaslift; wells.

Introduction

Broad spreading of gas lift way of oil extraction requires the improvement of the economic indexes of gas lift oil extraction objects. The optimization of gas lift wells working regimes as well as optimal distribution of working agent are an important problems of the specified direction. The investigations on gas lift performance curve are an integral part of the decision of these problems.

Problem statement

It's known that, the dependence of gas lift wells' debit from expense of working agent $Q_n = f(V)$ has external character (figure) [1]. Point A on the curve $Q_n = f(V)$ corresponds to the optimal (at mean of apportioned expense of working agent) and the point B to the maximal value of debit depending on available quantity of working agent in practice. The work regime of gas lift wells are established between point A and B.

In common staging the distribution problem be given quantity of working agents between gas lift wells connected to our gas – air distribution bodl (GADB) contain the supporting of working agent's expense for each well in interval between points A and B. In real stipulations because of order of reasons (well's repair, input of new wells, practical repair of gas lift equipment's), the situation of temporary unnefficuor surplees of working agent in appear.

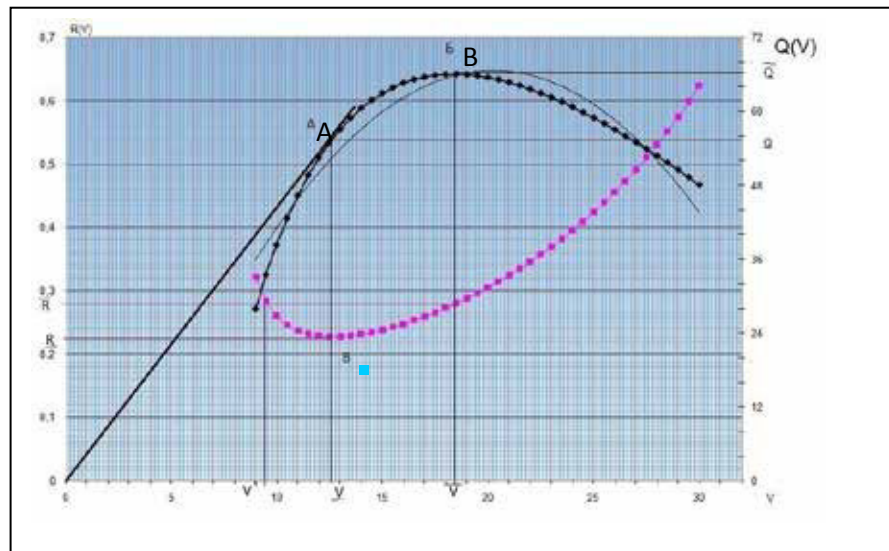


Figure 1. The dependence of gaslift wells' debit from expense of working agent

Coming from real situation it's necessary a distribution of working agents expense between wells in veer so that maximized the summary oil selection from this wells.

At present time in trades is restarted only with head on basic of experiment with discount of wells production and characteristic features, the decision about establishment of wells new regime is made.

In swelled time, depending on certain situation of optimal distribution of available common quantity of working agent between acting gas lift wells allow to the oil extraction and decrease the summary apportioned expense of working agent.

The solution of problem of the optimal working agent's expense distribution between gas lift wells is defined by following stages.

On the basic of gas lift well investigation data, i.e. gas lift well debit's value by oil Qn and corresponding value of working agent's expense, pressing to well V , the analytical expression of dependence $Qn = f(V)$ are defined.

Problem decision

From theory and practice of gas lift well exploitation is known, that the dependence $Qn = f(V)$ has the view of parabola with more sleep left and plane right brannels. In practice the working area of characteristics is assumed the left braude, where expense investing of working agent is souse to debits cur easing. Therefore it has possibility the substitution of $Q(V)$ by logarithmic parabola.

So dependence $Qn = f(V)$ may be represented in following view [2]:

$$Q = \beta_0 + \beta_1 \ln V + \beta_2 (\ln V)^2$$

Based on available several results point of gas lift well, by method of minimum squares, the value of the coefficients are counted.

One of the main parameters characterized the work regime of gas lift wells is the working agent's expense (R), which in this case is defined as follows:

$$R = V / [\beta_0 + \beta_1 \ln V + \beta_2 (\ln V)^2]$$

The work regime of gas lift wells at point B is corresponded to maximum debit and determined from condition $Q(V) = 0$, where $V=V$, i.e.

$$V = \exp(-\beta_1 / 2\beta_2)$$

$$Q = \beta_0 - \beta_1^2 / 4\beta_2^2$$

The optimal value of Q at given V , when is supplied maximum (minimum of apportioned expense of working agent), corresponds $tg \varphi + \varphi$ which attained maximum by V at point A , when stripped, connected. The beginning of coordinates with grapple $Q(V)$ has the maximum slope. Therefore, well's work regime at point A is defined by way of point solution of equation $Q = f(V)$ and tangent to this point, which has throle coordinates beginning:

$$V = \exp\left[1 - \frac{\beta_1}{2\beta_2} - \sqrt{\left(\frac{\beta_1}{2\beta_2}\right)^2 - \frac{\beta_1}{\beta_2} + 1}\right]$$

$$Q = 2\beta_2^2 + \sqrt{(\beta_1)^2 - 4\beta_0\beta_2 + 4\beta_2^2}$$

For distribution given gratuity of working agent between gas lift wells, it must be adduced the maximization of summary extraction of gas lift wells and performing of working agent's balance condition.

For this purpose is required to maximize the total oil extraction function:

$$F(V) = \sum_{i=1}^m \beta_{0i} + \beta_1 \ln V_i + \beta_2 (nV_i)^2$$

Subject to

$$\sum_{i=1}^m V_i = V_g ;$$

$$0 \leq V_i \leq V_i \leq V_i \quad i = \overline{1, m}$$

where

m - the quantity of gas lift wells

V_g - given quantity of working agent

Conclusion

Getting problem is referred to problem type of non-linear programming with non-linear objective function and linear conditions. The getting of precise solution of given problem in common view of present time is difficult.

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Strain ground surface during process the device of vaulted tunnels in a tight basis

Abstract: This article focuses on the definition of extreme internal power factors in monolithic reinforced concrete frames vaulted tunnels planned for the numerical experiment using modern software system «PLAXIS-8». Modern software package «PLAXIS-8» can be widely used in construction practice to solve plane problem (strain) contacting the soil environment of the extended frame construction - tunnel. However, the widespread and effective use is constrained by the relative complexity and cumbersome basic and preliminary calculations, the need to consider the numerical properties of hard soil base, the location of groundwater, shape and size of that structure.

Keywords: tunnel; factors; model; the natural rainfall; additional rainfall; total strain ground surface.

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Осідання поверхні землі в процесі облаштування склепінчастих тунелів в напруженій основі

Анотація: В статті приведені результати численного експеримента по изучению влияния размеров подземного сооружения, уровня подземных вод, типа грунтовых условий, величины распределенной нагрузки от свайно-плитного ростверка здания на величину осадок (сдвижений) поверхности земли над подземной выработкой, у ближнего и дальнего от нее углов рядом расположенного здания, а также статистические математические модели, характеризующие указанные осадки в большом диапазоне изменения исследуемых факторов.

Ключевые слова: тоннель, обделка, факторы, модель, естественные, дополнительные и общие осадки поверхности земли.

Актуальність теми. При будівництві підземної споруди - тунелю глибокого розташування в ґрунтах середньої міцності здійснюється виїмання ґрунту прохідницьким комбайном та влаштування, слідом за цим, оправи тунелю. Досвід показує, що площа поперечного перерізу тунелю, підкріпленого оправою, завжди є меншою від площі зробленої печери - виїмки в ґрунті. І хоча будівельниками приймаються заходи щодо заповнення цих шпарин, все ж не вдається уникнути перерозподілу напружень і деформацій ґрунту в ході його будівництва. З метою уникнення негативних наслідків, пошкоджень існуючих будівель і фундаментів на поверхні землі необхідно, з одного боку, визначати природні, додаткові і загальні осідання окремих її точок, прогнозувати ці ефекти і визначати внутрішні зусилля в оправах тунелів, а з іншого боку, приймати відповідні ефективні заходи. Такий аналіз може бути виконаний як аналітичними, так і чисельними методами, зокрема за допомогою програмного комплексу PLAXIS-8 [1, 2, 3]. Точні методи носять поки що досить умовний характер і потребують вдосконалення.

Мета публікації полягає у вивченні впливу конструктивних чинників та факторів зовнішнього впливу на величину осідань поверхні землі в процесі облаштування склепінчастих тунелів в ґрунтових умовах півдня України для подальшої їх оптимізації.

Ключові слова: склепінчастий тунель, оправа, загальні та додаткові осідання поверхні землі, математичні моделі.

Результати досліджень

Числові експерименти по дослідженню взаємодії ґрунтів основи пальових фундаментів та фундаментної плити будівлі зі склепінчастою оправою тунелів (рис. 1.) виконані із застосуванням математичної теорії планування експерименту, яка дозволяє теоретично обґрунтовано встановити мінімально необхідну кількість та склад числових експериментів для отримання достатньо повної інформації про якісний і кількісний вплив дослідних факторів на вихідні параметри як з окрема, так і при їх взаємодії, чого не можна домогтися при використанні традиційної методики.

На підставі аналізу наявної апріорної інформації з літературних джерел і з урахуванням реальних нашарувань ґрунтів основи південного регіону України в якості дослідних обрані фактори (табл. 1): номінальний проліт склепінчастої оправи тунелю (X_1), рівень підземних вод (початок координат (рис. 1) від денної поверхні ґрунту по осі Y , фактор X_2), наведений тип ґрунтових умов характерного для південного регіону України нашарування (X_3), який інтегрально ураховує вплив питомої ваги ґрунту (γ_{unsat} або γ_{sat}), коефіцієнтів горизонтальної (k_x) та вертикальної (k_y) фільтрації (проникності), модуля Юнга (деформацій, E_{ref}), коефіцієнта Пуассона (ν), зчеплення (c_{ref}), кута внутрішнього тертя (ϕ) і ділатансії ψ ґрунту, а також коефіцієнта його пружного відпоругі (K), що визначається за формулою:

$$T_{\text{red},j} = \sum_{i=1}^n (\gamma_{\text{sat},i} k_{x,i} k_{y,i} E_{\text{ref},i} \nu_i c_{\text{ref},i} \phi_i \psi_i K_i) h_i / \sum_{i=1}^n h_i, \quad (1)$$

де $\gamma_{\text{sat},i}$ - питома вага насиченого водою i -того шару ґрунту, що змінюється в межах 18,0...21,5 кН/м³;

$k_{x,i}$ - коефіцієнт горизонтальної проникності (фільтрації) i -того шару ґрунту, що змінюється в межах від 0,01 до 1,60 м на добу;

$k_{y,i}$ - коефіцієнт вертикальної проникності i -того шару ґрунту, що змінюється в межах 0,01...1,60 м на добу;

$E_{\text{ref},i}$ - модуль Юнга (деформацій) i -того шару ґрунту, що змінюється в межах від 1000 до 5000 кН/м²;

ν_i - коефіцієнт Пуассона i -того шару ґрунту, що змінюється в межах 0,26...0,38;

$C_{ref,i}$ - зчеплення i -того шару ґрунту, що змінюється в межах від 0,2 до 1400 кН/м²;

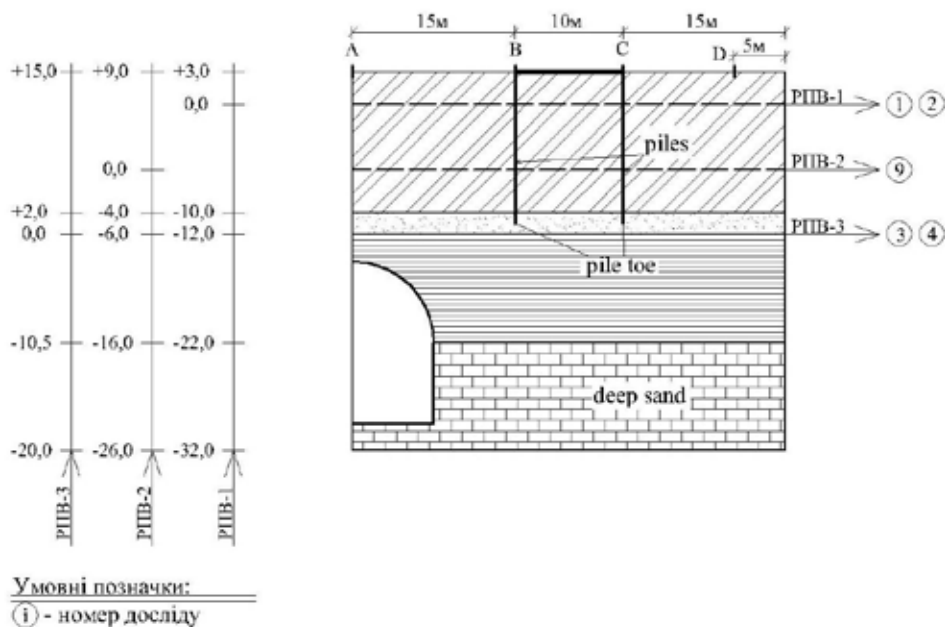


Рис. 1. Геометрія склепінчатого тунелю з номінальним прольотом 15 м, нашаруваннями ґрунтів та рівнями підземних вод для Одеського регіону в числовому експерименті

Характерний для південного регіону України розріз ґрунтового масиву свідчить про наявність чотирьох різних шарів. Верхній шар потужністю 13 м складається з лесового суглинку. Під ним залягає шар дрібнозернистого піску потужністю 2,0 м, у який, як у несучий шар, заглиблені палі старої будівлі - пам'ятки архітектури та містобудування. Зміщення і осідання цих паль можуть викликати пошкодження будівлі - пам'ятки, що є вкрай небажаним. Нижче піщаного шару залягає глибинний шар червоно-бурих суглинків і глин потужністю, відповідно, 5,0; 7,5 і 10,0 м. Це один із шарів, в якому споруджується тунель. Інша частина тунелю розташовується в глибинному шарі вапняку-черепашнику понтичного ярусу з включеннями перекристалізованого вапняку-черепашнику в покрівлі.

Цей нижній глибинний шар є досить жорстким. Тому тільки 5 м цього шару включені в скінчено-елементну модель. А нижня частина основи тунелю

розглядається як абсолютно жорстка і моделюється відповідними граничними умовами.

Розподіл порового тиску води. приймається гідростатичним. Рівень підземних вод може розташовуватися на 3,9 і 15 м нижче від поверхні землі (на позначці умовного нуля: $y = 0$).

Оскільки оправа тунелю і ґрунтові нашарування є більш-менш симетричними відносно вертикальної осі тунелю, то в даній моделі плоскої деформації враховуємо тільки одну (праву) половину оправи та ґрунтів основи. Від центру тунелю модель простягається на 30, 35 і 40 м в горизонтальному напрямку.

Таблиця 1. Дослідні фактори та рівні їх зміни

Фактори		Рівні зміни			Інтервал зміни
Натуральний вигляд	Кодований вид	«-1»	«0»	«+1»	
(1)	(2)	(3)	(4)	(5)	(6)
Проліт оправи тунелю, L , м	X_1	5	10	15	5м
Рівень підземних вод (початок координат від денної поверхні ґрунту), $T_{op,i}$, м	X_2	+15 ($T_{op,1}$; РПВ-3)	+9 ($T_{op,2}$; РПВ-2)	+3 ($T_{op,3}$; РПВ-1)	6м
Наведений тип ґрунтових умов, $T_{red,j}$, [кН ⁴ град ² /(М ⁷ добу ²)]	X_3	226000 ($T_{red,1}$)	435000 ($T_{red,2}$)	644000 ($T_{red,3}$)	209000 кН ⁴ град ² / (М ⁷ добу ²)

Аналіз математичних моделей екстремальних згинальних моментів, поперечних і поздовжніх сил в оправах склепінчастих тунелів з метою їх мінімізації

Відповідно до прийнятого плану в програмному комплексі PLAXIS-8 був реалізований числовий експеримент в 15-тьох основних дослідах (точках) і одному додатковому, 16-му, зі збільшеним в 4 рази навантаженням від розташованого на поверхні будівлі із заміною в ньому дерев'яних паль на залізобетонні без зміни їх кроку.

В результаті обробки отриманих в числовому експерименті даних, вилучення незначимих та перерахунку тих коефіцієнтів, що залишилися, за допомогою ефективною комп'ютерної програми COMPEX, розробленої під

керівництвом проф. Вознесенського В.А., отримані адекватні математичні моделі початкових, загальних та додаткових осідань (зрушень) поверхні землі над гірською виробкою (2, 6), під будівлею – пам'ятником архітектури (3, 4, 7, 8) та на віддалі 10 м від неї. Зокрема, загальні осідання поверхні землі у зазначених точках можна охарактеризувати за допомогою наступних виразів:

$$\hat{Y}(\sum y_A) = 101 + 36X_1 + 10X_2 - 5X_3 - 30X_1^2, \text{мм}, \quad v = 12\%; \quad (2)$$

$$\hat{Y}(\sum y_B) = 94 + 47X_1 + 21X_2 - 9X_3 - 7X_1^2 - 12X_2^2 + 8X_3^2 + 11X_1X_2 - 6X_1X_3, \text{мм}, \quad v = 12\%; \quad (3)$$

$$\hat{Y}(\sum y_C) = 21 + 41X_1 + 21X_2 - 8X_3 + 19X_1^2 + 9X_2^2 + 5X_3^2 + 18X_1X_2 - 6X_1X_3, \text{мм}, \quad v = 26\%; \quad (4)$$

$$\hat{Y}(\sum y_D) = 22 + 35X_1 + 12X_2 - 7X_3 + 28X_1^2 - 3X_2^2 - 7X_3^2 + 9X_1X_2 - 5X_1X_3, \text{мм}, \quad v = 21\%; \quad (5)$$

Додаткові осідання (зрушення) поверхні землі у цих же точках, зумовлені проходкою виробок під склепінчасті тунелі та їхнім оздобленням, можна представити наступними залежностями:

$$\hat{Y}(\Delta y_A) = 51 + 36X_1 + 6X_2 - 3X_1X_3, \text{мм}, \quad v = 6\%; \quad (6)$$

$$\hat{Y}(\Delta y_B) = 63 + 44X_1 + 26X_2 - 2X_3 + 6X_1^2 - 5X_2^2 - 2X_3^2 + 12X_1X_2 - 5X_1X_3, \text{мм}, \quad v = 12\%; \quad (7)$$

$$\hat{Y}(\Delta y_C) = 41 + 35X_1 + 26X_2 - 3X_3 + 20X_1X_2 - 5X_1X_3, \text{мм}, \quad v = 10\%; \quad (8)$$

$$\hat{Y}(\Delta y_D) = 26 + 22X_1 + 14X_2 - 2X_3 + 11X_1X_2 - 4X_1X_3 - 3X_2X_3, \text{мм}, \quad v = 9\%. \quad (9)$$

Геометрична інтерпретація наведених моделей може бути представлена на рис. 2, 3.

При середніх значеннях всіх дослідних факторів загальні осідання поверхні землі над гірською виробкою (т. А), біля ближнього (т. В) та дальнього (т. С) фасадів від неї, а також на відстані від нього (т. Д) складають, відповідно, 101 мм, 94 мм, 21 і 22 мм. При цьому, осідання всіх точок по відношенню до їх середніх значень збільшуються (рис. 3.1) по всьому фронту, відповідно, на 71, 100, 390 і 318% при збільшенні прольоту склепінчастих виробок. Аналогічний вплив на загальні осідання має рівень підземних вод. З його підвищенням від 15

до 3 м до денної поверхні осідання її точок по зазначеному профілю складають 20, 45, 200 і 109 мм. З погіршенням типу ґрунтових умов від $644 \cdot 10^3 \frac{\text{кН}^4 \cdot \text{град}^2}{\text{М}^7 \cdot \text{діб}^2}$ до $226 \cdot 10^3 \frac{\text{кН}^4 \cdot \text{град}^2}{\text{М}^7 \cdot \text{діб}^2}$ загальні осідання поверхні землі збільшуються на 10, 19, 76 і 64%. Більшість дослідних факторів мають нелінійний вплив на загальні осідання поверхні землі, а також взаємодіють між собою.

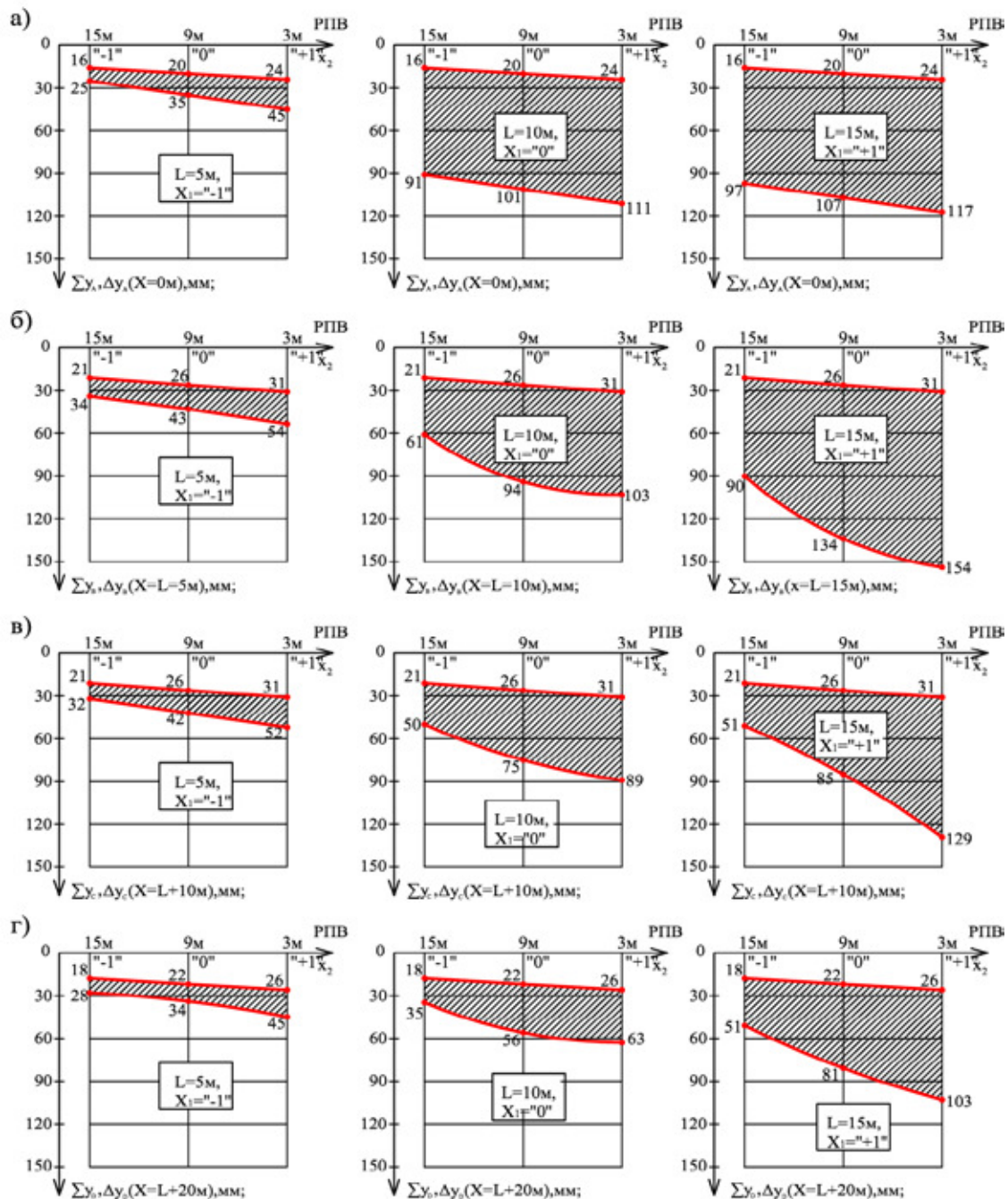


Рис. 2. Вплив прольоту склепіння, рівня підземних вод та ґрунтових умов на величину екстремальних значень згинальних моментів (а, б), поперечних сил (в, г) та стискаючих поздовжніх сил (д)

Залежність додаткових осідань (зрушень) поверхні землі (рис. 2) від зазначених факторів носить більш впорядкований характер. Зокрема, додаткові осідання поверхні землі над точками А, В, С, Д, зумовлені збільшенням прольотів підземних склепінчастих виробок від 5 до 15 м збільшуватимуться, відповідно, на 141, 140, 140 і 169%, при збільшенні рівня підземних вод від 15 до 3 м до поверхні землі на 24, 83, 127 на 108%, при погіршенні ґрунтових умов від $644 \cdot 10^3 \frac{\text{кН}^4 \cdot \text{град}^2}{\text{М}^7 \cdot \text{діб}^2}$ до $226 \cdot 10^3 \frac{\text{кН}^4 \cdot \text{град}^2}{\text{М}^7 \cdot \text{діб}^2}$ - від 6 до 15%, при одночасному збільшенні прольоту склепіння і рівня підземних вод до 90%, при одночасному збільшенні прольоту склепіння й погіршенні типу ґрунтових умов - на 12 - 24% по всьому профілю оптимізаційних задач, в яких використовуються достатньо математично обґрунтовані стохастичні залежності параметрів, що розглядаються, від зазначених дослідних факторів.

Збільшення рівня рівномірно розподіленого навантаження від розташованої праворуч від майбутнього тунелю будівлі в чотири рази (від $w=25$ до 100 кНм/м), дослід № 16 призведе до суттєвого збільшення загальних і додаткових (від 2 до 3 раз) осідань поверхні землі, обумовлених будівництвом склепінчастого тунелю.

Запропонована методика дозволяє досить швидко визначити основні та додаткові осідання поверхні землі без виконання громіздких розрахунків в ґрунтових умовах південного регіону України, а також спрогнозувати можливі негативні наслідки в процесі облаштування тунелів.

Висновки. Наведенні математичні моделі (2)...(9) зручно використовувати для оцінки впливу того чи іншого фактора як зокрема, так і у взаємодії один з одним на величину загальних та додаткових осідань (зрушень) поверхні землі в характерних точках, а також для вирішення.

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Impaired Fasting Glucose & 8-Iso-Prostaglandin F_{2α} in Diabetes Disease Progression

ABSTRACT

Aims: The objective of the present study was to evaluate the changes of 8-isoprostaglandin F_{2α} and other markers of oxidative stress with impaired fasting glucose when compared to non-diabetic control participants.

Methodology: This is a cross-sectional study, conducted at Charles Sturt University, Albury, NSW, Australia and included 428 participants (female: male, 247:181) participants attending the Diabetes Complications Clinic in the School of Community Health for the period between January 2011 to October 2012.

Results: Urinary 8-isoprostaglandin F_{2α} was significantly greater in the impaired fasting glucose group (1.4±1.3 ng/ml) compared to control group (0.68±0.5 ng/ml, *P*=.05). The increase in urinary 8-isoprostaglandin F_{2α} was associated with a significant elevation in serum total cholesterol (4.7±1.1 mol/L, *P*=.04) and a significant reduction in high density lipoprotein cholesterol (1.4±0.4 mmol/L, *P*=.02) in the impaired fasting glucose group compared to the control group. A significant negative correlation was noted between urinary 8-iso-prostaglandin F_{2α} and high-density lipoprotein cholesterol among all the participants included in this study (*P*= .05).

Conclusions: The current study proves the importance of measuring markers of oxidative stress, expressed by urinary 8-isoprostaglandin $F_{2\alpha}$ and serum lipids in managing cases of impaired fasting glucose and suggests a useful biomarker for assessing disease progression and/or remission, especially in the prediabetic state.

Keywords: oxidative stress; impaired fasting glucose; 8-isoprostaglandin $F_{2\alpha}$; serum lipids.

1. INTRODUCTION

Patients with diabetes mellitus type 2 (DMT2) have an impaired redox state, with impaired antioxidant activity primarily associated with the glutathione-glutathione disulfide (GSH: GSSG) redox, thioredoxin-1 and plasma cysteine / cysteine reactions [1-3] as hyperglycemia causes cellular oxidative stress, which through generating free radicals, leads to diabetes complications, some of which may already manifest in the impaired fasting glucose (IFG) stage [4,5]. Cardiovascular disease, as a complication of diabetes progression, develops as a result of transient or chronic hyperglycemia due to polyol pathway flux, formation of advanced glycation end products and over activity of the hexosamine pathway [6-8]. These pathophysiological changes are in turn linked with lipid peroxidation, oxidative stress, and inflammation seen in IFG and diabetes [9]. Lipid peroxidation is most often measured using malondialdehyde (MDA) and 8-iso-prostaglandin $F_{2\alpha}$ (8-iso-PGF $_{2\alpha}$) [10-12]. Oxidative stress can be determined by GSH and 8-hydroxy-2-deoxyguanosine (8-OHdG) assays [13-15]. GSH is a global antioxidant primarily located in erythrocytes, while 8-OHdG is correlated with endothelial DNA damage caused by oxidative stress.

Increased fasting blood glucose (FBG) and postprandial blood glucose (PBG) levels, glycated hemoglobin (HbA1c), low density lipoprotein-cholesterol (LDL-C) and triglycerides (TG) are associated with oxidative stress progression and diabetes complications. IFG can lead to atherosclerosis through glucose self-oxidation, protein oxidation and lipid peroxidation [16-20]. Progression of atherosclerosis in turn leads to an increase in 8-OHdG, interleukin-6 (IL-6), C-reactive protein (CRP), MDA and 8-iso-PGF $_{2\alpha}$ [12,14,21].

The pathophysiological imbalance between LDL-C, high density lipoprotein-cholesterol (HDL-C), triglycerides and blood glucose levels (BGL) are already present in the IFG state and increases the risk of coronary heart disease and

arrhythmia [13,22-25]. Impaired fasting glucose is a preclinical stage of diabetes characterized by intermittent or chronic increases in BGL above 5.5 mmol/L and below 7 mmol/L [26]. Increased levels of BGL and triglycerides have been shown to be associated with increased endothelial dysfunction and oxidative stress [27,28].

Isoprostanes are stable products of arachidonic acid peroxidation due to free radical activity and reliable biomarkers for oxidative stress, which are suitable for measures of lipid peroxidation in place of MDA [29]. Isoprostanes, including 8-iso-PGF_{2α} are stable in biological fluids and easily detectable as well as not being affected by diet and modulated by endogenous antioxidants [30]. Plasma levels of 8-iso-PGF_{2α} have been associated with atherosclerosis and coronary artery disease as well as DMT2 [31-33]. In contrast to cross-sectional studies where 8-iso-PGF_{2α} have been shown to be increased in type 2 diabetes, longitudinal studies have shown an inverse relationship between the level of 8-iso-PGF_{2α} and risk of diabetes independent of traditional risk factors [33,34]. This inverse relationship may occur due to either lower levels of HDL-C or HDL-C losing some of its antioxidant potential with increased blood glucose levels or hypertriglyceridemia affecting redox balance differently.

Multiple metabolic pathways are therefore associated with oxidative stress and the development of diabetes and its complications. Whether these changes are seen in impaired fasting glucose and the relationship between antioxidant activity cholesterol and isoprostane levels is not clear and this paper aims to elucidate some of this [35].

2. METHODOLOGY

Data for this study was obtained from patients attending the diabetes complications clinic at Charles Sturt University, Albury, NSW, Australia. All participants were recruited via public media announcements. Those with diabetes, cardiovascular or renal disease were excluded from the analysis. Twenty-five participants with IFG were included in this study. IFG was set between 5.5 mmol/L to 7 mmol/L in accordance with the American Diabetes Association [36]. Thirty-eight subjects were included in the control group. The research was approved by the Human Ethics in Research Committee, Charles Sturt University. Medications used by the participants are listed in (Table 1).

Table 1. Medications used by the participants in this study

	Control (n=38)	IFG (n=25)	P
Aspirin/clopidogrel	9	4	ns
Statins	8	14	.04
Antihypertensives	12	14	.006
Diuretics	3	4	ns

**ns-non significant*

After an overnight fast, whole blood specimens were collected into heparin and EDTA tubes for analysis. Plasma was separated within 1 hour by centrifugation at 1000 x g for 10 min. Plasma from heparin-containing tubes was immediately used for lipid analysis. Plasma from EDTA-containing tubes was kept at -80°C for serum 8-OHdG and GSH analysis. Fresh blood was kept on ice for not more than 1 hour to measure GSH. The level of erythrocyte reduced glutathione (GSH) was determined using the 5, 5-dithiobis-2-nitrobenzoic acid (DTNB) reaction [37]. 8-isoprostane was determined by a urinary Isoprostane ELISA Kit (Northwest, USA), which uses a competitive ELISA strategy, allowing the 8-isoprostane contained in samples and standards to compete with a 8-isoprostane-horseradish peroxidase conjugate for binding to a specific antibody pre-coated on a microplate. The blue colour development after addition of the horseradish peroxidase substrate is inversely proportional to the amount of 8-isoprostane in the samples and standards and changes to yellow after stopping the reaction with acid. Absorbance is measured at 450 nm. Urine 8-OHdG was measured using an EIA Kit, Cayman Chemical, MI, USA [38]. The test utilizes an anti-mouse IgG-coated plate and a tracer consisting of an 8-OHdG-enzyme conjugate, which detects all three oxidized guanine species; 8-hydroxy-2'-deoxyguanosine from DNA, 8-hydroxyguanosine from RNA and 8-hydroxyguanine from either DNA or RNA. This format has the advantage of providing low variability and increased sensitivity compared with assays that utilize an antigen coated plate and only detect 8-hydroxy-2'-deoxyguanosine. 8-iso-PGF_{2α} was also measured using an EIA Kit, Cayman Chemical, MI, USA.

Fasting plasma total cholesterol (TC), triglycerides (TG) and high-density lipoprotein cholesterol (HDL-C) were measured by standard techniques. TC and TG were determined with a commercial enzymatic kit. HDL-C was determined by immunoinhibition assay. Low-density lipoprotein cholesterol (LDL-C) was calculated according to the Friedewald formula [39].

Statistical analysis: The data was analyzed using SPSS (Version 14) and Microsoft Excel (Office 2007, Microsoft). All values were expressed as mean \pm standard deviation (M \pm SD). Statistical analysis was performed using an independent sample t-test. In all tests, $P < .05$ was considered to be statistically significant. Power analysis was performed for a median effect size and high power, providing a sample number of 27 with a p value of 0.05.

3. RESULTS

During the screening period of January 2011 to October 2012, 428 participants (female: male, 247:181) attended the diabetes screening clinic. After exclusions, 25 participants were identified with an impaired fasting blood glucose levels (IFG) in the range defined by the American College of Endocrinology [36] and 38 participants had no IFG/diabetes. Table 2 shows the demographics and biomarker results of the study.

The blood glucose level (BGL) was significantly different between the two groups as expected with a near statistically significant rise in HbA1c in the IFG group ($P = .052$). 8-iso-PGF_{2 α} was significantly elevated in the IFG group ($P = .02$) (Fig. 1). Both total cholesterol and HDL-C were significantly lower in the IFG group, while triglycerides and LDL-C showed no difference between the groups (Table 2).

Table 2. Demographics and biomarkers of the study population

Parameters	Control(38)	IFG(25)	P value
Age (yrs)	64 \pm 11	65.4 \pm 9	ns
Male/Female ratio	17/21	11/14	ns
BGL (mmol/L)	4.9 \pm 0.5	6.3 \pm 0.4	.001
HbA1c (%)	5.7 \pm 0.7	6.2 \pm 0.6	ns (.052)
BMI (kg/m ²)	25.7 \pm 4.4	26.4 \pm 5	ns
TC (mmol/L)	5.4 \pm 0.9	4.7 \pm 1.1	.04
Triglycerides (mmol/L)	1.2 \pm 0.6	1.3 \pm 0.7	ns
HDL-C (mmol/L)	1.7 \pm 0.5	1.4 \pm 0.4	.02
LDL-C (mmol/L)	3.1 \pm 0.8	2.6 \pm 0.9	ns
TC/HDL-C	3.3 \pm 0.9	3.5 \pm 1	ns
8-OHdG (ng/ml)	119.3 \pm 81.2	132.6 \pm 108.5	ns
GSH (mg/100 ml)	68.4 \pm 16.2	58.9 \pm 21.5	ns
GSSG (mg/100 ml)	28.9 \pm 17.9	21.6 \pm 8.9	ns
GSH:GSSG	6.6 \pm 4.4	6.1 \pm 3.2	ns
8-iso-PGF _{2α} (ng/ml)	0.68 \pm 0.5	1.4 \pm 1.3	.02
AIP	-0.18 \pm 0.3	-0.09 \pm 0.27	ns

*ns-non significant

The atherogenic index of plasma (AIP), which reflects the balance between atherogenic and protective lipoproteins, was in the normal range for both groups suggesting a low risk of CVD. Oxidative stress measured by 8-OHdG was elevated with redox balance (GSH: GSSG) reduced but neither reached significance (Table 2).

Pearson correlation analysis showed a significant negative correlation between 8-iso-PGF_{2α} & HDL-C (Table 3). This correlation wasn't significant with other parameters of this study (Table 3).

Table 3. Pearson correlation between significant markers found in this study

Parameters	HDL (mmol/L)	Isoprostane (ng/ml)	HbA1c (%)
Isoprostane (ng/ml)	-0.4(0.002)*		
HbA1c (%)	-0.27(0.07)	0.2(0.15)	
TC (mmol/L)	0.4(0.001)	-0.4(0.001)	-0.16(0.25)

*Pearson Correlation Coefficient (*P* value < .05)

No significant difference in 8-iso-PGF_{2α} was observed when statin use was considered in the analysis (Fig. 1).

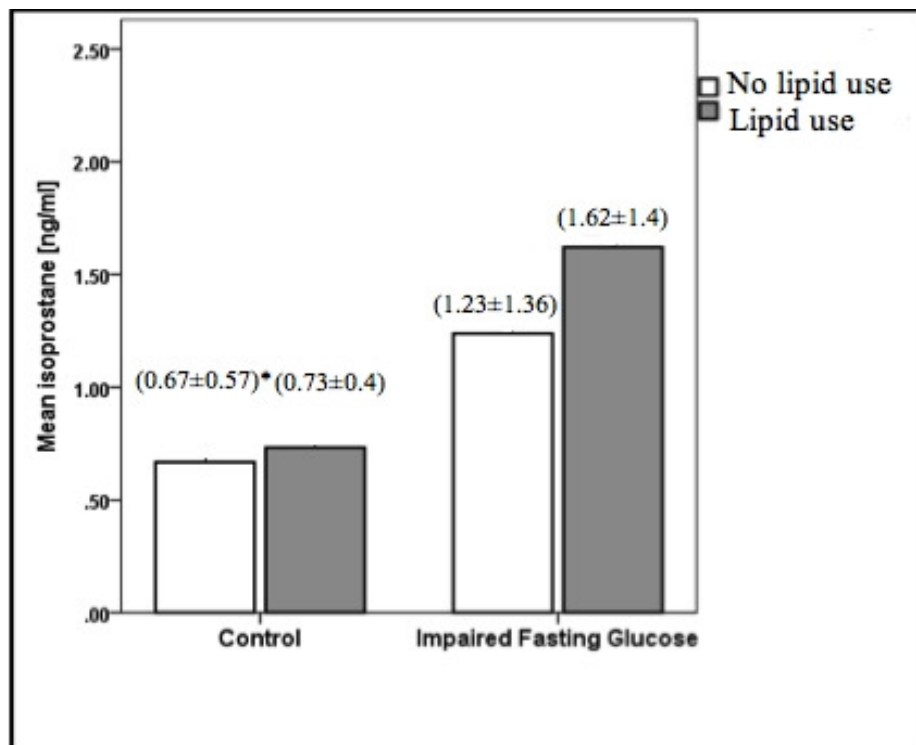


Fig. 1. The mean values of 8-iso-PGF_{2α} in both the control group and the IFG group with and without the use of lipid lowering medication

4. DISCUSSION

Our data demonstrates a significant increase in 8-iso-PGF_{2α} in the IFG group, which means that lipid peroxidation is definitely present during the IFG stage and supports Gopaul, et al.'s findings that 8-iso-PGF_{2α} was increased following an oral glucose tolerance test in individuals with no diabetes but with either IFG or impaired glucose tolerance [40]. These authors suggested that oxidative stress identified by elevated 8-iso-PGF_{2α} levels precedes glucose intolerance and insulin resistance. However other studies argue for no direct causal link between 8-iso-PGF_{2α} and a decrease in insulin sensitivity [41]. This indicates the presence of other oxidative stress associated pathways and the necessity to identify these to better understand disease progression even into the preclinical domain. Changes in serum lipids in type 2 diabetes have also been demonstrated in the IFG stage and are associated with oxidation of arachidonic acid to 8-iso-PGF_{2α} [42,43,37]. In our current study there was a significant reduction in both total cholesterol and HDL-C, which explains the increased 8-iso-PGF_{2α} as HDL-C carries 8-iso-PGF_{2α} [11]. Of importance is that no significant change in serum lipids in response to the statin use was noted. This may be related to the fact that LDL-C does not play a major role in diabetes disease progression. Furthermore, the type of statin medication used may possess variable effects on lipid peroxidation and oxidative stress and hence variation in the levels of 8-iso-PGF_{2α} [22,44].

The increase in 8-iso-PGF_{2α} shown in the current research is associated with a non-significant decrease in GSH and GSSG with a concomitant increase in 8-OHdG. The decrease in GSH suggests that the intracellular erythrocyte pool is depleting due to its role in the detoxification of aldehydes associated with lipid peroxidation [45] but in our study it has not reached a significant value.

It is worth mentioning here that IFG forms approximately 15% of the patients newly diagnosed with high blood glucose and is confirmed by either impaired fasting glucose or impaired glucose tolerance [46]. IFG can be viewed as a multifactorial disease with increased risk of developing diabetes mellitus and its complications. Therefore the etiology of IFG needs to be carefully determined with reference to the multiple biochemical pathways associated with hyperglycemia and associated oxidative stress and inflammation.

5. CONCLUSION

The current study illustrates that lipid peroxidation, expressed by urinary 8-iso-prostaglandin $F_{2\alpha}$, is already present in IFG. In addition, oxidative DNA damage and impaired antioxidants, which may be associated with endothelial dysfunction may be present at this stage as demonstrated by the increased 8-OHdG and decreased GSH levels. These findings provide a useful way of assessing disease progression and/or remission in response to the treatment.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this study.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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Acinetobacter Species Associated with Spontaneous Preterm Birth and Histological Chorioamnionitis

ABSTRACT

Aim: Preterm birth is a complex and unresolved public health problem across the globe. Infection is a factor for which a causal link has been established with preterm birth. A better understanding of its aetiology is required to improve obstetric and neonatal care. The case highlights the limitations of current obstetric hospital microbiology tests, and contributes to the knowledge of bacterial pathogens in the female genital tract associated with preterm birth.

Case Presentation: A woman presented with no signs of infection and spontaneously delivered preterm at 34 weeks gestation. Culture-based microbiological results from blood samples and swabs of mother and child were negative. Postpartum histopathology of the placenta demonstrated chorioamnionitis, and vasculitis of the umbilical cord. Cultivation-independent PCR analyses showed a massive *Acinetobacter* spp. infection.

Conclusion: Cultivation-independent PCR analyses may detect potentially pathogenic species when standard culture-based techniques are negative. The frequency of *Acinetobacter* spp. infections during pregnancy and in neonatal units manifests the need to develop appropriate diagnostic methods that can become standard practice in hospitals and clinics.

Keywords: *acinetobacter*; infection; pregnancy; preterm birth.

1. INTRODUCTION

Preterm birth (PTB) is associated with perinatal mortality contributing to more than two-thirds of all perinatal deaths. Premature delivery is the second largest direct cause of child deaths in children younger than 5 years [1], a major cause of perinatal mortality and serious neonatal morbidity, and moderate to severe childhood disability in developed and under developed countries [1]. It places a burden on society owing to its potential impact on families, health care services and education systems.

Preterm birth may occur owing to maternal or fetal disease leading to induction of labour or elective Caesarean section prior to 37 weeks gestation [2]. Also, it may occur spontaneously or as a result of prelabour preterm prolonged rupture of membranes [2]. Other risk factors of PTB include smoking, multiple pregnancy, especially in association with IVF, viruses and various types infections [2-5]. The aetiology of PTB is multifactorial, but a leading cause of spontaneous PTB is infection resulting from bacterial invasion of the amniotic cavity [2].

The gold standard for identification of intra-uterine infection has been the isolation of microbes from the amniotic fluid using culture-based techniques. However, investigations of the intra-uterine flora of women giving birth preterm based on non-cultivation PCR analyses have demonstrated the presence of pathogenic microflora belonging to more than 50 bacterial genera even in situations without any signs of infection [6]. A case is presented of an *Acinetobacter* spp. associated with spontaneous PTB and histological chorioamnionitis that underlines the need to consider new methods to detect infections during pregnancy.

2. PRESENTATION OF THE CASE

A 38-year-old woman (gravida 2 para 1) presented at 34 weeks gestation to the birth suite in spontaneous preterm labour. She had been diagnosed with gestational diabetes mellitus (GDM) following a 75 g glucose load at 28 weeks gestation and required treatment with diet and insulin 10 unit prophane nocte. Otherwise, the pregnancy had been uncomplicated with no evidence of fetal macrosomia. The woman's prior pregnancy was uncomplicated with a vacuum delivery of a term male infant of 3720 g. On history, the patient reported onset of contractions four hours earlier and had presented because the contractions increased in strength and duration. There was no history of bleeding, fever or ruptured membranes. On examination she appeared well,

was afebrile, and contracting 4 times every 10 minutes, with contractions lasting 40 s. Abdominal palpation demonstrated a non-tender abdomen with a singleton pregnancy of longitudinal lie, cephalic presentation and left occipito-anterior position. The fetal heart rate was 142. The fetal cardiotocograph trace was normal. Vaginal examination demonstrated cervical dilation of 5 cm, intact membranes, station minus 1, and confirmed the abdominal palpation of the fetal position. A diagnosis of preterm labour was made based on established criteria [7,8]. A swab was collected from the vagina as well as a urine sample, and both were sent for microscopy and culture. She was commenced on amoxicillin as antibiotic prophylaxis for Group B Streptococcus as her status was unknown and per hospital policy. She rapidly proceeded to full dilation, spiking a single temperature of 38.8°C. Her antibiotic regimen was broadened to cover Gram-negative organisms with cefazolin 1 g daily, Flagyl 500 mg bd and Gentamicin 120 mg bd as intravenous bolus doses. Rapidly, she proceeded to vaginal delivery of a female infant that weighed 2250 g. Third stage was normal. The mother had no further episodes of fever in her hospital course. The baby was admitted to the level 2 nursery for airway support, and 6 h after birth developed a temperature of 38.6°C. Following blood cultures and swabs, the baby was commenced on broad spectrum antibiotic therapy. The temperature settled over the next 48 h. Blood cultures and swabs from the baby and from the mother's vagina during labour were subsequently reported as negative, including specific testing for Group B Streptococcus. Histopathology of the placenta demonstrated features consistent with moderately severe histological chorioamnionitis, with dense infiltration of the chorionic plate and subamniotic tissues by neutrophils. There was evidence of vasculitis of the umbilical cord but no funisitis was noted. At 6-week and 3-month reviews mother and baby were doing well. The baby had no apparent abnormalities and displayed normal milestones.

DNA extraction from a second vaginal swab was performed using the QIAamp DNA Mini Kit (Qiagen) according to the manufacturer's instructions. The concentration and quality of DNA was measured using a Nanodrop ND-1000 Spectrophotometer (Nanodrop Technologies; Wilmington, USA). The microbial community was assessed by high-throughput sequencing of the 16S rDNA gene utilising a Roche 454 FLX instrument with Titanium reagents. Tagencoded amplicon pyrosequencing analyses were performed at the Research and Testing Laboratory (Lubbock, TX, USA) based upon established and validated protocols. The

sequence data derived from the high-throughput sequencing process was analysed employing a pipeline developed at the same laboratory.

Microbiome analyses returned that the patient had a substantial *Acinetobacter* spp. infection, including a significant content of *A. septicus*, and negligible presence of other bacteria, including normal flora. *Acinetobacter* spp. infection is undetectable by current standard hospital diagnosis methods.

3. CONCLUSION

In the last three decades *Acinetobacter* spp. have emerged as important pathogens in nosocomial infections [9]; in particular, as pathogens involved in intra-amniotic infections during pregnancy and in neonatal intensive care units. A number of reports have linked various *Acinetobacter* spp. with adverse pregnancy outcomes and serious neonatal infections [10-12], including three cases of stillbirth in which the mothers had severe *A. septicus* infections [13].

Problems posed by *Acinetobacter* spp. are the multifactorial nature of their virulence [11] and their ability to develop mechanisms of resistance that have resulted in the emergence of multi-drug resistance strains to most commercially available antibiotics [9]; these factors can cause substantial infant morbidity and mortality in untreated infections [14].

In the present case the woman had a number of risk factors for PTB apart from intrauterine infection. These included an age of 38 years and GDM; nonetheless, she had a previous term delivery. A recent systematic review found that older maternal age was associated with preterm birth, but the authors concluded there was insufficient evidence to determine if age was an independent and direct risk factor for PTB, or a risk marker that exerted its influence on gestational age through its association with age-dependent confounders [15]. Gestational diabetes mellitus is a risk factor for iatrogenic preterm birth, but is a higher risk when diagnosed prior to 24 weeks [16], suggesting that a pre-existing or type 2 diabetic state may exist. In the present case, the diagnosis was made at 28 weeks, and insulin was required in management, but the factor responsible for preterm birth was the intrauterine infection.

Notwithstanding the evidence, knowledge of bacterial invasion of the amniotic cavity is at present insufficient to develop effective prevention of infection-related PTB and other morbidities. Cultivation-independent studies to identify and charac-

terize the bacteria that cause intra-amniotic infections associated with histological chorioamnionitis and spontaneous PTB will reveal species that warrant further investigations to elucidate their clinically relevant traits such as virulence mechanisms, evasion of the host immune system, and antimicrobial susceptibilities. This knowledge, in conjunction with the application of improved microbial detection methods in the clinical setting will facilitate the development of new prevention, diagnosis and treatment strategies.

CONSENT AND ETHICS APPROVAL

The patient consented to a swab for microbial analyses, and to use of results in a deidentified format for research purposes. The work received Ethics approval from the University of Notre Dame Australia Human Research Ethics Committee, registration number 010120S.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Hosting the Unwanted: Stethoscope Contamination Threat

ABSTRACT

Aims: Stethoscopes represent a vehicle of bacteria and other microorganisms and may play a role in the spread of health-care associated infections (HAIs). We aimed to evaluate the contamination levels of stethoscopes before and after use of a disinfecting technique (DT).

Study Design: Matched cross-over study.

Place and Duration of Study: The study was conducted in July 2012 and involved three hospitals in Siena Province (Italy). Two were public hospitals with about 750 and 140 beds, and the other was private with 40 beds.

Methodology: We evaluated: i) contamination on 74 shared and non shared stethoscopes; ii) bacterial load before and after use of a DT. Total bacterial count (TBC) at 36°C and 22°C, *Staphylococcus spp.*, molds, *Enterococcus spp.*, *Pseudo-monas spp.*, *Escherichia coli* and total coliforms bacteria were evaluated. Mann Whitney and Wilcoxon tests were used for comparisons ($p < 0.05$).

Results: Before DT, 49 stethoscopes were positive for TBC at 36°C, 48 for TBC at 22°C, 40 for *Staphylococcus spp.*, 18 for methicillin-resistant *Staphylococcus aureus*, 33 for coliforms (9 for *Escherichia coli*), 5 for *Enterococcus spp.* and 2 for molds. After cleaning, the percentage reduction in CFUs was close at 100% in most comparisons. Shared stethoscopes proved to be less contaminated than non shared ones ($p < 0.05$).

Conclusion: Our results suggest that stethoscopes may be potential vehicles of HAIs. The DT was effective in reducing bacterial contamination.

Keywords: stethoscope; health care-associated infections; hospital, medical devices; hygiene.

ABBREVIATIONS

HAI: Health-care associated infections; DT: Disinfecting technique; TBC: Total bacterial count; CFU: Colony forming unit; MRSA: Methicillin-resistant Staphylococcus Aureus.

1. INTRODUCTION

Health care-associated infections (HAIs), also referred to as "nosocomial" or "hospital" infections, are contracted in hospitals or other health care facilities without being present or incubating at the time of admission. They can affect patients in any type of care setting and can also appear after discharge. HAIs are the most frequent adverse event of health care [1]. Hospital infections may be caused by any agent, including bacteria, fungi and viruses, as well as other less common types of pathogens. They represent a significant cause of morbidity and mortality and may increase health care costs [2,3]. Most involve the urinary tract, bloodstream, surgical sites and respiratory tract. They are also a considerable problem for certain categories of patients, such as those with immune deficiency or suppression, intensive care patients, chemotherapy patients, recipients of organ transplants, diabetics and so forth [4,5].

For primary prevention it is essential to identify reservoirs of microorganisms that cause nosocomial infections. Hands are the main sources, followed by medical devices, such as: catheters, ventilators, endoscopes, sphygmomanometers, otoscopes, thermometers, stethoscopes, computer keyboards etc [6-9]. Practices such as hand-washing and barrier protection remain the simplest and most important infection-control measures [4,10,11]. Stethoscopes are probably the most common medical device used by physicians/health professionals and they are used in close contact with patients' skin. Several studies have shown that stethoscopes are important vectors of infection [3-5,12-19], while other studies have investigated microbial contamination on stethoscopes [9,20,21]. Other researches have examined the ability of certain products to decrease microbial contamination [3,22].

Considering all these aspects, the education and sensitization of young health care providers to use of disinfecting techniques remain important. The aim of this study was to evaluate contamination levels of stethoscopes before and after use of a disinfecting technique (DT).

2. MATERIALS AND METHODS

2.1 Settings

A matched cross-over study involving three hospitals in Siena Province (Italy) was conducted in July 2012. Two were public hospitals with about 750 and 140 beds, and the other was private with 40 beds. To represent the heterogeneity of hospital departments and staff, the following hospital units were selected: intensive care, operating theatres, emergency units and medical units such as cardiology. These units provided different scenarios. Intensive care units have doctors/nurses who follow strict protocols and hygiene is a high priority. Patients may be unconscious and are generally critical, some with immunodeficiency or infections. Operating theatres are designed and operated to have a low contamination load. Emergency units have a very high volume of patients and many doctors/nurses participate in daily activity, making hygiene heterogeneous. Medical units are places where patients have contact with doctors and visitors.

Before the study began, meetings were held between the hospital management and the principal researcher. This was necessary to explain the project, establish the necessary contacts, and avoid any bias in conducting the study. It was considered important to avoid bias caused by doctors/nurses knowing when the investigation would be run, as this might prompt changes in hygiene. It was also decided that stethoscope sampling would be on the same day in each hospital, to prevent news of the study circulating and modifying hygienic behaviour.

2.2 Study Population

74 stethoscopes were analyzed, including shared (47) and personal (27) ones.

2.3 Disinfecting Technique

A putty compound, having a malleable elastic consistency was used, it adheres, removing dirt, and disinfects at the same time. These two characteristics distinguish this DT from traditional methods of cleaning and disinfection. The main

sanitizing principle was ethanol (29%), in addition the compound contained purified water (51%), guar (6%), glycerine (7%), and minor quantity of other substances such as boric acid, colorants and odorants. This technique has a disinfectant efficacy, evidenced by studies conducted according to the indications in the U.S. Pharmacopeial Convention (USP), chapter <1072> “Disinfectants and antiseptic” and according to CONFARMA protocol number 229100911 A-B which is based on the: i) guideline of the Germany Society for Hygiene and Microbiology from 1991, ii) norms EN 1040 “*Chemical disinfectants and antiseptics Basic bactericidal activity Test method and requirements*” and iii) the norm EN 13697 “*Chemical disinfectants and antiseptics-Quantitative non-porous surface test for evaluation of bacteria and/or fungicidal activity of chemical disinfectants used in food, industrial. Domestic and institutional areas – Test method and requirements without mechanical action*” [23].

2.4 Data Collection

The experimental protocol required a first sample (swab) H(0) from one half of each stethoscope membrane before cleaning it with the product, and a second sample H(1) from the other half of the stethoscope membrane after cleaning. Samples were obtained by swabbing the stethoscope surface with sterile cotton pads for approximately 5 seconds per sample. Cleaning the stethoscope diaphragm with the product took approximately 20-25 seconds. All samples were obtained by the principal investigator who was escorted by a doctor of the hospital management. All doctors/nurses encountered during the visit to the units were informed by the principal researcher/hospital management doctor of the study and were asked if there was any problem about taking stethoscope samples. There were no objections. A new pack of product was used for every stethoscope. The following information was also recorded at the time of sampling: hospital ID, department ID, doctor/nurse ID. Records were indexed with a unique ID. The same ID was assigned to the pack of sanitizing product. All the information was recorded and stored in a database for future analysis.

2.5 Laboratory Analysis

Analysis was carried out in the Hygiene and Environmental Laboratory of the University of Siena, where the swabs were placed in 1 ml of phosphate buffered saline, shaken in a vortex mixer and the liquid sown (0.1 ml/plate) in Petri

dishes containing: plate count agar (PCA) for total microbial load of mesophilic and psychrophilic microorganisms incubating at 36°C and 22°C, respectively; mannitol salt agar for *Staphylococcus spp.*, *Pseudomonas cetrimide* for *Pseudomonas spp.*, Slanetz & Bartley medium for *Enterococcus spp.*, Brilliance E. coli/coliform spp. chromogenic medium for *Escherichia coli* and coliform bacteria, *Acinetobacter* base for *Acinetobacter spp.*, and Brilliance methicillin-resistant *Staphylococcus aureus* (MRSA) MRSA2 medium for methicillin-resistant *Staphylococcus aureus* incubating at 36°C. *Clostridium difficile* agar base was supplemented with *Clostridium difficile* selective supplement and 7% defibrinated horse blood for *Clostridium difficile* spp, with incubation for 48 hours at 36°C in an anaerobiosis jar. Anaerobiosis was obtained using a gas generating kit.

All the sowings were made by the same technician of the Department of Physiopathology, Experimental Medicine and Public Health involved in the study. The Petri dishes were read by the principal researcher and the technician. The results were expressed as colony-forming units per swab (CFU/ 0.1 ml). The plates were read 24 and 48 hours after sowing. All bacteria/mould counts were added to the previous database for further use.

2.6 Statistical Analysis

Data cleaning of the database was performed. Descriptive analysis (mean, standard deviation, median, interquartile range, minimum, maximum) of the data for all types of microbes/molds was performed at H(0) and H(1). To reveal differences in bacterial contamination before and after use of the product the Wilcoxon signed-rank test was used, while the Mann-Whitney test was used to detect difference between personal and shared stethoscopes and differences among three hospitals.

For each microorganism, the number of positive samples at H(0) and H(1) was counted and their percentages were calculated. The total quantitative CFU count of the 74 stethoscopes at H(0) and H(1) and the percentage reduction after use of the product (Table 1) were also calculated. Significance level was set $P < 0.05$. Stata ® SE, version 12.1, Stata Corp, College Station, Texas, USA software was used for the analysis.

Table 1. Descriptive statistics of stethoscope variables at H(0) and H(1): Number and percentage of positive samples, overall CFU count, percentage reduction in CFUs between H(0) and H(1), mean, standard deviation, median, interquartile range, minima and maxima

Culture medium	Time	Positive sample (%)	CFU count	% CFU reduction	Mean ^a	Standard deviation ^a	Median ^a	Interquartile range	min ^a	max
PCA 36	H(0)	49(66,2)	5329	-99,8	108,8	228,1	15	5 to 41	1	1110
	H(1)	6(8,1)	10		1,7	0,5	2	1 to 2	1	2
PCA 22	H(0)	48(64,9)	5509	-99,9	114,8	274,7	10	3.5 to 46	1	1508
	H(1)	3(4,1)	5		1,7	0,6	2	1 to 2	1	2
<i>E.coli</i>	H(0)	9(12,2)	140	-100	15,6	23,7	5	2 to 11	1	71
	H(1)	0(0)	0		-	-	-	-	-	-
<i>Coliforms</i>	H(0)	33(44,6)	1739	-99,7	52,7	99,5	12	3 to 28	1	361
	H(1)	3(4,1)	5		1,7	1,2	1	1 to 3	1	3
<i>Enterococci</i>	H(0)	5(6,8)	15	-100	3	3,9	1	1 to 2	1	10
	H(1)	0(0)	0		-	-	-	-	-	-
<i>Staphylococci</i>	H(0)	40(54,1)	3188	-99,8	79,7	201,9	10	4 to 46	1	1003
	H(1)	4(5,4)	5		1,3	0,5	1	1 to 1.5	1	2
MRSA	H(0)	18(24,3)	233	-100	12,9	18,7	5	2 to 16	1	68
	H(1)	0(0)	0		-	-	-	-	-	-
Molds	H(0)	2(2,7)	2	-50	1	-	1	1	1	1
	H(1)	1(1,4)	1		1	-	1	1	1	1

Pseudomonas spp., *Acinetobacter* spp. and *Clostridium difficile* were not detected on the stethoscopes.

* summing all CFUs on the stethoscopes,

^a only positive samples

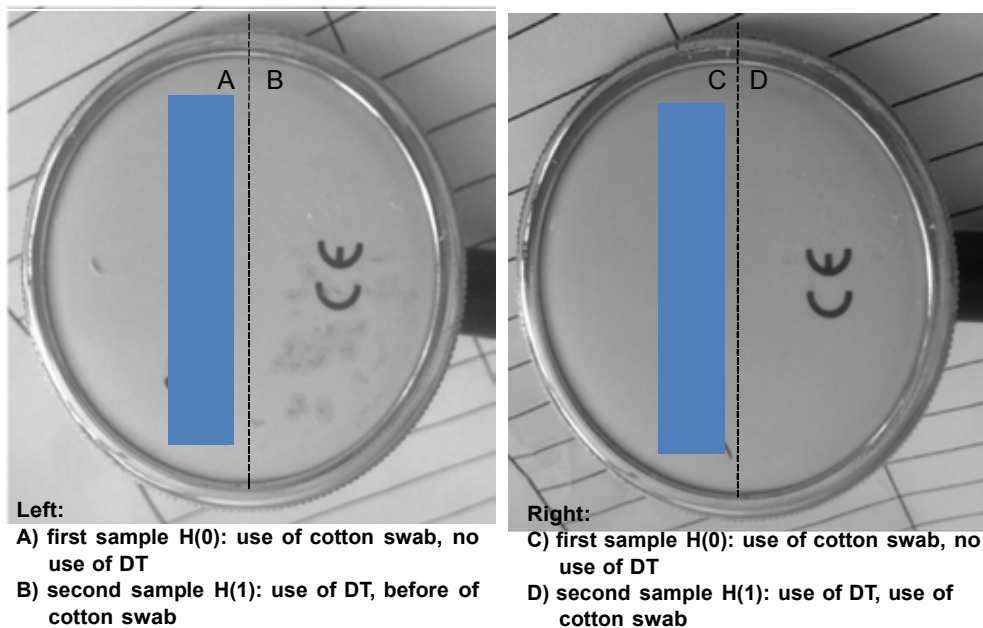
3. RESULTS AND DISCUSSION

The Table 1 shows the variables at H(0) and H(1) with mean, standard deviation, median, interquartile range, minima, maxima, overall CFU count, percentage reduction in CFUs between H(0) and (H(1), number of positive samples and their percentages for all stethoscopes. No samples contained *Pseudomonas*, *Acinetobacter spp.* or *Clostridium difficile* at H(0) or H(1). The CFUs' reduction is close at 100% in most comparisons. In cases the number of CFUs in H(1) did not correspond to 0, statistical tests were carried to highlight differences between pre- and post-cleaning. Significant differences were detected in the comparison for TBC at 36°C and 22°C, *Coliforms*, *Staphylococcus spp.* ($p < 0.001$), No differences emerged in the molds comparison ($p < 0.563$). Only 2/74 stethoscopes were contaminated with molds before the DT, and one after cleaning. Two stethoscope diaphragms also carried a visible film of undefined material (solidified gel or other dirt) which was only partly removed by the disinfecting technique (Fig. 1). These stethoscopes, at H(1), did not show microbial contamination.

The comparison between physicians'/nurses' stethoscopes and shared ones showed significant differences in some cases. We recorded increased contamination of private stethoscopes by *E. coli* ($P = 0.0360$), *Enterococcus spp.* ($P = 0.0024$), *Staphylococcus spp.* ($P = 0.0164$) and MRSA ($P = 0.0060$). No significant statistical difference was found between shared and private stethoscopes for TBC at 36°C ($P = 0.2496$), TBC at 22°C ($P = 0.2235$) and coli form ($P = 0.3583$) contamination. The (Fig. 2) shows an example of cultures for MRSA from swabs taken before and after cleaning. No statistical differences were also found in contamination among the three hospitals ($P > 0.05$).

Stethoscopes are a universal tool of the medical profession and a potential source of nosocomial infections. They are used in direct contact with numerous patients every day and are often not routinely cleaned [24]. Several studies, as well as our own, have investigated microbial contamination of stethoscopes and, consequently, their role in the transmission of health-care-associated infections. Some of these infections are very dangerous, for example in the European Union, methicillin-resistant *Staphylococcus aureus* (MRSA) is frequently isolated in hospitals of Italy, Spain, Greece, Portugal and Great Britain [25].

In line with our results, the bacteria most commonly isolated are gram-positive cocci, especially *Staphylococcus* spp. [5,19,20,24,26]. Other bacteria frequently isolated are Enterobacteriaceae: *Enterobacter* spp., coliforms spp, *Citrobacter* spp., *Klebsiella* spp. and *Serratia* spp. being microorganisms considered by several studies [5,18,19,26-28]. We too found coli forms and *E. coli* in our samples; indeed, before cleaning, 40 out of 74 were positive for *Staphylococcus* spp., including 18 for MRSA, 33 for coliforms (with 3 *E. coli*), 5 for *Enterococcus* spp. and 2 for molds.



The disinfecting technique eliminated bacterial load, but did not always remove dirt from stethoscopes (see part B)

Fig. 1. Stethoscopes pre and post use of disinfecting technique

This and other studies have been conducted with the additional aim of determining the effectiveness of certain sanitizing techniques in reducing microbial contamination of stethoscopes. The compounds most commonly used for cleaning and disinfection of stethoscopes are ethyl and isopropyl alcohol or disinfectants based on them, non-ionic detergents and antiseptic soaps. The results showed that ethyl and isopropyl alcohol have similar effectiveness in reducing CFUs. Ethyl alcohol and ethanol-based cleansers reduce bacterial count by 92.8% and 96%, isopropyl and isopropyl-based compounds reduce it by 92.5% and 99%. However, repeated use of alcohol can dry out stethoscope rubber seals and damage the tubing [29].

Antiseptic soaps are less effective, reducing CFUs by about 74-75% [4, 10, 18, 26, 29, 30]. After use of the disinfecting technique, the swab sometimes removed some of the print on membranes of cheaper stethoscopes. This was probably due to the moist and adhesive nature of the product and the wiping action of the swab.

The cleaning product contains about 30% ethyl alcohol and has elastic consistency that attaches to and removes dirt. Both features disinfect. Our study demonstrates that after cleaning the percentage reduction in CFUs in all samples was 99.8% for TBC at 36°C and 99.9% for TBC at 22°C. These values are larger than the percentage reductions obtained in the surveys mentioned above. This disinfecting technique also determined a 99.7% reduction in *coliforms*, 99.8% in *Staphylococcus* spp., and 100% in *E. coli*, *Enterococcus* spp. and MRSA at H(1). Molds showed a different pattern, decreasing from two to one positive sample. This apparent ineffectiveness of the technique for molds could be due to a relative initial absence of molds on the stethoscopes.

Petri dish containing *Brilliance MRSA2* culture medium for Methicillin-resistant *Staphylococcus aureus*.

Petri dishes containing Mannitol Salt agar for *Staphylococcus* spp.

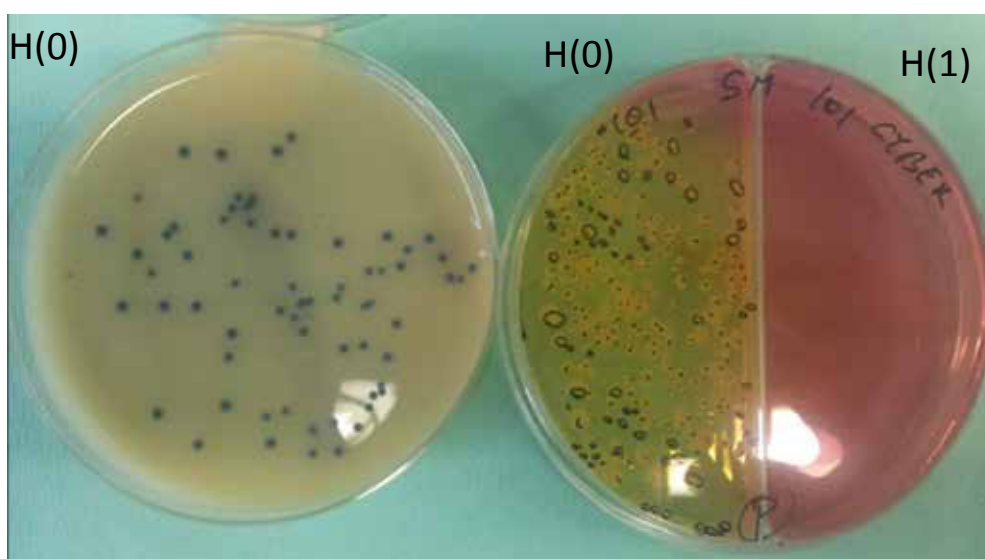


Fig. 2. Example of cultures of swabs from stethoscopes taken pre and post cleaning

To test the disinfecting technique for molds, greater initial mould contamination is necessary. The tested product does not wet the article to be cleaned, dispensing with a drying step.

The Healthcare Infection Control Practices Advisory Committee recommends that stethoscopes be disinfected when visibly soiled and on a regular basis but does not specify what constitutes a regular schedule. There is no consensus about the appropriate frequency of cleaning [31]. Thus the cleaning of stethoscopes by healthcare professionals varies in frequency. A study conducted in 2001, evaluated stethoscope cleaning by 150 personnel and showed that: 49% cleaned them daily and 7% admitted to never cleaning them [29]. A survey of 1382 health care workers in 2012 showed that only 24% disinfected their stethoscopes after every use, 32% cleaned them many times per day but not after every use, 11% cleaned them weekly and 3.8% never cleaned them [17].

We also compared microbial contamination of stethoscopes of physicians / nurses and shared stethoscopes and found some significant statistical differences. We recorded greater contamination on non-shared stethoscopes for: *E. coli*, *Enterococcus* spp, *Staphylococcus* spp. and MRSA. Since health care professionals presumably use their own stethoscopes more often than shared ones, the former are more likely to be contaminated. Other reasons for greater contamination of personal stethoscopes could be that shared stethoscopes are subject to established hygiene practices. In fact, we found that in intensive care units, standard protocols require the disinfection of stethoscopes which are placed at every bedside. Other departments may also follow this procedure. On the contrary, a study by Whittington et al. conducted in an intensive care unit showed that the diaphragms of bedside stethoscopes had greater bacterial contamination than personal ones, though the latter are more frequently contaminated by pathogenic bacteria [22]. This could sustain our hypothesis that personal stethoscopes are used with greater frequency than shared ones and are therefore more often colonized by pathogenic bacteria.

Although our study involved different departments, the overall number of stethoscopes was small compared to other studies [18,21]. It would be useful to follow this population for a longer period of time in order to highlight the effects of continued use of the disinfecting technique on bacterial contamination. It would also be interesting to know the capacity of the technique to keep microbe concentrations low with repeated use and to test how long the effect lasts.

Our results indicate that educational programmes on disinfection procedures for doctors are important, especially for young staff. They help make health

personnel more aware of these aspects, often overlooked or considered marginal. Habits acquired early in professional life are more likely to last.

It would be also useful to calculate the attributable risk of nosocomial infection caused by stethoscopes. This information, linked to hospital expenses, would infer savings in health care costs.

4. CONCLUSION

The results of the present study suggest that the disinfecting technique was effective in reducing stethoscope microbiological load, however its efficacy should not be a reason to neglect standard hygiene and cleanliness practices. Stethoscopes may also be disinfected by simple traditional methods, such as swabbing with sodium hypochlorite which normally eliminates bacteria.

CONSENT

The study did not involve patients, so the consent has not been applied. However we were authorized by the medical administrations of Siena teaching hospital "Le Scotte", the Rugani Clinic and Alta Val D'Elsa Hospital in Siena Province Italy.

ETHICAL APPROVAL

Not applicable.

FUNDING SOURCES

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Adherence to Antihypertensive Medications in Type 2 Diabetes: Prevalence and Determinants

ABSTRACT

Aim: To estimate the extent of non-adherence to antihypertensive drugs in type 2 diabetes.

Study Design: Observational.

Place and Duration of Study: The study was conducted at three Belgian specialised diabetes centres during two months.

Methodology: Included were adult type 2 diabetes patients, treated with insulin and either ACE-inhibitors or sartans. Adherence was assessed electronically with the Medication Event Monitoring System. A standardised blood pressure measurement was taken at the study start and end.

Results: Mean age of the 130 included patients was 65 and 51% was male. Mean HbA1c was 7.5 mg% (59 mmol/mol), mean BMI 32 kg/m² and mean daily oral pill burden 8. Half of the patients showed perfect adherence and another fourth missed the prescribed dose on only 1 of 56 days. Mean baseline blood pressure was 143/77 mm Hg and 25% had controlled blood pressure (<130/<80 mmHg). Higher hypertension knowledge was associated with adherence and higher daily doses of insulin with non-adherence. Adherence correlated positively to

diastolic, but not systolic blood pressure. Of patients never missing a dose 78% reached controlled diastolic blood pressure compared to 68% of patients missing doses on ≥ 3 days.

Conclusion: Adherence to antihypertensive medications was high in this cohort followed up at specialised diabetes centres. Still, about 15-20% had suboptimal adherence and should receive adherence enhancing support, especially since high adherence seems necessary to obtain blood pressure control.

Keywords: diabetes; hypertension; medication; adherence.

1. INTRODUCTION

In type 2 diabetes blood pressure is as crucial as glycaemia control [1-3]. Hypertension in diabetes is common and associated with insulin resistance and vascular complications [1]. Type 2 diabetes patients are at a threefold higher risk of coronary artery and peripheral arterial disease and most deaths among them are attributable to cardiovascular disease [4]. Belgian type 2 diabetes patients who are prescribed at least two insulin injections per day are treated at specialised diabetes clinics, called convention centres, where they benefit of an intensive educational and follow-up programme by a multidisciplinary team [5]. In order to further optimise diabetes management they receive free blood glucose monitoring materials. The convention centres collaborate closely with the general practitioners. The general practitioners follow up hypertension treatment on a regular basis (e.g. medication prescription) and the convention centres follow up the general treatment once or twice a year (e.g. insulin dose).

Although antihypertensive medications are available, few type 2 diabetes patients reach blood pressure control. In general, only about 50% have a blood pressure $\leq 140/90$ mmHg [2,6,7] while the threshold for controlled blood pressure in diabetes is even set at 130/80 mmHg [1]. Non-adherence to antihypertensive treatment is often pointed to as the responsible factor and is reported to be ubiquitous in chronic illnesses. The World Health Organization reports a prevalence of 50% [8]. DiMatteo estimates the rate at 25% [9]. Among patients with hypertension non-adherence has a prevalence of 50% [10,11]. Whether medication non-adherence exists in all patients and to all types of medications is not fully known.

In type 2 diabetes the problem of non-adherence has been established in many treatment aspects [12-15]. Research on non-adherence to antihypertensive treatment is, however, scarce. In the few studies addressing the topic, the adherence measure is based on prescription refill data or self-report [16,17] which are not the most reliable methods [18]. Self-report is a subjective adherence measure and in prescription refill measures there is no guarantee that dispensed medication is actually taken and a certain time delay exists between the actual filling of prescriptions and the consequent generation of adherence data [18].

The aim of the present study is 1) to estimate the extent of non-adherence to antihypertensive drugs in type 2 diabetes, measured electronically with the Medication Event Monitoring System (MEMS ®) and 2) to identify potential determinants.

2. MATERIALS AND METHODS

2.1 Study Design

An observational cohort study was performed, measuring adherence to antihypertensive medications during two months. Patients, study personnel and caregivers remained blind for the adherence outcome. The diabetologists and diabetes educators of three Belgian, specialised diabetes convention centres recruited patients during three months. Eligible persons received a standard brochure with information about the study and were invited to return on one of the three starting dates, bringing their antihypertensive medications with them.

On the first study visit, participants signed the informed consent form and brought their antihypertensive medications for the next two months which were placed in a drug container. Drug containers were capped with a MEMS that records date and time of each opening of the package. Patients filled out the study questionnaires and had their blood pressure taken. At the second study visit, the study nurse read the dosing history data from the MEMS cap into computer and remeasured patients' blood pressure.

2.2 Study Population

Approval was obtained from the Ethics Committee of the Antwerp University Hospital (B300201111744). All patients at the participating diabetes centres were screened by study nurses between November 2011 and February 2012. Eligible were 1) adult (aged ≥ 18), 2) type 2 diabetes patients, 3) treated with insulin, incretin hormone mimetics or analogues and 4) prescribed ACE-inhibitors or

sartans. The exclusion criteria comprised, 1) not self-administering medication care, 2) not speaking Dutch, 3) cognitive impairment, 4) nursing home residents or, 5) diabetes treatment with pump therapy.

2.3 Data Collection

The baseline questionnaires surveyed 1) patients' demographics, 2) attitudes towards the antihypertensive treatment (perception of adverse events, belief in benefit and self-reported adherence), 3) knowledge, 4) social support and 5) health and quality of life (SF-36) [19]. Knowledge was assessed by a ten-item multiple-choice test on blood pressure, hypertension and antihypertensive treatment. The social support percentage was based on eleven questions assessing perceived support in diabetes in general and support with taking antihypertensive medications specifically. Medical and pharmacological data was gathered from patients' charts.

Primary outcome variable was adherence to ACE-inhibitors or sartans, derived from the MEMS (Fig. 1 [20]). Drug containers were filled with patients' ACE-inhibitors or sartans capped with MEMS. Patients were instructed to take them only and directly from the container at the time of intake and to open it only for an intake. The microchip in the MEMS cap registered date and time of each opening – and presumed intake. The dosing history data were read from the MEMS and centralised through a secured server.

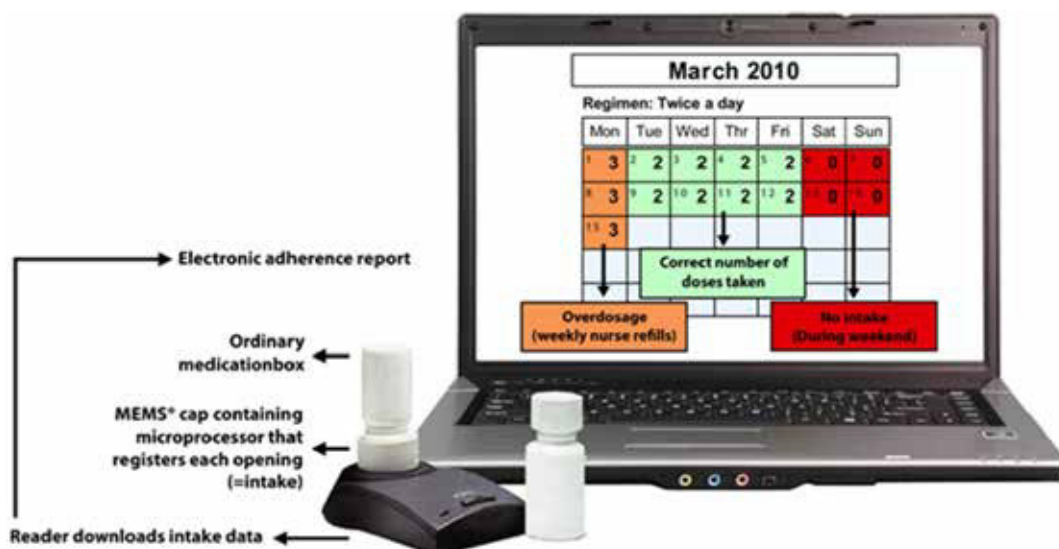


Fig. 1. Medication event monitoring system (MEMS ®) [20]

The secondary outcome, blood pressure, was measured in a standardised way. After a 5 minutes rest, three consecutive blood pressure measurements were

taken at 15 seconds intervals. An automatic blood pressure monitor was placed at the right upper arm in a sitting position with the arm resting on a desk at heart level [21]. The three blood pressure measurements were averaged and dichotomised with blood pressure control $<130/<80$ mmHg [1].

2.4 Data Analysis

Data was analysed using IBM SPSS Statistics 20®. The adherence data was corrected for medication changes and hospitalisation periods (excluded). Adherence was calculated by dividing the number of doses taken by the number of prescribed doses, averaged per week. Adherence was also dichotomised with being adherent defined as having missed prescribed dose(s) on no more than 3 out of the 56 days observed.

Differences between adherent and non-adherent patients were identified using independent samples t-tests and chi-square tests for continuous and categorical variables, respectively. Pearson's correlations were applied to calculate correlations between continuous variables. Differences and correlations were judged statistically significant when $P\text{-value} \leq 0.05$. Odd's ratios of influencing factors of non-adherence were calculated by logistic regression, building a multivariate model to identify the factors explaining the variance in adherence, with the significance of the odd's ratios judged by the 95% CI.

3. RESULTS AND DISCUSSION

3.1 Study Sample

(Fig. 2) shows the patient flow. During the recruitment period, 1853 diabetes patients attended an appointment. The inclusion criteria were met by 665 patients, 118 of whom were excluded, yielding a total of 547 eligible patients. Of those, 137 showed interest in the study and returned to the first study visit. Five patients withdrew immediately after enrolment and two were excluded from the analyses because they continued to lay out their medications in advance, invalidating their MEMS adherence data. Thus, 130 patients were included in the analyses. With the exception of one patient with ACE-inhibitor treatment discontinuation in week 6, there were no dropouts.

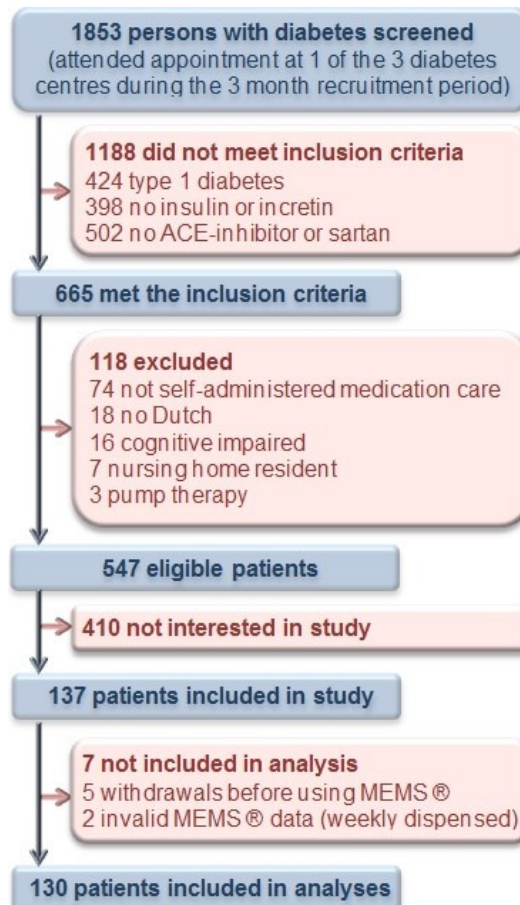


Fig. 2. Patient flow

The characteristics of the study subjects are listed in (Table 1). Mean age was 65 years and about half of the population was male. Most lived with their partner and wereretired. Mean HbA1c was 7.5% (59 mmol/mol) and mean BMI 31.9 kg/m². Most patients had a diabetes complication, 28% had retinal and 25% renal damage. Over half of the patients indicated to exercise seldom or never. Mean SF-36 scores were 50% (mental) and 43% (physical). The average score on the hypertension knowledge test was 59%. Total mean daily pill burden amounted to 8 and 15% of the population used antidepressants.

Regarding the antihypertensive treatment 61% of the population took ACE-inhibitors and 39% sartans. The vast majority had a once a day regimen, about one fourth reported adverse events and most patients (85%) believed in the effectiveness of the ACE-inhibitors or sartans. Additional antihypertensive medications, mostly beta-blockers, calcium-antagonists and/or diuretics, were prescribed to 67% of patients.

Table 1. Study subject characteristics

Socio-demographic characteristics		
Age in years (mean (range))		65 (39-87)
Sex (%male)		51
Living situation	With partner	53
	With partner & children	25
	Alone	22
Profession	Retired	66
	Working	18
	None	16
Social support score (mean%(SD))		71 (22)
Pharmacological characteristics		
ACE-inhibitor or sartan treatment		
Type: % on ACE-inhibitor		61
Brands ¹		
Tritace® (%)		22
Coversyl® (%)		13
Regimen: % on once a day		94
Adverse events (%yes)		23
Belief in effectiveness (%yes)		85
Self-reported adherence (%yes)		78
Additional antihypertensive (%yes)		67
Number of extra types (mean(SD))		1.7(0.9)
Beta-blockers (%)		42
Calcium-antagonist (%) Diuretics (%)		33
		21
Total daily pill burden (mean(range))		8 (2-19)
Chronic antidepressant use (%)		15
Health characteristics		
Blood pressure (BP) (mean mmHg) BP control at start (<130/80mmHg) (%)		143/77
Systolic BP control (<130 mmHg) (%)		20
Diastolic BP control (<80 mmHg) (%)		25
Years with diabetes (mean(range))		62
H _b A1c in % (mean(range))		15 (1-49)
H _b A1c in mmol/mol (mean(range))		7.5 (5-13)
BMI in kg/m ² (mean(range))		59 (32-119)
Diabetes complications (mean(SD))		31.9 (20.5-53.5)
Retinal (%yes) ¹		0.7 (0.8)
Renal (%yes) ¹		28
Comorbidities (mean number (range))		25
Hypertension (%yes)		3.4 (0-6)
Alcohol-use (%yes)		100
Smoking (%yes)		50
Physical activity (%)		11
Seldom or never		53
At least once a week		47
SF-36 (health and quality of life scale)		
Mental score in % (mean (range))		50 (14-72)
Physical score in % (mean (range))		43 (12-60)
Knowledge of hypertension (mean% (SD))		59 (25)

3.2 Adherence to Antihypertensive Medications

(Fig. 3a) visualises the mean percentage of prescribed doses taken per week by all patients over two months. (Fig. 3b) shows boxplots of the mean adherence percentages per week. As the percentiles and whiskers all coincide in 100% we added the proportion of patients with perfect adherence (100% prescribed doses taken) per week. Although the majority of patients never missed a single dose, the

outliers indicate that every week 15 to 20% of the patients showed suboptimal adherence and were at risk of a lack of the ACE-inhibitors or sartans efficacy.

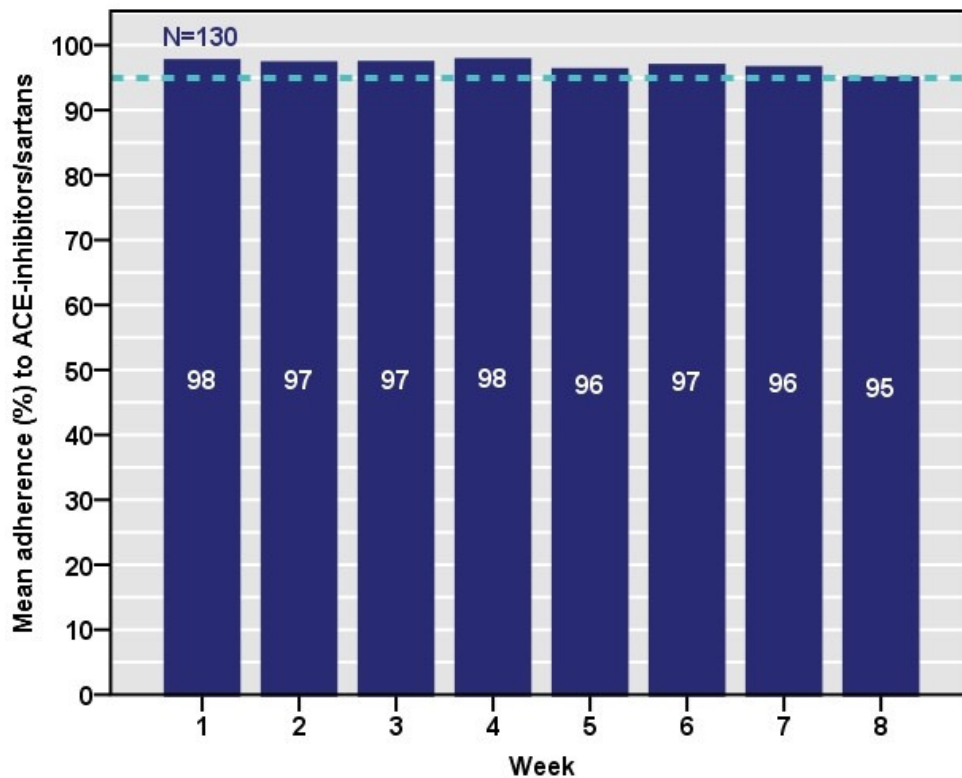


Fig. 3a. Mean percentage of adherence (prescribed doses taken) to ACE-inhibitors or sartans over two months

Over the eight weeks (56 days) period, nearly half of the patients (48%) never missed a single dose. One fourth (24%) missed the prescribed dose on 1 of the observed 56 days. Eight per cent missed 2 days of prescribed intake. The remaining 20% had 3 or more days on which the prescribed dose was not taken. The maximum number of days with a missed prescribed dose was nine.

3.3 Blood Pressure

At study visit 1 mean blood pressure of the included patients was 143/77 mmHg. One in five patients reached combined controlled systolic and diastolic blood pressure (<130/<80 mmHg); 25% had a controlled systolic and 62% a controlled diastolic blood pressure.

At study visit 2 after 2 months patients' mean blood pressure was 137/74 mmHg and 31% had a combined controlled systolic and diastolic blood pressure; 35% had a controlled systolic and 71% a controlled diastolic

blood pressure. The differences of -4 mmHg in mean systolic and of -3 mmHg in diastolic blood pressure between study visit 1 and 2 were significant ($P=.006$ and $P=.002$, respectively).

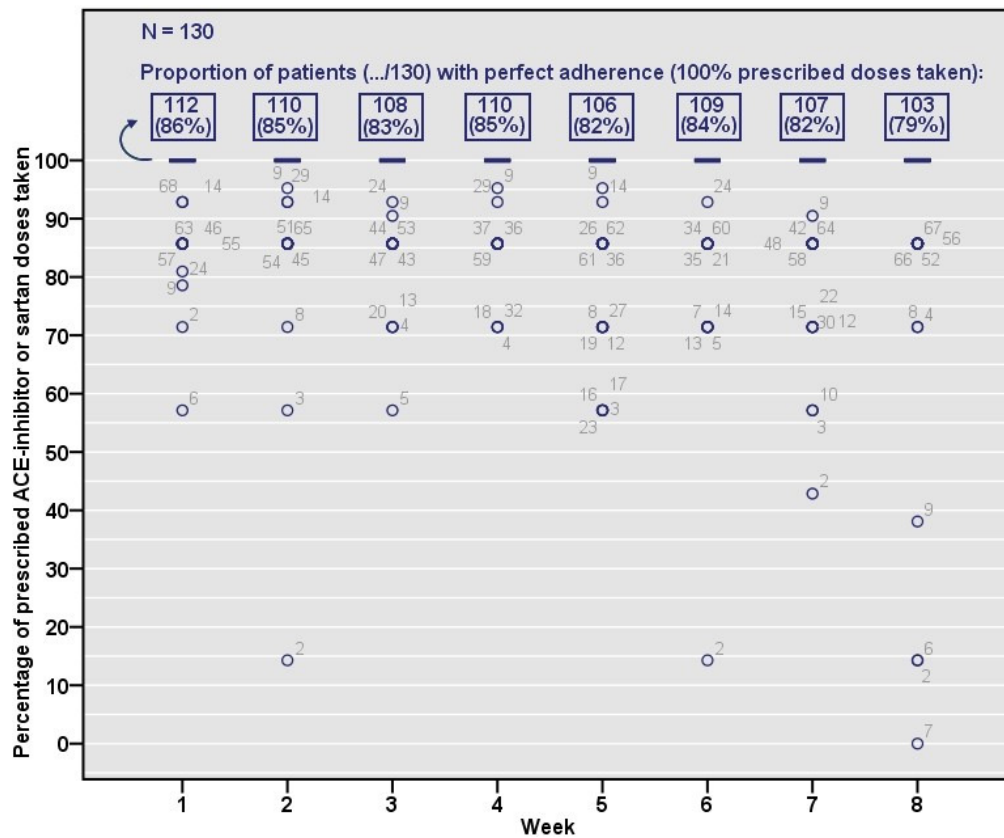


Fig. 3b. Boxplots per week of the percentage of prescribed ACE-inhibitor or sartan doses taken, with indication of the proportion of patients with perfect adherence (100% prescribed doses taken)

3.4 Association between Adherence and Blood Pressure

No correlation was found between systolic blood pressure and adherence ($P=.42$). The correlation between diastolic blood pressure and adherence was significant but weak ($r=0.068$; $P=.03$; $y=-0.075x+81$). (Fig. 4) shows the proportion of patients with controlled diastolic blood pressure (<80 mmHg at the second study visit after 2 months) per number of days with a missed dose (over the 2 months observation period). Of patients with perfect adherence (never having missed a single dose) 78% reached controlled diastolic blood pressure. Of patients having missed 3 or more days 64% had controlled diastolic blood pressure.

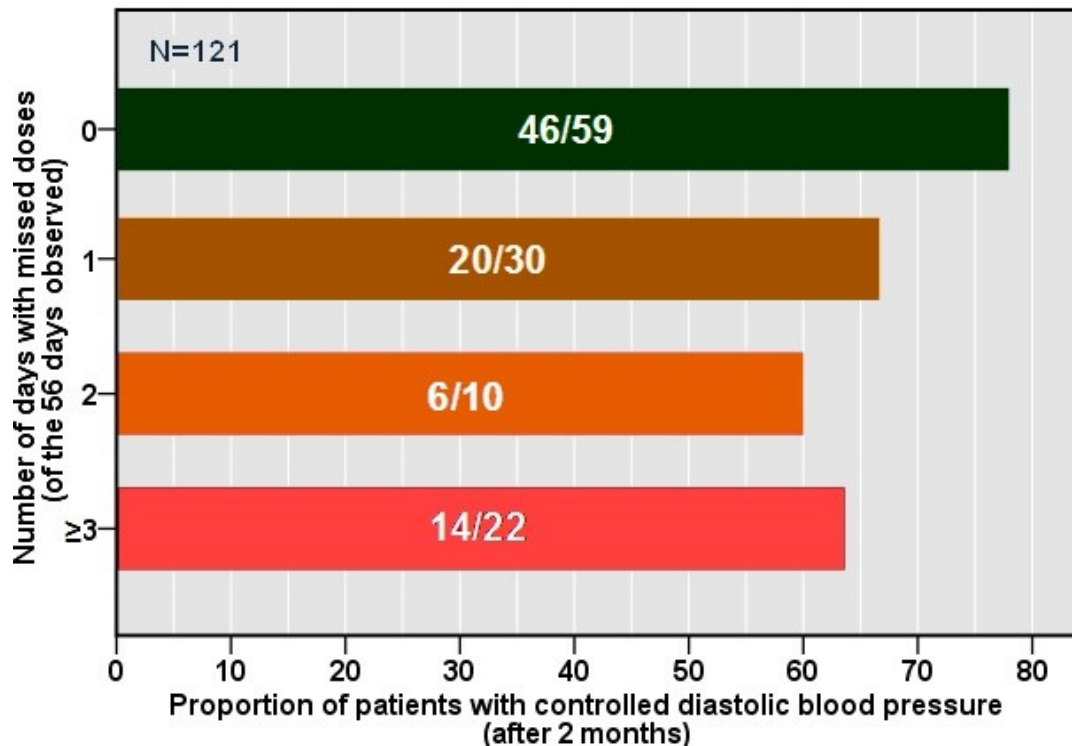


Fig. 4. Proportion of patients with controlled diastolic blood pressure (measured after 2 months) per number of days with a missed dose (over the 2 months observation period)

3.5 Association between Self-reported and Electronically Measured Adherence

Of the 130 patients 100 reported never to miss a single dose. In 47 of those 100 patients that reported perfect adherence the MEMS data showed a mean adherence percentage <100% (Kappa=0.124; $P=.09$). The correlation of $r=0.231$ between self-reported adherence (always, mostly or mostly not) and mean adherence according to MEMS was significant ($P=.009$). Patients self-reporting perfect adherence had 4.7 times the odds of missing no more than three day doses in the two months period (95% CI 1.227-10.317).

3.6 Determinants of Non-adherence to ACE-inhibitors or Sartans

(Table 2) lists the influences of the studied variables on non-adherence (defined as having missed an intake on more than 3 of the 56 days observed). Sex and social support in diabetes proved to differ significantly between adherent and non-adherent patients. Only female sex—enhancing the odds of adherence—remained a significant determinant in the univariate analysis, yet not in the multivariate model.

A once a day regimen (prescribed to 94% of the population) was a predictor of adherence in the model. Of the health characteristics, higher hypertension knowledge increased the likelihood of adherence. Higher daily doses of insulin and higher numbers of hospitalisations in the year preceding inclusion both decreased the odds of adherence.

In the multivariate model, three factors were retained: a once a day regimen, higher daily dose of insulin and hypertension knowledge. All three of them explained a fourth of the variance in adherence (Nagelkerke $r^2=0.25$). The odd's ratio of a once a day antihypertensive regimen did, however, have a relatively wide confidence interval with most patients having a once a day prescription.

3.7 Discussion

3.7.1 Main findings

Our study is among the first to find high adherence prevalences. Half of the patients never missed a single dose and another 24% only missed a dose on 1/56 observation days. Nonetheless, every week about 15 to 20% of patients showed suboptimal adherence. Further, we found high prevalences of uncontrolled blood pressure. We found an association between adherence to antihypertensive medications and diastolic, but not to systolic blood pressure. Of patients never missing a dose 78% reached controlled diastolic blood pressure compared to 68% of patients missing doses on ≥ 3 days.

Higher hypertension knowledge enhanced the likelihood of adherence, whereas a higher daily dose of insulin decreased the odds.

3.7.2 Prevalence of non-adherence

We found quite a high adherence prevalence. The reason might be that the patients were recruited at specialised convention centres where high-risk diabetes patients are closely followed up [5,22]. Further, Belgian diabetes patients are followed up also in the primary care setting. General practitioners are responsible for blood pressure regulation on a regular basis and every (half) year patients return to the outpatient convention centre led by diabetes educators and diabetologists. Diabetes care is also quite self-managing oriented, which might also lead to self-control of concomitant treatments, such as the antihypertensive.

Table 2. Determinants of adherence to ACE-inhibitors or sartans

	Descriptive			Analytical	
	Adherent* (N=104)	Non-adherent** (N=26)	p	Univariate ratio (95%CI)	Multivariate Odd's ratio (95%CI)
Socio-demographics					
Age: mean (SD)	65(9)	65(11)	0.979	1.00(0.96-1.05)	
Sex: % female	53	31	0.039	2.58(1.03-6.46)	
Living situation: % with children	21	35	0.157	0.51(0.20-1.31)	
Profession: % retired	67	65	0.902	1.06(0.43-2.62)	
Social support score: mean% (SD)	72	67	0.323	1.01(0.99-1.03)	
Social support in general: %yes	88	73	0.050	2.79(0.97-8.03)	
Pharmacological characteristics					
Regimen: % on once a day	97	81	0.002	7.94(1.76-35.81)	15.75(2.94-84.38)
Adverse events ¹ : %yes	20	32	0.213	0.54(0.21-1.43)	
Belief in effectiveness ¹ : %yes	87	76	0.151	2.19(0.74-6.48)	
Total daily pill burden: mean (SD)	7.6(3.2)	8.4(4.5)	0.306	0.94(0.84-1.06)	
Antidepressant use: %yes	15	15	0.916	0.94(0.29-3.11)	
Health characteristics					
Years with diabetes: mean (SD)	14(9)	16(10)	0.543	0.99(0.94-1.03)	
Daily dose of insulin: mean (SD)	54(31)	75(62)	0.012	0.99(0.98-0.99)	0.99(0.97-0.99)
BMI: mean (SD)	32.3(5.6)	30.1(5.0)	0.075	1.09(0.99-1.20)	
Diabetes complications: mean (SD)	0.6(0.7)	0.9(1.0)	0.197	0.66(0.39-1.11)	
Comorbidities: mean (SD)	3.4(0.9)	3.4(1.0)	0.985	1.01(0.64-1.58)	
Hospitalisations <year: mean (SD)	0.5(0.9)	1.4(3.0)	0.009	0.69(0.46-1.02)	
Alcohol use: %yes	47	64	0.119	0.49(0.20-1.21)	
Smoking: %yes	12	8	0.640	1.45(0.30-6.96)	
Physical activity: %seldom/never	45	58	0.234	1.69(0.71-4.03)	
SF-36 mental score: mean (SD)	51(11)	47(11)	0.091	1.03(0.99-1.07)	
SF-36 physical score: mean (SD)	42(12)	44(10)	0.425	0.96(0.95-1.03)	
Knowledge ² : mean (SD)	62(25)	48(24)	0.011	1.02(1.01-1.04)	1.03(1.01-1.05)

Nagelkerke $r^2 = 0.25$ ($p < 0.001$)

*Adherent: missed prescribed dose(s) on no more than 3 out of 56 days observed ** Non-adherent: missed prescribed dose(s) on more than 3 out of 56 days observed;¹ Concerns ACE-inhibitors or sartans;² Knowledge was measured with a 10-item multiple choice test about blood pressure, hypertension and antihypertensive treatment (expressed as a percentage)

Especially patients followed up at convention centres might be more aware of their condition and its progression and thus be motivated to control both condition and comorbidities like hypertension. Further, the predominant regimen of ACE-inhibitors and sartans in general, and in this study was quaque die, which has proven to contribute to adherence [23-25].

The relatively low response rate might also have contributed to the high adherence figures. Originally, this study was set up as a one year randomised controlled trial, asking patients to return bi-monthly to the diabetes centre. The purpose was to randomise patients and test a nurseled adherence enhancing intervention after the two-month observational baseline period (on which we reported here). Still, only 20% of the patients had a controlled blood pressure and still all of them agreed to participate in the study. Also, in many other studies the same recruitment method was applied with often low response rates and still high prevalences of non-adherence reported [26]. A follow-up study started fall 2012, applying similar methods, but with a consecutive sample to decrease selection bias to concur the findings of this study.

3.7.3 Factors associated with non-adherence

The once a day regimen was retained as a factor increasing the odds of adherence in both our uni and multivariate analyses but 94% of patients were on this regimen. Other factors retained were, not surprisingly, higher hypertension knowledge, corroborating existing literature [27-30]. We also found higher daily doses of insulin decreasing the odds of adherence, which might indicate that patients experiencing difficulties adhering to their diets and insulin treatment are also more likely not to adhere to their medication treatment. However, similar correlations were not found in other health-related habits such as BMI, physical exercise or smoking.

3.7.4 Adherence measurement

Our adherence measurement was restricted to the proportion of prescribed drugs taken (intake adherence), recently called the implementation of drug prescription [31]. We did not measure other adherence components, such as initiation (taking the first prescribed dose) or the number of doses taken on time. First, our aim was specifically to assess the implementation of drug prescriptions and as patients are encouraged by their caregivers to link the intake to daily habits such

as breakfast, the intake might fluctuate in time. Second, most anti hypertensives have a forgiveness with substantially differing capacity depending on their pharmacokinetic (from six hours for Atenolol to a couple of days for Aiskiren). For these reasons timing adherence was not worth to be further explored here, unlike in case of HIV-medications for instance, where timing adherence is as crucial as taking adherence [32].

3.7.5 Blood pressure control

In line with previous studies, we found that few diabetes patients achieve blood pressure control [2,6,7]. Compared to the first visit, patients did show significantly better blood pressure outcomes at the second study visit, probably attributable to a white coat effect. As established in previous research especially systolic blood pressure control was problematic [33,34], with only 25% achieving it. Systolic blood pressure control proves especially challenging in middle-age and older patients, in whose case it is associated with increased arterial stiffness that appears less amenable to current therapies [35]. Although diastolic blood pressure was historically thought to be the strongest predictor of cardiovascular events, systolic blood pressure confers a greater risk and should be the primary (and to some even the only) focus of therapy [36,37]. Still, today, treatment guidelines lay the emphasis on both. Alternatively, the cut-off value of <80 mmHg for controlled diastolic blood pressure might be questioned but even when raising the threshold to <90 mmHg, half of the patients did not reach systolic pressure control (not reported in the result section).

In the same line, we found that higher adherence to ACE-inhibitors or sartans was associated with diastolic, but not with systolic blood pressure. Of patients never missing a dose 78% reached controlled diastolic blood pressure compared to 68% of patients missing doses on ≥ 3 days. Improving adherence shows to be an important factor in achieving diastolic blood pressure control and should be a priority in the care for (diabetes) patients suffering from hypertension.

4. CONCLUSION

Adherence to ACE-inhibitors or sartans was high in this cohort of type 2 diabetes patients at specialised convention centres. Although the majority had good adherence, about 15 to 20% of the patients showed suboptimal adherence and

should be supported to improve their medication intake, especially since high adherence seems necessary to obtain blood pressure control. Health care workers should focus on intake behaviour and inform patients about the consequences of—even occasionally—missing a dose. Even in our population showing (nearly) perfect adherence, (too) many diabetes patients had an uncontrolled blood pressure. The reason why high adherence is not translated into controlled blood pressure is to be further explored.

CONSENT

All authors declare that written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

The authors have obtained all necessary ethical approval from suitable Institutional or State or National or International Committee. Approval was obtained from the Ethics Committee of the Antwerp University Hospital (B300201111744).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Forensic and legal aspects of providing of medical care in Ukraine

Abstract: The issue of quality and accuracy of medical care is particularly acute in modern life. It's confirmed by the steady increase in the number of forensic examinations intended in Ukraine in criminal and civil cases against physicians in bad providing medical care. The aim of the study to analyze regulations documents within the current legislation of Ukraine, which regulate the basic provisions for forensic examination, particularly in cases involving legal liability of doctors in connection with their professional activities; data on the criminal offenses under Articles 139 ('Failure to help the patient by medical worker ...') and 140 ('Improper performance of professional duties by medical or pharmaceutical worker') of the CCU (Criminal Code of Ukraine) from 2012 to March 2016.

Keywords: forensic examination, lack of medical care, improper medical care, defect of medical care, criminal offenses.

Introduction. Many modern scientists in the medical field as well as in legal issues studied inadequate medical assistance [1, 2]. At the same time, it should be noted that along with the errors that allowed by physicians clinicians to provide medical care, forensic experts themselves make mistakes in conducting examinations for 'Doctoring'. It's clear that such expertise is one of the most difficult, because formal approach to their conduct is unacceptable. Determination of the kind of defect of medical care belongs only to the competence of a forensic expert, according to the current legislation of Ukraine [3-6]. One of the main tasks of forensic examination in such cases is to establish a causal connection between the actions (inaction) of medical personnel and the onset of adverse consequences. It should be noted, that 'lack of medical care' and 'improper medical care' are two differs terms.

This gradation is very important for investigative judicial authorities is essential for the correct qualification of the crime.

The aim of the study was to analyze regulations documents within the current legislation of Ukraine, which regulate the basic provisions for forensic examination, particularly in cases involving legal liability of doctors in connection with their professional activities; data on the criminal offenses under Articles 139 and 140 of the CCU (Criminal Code of Ukraine) from 2012 to March 2016.

Material and methods. The research material were data from the Unified report of the Prosecutor general's office of Ukraine about criminal offenses in the state from 2012 to March 2016 in criminal cases under articles 139 and 140 of the CCU.

The data were subject to statistical analysis by standard methods of descriptive statistics.

Results and discussion. During the statistical analysis of data from the Unified report criminal offenses [7] in the state from 2012 to March 2016, it appeared, that during this period Ukraine in criminal cases under Art. 139 of the Criminal Code ('Failure to help the patient medical worker ...') were accounted 143 criminal offenses; the number of criminal offenses where notifications of suspicion were issued, was only 1; total of criminal offenses forwarded to the court with indictment act was 2; 235 criminal offenses in which proceedings were closed during the reporting period, including 233, which were closed on P. 1, Ch. 1, 2, 4, 6, Art. 284 Code of Ukraine; criminal offenses in which by the end of the reporting period, no decision was taken (of termination or suspension) - 139. In criminal cases under Art. 140 of the CCU ('Improper performance of professional duties by medical or pharmaceutical worker') for the same period 2025 criminal offense were accounted; the number of criminal offenses where notifications of suspicion were issued, was 23; total of criminal offenses forwarded to the court with indictment act was 21; 1054 criminal offenses in which proceedings were closed during the reporting period, all they were closed on P. 1, Ch. 1, 2, 4, 6, Art. 284 Code of Ukraine; criminal offenses in which by the end of the reporting period, no decision was taken (of termination or suspension) - 2003.

According to the previous researches during the period from 2012 to April 2016 there were two court decisions in criminal cases under Art. 139 of the CCU, and the doctor was found guilty only in one case; in criminal cases under Art. 140 of the CCU among the 48 judgments 50 medical workers were 44 (88%) guilty, 5 (10%) of

health workers were justified, in 1 case health worker was exempted from criminal liability for committing an offense under Ch.1, Art. 140 of the CCU.

Given the above, the question arises whether in Ukraine is almost no cases of failure to provide medical care? In these cases almost always carried out forensic examination on defects of medical care and according to ch. 2, Art. 84 CPC of Ukraine (Criminal Procedure Code) procedural sources of evidence in criminal proceedings is an expert conclusion. At the same time, as is evident from reports of criminal offenses, most of the criminal proceedings (92.3%) were closed under P. 1 Ch. 2, Art. 284 CPC of Ukraine (absence of actus reus). According to the commentary to art. 139 of the CCU 'from the objective side of crime expressed in inaction: medical professional, which according to the rules required to assist a patient, without valid reasons not doing this', i.e. investigative and judicial authorities sometimes unable to understand this issue without special medical knowledge. Therefore, it should be clearly understood, what's a 'lack of medical care' and how it differs from the term 'improper medical care'. In scientific commentary to Art. 140 of the CCU [8] stated, that 'actus reus is characterized by: 1) act (act or omission) - failure or improper performance of medical or pharmaceutical employee of his professional duties as a result of careless or dishonest attitude toward them; 2) consequences in the form of serious consequences for the patient; 3) the causal link between these consequences and act. 'It also gives the interpretation that 'the provision of medical care includes diagnosis (evaluation of objective and subjective health data, choice and decision about treatment) and treatment (use of different kinds of procedures of drug and other therapies, perform surgeries, etc.). Failure professional duties means, that medical or pharmaceutical employee doesn't take the actions, which he must do. Improper performance of professional duties occurs in cases, when medical or pharmaceutical worker performs his duties not in full, careless, superficial, not as required by the interests of his career'.

The authors note, that 'under Art. 140 may qualify the following acts: delayed or wrong diagnosis of the disease, abandonment the patient without proper medical care, blood transfusions another group, leaving foreign objects in the patient during surgery, use of improper treatment, inadequate control of medical equipment, violation manufacture, possession or use of drugs, improper medical protective treatment for patients suffering from mental disorders, failure of doctor's instructions to nurse

on application to the patient drugs or procedures, infection disease (e.g., hepatitis C) during a blood transfusion or organ transplantation etc.’.

The commentary to Art. 139 of the CCU states, that ‘failure to assist a patient can be expressed as the full rejection of its provision and failure to provide assistance to the extent necessary in a particular situation. According to Art. 139 such defects should be classified: the refusal to accept the challenge doctor; failure to attend to a sick call; refusal to accept the patient in health care institute to provide him first aid in the event of an accident; refusing to call the ambulance or deliver the patient to the hospital; superficial, formal examination of a sick person, who needs medical care; refusal to provide first emergency medical care to wounded or injured (give medication, an artificial breathing or heart massage, stopping the bleeding, etc.). Failure to provide patient care in a specific situation may be combined with concealment of guilty of his profession’.

Thus, from a legal point of view, lack and inadequate medical care is characterized only by the amount of measures. From a medical point of view, not all medical activities (therapeutic, diagnostic, etc.) are equivalent. For example, it's not clear, what's ‘superficial, formal examination a patient man’, if the quantity of examinations is not clearly regulated by protocols or other documents. If you rely on the existing legislation (clinical protocols and standards of care, job descriptions, etc.), then only lack of all these points they can be regarded as a lack of medical care.

For example, under the protocols of care for patients with brain concussion, approved by the Ministry of Health of Ukraine of 25.04.2006 number 380, there are a lot of diagnostic measures. In practice, in most cases, doctors don't perform all these activities, but not all of them are equally important, such as CT and analysis of blood RW. Therefore, if we have such defect, as lack of analysis of blood RW, perhaps, we shouldn't regard it as improper medical care, although formally specified protocols were violated. At the same time lack of CT of a brain in cases of a brain bruises is a significant diagnostic defect, even if all other items of protocol were done. And if the negative effects will occur, such situation can be established as a lack of medical care. In such cases, should clearly distinguish between measures that are urgently needed to the victim, such as those carried out on vital testimonies, and such measures, which have been prescribed protocol, but their failure in itself was not a priority in this particular case.

However, investigative judicial authorities should distinctly articulate expert questions, namely, what was due to the onset of adverse consequences: actions (improper medical aid) or omission (failure to provide medical care), during what stage of diagnosis and treatment? Although some scholars argue, that the concept of action and inaction - entirely legal concepts, in analysis of the literature we haven't found confirm such opinion. Especially, that such term as 'the severity of injuries', is purely legal, but determination of the severity of injuries belongs only to the competence of a forensic expert. In any case, the expert can always operate the terms 'rendering' or 'lack of medical care', which, in fact, means action or inaction, and for investigative judicial authorities is essential for the correct qualification of the crime.

It should be also noted, that although the competence of a forensic expert didn't include establishing guilt, but such concepts as possibility to prevent the onset of serious consequences (for the most part it can be determined by doctors, but not lawyers) can help investigative and judicial authorities in right assessment of actions of medical staff.

CONCLUSIONS

1. During the statistical analysis of data from the Unified report criminal offenses in the state from 2012 to March 2016, it appeared, that during this period Ukraine in criminal cases under Art. 139 of the Criminal Code ('Failure to help the patient medical worker'...) were accounted 143 criminal offenses; the number of criminal offenses where notifications of suspicion were issued, was only 1; total of criminal offenses forwarded to the court with indictment act was 2; 235 criminal offenses in which proceedings were closed during the reporting period, including 233, which were closed on P. 1, Ch. 1, 2, 4, 6, Art. 284 Code of Ukraine; criminal offenses in which by the end of the reporting period, no decision was taken (of termination or suspension) - 139. At the same time, during this period there were only two court decisions in criminal cases under Art. 139 of the CCU, and the doctor was found guilty only in one case. Thus, either cases of lack of medical care in Ukraine are almost absent or there are no approaches to defining defects of medical care in the form of its lack. As a result of this, opportunity of determining guilt doctor by investigative and judicial authorities is absent.
2. In criminal cases under Art. 140 of the CCU ('Improper performance of professional duties by medical or pharmaceutical worker') for the same period 2025 criminal offense were accounted; the number of criminal offenses where

notifications of suspicion were issued, was 23; total of criminal offenses forwarded to the court with indictment act was 21; 1054 criminal offenses in which proceedings were closed during the reporting period, all they were closed on P. 1, Ch. 1, 2, 4, 6, Art. 284 Code of Ukraine; criminal offenses in which by the end of the reporting period, no decision was taken (of termination or suspension) - 2003. At the same time, among the 48 judgments 50 medical workers were 44 (88%) guilty, 5 (10%) of health workers were justified, in 1 case health worker was exempted from criminal liability for committing an offense under Ch. 1, Art. 140 of the CCU.

3. Most of the criminal proceedings (92.3%) were closed under P. 1 Ch. 2, Art. 284 CPC of Ukraine (absence of actus reus). According to the commentary to art. 139 of the CCU 'from the objective side of crime expressed in inaction: medical professional, which according to the rules required to assist a patient, without valid reasons not doing this', i.e. investigative and judicial authorities sometimes unable to understand this issue without special medical knowledge.
4. Although some scholars argue, that the concept of action and inaction - entirely legal concepts, in analysis of the literature we haven't found confirm such opinion. Especially, that such term as 'the severity of injuries', is purely legal, but determination of the severity of injuries belongs only to the competence of a forensic expert. In any case, the expert can always operate the terms 'rendering' or 'lack of medical care', which, in fact, means action or inaction, and for investigative judicial authorities is essential for the correct qualification of the crime.
5. Although the competence of a forensic expert didn't include establishing guilt, but such concepts as possibility to prevent the onset of serious consequences (for the most part it can be determined by doctors, but not lawyers) can help investigative and judicial authorities in right assessment of actions of medical staff.

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New highly effective acaricide preparation "Trimiksan" and him dosage forms

Abstract: This article is devoted to the new highly effective acaricide preparation "Trimiksan". Receiving "Trimiksan", the given on toxicity and dosage forms on his basis is given in the publication.

Keywords: "Trimiksan", benzofuroksan, biological activity, veterinary preparation.

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Новый высокоэффективный акарицидный препарат «Тримиксан» и его лекарственные формы

Аннотация: Данная статья посвящена новому высокоэффективному акарицидному, фунгицидному препарату «Тримиксан». В публикации приводятся: способ получения «Тримиксана», данные по токсичности и лекарственные формы на его основе.

Ключевые слова: «Тримиксан», бензофуроксан, биологическая активность, ветеринарный препарат.

Современный фармацевтический рынок остро нуждается в новых лекарственных препаратах ветеринарного назначения, обладающих широким спектром действия и не вызывающих побочных эффектов. Кроме того, причиной непрекращающегося поиска новых препаратов является привыкание микроорганизмов к используемым веществам. Вследствие этого лечение болезней животных, вызванных патогенными микроорганизмами, как трихофития и микроспория, а также чесоточным клещем представляет собой весьма трудную задачу. Применяемые с профилактической и лечебной целью ветеринарной медициной при демодекозе такие препараты, как хлорофос, креолин и др. явля-

ются весьма токсичными и недостаточно эффективными, имеют отдаленные последствия для потомства. Таким образом, создание новых препаратов является актуальной задачей.

Производные бензофуруксанов зарекомендовали себя как соединения, обладающие высокой биологической активностью. На основе хлорнитропроизводных бензофуруксанов получены высокоэффективные лекарственные препараты «Нитроксан» (смесь 4-нитро-5,7-дихлорбензофуруксана и 5-нитро-4,6-дихлорбензофуруксана) [1] и «Димиксан» (смесь 4,6-динитро-5,7-дихлорбензофуруксана и 5-нитро-4,6-дихлорбензофуруксана), проявляющие фунгицидную, акарицидную и бактерицидную активности [2,3].

«Тримиксан» по своей активности превосходит вышеуказанные препараты. Так, в процессе изучения акарицидной активности препарата на клеще *Psoroptes cuniculi* было установлено, что «Тримиксан» проявляет очень высокую акарицидную активность, которая в 340 раз превышает активность эталонных препаратов - Креолин и Хлорофос (табл. 1).

Также определялась бактериостатическая активность «Тримиксана» на культуре бактерий *Staphylococcus aureus*. Препарат проявил высокие бактериостатические свойства (табл. 1).

Таблица 1. Биологическая активность «Тримиксана» и известных биологически активных веществ

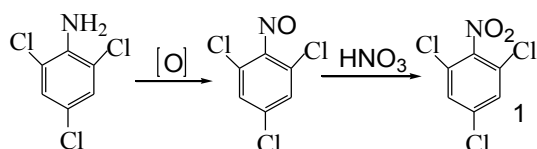
Вид активности	Акарицидная активность СК ⁵⁰ , %	Бактериостатическая активность МБСК, %	Фунгицидная активность МФСК, %			
	<i>Psoroptes cuniculi</i>	<i>Staphylococcus aureus</i>	<i>Aspergillus niger</i>	<i>Microsporum lanosum</i>	<i>Trichophyton gypseum</i>	<i>Trichophyton rubrum</i>
«Тримиксан»	0,00044	0,0156	0,0011	0,0156	0,0078	0,004
«Нитроксан»	0,0044	0,0312	0,0013	-	-	-
«Димиксан»	0,069	0,025	0,0017	-	-	-
Креолин	0,15	0,07	0,0011	-	-	-
Хлорофос	0,7	-		-	-	-
ДМСО	-	-	>1	0,1		

Эти препараты отличаются от отечественных и зарубежных аналогов не только высокими характеристиками биологической активности, но и доступностью способа получения, безопасностью в обращении, отсутствием мутагенных, кумулятивных и аллергизирующих свойств.

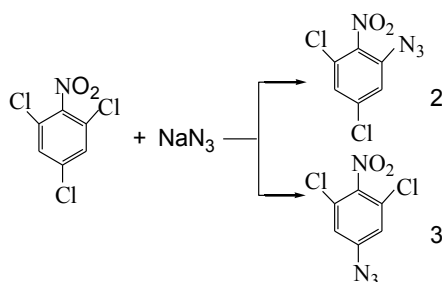
Продолжением исследований в ряду галогеннитробензофуроксанов стал синтез нового препарата «Тримиксан» [4], представляющего смесь 4,6-динитро-5,7-дихлорбензофуроксана, 4-нитро-5,7-дихлорбензофуроксана и 5-нитро-4,6-дихлорбензофуроксана. Исследования физиологического действия этого препарата показали, что по акарицидной активности он превосходит на два порядка активность ранее полученных препаратов «Нитроксан» и «Димиксан», а по фунгицидной активности – на порядок.

Получение «Тримиксана» представляет процесс, состоящий из пяти стадий: окисление 2,4,6-трихлоранилина, окисление 2,4,6-трихлорнитрозобензола, азидирование 2,4,6-трихлорнитробензола (1), нитрование полученной смеси изомеров 2-азидо-4,6-дихлорнитро-бензола (2) и 4-азидо-2,6-дихлорнитробензола (3) смесью 85% серной кислоты и концентрированной азотной кислоты до 2-азидо-1,3,5-тринитро-4,6-дихлорбензола (4), 2-азидо-1,5-динитро-4,6-дихлор-бензола (5) и 2-азидо-1,3-динитро-4,6-дихлорбензола (6), циклизация которых в среде уксусной и трихлоруксусной кислот приводит к получению целевого «Тримиксана»:

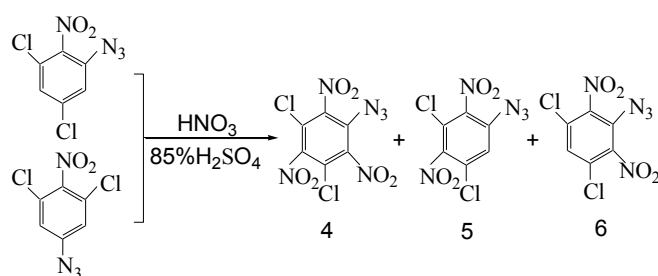
- окисление



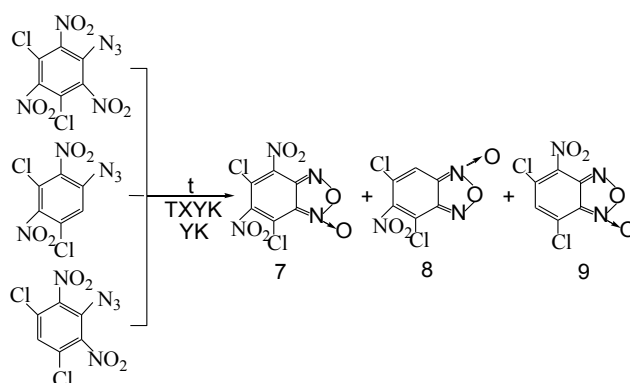
- азидирование



- нитрование



- термоциклизация



В процессе скрининга биологически активных веществ, при изучении фармакологической активности и безопасности потенциальных лекарственных веществ неизбежно возникает необходимость оценки их класса токсичности.

Исследование токсичности ядов принято начинать с острого опыта, в результате проведения которого предусматривается получение данных о смертельных дозах и концентрациях. В диапазоне смертельных доз и концентраций основным показателем токсичности вещества является наиболее статистически точная величина, вызывающая гибель 50% подопытных животных (ЛД₅₀). Как правило, определение смертельных доз и концентраций проводится не менее чем на двух видах животных. Наиболее часто используемые животные - белые мыши и крысы. Установлены параметры острой токсичности «Тримиксана» при введении в желудок для белых мышей и крыс, а также для крыс при накожном применении (табл. 2).

Таблица 2. Параметры острой токсичности «Тримиксана»

Параметры острой токсичности	При введении в желудок		При накожном применении
	Белые мыши	Белые крысы	
Вид животных	Белые мыши	Белые крысы	Белые крысы
ЛД ₅₀ , мг/кг	448,0±60,8	723,0±62,0	655,0±123,0

Изучены также кумулятивные свойства «Тримиксана». Согласно гигиенической классификации Медведя Л.И. «Тримиксан» при пероральном введении можно отнести к веществам с умеренной кумуляцией (коэффициент кумуляции = 5,2), а при накожном применении в ДМСО препарат является умеренно кумулятивным (коэффициент кумуляции = 1,28). Для исследуемого вещества важно отсутствие аллергенных свойств. Согласно полученным результатам «Тримиксан» не является аллергенным, так как в процессе опыта клинико-морфологические признаки аллергии визуально не были отмечены.

Как известно, целый ряд химических соединений, лекарственных препаратов длительно воздействуя на организм, могут вызвать отдаленные нежелательные последствия. Яды вызывают изменения генеративной функции у человека и животных, оказывают мутагенное, тератогенное действие. Исходя из этого, были проведены специальные исследования по изучению отдаленных последствий действия «Тримиксана».

Мутагенное действие «Тримиксана» изучали на примере His⁺ реверсий у ауксотрофного по гистидину штамма BA13 *Salmonella thyphimurium*, имеющего мутацию в гене hisG46 (рис. 1).

Результаты проведенных исследований позволяют сделать вывод, что исследуемый препарат не показал на данной мутационной модели мутагенных свойств, что позволяет предположить отсутствие и канцерогенных свойств. Анализ проведенных исследований показал также отсутствие эмбриотоксических свойств препарата.

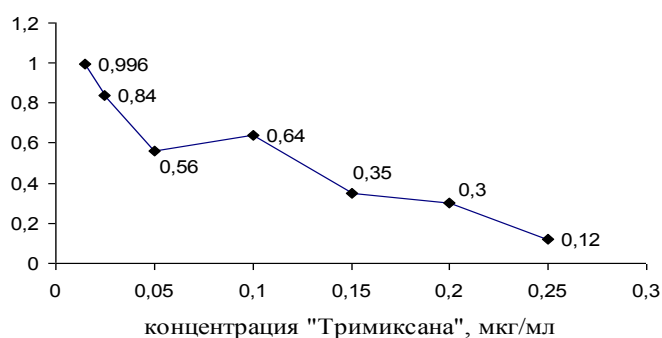


Рисунок 1. Зависимость мутагенной активности от концентрации «Тримиксана»

Высокая акарицидная и фунгицидная активность «Тримиксана», его низкая токсичность, отсутствие мутагенных, канцерогенных, эмбриотоксических свойств явилось предпосылкой для создания лекарственных препаратов для ветеринарной медицины.

В связи с тем, что «Тримиксан» практически нерастворим в воде, возникла необходимость подбора растворителя для создания удобных для применения лекарственных форм. Было выявлено, что лучшими растворителями для «Тримиксана» является ДМСО и 96% этиловый спирт.

Одной из самых простых в приготовлении лекарственных форм для нерастворимых в воде соединений является суспензия. При разработке суспензий в качестве ПАВ нами использовались ПЭО-400 и стеарокс-6. Были получены две лекарственные формы (табл. 3).

Таблица 3. Лекарственные формы «Тримиксана»

Раствор (жидкая мазь) «Тримиксана» и его компоненты	Состав в г	Ушные капли, его компоненты:	Состав в г
Тримиксан	0,1	Тримиксан	0,1
ДМСО	10	96% Этиловый спирт	90
ПЭО-400	60	Н ₂ О _{дист.}	9,9
Н ₂ О _{дист.}	29,9г		

Таким образом, для испытаний лечебной эффективности на животных были предложены водная суспензия (жидкая мазь) и ушные капли в 70% этиловом спирте. «Тримиксан» в данных лекарственных формах проявил высокую лечебную эффективность при лечении саркоптоидозов, гнойного отита и дерматомикозов животных.

Использование «Тримиксана» в концентрации 0,1% в лекарственных препаратах выгодно отличается не только от известных аналогов, но и от ранее полученного в Казанском национальном исследовательском технологическом университете высокоэффективного препарата «Нитроксан», который использовался в концентрации 0,5 – 1%.

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Evaluation in EMG-activity of masticatory muscles in the functional correction in adolescent girls with disorders of sexual development

Abstract: This article is devoted to changes in the EMG-activity of masticatory muscles in adolescent girls with disorders of sexual development. The publication focuses on functional correction of these changes and improvement of values of EMG-activity as objective evaluation of treatment results.

Keywords: adolescent girls, EMG-activity, masticatory muscles, disorders of sexual development.

Temporomandibular disorder (TMD) is usually defined as a collective term that embraces a number of clinical problems that involve the masticatory muscles, the temporomandibular joint (TMJ) and the associated structures and forms the most prevalent clinical entity afflicting the masticatory apparatus [1, 2]. There are two basic concepts regarding the causes of TMD. The first one explains, that the cause of TMJ is a malocclusion and a violation of dental occlusion [3, 4]. The second concept is called myogenic that sees the reason for TMJ in violations of the masticatory muscles by forming zones of hyperactivity [5, 6].

Surface electromyography (sEMG) of masticatory muscles is a modern noninvasive technique for recording muscle activity that may be employed in the assessment of TMD [7, 8, 9]. In combination with a collecting detailed medical history and clinical examination, sEMG can provide objective, evidence and individual assessment of functional status of masticatory muscles [10]. At the same time it is important to estimate adjustment of bioelectrical activity of muscles during functional therapy by occlusal splints. This question is not displayed enough in the scientific literature.

The purpose of this study was to determine the criteria for the assessment of EMG-activity of masticatory muscles in patients during functional therapy.

Materials and methods

The study comprised 57 female adolescents, including 32 girls with with violations of sexual development which was the study group and 25 healthy girls, matched by age, who composed the control group. The average age of girls in the study group was $14,66 \pm 0,3$, in the control group – $14,48 \pm 0,33$ years. All subjects were evaluated according to the Research Diagnostic Criteria for TMD [11]. They had permanent dentition without crossbite, no dental pain or periodontal problems, previous or current traumas in the head and neck region. The girls did not have orthodontic treatment previously. Patients with TMD were examined before and after functional treatment by occlusal splint. Recording of sEMG of masticatory muscles was performed according to the recommendations Sforza et al. and Tartaglia et al [12, 13]. The masseter and anterior temporal muscles of both sides (left and right) were examined. Disposable silver/silver chloride bipolar surface electrodes (diameter 10 mm, interelectrode distance 21 ± 1 mm; Neurosoft, Russia) were positioned on the muscular bellies parallel to muscular fibers [14]. A disposable reference electrode was applied to the forehead. sEMG activity was recorded using a computerized instrument Synapsis and software by Neurotech (Russia). The analog EMG signal was amplified and digitized. Patients were sitting in a natural position without muscular tension, arms, legs were not crossed, head was held equally without support. Lips were kept closed slightly, tooth – in physiological rest. To avoid the effect of fatigue, there was three minutes-rest between each test.

EMG-activity was recorded in 3 tests, lasted 10s for each one. The first test or the maximum voluntary clenching (MVC) of the teeth on both sides was registered for evaluation of symmetry of the muscles of the left and right sides. The second and third tests were one-side constriction for evaluation of EMG-activity of masticatory muscles on working and balancing sides.

EMG-activity of masticatory muscles was compared with the results of sEMG in patients of the control group.

The obtained data was statistically analyzed using the Student's t-test and the Fisher's criterion X^2 . The hypotheses were verified at the level of significance $p < 0,05$.

Results. 32 (100,0%) patients of the study group were diagnosed TMD according to RDC/TMD (group Ia, Ib of muscle disorders). All girls had the skeletal

first skeletal class of malocclusion by Angle, distinguished by overbite and the anomalies of individual teeth position. The data on the results of sEMG of masticatory muscles of adolescent girls in both groups are presented in Table 1.

**Table 1. EMG-activity of temporalis and masseter muscles
in the tests in girls of both groups**

Test	EMG activity	M.temporalis dextra		M.temporalis sinistra		M.masseter dextra		M.masseter sinistra	
		SG	CG	SG	CG	SG	CG	SG	CG
MVC	MA, μ V	2481,78 \pm 136,35	767,32 \pm 31,57	2434,88 \pm 131,67	762,24 \pm 45,67	2331,13 \pm 139,86	972,44 \pm 30,03	2859,78 \pm 184,39	952,84 \pm 30,77
		p<0,001		p<0,001		p<0,001		p<0,001	
	AA, μ V	331,81 \pm 19,10	188,04 \pm 9,23	398,16 \pm 87,81	189,80 \pm 8,93	318,09 \pm 16,52	212,76 \pm 7,92	358,47 \pm 17,15	223,60 \pm 9,12
		p<0,001		p<0,05		p<0,01		p<0,01	
RSC	MA, μ V	1838,31 \pm 122,83	1033,28 \pm 31,47	1887,56 \pm 8,63	708,28 \pm 37,65	1900,94 \pm 115,91	1052,72 \pm 31,48	2166,34 \pm 08,72	763,72 \pm 31,48
		p<0,001		p<0,001		p<0,001		p<0,001	
	AA, μ V	244,13 \pm 14,45	189,56 \pm 7,55	250,31 \pm 9,48	152,4 \pm 7,2	238,94 \pm 13,82	203,00 \pm 8,45	281,03 \pm 12,88	172,92 \pm 8,23
		p<0,01		p<0,01		p<0,05		p<0,001	
LSC	MA, μ V	1720,03 \pm 95,63	778,16 \pm 54,53	1935,34 \pm 70,85	1034,28 \pm 55,59	1973,41 \pm 113,11	845,16 \pm 46,77	2145,78 \pm 120,36	1065,68 \pm 43,40
		p<0,001		p<0,001		p<0,001		p<0,001	
	AA, μ V	268,38 \pm 21,61	147,64 \pm 9,15	287,56 \pm 21,37	188,76 \pm 10,01	293,22 \pm 4,51	183,56 \pm 1,98	336,84 \pm 8,94	202,28 \pm 11,15
		p<0,001		p<0,001		p<0,001		p<0,001	

MVC - maximum voluntary clenching, RSC – right side clenching, LSC – left side clenching, MA – maximum amplitude, AA – average amplitude

Neuromuscular balance that recording as symmetrical EMG-activity was determined in patients of the control group without TMD.

At maximum compression teeth bioelectric activity of the temporal and proper chewing muscles recorded the same and symmetrical, the maximum amplitude contractions of each muscle does not exceed 1000 MW.

EMG-activity of temporal and masseter muscles on the left and right during maximum constriction side was the same and symmetrical. The maximum amplitude of each muscle did not exceed 1000 MkW.

In test of one-side clenching there was observed increased EMG-activity of masticatory muscles on the working side and decreased EMG-activity on balance side. During left-side clenching values of maximum and average amplitude of temporal and masseter muscles on the left side were greater, then on the right side. Prevalence of EMG-activity of the masticatory muscles on the right side was found during right-side clenching. These statistical significant differences between EMG-activity on working and balancing sides is due to the presence of occlusal contacts on the working side, ensuring the normal function of the masticatory muscles.

Patient of the study group with TMD was found asymmetrical EMG-activity on the side with symptoms and on the opposite side. It indicates on disorders on motor behavior of masticatory muscles on the both sides.

Increased and asymmetrical temporalis and masseter muscle activity was determined on the right and left sides at MVC. Significant prevalence of EMG-activity of masseter muscle on the left side and temporalis muscle on the left in this test.

In right side clenching we observed disorders in muscle activity, accompanied by increased EMG-activity of the muscles on the left side (balancing) compared to the muscles of the right side - working. In left side clenching EMG-activity of the muscles on the right side were significant higher, than values of the masticatory muscles activity of the right side.

For functional correction we applied occlusal splint on the upper jaw made of soft thermoplastic material. Occlusal surface of splint was performed with considering supercontacts identified using Brux-chesker.

In a month after using the occlusal splint sEMG was made to assess the restructuring of motor behavior of masticatory muscles (Table 2).

Table 2. EMG-activity of temporalis and masseter muscles in a month after functional correction

Test	EMG activity	Study group			
		TD	TS	MD	MS
MVC	MA, μ V	1153,62 \pm 144,45*	1125,38 \pm 134,23*	1105,0 \pm 124,06*	1189,0 \pm 133,06*
	AA, μ V	219,69 \pm 21,0	223,85 \pm 22,06	231,54 \pm 18,62	253,31 \pm 22,02
RSC	MA, μ V	1229,08 \pm 76,16**	1038,0 \pm 68,97***	1250,31 \pm 87,23***	1094,08 \pm 66,97*
	AA, μ V	225,69 \pm 25,01	205,69 \pm 20,63	223,23 \pm 23,06	222,38 \pm 21,24
LSC	MA, μ V	978,08 \pm 58,84*	1199,08 \pm 56,14***	1106,31 \pm 72,85**	1377,15 \pm 5671*
	AA, μ V	183,46 \pm 14,39*	203,38 \pm 12,97***	210,38 \pm 17,50*	227,31 \pm 16,72*

* – statistical significance $p < 0,001$ ** – statistical significance $p < 0,01$

*** – statistical significance $p < 0,05$

MVC- maximum voluntary clenching, RSC – right side clenching, LSC – left side clenching, MA – maximum amplitude, AA – average amplitude

sEMG results after functional correction was different from data before occlusal treatment. Thus, in MVC test symmetrical EMG-activity of the temporal and masseter muscles on the right and left sides was observed. The maximum amplitude decreased significantly and was within the normal range.

In test of one side constriction prevalence of EMG-activity of masticatory muscles was determined on working side compared to the balancing side. (The prevalence of EMG-activity of right temporalis and masseter muscles was found on right side clenching, on left-side clenching there was found prevalence of left temporalis and masseter muscle).

Conclusion. According to the results, the signs and symptoms of TMD, decreased or disappeared entirely during the month of functional therapy. Control of reconstruction of muscle activity of masticatory muscles was performed using sEMG after 1 month, 3 months. Significant reduction of maximum, average amplitude and eliminate of asymmetry of masticatory muscle activity was found in a month after functional therapy by occlusal splint.

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Hormonal infringements and them correction at leiomyoma of uterus

Abstract: 112 women of reproductive age with the diagnosis leiomyoma of a uterus to which accepted conservative therapy was surveyed. Correction of hormonal infringements at leiomyoma of uterus allows to apply effectively conservative therapy of a leiomyoma of a uterus at women of reproductive age.

Keywords: hormonal infringements, leiomyoma, uterus.

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Гормональні порушення та їх корекція при лейоміомі матки

Анотація: Обстежено 112 жінок репродуктивного віку з лейоміомою матки, яким була показана консервативна терапія. Корекція гормональних порушень при лейоміомі матки дозволяє ефективніше застосовувати консервативну терапію лейоміоми матки у жінок репродуктивного віку.

Ключові слова: гормональні порушення, лейоміома матки.

Вступ. Частота лейоміоми матки у жінок віком 20-30 років сягає 0,9-1,5%, після 35 років – 15-35% [1,2]. Одне з центральних місць в патогенезі лейоміоми матки відводиться особливостям гормонального стану репродуктивної системи. До тригерних факторів цього захворювання відносяться порушення гормонотворючої функції яєчників, порушення естроген- і прогестерон-чутливих рецепторів міометрію [3,4].

Оскільки лейоміома матки є гормонозалежною пухлиною [5], поєднана дія естрадіола і прогестерону стимулює проліферативний потенціал клітин міоми [6]. Лікування хворих на лейоміому матки в репродуктивному віці потрібно розпочинати відразу після встановлення діагнозу. Вивчення механізмів розвитку лейоміоми дає можливість визначення профілактичних і терапевтичних заходів. Вплив на регуляцію рівня прогестерону і його рецепторів може служити одним із необхідних компонентів для консервативної терапії лейоміоми [7].

Консервативна терапія лейоміоми у жінок репродуктивного віку основана на концепції гормонально-залежного характеру міоми. Застосування препаратів, механізм дії яких направлено на гіпогормонемію, приводить до зменшення розмірів пухлини на 30-50%. Традиційно терапевтичне лікування базується на ефекті медикаментозної псевдоменопаузи або індукції гіпоестрогенії внаслідок пригнічення функції яєчників. Ефективність гормональної терапії різниться в залежності від характеру гормональних порушень та щільності і чутливості відповідних рецепторів в міоматозних вузлах і міометрії [7,8]. Базовими препаратами лікування лейоміоми матки є антигонадотропіни і агоністи гонадотропних рилізінг-гормонів (аГН-РГ), дія яких полягає у пригніченні гонадотропної функції гіпофіза, зниженні рівня естрадіолу, блокаді продукції прогестерону. Представниками таких препаратів є Диферелін, Золадекс, Люкрин-депо та внутрішньоматкова левоноргестрел-виділяюча система «Мирена» [1].

Для консервативного лікування лейоміоми використовують також гестагени: норколут, примолут-нор, дуфастон та негормональні препарати

рослинного походження (наприклад, індол-3 карбінол). З антипрогестеронових препаратів застосовують міфепристон, гестринон (неместран), які пригнічують преовуляторні піки лютеїнізуючого і фолікулостимулюючого гормону. Для блокування овуляторної функції яєчників застосовують комбіновані оральні контрацептиви та похідні андрогенів [2]. Антифібротична терапія негормональними препаратами Пуфенідомом, Пірфенідомом впливає на процес апоптозу, проліферацію і міграцію ендотеліоцитів, а відтак – блокує фактори росту лейоміоми, що приводить до регресії міоматозних вузлів [7].

Ортомолекулярний підхід до лікування лейоміоми матки полягає у підвищенні функцій клітинного імунітету.

При міомі матки необхідні вітаміни (С, А, натуральний бета-каротин), мінерали (цинк, кальцій), амінокислоти (аргінін, лізин) [7].

Мета дослідження. Вивчити вплив патогенетично обґрунтованого комплексу профілактики та лікування лейоміоми матки на корекцію гормональних порушень при ній.

Матеріали та методи дослідження. Обстежено 112 жінок репродуктивного віку з лейоміомою матки, яким була показана консервативна терапія (наявність одного або декілька міоматозних вузлів, які не перевищують розміри 4-5 см, лейоміома матки за розмірами не більша 12 тижнів вагітності при інтерстиціальному або субсерозному розташуванні вузла, відсутність кровотеч, болювого синдрому, клінічно малосимптомний перебіг захворювання та відсутність гіперплазії ендометрія у жінок, які не виконали репродуктивні плани).

Загальноприйнятий комплекс лікувально-профілактичних заходів проведено 56 жінкам з лейоміомою матки (група А) згідно діючого протоколу (наказ МОЗ України № 676 від 31.12.2004 року). Корекція гормональних порушень в цій групі жінок проводилась препаратами Гінестріл (Міфепристон), аГН-РГ (Диферелін, Золадекс, Люкрин-депо), Епігалін, прогестагени, КОК з дієногестом.

У 56 жінок репродуктивного віку з лейоміомою матки (група Б) загальноприйняті лікувально-профілактичні заходи були доповнені патогенетично обґрунтованим комплексом профілактики лейоміоми матки, який носив суцільно індивідуальний характер: активний здоровий спосіб життя, збалансоване харчування (вживання в достатній кількості овочів, фруктів, продуктів рослинного походження), що сприяє антиоксидантному ефекту та введенню в організм вітамінів С, А, Е, В6, В12, макро- та мікроелементів (кальцій, магній, марганець, цинк, залізо) з

метою профілактики порушень вуглеводного, ліпідного обмінів, ожиріння; вживання щодобово від 1,5 до 2,0 л рідини, що профілактує згущення крові; профілактика та етіопатогенетичне лікування інфекційних процесів статевих органів та сечовивідної системи, в тому числі захворювань, що передаються статевим шляхом (ЗПСШ), особливо вірусної та мікоплазмової етіології (особиста гігієна, упорядковане статеве життя); виключення абортів та запобігання травм матки під час пологів, діагностичних вишкрібань стінок порожнини матки; корекція гормональних дисфункцій; своєчасна реалізація репродуктивної функції; фітотерапія, терапія негормональними препаратами.

Визначали вміст статевих стероїдів (естрадіол (E2), естрон (E1), прогестерон), гонадотропних гормонів (фолікулостимулюючий гормон (ФСГ), лютеїнізуючий гормон (ЛГ), пролактин) у сироватці крові, взятої з ліктьової вени. Гормональні дослідження проводились на 5-7 день менструального цикла, рівень прогестерона визначався на 20-21 день цикла. Застосовувався імунохімічний метод з електрохемілюмінісентною детекцією (ECLIA) на аналізаторі Cobas 6000 (e 601 модуль). Тест система: Roche Diagnostics (Швейцарія).

Результати дослідження та їх обговорення. Концентрація естрадіолу (E2) в сироватці крові у хворих з лейоміомою матки, які отримували патогенетично обґрунтований комплекс профілактики та лікування (група Б), по відношенню до групи хворих з лейоміомою матки, які отримували загальноприйнятий комплекс профілактики (група А), дорівнювала $336 \pm 20,1$ пг/мл і була у 1,5 рази нижчою ($p < 0,001$); рівень естроу (E1) складав $54,1 \pm 3,2$ нг/мл і був також у 1,5 рази менший ($p < 0,001$); концентрація ЛГ була $12,0 \pm 0,7$ мМО/мл – у 1,7 рази нижче ($p < 0,05$); вміст пролактину – $338,4 \pm 20,3$ нг/мл (у 1,4 рази менший, $p < 0,001$). Рівень ФСГ складав $10,4 \pm 0,6$ мМО/мл, тобто був вищим у 1,2 рази ($p < 0,05$) в групі Б порівняно із групою А. Відмічалось також підвищення показників вмісту прогестерону у 1,1 рази ($12,6 \pm 0,8$ нг/мл в групі Б проти $10,0 \pm 0,6$ нг/мл в групі А), ($p < 0,001$).

Клінічним підтвердженням нормалізації гормонального стану у жінок з лейоміомою матки групи Б є зменшення розмірів пухлини на 30-50%. Одночасно слід відмітити, що у жінок групи Б частота зменшення розмірів пухлини була у 2 рази частішою, ніж у групі А ($p < 0,001$). Ознаки метаболічного синдрому, вегетосудинної дистонії та анемії у групі Б зустрічались у 1,6-2,3 разів рідше, ніж у групі А ($p < 0,05$). Порушення менструальної функції у групі Б зустрічались у 1,8 рази

менше в порівнянні з групою А ($p < 0,01$). Наявність больового синдрому у животі, крижо-поперековій ділянці, які не пов'язані з менструацією, зустрічались у 1,9 разів менше у групі Б, ніж у групі А ($p < 0,001$).

У жінок, хворих на лейоміому матки, в залежності від виду застосованих лікувально-профілактичних заходів показники частоти патології молочних залоз (доброякісні дисплазії та новоутворення молочної залози) суттєво відрізнялись у групі Б від групи А – вони були достовірно меншими у 1,8 рази ($p < 0,05$). При застосуванні запропонованих лікувально-профілактичних заходів наявність запальних захворювань органів малого таза була у 1,8 рази меншою по відношенню до традиційної терапії ($p < 0,001$), значущі метрорагії – у 2,6 рази рідшими ($p < 0,05$). Ерозія та дисплазія шийки матки, залозиста гіперплазія ендометрія та ендометріоз виявлялись у групі Б у 1,6; 2,3; 2,6; 3,6 разів рідше відповідно, ніж при стандартній терапії ($p < 0,05$; $p < 0,01$). Збільшення розмірів яєчників, кістозні зміни в них, кісти, доброякісні пухлини, які є характерною патологією, що супроводжує виникнення та розвиток лейоміоми матки у жінок репродуктивного віку, при застосуванні патогенетично обґрунтованого комплексу профілактики зустрічались у 2,4 рази менше, ніж у групі А.

Висновки.

1. Консервативна терапія лейоміоми матки у жінок репродуктивного віку повинна проводитись за строгими показаннями і базуватись на концепції гормонально-залежного характеру з індивідуальним підходом.

2. Базовими препаратами лікування лейоміоми матки є антигонадотропіни і агоністи гонадотропних рилізінг-гормонів, які доповнені запропонованими нами патогенетично обґрунтованими заходами профілактики.

3. Корекція гормональних порушень при лейоміомі матки, яка доповнена патогенетично обґрунтованими заходами профілактики, дозволяє з більшим ефектом застосовувати консервативну терапію лейоміоми матки у жінок репродуктивного віку.

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***Phenotypic features of the biological properties
of Enterococcus faecalis in children with pathology
of the urinary system***

Abstract: This article presents the research findings of biological properties of *E. faecalis*, isolated from urine of children with urinary tract infection. The properties of pathogenicity factors and antimicrobial resistance of fecal enterococcus are being analyzed. It was observed, that uropathogenic *E. faecalis* show variable phenotypic manifestations of pathogenicity factors with varying degrees of adhesion.

Keywords: urinary tract infection, *Enterococcus faecalis*, newborn, pathogenicity factors, adhesive properties, antibiotic resistance.

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Фенотипические особенности биологических свойств *Enterococcus faecalis*, изолированных у детей с патологией мочевыделительной системы

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Аннотация: В статье приведены результаты исследований биологических свойств *E. faecalis*, выделенных из мочи у детей с инфекцией мочевой системы. Проанализированы особенности факторов патогенности и антибиотикорезистентность фекальных энтерококков. Отмечено, что уропатогенные *E. faecalis* с разной степенью адгезии показывают вариабельные фенотипические проявления факторов патогенности.

Ключевые слова: инфекция мочевой системы, *Enterococcus faecalis*, новорожденные, факторы патогенности, адгезивные свойства, антибиотикорезистентность.

Инфекция мочевых путей (ИМП) является одной из распространенных патологий и встречается во всех возрастных группах. Этиологическими факторами развития ИМП могут быть различные микроорганизмы, но ведущим возбудителем инфекций мочевыводящих путей считается *Escherichia coli*. В последние годы все большее значение в этиологии заболевания приобретают грамположительные кокки, в том числе энтерококки. Установлено, что энтерококки обладают выраженным тропизмом к почечной ткани, что обусловлено комплексом необходимых для этого свойств [1].

Исследования последних лет позволили установить, что энтерококки синтезируют большое количество факторов патогенности, способствующих развитию инфекционного процесса (гемолизин, желатиназа, энтерококковый поверхностный белок, субстанция агрегации, сериновая протеаза, капсула и др.) [2]. Наибольшее количество факторов патогенности выявлено у *E. faecalis*, выделенных из мочи [3]. Высокая протеолитическая активность данного микроорганизма (гидролиз желатины, казеина, коллагена) вызывает токсическое повреждение тканей и способствует тем самым формированию рубцовых изменений в почках при ИМП [2, 3, 4, 5]. Особое значение имеет способность энтерококков быстро приобретать и распространять устойчивость ко многим антимикробным препаратам, что является серьезной клинической и экологической проблемой.

Однако, истинное этиологическое значение этих микроорганизмов в развитии тяжелого течения инфекционного процесса и неблагоприятных исходов остается неопределенным до настоящего времени из-за постоянно меняющихся свойств микроорганизмов. В то же время без учета патогенного потенциала невозможно оценить клинико-эпидемиологическое значение того или иного штамма.

Цель исследования: определить фенотипические особенности *E. Faecalis*, выделенных из мочи у детей с инфекцией мочевой системы, для оценки их патогенного потенциала.

Материалы и методы

В работе исследовано 44 культуры *E. faecalis*, изолированных из мочи детей с патологией мочевыделительной системы в диагностическом титре 10^4 – 10^5 КОЕ/мл в 2013 – 2016 гг. Микробиологическое исследование мочи проводилось согласно Приказа № 535 от 22 апреля 1985 г. Чувствительность энтерококков к антимикробным препаратам определяли на среде Мюллера-Хинтон (BioMerieux) диско-диффузионным методом согласно МУК 4.2.1890-04. Резистентность энтерококков оценивали по индексу множественной антибиотикорезистентности. Адгезивную способность изучали по методике В.И. Брилис (1986) на эритроцитах O (I) группы крови Rh (+). Для оценки адгезивных свойств энтерококков использовали средний показатель адгезии (СПА) - среднее количество микробных клеток, прикрепленных к одному эритроциту. Адгезивность считали нулевой при СПА от 0 - 1,0; низкой – при СПА от 1,01 до 2,0; средней – от 2,01 до 4,0; высокой – свыше 4,0 [6].

Полученные данные обработаны с применением метода параметрического анализа: рассчитывались средние относительные значения, их ошибки. В расчетах применяли t-критерий Стьюдента для оценки статистической значимости полученных результатов. Учитывали достоверность не менее 95% по данному критерию.

Результаты исследования и обсуждение

Все изучаемые культуры *E. faecalis*, изолированные из мочи у детей с ИМС, представляли собой кокки или овальные грамположительные бактерии, располагающиеся одиночно, парами, в виде небольших скоплений или короткими цепочками. Культуры *E. faecalis* были каталазоотрицательными и неподвижными при температуре 22⁰ и 37⁰С. У 86,6±5,5% изолятов энтерококков выявлены редуцирующие свойства по отношению к 2,3,5-трифенилтетразолию хлорида.

Одним из типичных свойств энтерококков является редукция метиленовой сини в молоке. Отмечено, что все исследуемые *E. faecalis* обладали данным свойством в той или иной степени.

Известно, что фекальные энтерококки ферментируют маннит, лактозу и сахарозу, а в отношении к другим сахарам могут быть переменными [7]. В наших исследованиях все изучаемые *E. faecalis* разлагали маннит, глюкозу, не ферментировали рамнозу, однако, показали переменные результаты в отношении лактозы и сахарозы. Лактозу ферментировали до кислоты без газа 88,9±6,05% исследуемых *E. faecalis*, а сахарозу - 70,4±8,7% культур. При этом, отмечено слабое и замедленное кислотообразование при разложении лактозы у трех культур (только на третий день), а у 12 изолятов – при ферментации сахарозы (к 10 дню).

В настоящее время липазу относят к малоизученным факторам персистенции энтерококков, хотя известно, что липаза может быть потенциальным фактором вирулентности *E. faecalis*, способствуя токсическому повреждению тканей [8]. Среди исследованных нами энтерококков, выделенных из мочи детей с ИМП, липолитическая активность определялась у 85,0±8,2% культур (чаще по отношению к твину 20 и твину 80) (таблица).

Таблица

Факторы патогенности *E. faecalis*, выделенных из мочи у детей с ИМП

Факторы патогенности	Кол-во исследованных культур	Наличие ферментативной активности		
		Абс. число	M±m, %	
Ферментация желатины	31	12	38,7±8,7%	
Ферментация молока	41	34	82,9±5,9%	
Лецитиназная активность	41	11	26,8±6,9%	
Липазная активность по отношению к твин 20	37	35	94,6±3,7%	
		твин 60	8	33,3±9,8%
		твин 80	26	96,3±3,7%
Гемолитическая активность:	44	α- тип	10	22,7±6,3%
		β- тип	13	29,5±6,8%
		γ-тип (нет гемолиза)	21	47,7±7,5%
Наличие капсулы	33	12	36,4±8,4%	

Известно, что фекальные энтерококки обладают высокой протеолитической активностью в отношении ряда белков [9]. Кроме того, продукция цитолитических ферментов, в том числе гемолизина, у клинических изолятов энтерококков ассоциируется с повышением тяжести инфекционного процесса [10]. В нашем исследовании культуры энтерококков, изолированные из мочи у детей с ИМП, показали неоднородность в протеолитической активности (табл.). Гемолитическая активность (α- и β-тип) отмечена у 52,3±7,5% *E. faecalis*, кроме того выявлена лецитиназная - у 26,8±6,9% культур энтерококков.

Данные о ДНК-азной активности энтерококков в литературе крайне ограничены. Известно, что *E. faecalis*, изолированные из кишечника, обладают низкой ДНК-азной активностью [11]. Среди исследованных *E. faecalis* только у одной культуры определялась ДНК-азная активность. Эта культура выделена из мочи у ребенка при остром воспалительном процессе мочевыделительной системы.

Капсула является одним из факторов патогенности бактерий. В наших исследованиях имели капсулу $36,4 \pm 8,4\%$ культур *E. faecalis*.

Адгезия – свойство микроорганизмов, создающее условия для последующей их инвазии в ткани хозяина, являясь пусковым механизмом любого инфекционного процесса. В исследованиях Перетятко Е.Г. (2007) установлено, что клинические изоляты *E. faecalis*, выделенные от больных с карциномой мочевого пузыря, из трофических язв больных сахарным диабетом, являются высоко адгезивными, тогда как штаммы, выделенные из желудочно-кишечного тракта здоровых людей, проявляют значительно меньшую адгезивную активность [12].

При изучении адгезивных свойств *E. faecalis*, изолированных из мочи у детей с ИМП, определено, что все культуры энтерококков обладали способностью взаимодействовать с эритроцитами человека. Из них с высоким уровнем адгезии выявлено $42,9 \pm 8,4\%$ *E. faecalis* и со средним - $57,1 \pm 8,4\%$ культур. Энтерококков с нулевым и низким уровнем адгезии не было.

Обращает на себя внимание тот факт, что энтерококки с высоким показателем адгезии (СПА $\geq 4,01$) с большей частотой ферментировали желатин (50,0% культур) и молоко (91,7%), обладали гемолизом β -типа (58,3%), лецитиназной (50,0%) и липазной (91,7%) активностями.

У *E. faecalis* со средним уровнем адгезии (СПА = 2,01 – 4,0) реже отмечалась протеолитическая (у 12,5% культур - желатиназная, у 75,0% - ферментация молока), лецитиназная (12,5%), липазная (75,0%) активности и у 35,7% изолятов определялась гемолитическая активность α -типа.

Отмечены пять культур *E. faecalis* со значениями СПА выше 5,5, среди которых - три культуры изолированы из мочи новорожденных детей с пневмонией. Эти культуры отличались от других *E. faecalis* тем, что обладали комплексом уропатогенных факторов - протеолитической, гемолитической (β типа), липолитической и лецитиназной активностями, у них выявлялась капсула.

При изучении чувствительности уропатогенных энтерококков к антимикробным препаратам отметили, что все культуры были чувствительны только к ванкомицину. Высокая чувствительность *E. faecalis* отмечена к фурадонину ($91,9 \pm 4,5\%$), хотя в клинической практике данный препарат используют, главным образом, при лечении острых не осложненных форм ИМП.

Большинство исследуемых энтерококков чувствительны к доксициклину ($83,8 \pm 6,05\%$) и хлорамфениколу ($75,7 \pm 7,05\%$). Чувствительными к пенициллину и ампициллину были только $66,7 \pm 7,8\%$ и $63,9 \pm 8,0\%$ культур соответственно.

Несмотря на то, что энтерококки обладают природной устойчивостью к низким дозам аминогликозидов, данный класс антибиотиков широко применяется в комбинированной терапии генерализованных энтерококковых инфекций. В наших исследованиях чувствительность к стрептомицину выявлена у $64,9 \pm 7,8\%$ культур, а к гентамицину – у $59,5 \pm 8,1\%$ *E. faecalis*.

Отмечена высокая резистентность энтерококков к эритромицину ($75,0 \pm 8,2\%$), тетрациклину ($65,6 \pm 7,8\%$), фторхинолонам II и III поколения, не используемых в педиатрической практике - ципрофлоксацину ($58,3 \pm 8,2\%$), левофлоксацину ($51,35 \pm 8,2\%$), норфлоксацину ($50,0 \pm 8,3\%$).

Выявлены культуры *E. faecalis* резистентные ($24,2\%$) и с промежуточной чувствительностью ($15,2\%$ культур) к препарату резерва – линезолиду, рекомендуемый для лечения инфекций, вызванных штаммами, резистентными к ванкомицину, аминогликозидам и бета-лактамам. Хотя в России при изучении энтерококковых инфекций в период с 2005 по 2013 гг. выявлялись единичные штаммы энтерококков со сниженной чувствительностью к линезолиду.

Необходимо подчеркнуть, что $75,7\%$ исследуемых *E. faecalis* обладали резистентностью к 4 и более антимикробным препаратам, индекс множественной антибиотикорезистентности колебался в пределах от 0,43 до 0,78.

Успех лечения больных с ИМС во многом зависит от своевременности назначения и правильного выбора антибактериальной терапии. Часто руководствуясь клиническими рекомендациями, при эмпирической этиотропной терапии врачи назначают антибиотики, к которым у энтерококков имеется природная или приобретенная резистентность. Важно помнить, что не рациональная антибиотикотерапия в отношении энтерококков может очень быстро привести к появлению резистентных штаммов, а также способствовать развитию генерализованных энтерококковых инфекций.

Полученные результаты выявили фенотипическую неоднородность биологических свойств *E. faecalis*, изолированных из мочи у детей с ИМП, особенно факторов патогенности, что возможно определяет характер течения, тяжесть инфекционного процесса и его прогноз.

Выводы:

1. Выявлены фенотипические особенности биологических свойств у *E. Faecalis*, изолированных из мочи у детей с патологией мочевыделительной системы.

2. Отмечено, что *E. faecalis* с разной степенью адгезии показывают вариabельные фенотипические проявления факторов патогенности.

3. Большинство *E. faecalis*, выделенных из мочи у детей с патологией мочевой системы, обладают высокими адгезивными свойствами и ферментативной активностью, связанной с факторами патогенности, что создает этим бактериям преимущества в колонизации и инициации инфекционного процесса.

4. Выявленное сочетание комплекса факторов патогенности (протеолитической, гемолитической, липазной и лецитиназной активностей) на фоне высокого уровня адгезии, возможно, имеет определенную диагностическую и прогностическую значимость.

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Evaluation of conservative treatment of patients with secondary comparative stenosis spinal canal of spine lumbar part

Abstract: In 87 patients with secondary spinal canal stenosis relative studied clinical and paraclinical indicators, CT, MRI, reovazographic and electro-neuromyographic research. The proposed method of basic therapy with the inclusion of electrophoresis products papain and ultrasound therapy hydrocortisone ointment lumbar led to a decrease in pain VAS scale, increase range of motion in the spine and reduce the IMS. In addition, the marked improvement reovasographical, electroneuromyographical indicators in both groups of patients, but in the main group, these changes were significantly better character.

Keywords: secondary spinal stenosis, degenerative-distrophic spinal diseases, back pain, electroneuromyography, rheovasography, conservative treatment.

The prevalence of chronic pain in the back of Russia's adult population is 42,4% – 56,7% [1, 2]. One of the causes of chronic pain in the back is a spinal stenosis (PC) [3]. Stenosis is diagnosed, according to different authors, from 5-65,2% of patients with long-term degenerative processes in the lumbar spine [4]. With the widespread introduction into clinical practice of computer (CT) and magnetic resonance imaging (MRI) significantly increased the capacity of diagnosis of spinal stenosis [5]. However, the key issues of etiology, pathogenesis, clinical

manifestations, and treatment strategy of a narrow spinal canal remain largely unresolved, despite the long history of the study of pathology.

Patients with a narrow spinal canal is traditionally carried out surgical treatment [4]. However, the unsatisfactory results of surgical treatment, achieved by 50% according to different authors [4, 6, 7, 8]. In their research some authors concluded, that conservative treatment could be recommended instead surgery, or at least before the operation. Positive results also indicated the use periradicular and epidural blockade with corticosteroids in 75% of patients with lumbar spinal stenosis [9] also observed a high efficiency blockades in patients with radiculopathy, and in patients with degenerative stenosis and spondylolisthesis with spinal canal stenosis results significantly better than in patients with herniated intervertebral disks. There are reports of equally good functional results of treatment of blockages in patients with lumbar disc herniation and lumbar spinal stenosis [10]. Thus, nowadays, it appears to identify the actual problem of spinal stenosis in the early stages of the disease with the optimization of complex conservative treatment.

The aim of this study is to assess the effectiveness of conservative treatment of spinal canal stenosis relative to the lumbar level.

Material and methods. 87 patients were selected in the day hospital neurological clinic «Global Med System». Surveyed were randomized into 2 groups of the primary (n = 52) and control (n = 35). In the primary group was dominated by men – 35 (67,3%) patients, 17 were women (32,7%) in the control group – respectively, 23 (65,7%) and 12 (34,3%). Age men in the primary group averaged $45,9 \pm 2,1$ years, women – $43,5 \pm 2,3$ years in the control group - respectively $44,1 \pm 2,3$ and $42,3 \pm 2,5$ years.

The research design included a clinical and neurological evaluation of patients with the traditional physical examination, the degree of pain severity determination on a scale before and after treatment, manual testing of individual muscles using a metered-dose loading tests, dynamic clinical analyzes, rheovasography lower limbs to determine the state of the venous outflow, electromyography of individual muscles. To confirm vertebral stenosis conducted various types of radiation diagnosis. Advantage (55 pers., 63,2%) in the method of imaging gave MRI. CT performed 42 (48,3%) patients, 10 (11,5%) patients was used both methods. Based on the results of CT and MRI were performed spinal canal area calculations (SC) on unchanged level (relative area of the SC) and the area of the SC

to the change in the level at the narrowest point (standardized SC area). On the basis of calculations identified the degree of narrowing of the SC.

CT and MRI studies of our patients, we calculated the spinal canal area by the formula: $S = A * B / 2$, where A – the frontal size of the spinal canal; B – the sagittal size of spinal canal [11], which in all cases regardless of the type of spinal stenosis was from 75 mm² to 100 mm² – comparative stenosis.

Patients in the control group received basic therapy, including nonsteroidal anti-inflammatory drugs, muscle relaxants, vasoactive drugs (pentoxifylline – 800 mg/day for 12-14 days), B vitamins, chondroprotectors, physiotherapy, exercise therapy and massage. In addition to the basic treatment of the control group patients received paravertebral blocks with corticosteroids.

Patients of the main group at the background of basic therapy with ultrasound therapy gidrocortisone ointment at the lumbar spine and karipazim by the methods electrophoresis and phonophoresis. Karipazim was introduced by electrophoresis with the positive pole. Bottle karipazima 350 PE were diluted in 5-10 ml saline immediately before the procedure. The solution was added 2-3 drops dimexidum. The solution was applied on filter paper placed on the electrode pads. The dimensions of the electrode-pads – 10-15 cm. Temperature of pads – strictly 37-39°C. Exposure time – 20 minutes. Courses of treatment – 10-12 procedures. In the presence of contraindications to electrophoresis (cardiovascular failure, the presence of an artificial pacemaker, arrhythmia, cancer and skin diseases) was used phonophoresis with karipazim. Karipazim 350 PE mixed with 2 ml indomethacin ointment was applied to the affected symmetric region along the spine portion. The exposition of 10 minutes. In the course of 10-12 procedures.

The efficacy of the treatment was evaluated on the following criteria: 1) the intensity of pain on a visual analog scale (VAS – 10 points); 2) muscle-tonic manifestations; 3) the amount of motion in the spine; 4) according rheography and 5) electroneuromiografy.

The degree of the musculo-tonic syndrome (MTS) was determined by calculating the index of muscle syndrome (IMC):

1) spontaneous pain evidence: 1 point – no pain at rest, appear under load; 2 points – insignificant pain at rest, aggravated by movement; 3 points – pain at rest, disturbed sleep, forced to pose;

2) muscle tone: 1 point – finger easily immersed into the muscle; 2 points – for immersion requires a certain force; 3 points – muscle density stone;

3) muscle soreness: 1 point – palpation patient indicates the presence of pain; 2 points – response to palpation of the facial reaction; 3 points – answer general motor reaction;

4) duration of pain: 1 point – soreness cease immediately; 2 points - continued to 1 minute; 3 points – lasts more than 1 minute;

5) the degree of irradiation of pain on palpation: 1 point – pain is localized at the site of palpation; 2 points – the pain spreads to the tissue located near; 3 points – pain spreading to remote areas.

IMC is assessed by the total score of these signs: I degree (mild) – IMC to 5 points; II (average, reasonable) – from 5 to 12 points; III (hard, severe) – more than 12 points [12].

Range of motion in the affected segment was assessed by patient – 4 scale (0 – the amount of movement is not limited to, 1 point – a slight limitation, 2 points – moderate limited 3 points – severely restricted). Investigation of the state of regional circulation by rheography ("Rheo-Spectrum-2" Company "Neurosoft" with a four-channel recorder).

The aim of the electrophysiological examination was to assess the severity of damage to the neuromotor apparatus with the assessment of motor and sensory spinal spine portions. The study was carried out on a 4-channel digital computer electromyograph ("Neuro-EMG-4" "Neurosoft" company).

Results and discussion. Patients were examined in dynamics: the admission to the hospital and after treatment. All patients in the survey revealed a relative degenerative spinal stenosis of spinal canal. Patients with absolute stenosis we are not included in the survey niche, as it is shown operative treatment.

The causes of stenosis in our patients were spondyloarthrosis combination with hernias of intervertebral discs of various localization (74 persons – 85,1%) or spondyloarthrosis, spondylolisthesis, and hernias of intervertebral discs (13 persons – 14,9%). In 13 (14,9%) patients had stenosis, spondylolisthesis cause I and II degree, and 8 (9,2%) persons it was combined with a medial hernia. The amount of disc prolapse by CT and MRI ranged from 5,5 mm to 10 mm.

In the study of the neurological status of patients have been identified following neurological symptoms: radiculopathy (65 patients, 74,7%), radiku-

loischemia (at 22 – 25,3%), myelopathy (from 3 – 3,45%), lumbar pain (from 2 – 2,3%). Sensory disturbances in the lower extremities were detected in 59 (67,8%) patients, 1 (1,6%) – in the anogenital area. Violations of the pelvic organs on delay function type diagnosed in 5 (5,75%) patients. Periodic cramp in the calf muscles in 12 (13,8%), neurogenic intermittent claudication – in 75 (86,2%).

To measure pain intensity we were used visual analogue scale (VAS). In the primary treatment of pain intensity on the VAS was similar in the groups: $7,4 \pm 0,3$ points in control group and $7,5 \pm 0$, in the core. During treatment, pain intensity decreased in both groups. However, in patients who in a primary group pain intensity on the VAS was significantly ($P < 0.05$) lower than $2,0 \pm 0,1$ points, than in the control group – $2,7 \pm 0,3$ points (Table).

Musculo-tonic manifestations in the surveyed groups corresponded to the degree of pain severity was comparable: at $12,5 \pm 0,2$ points in both groups. After 10 days of IMC in both surveyed groups declined: in the control – up to $4,8 \pm 0,2$ points, and in the main – to $2,0 \pm 0,2$ ($P > 0.05$). The positive dynamics of pain and IMC accompanied by a significant decrease in pain paravertebral points in the projection of the L3-S1 segments (Table).

In assessing the effectiveness of the treatment of the restoration of the affected organ function is no less important than the disappearance of pain. Restoring the spine function characterized by an increase range of motion in the affected PDS. During the initial examination, the majority of patients in both groups observed a sharp limitation of movement in the affected PDS: in the main group – $2,5 \pm 0,2$ points, the control – $2,5 \pm 0,3$ points. Recovery of motion in the course of treatment were observed in both groups, however, the main group ($1,0 \pm 0,1$ points) these data were significantly better than the control group ($1,5 \pm 0,2$ score) (Table).

For objectification of the results of treatment with rheography we assessed the state of regional circulation. The study was conducted before and after treatment. Prior to treatment, patients of both groups the main blood flow to the damaged side was reduced by 10-15% compared with the healthy. It was found that it was caused by lowering the tone of the veins and venous outflow obstruction (IN), as evidenced by the following indicators. In analyzing the causes of decline in the volume of blood flow (DSI-a) – an indicator characterizing the tone of venous vessels was increased by 42%. At the same time indicators (DKI-a) and peripheral resistance index (PRI), which characterize the state precapillar small vessels had no significant differences

between the affected and the collateral segments, which gives an indication of the absence of back up vessels spasm. The comparative analysis of these indicators after treatment in patients and control group was achieved normalization of blood flow to the affected side, reducing DUI-a 27% increase and 12% IN. At the same time the control group maintained a downward trend in the volume flow of 0.21 ml / min to 100 cm² compared with patients of the main group; DUI decreased by 23,1%, while IN increase of 7,5%.

Thus, the data analysis of comparable treatment led to improvement in regional hemodynamics in patients of both groups. However, the treatment regimen using drugs extract papaya tree and ultrasound therapy with hydrocortisone ointment it is more effective in comparison with the baseline therapy relative spinal stenosis. In order to assess the state of neuromuscular apparatus carried electroneuromyography (ENMG) on the affected side and intact. The following indicators were used for further analysis: the latent period (to determine the speed of the pulse (SI) for the motor fibers) and the amplitude of the M-response area, which indirectly reflect the number of functioning motor units in the muscle. From the analysis of the data revealed that on the affected side as the main and control groups before treatment was an increase in the latent period of the M-response to 0,21-0,23 ms decrease in M-response amplitude (3,18 mV / ms) and the area of the M-response (at 17,44 mV / ms) compared to the intact side. These changes in the electro-neuromyographic show a significant reduction in the number of active motor units of muscles. After completion of treatment in all patients, both in the main and control groups on the affected side was marked improvement in the main indicators of ENMG. Patients in the control group was detected a trend towards normalization, whereas in the study group ENMG performance did not differ from normal values intact side, indicating that the high efficiency of the treatment regimen using drugs extract papaya tree papayas and ultrasound therapy hydrocortisone ointment.

Conclusion

Thus, the combined use of ultrasound therapy hydrocortisone ointment and preparations papaya tree drawing Popeye (Karipazim, Karipain, Papain, Kukumazim) as electrophoresis or phonophoresis on a relative stenosis of the spinal canal in the lumbar level against the background of basic therapy provides pain relief, improves microcirculation and regenerative processes, relieves muscle spasms and increases the mobility of the affected segment.

The combined use of ultrasound therapy and hydrocortisone ointment preparations extracts papaya tree Popeye in complex conservative treatment of spinal canal stenosis relative to the lumbar level are effective in most cases, that allows to recommend it for wider use in the inpatient and outpatient practice.

Table**Some clinical information on examined patients during treatment**

Indicators	Main group		Control group	
	Before treatment	After treatment	Before treatment	After treatment
Intensity of pain in movements	7,5 ± 0,2	2,0 ± 0,1#*	7,4 ± 0,3	2,7 ± 0,3
Capacity of movement in affected PDS	2,5 ± 0,2	1,0±0,1 #*	2,5 ± 0,3	1,5±0,2
IMC	12,5 ±0,2	2,0±0,2 #*	12,5±0,2	4,8±0,2

Note : # reliability > 0,001 between 2 groups before and after treatment.

* reliability > 0,05 between main and control groups after treatment.

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The state of circulating antiphospholipid antibodies and antibodies to co-factors in case of missed abortion in the first term of gestation

Abstract: The studies to determine the level of antiphospholipidic antibodies (APhA) and to co-factors APhA of APhA in case of missed abortion have been carried out. Prognostic markers allowing to determine missed abortion origin possibility in the first term of gestation have been determined.

Keywords: antiphospholipid antibodies, antibodies to beta.2-glycoprotein-1, to aneksin V, to prothrombin, missed abortion.

Missed abortion is a pathological state, when the in development stops and the fetal egg dies. Missed abortion or non-developing pregnancy can stop progressing and developing at any period of gestation, but, as a rule, it takes place in the first term of pregnancy [1].

The reason for missed abortion can be a whole complex of various factors, the most frequent of which are latent infectious and inflammatory diseases, hormonal

disorders, abnormalities of the body and neck of uterus structure, genetic and immune disorders [2].

When studying the missed abortion pathogenesis role the investigation of autoimmune reactions is of particular importance and specifically the formation of antibodies to some own phospholipids [3]. Circulating antiphospholipid antibodies (APhA) can influence the process of implantation, growth and the embryo development, the course and outcome of pregnancies [4]. They can also promote the development of thrombotic complications in the endometrial and chorionic tissues that lead to the blood flow disturbance and the pregnancy development cessation [5].

For the last few years it was determined that realize some immune process it is necessary to have in the organism not only antibodies to phospholipids, but also antibodies to the so-called co-factor whose binding form natural complex of antigen-antibody whereas cellular phospholipids act as "complete" autoantigens [6].

Among similar co-factors, the plasmatic component β 2-glycoprotein-1, which is present in patients serum with the antiphospholipid syndrome (APhS) is more widely studied nowadays [7]. Despite a great number of investigations concerning the study of the APhA influence on the implantation and the formation of the chorial-placental blood circulation, up till now there exists not a single common system of evaluation of APhA and antibodies to their co-factors, which could prognoses the probable embryo death in the early period of gestation.

Purpose of investigation – is the determination of the clinicodiagnostic value of APhA and co-factors APhA (annexin V, prothrombin, β 2-glycoprotein-1) and their prognostic role in the development of missed abortion in the first term of pregnancy.

Materials and methods of investigation

Complex clinical and laboratory examination of 80 women at the age of 21 to 36 years with missed abortion in the first term of gestation, who were in the main group has been conducted.

The control group included 30 patients of the same age, with the physiological course of pregnancy, unburdened of obstetric-gynecological and somatic anamnesis.

65 (80.9%) patients of the main group in anamnesis had 1 to 2 missed abortion. 15 (19.1%) women were primigravidas. None of the observed patients of the main group had delivery in anamnesis.

In the control group 20 (66.7%) women in anamnesis had 1 to 2 deliveries. 10 (33.3%) patients were primigravidas.

All the patients of the main group, who had of missed abortion in anamnesis, were conducted cytogenetic investigation of chorion, the investigations concerning on the presence Torch-infection, hormonal investigations and the homeostasis system evaluation that didn't detect any pathological abnormalities.

All the examined women were compared as to the peculiarities of anamnesis reproductive function and age.

The determination of APhA concentration and antibodies to annexin V, to β 2-glikoprotein-I, to prothrombin in the maternal blood were carried out using the method of immunoenzymatic analysis with the help of the set of tests (ELISA).

Statistical analysis of the received data was made with the help of the pack of applied statistic BMDP programs, oriented on the analysis of the biomedical results. The data are presented in the form of the arithmetical mean value (M) and standard deviations (m). For comparison of samplings Student's t-criterion was applied. Significant was considered to be trustworthy if $P < 0.05$.

Results and their discussion

As a result of research it was determined the APhA values and antibodies to co-factors APhA were different significantly between the main and control groups.

The circulating APhA in pregnant women of the control group are detected only in 3.6% of observations. Mean concentration of the circulating APhA made up $0,07 \pm 0,01$ U / ml.

In case of missed abortion the APhA concentration increased almost 8 times and their mean concentration in the main group made up $0,55 \pm 0,09$ U / ml ($P < 0.001$).

Thus, we have determined that the APhA concentration is equal or more than 0.5 U / mL is prognostically unfavorable for the further embryo development.

We have carried out the study of concentration in the blood of circulating antibodies to annexin V. In the control group the antibodies to annexin V were detected only in 2 (2.5%) patients, whose mean concentration of circulating antibodies to annexin V made up 0.013 ± 0.003 U / ml.

In the main group the circulating antibodies to annexin V were detected in 43 (53.8%) their mean concentration made up 0.22 ± 0.03 U / ml and was 17 times greater as compared to the control group of patients ($P < 0.001$).

So, it was determined that the concentration of antibodies to annexin V more or equal to 0.22 U / ml is also prognostically unfavorable as to the development of missed abortion in the first term of pregnancy.

In the control group of women the circulation of antibodies to β -2-glycoprotein 1 was detected in 11 (36.7%) patients. In the main group of women with missed abortion the given antibodies were determined in the overwhelming majority of pregnant women - 69 (86.2%).

The concentration of antibodies to β 2-glycoprotein-1 in women with missed abortion made up 1.76 ± 0.38 U / mL. At the same time in the control group the concentration of antibodies to β 2-glycoprotein was 10 times less and made up 0.17 ± 0.31 U / ml ($p < 0.001$).

While studying antibodies to prothrombin we determined that the frequency of circulating antibodies to prothrombin and their concentrations considerably different in the main and control groups. Circulating antibodies to prothrombin in the control group of pregnant women were detected only in 2 (6.7%) of the observed patients. The mean concentration of the circulating antibody to prothrombin in the control group made up 0.31 ± 0.046 .

In the main group of women with missed abortion, mean concentration in the blood of the circulating antibodies to prothrombin was detected in 69 (86.2%) cases and made up 2.4 ± 0.19 U / ml ($p < 0.001$).

In connection with prognostically unfavorable development of missed abortion we determined the concentration of antibodies to prothrombin in pregnant women more or equal to 2.4 U / ml.

On the grounds of the conducted investigations one can come to the conclusion that in pathogenesis of missed abortion a special part is played the role autoimmune disorders that are evident in a considerable increase of the APhA production and antibodies to co-factors APhA, that can lead to the increased of blood coagulation properties and vascular disorders [9].

Against the background of changes in the natural anticoagulant activity, thrombosis in the endometrial and chorionic tissue are formed that promote the development and trophic disturbances of the fetal egg [10].

The danger of APhS complications is the course of pregnancy only increases. That is why to diagnosis the APhS and to treat accordingly is better in the early periods or before planning a pregnancy.

If APhS is diagnosed after pregnancy onset the patient needs in a regular case monitoring and adequate therapy. More over it is necessary to determine the level of APhA and antibodies to co-factors of APhA (annexin V, prothrombin, β 2-glycoprotein-1) in the pregnant woman in the first trimester of pregnancy.

Thus, the APhA and antibodies to co-factors of APhA are of important prognostic value in the development of missed abortion. Prognostically unfavorable markers concentration the development of missed abortion are: APhA > 0.55 U / ml, antibodies to annexin V > 0,22 U / ml; concentration to antibodies to β 2-glycoprotein-1 > 1.76 ± 0.38 U / ml and the antibodies to prothrombin > 2.4 U / ml.

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The study of the diagnostic value of immunoregulatory proteins to assess the functional capacity of the fetoplacental complex with intrauterine infection

Abstract: This article is devoted to the study of the content of immunoregulatory proteins to evaluate the functional capacity of the fetoplacental complex, forecasting and reduce the risk of intrauterine infection (IUI).

Keywords: intrauterine infection, immunoregulatory proteins, placental complex, pro-inflammatory cytokines.

One of the current problems in obstetrics and gynecology are infectious and inflammatory diseases of women during pregnancy [1]. Infection of the urogenital tract of pregnant woman can be realized in the infectious process and manifested pyelonephritis, cystitis, coleitis, chorioamnionitis, fetal infection and the development of intrauterine infection (IUI) [2]. Acute infection may be the cause of pregnancy loss and / or the birth of children with developmental disabilities as a result of direct infection of the fetus and placenta [3,4]. Long persistent, chronic infections often lead to intrauterine infection, can become a cause of placental insufficiency (FPI), which leads to intrauterine growth retardation (IUGR) of the fetus, the defeat of its most important organs of life [5,6]. The share of IUI in the structure of mortality in our country is almost 25%, however, transplacental infection of the fetus is considered to be one of the most probable causes of 80% of congenital malformations, which, in turn, account for about 30% of all deaths of children under 1 year [7].

The immune system of pregnant woman should be adapted to semiallogenny fetus and still be tense with respect to various pathogens of bacterial and viral infections, and changes in the immune system due to viral persistence may result secondary to activation of the bacterial flora and the development of autoimmune disorders and serve the cause of development of a chain of pathological inflammatory reactions [8]. The development of an infectious disease of the newborn affects the evolution of the infection. The spectrum of pathogens causing the intrauterine infection of the fetus and the intrauterine infection of the newborn changed in recent years. There is a growing pathology associated with persistent intracellular so-called slow infection. In general, it is believed that intrauterine infection affects the viability of newborns in 88%. The actual percentage of the negative effects of intrauterine infection is still uncertain. According to various estimates fetal neonatal infection can be observed in every tenth case of pregnancy in the world. However, the true incidence of perinatal pathology caused by an infectious factor, remains unspecified, due to the absence of screening, the cycle of the infection and the incidence of immediate, frequent latent course of the pathological process, the objective complexity of antenatal laboratory diagnostics. As a result, a significant portion of infections remain undiagnosed and statistical analysis is taken into account as a result of complications of childbirth, fetal asphyxia, syndrome of respiratory disorders and other pathological conditions [9]. To detect intrauterine infection apply complex methods, including a variety of diagnostic procedures, but in most cases they reveal either the mere presence of the pathogen in the active or persistent form of the mother or indirect signs of intrauterine infection, that does not mean unavoidable development of an infectious disease of the fetus. The incidence of infection with the manifestation of the disease is on average about 12-14% of all cases of intrauterine infection [10]. Direct antenatal diagnosis of IUI using high-tech invasive techniques (cordocentesis, amniocentesis, chorionic villus or placenta sampling) is rarely used because of the large number of contraindications and possible complications of pregnancy. Diagnostic methods in addition to the clinical and ultrasound include immunoassays of cytokines (IL-1 β , TNF- α , IL-8, IL-6, IL-10) which are the predictors of intrauterine infections. Cytokine levels has a great variability, which is not always possible to forecast the development of IUI [11].

Thus the search for reliable methods of antenatal and intrapartum diagnosis of IUI in newborns is still relevant in obstetrics. Thus the development of minimally

invasive techniques allow not only to detect the presence of the pathogen, but also to determine the risk of developing an infectious disease of the fetus and newborn, as well as complications of neonatal period is very important. The mechanisms affecting the fetus has not yet been established. In recent years, there is a popular theory that the damaging effect is not the pathogen, but the synthesis of autoantibodies to the cells of the mother and the fetus, which it provokes. It is believed that such a development of autoimmune processes leads to hyperactivation of the immune system cells and imbalance of the synthesis of proinflammatory cytokines, and as a consequence, there are characteristic for IUI violations. The immunoregulatory proteins modulate cytokine synthesis and there are α -2-macroglobulin (α -2-MG) and lactoferrin (LF). Both proteins are active components of innate immunity, they interact directly with bacterial agents and carry a variety of ions and proteins to cells carrying intercellular interactions, hence changes in the content of these multifunctional proteins help to evaluate the functional capacity of feto-placental complex, as well as to predict the development of the inflammatory response in pregnant [12,13].

The purpose and objectives of the study. Examine the contents of cytokines and immunoregulatory proteins in serum and amniotic waters of the mother, the umbilical cord blood to predict the development of intrauterine infection (IUI).

Materials and methods. Conducted research analysis of the clinical symptoms during pregnancy and its outcomes, the state of the fetus and the newborn in 131 women. All patients were divided into two groups. According to a retrospective analysis of all pregnant women of the main group they was divided into two groups: 1st(n = 58) - with favorable perinatal outcome of labor and the birth of a healthy child (8-9 points Apgar's score); 2nd (n = 40) - with adverse birth outcomes (7 Apgar's score with the implementation of IUI of the different severity and pathological course of the early neonatal period).

The study used clinical, immunological, microbiological, molecular-genetic methods. The analysis of the initial infectious and inflammatory diseases with the determination of the spectrum of possible pathogens. To determine the concentration of α -2-MG in cord blood and serum, and albumin in amniotic fluid using the method of low voltage immunoelectrophoresis. Determination of LF, IL-6, IL-8, TNF α , were determined by enzyme linked immunosorbent assay (ELIZA) using kits "Cytimmune" (USA). The amount of albumin was evaluated using standard biochemical tests. Age

of the patients included in the survey ranged from 22 to 38 years and averaged $34,3 \pm 0,5$ in the main group and $32,1 \pm 0,5$ years in the control group.

Results and its discussion. In the study of the structure of infectious and inflammatory diseases, which often leads to perinatal complications found in the study group was significantly more likely to meet a woman who had IgG antibodies to Herpes Simplex Virus 1,2 - 24 patients (24.4%); IgG antibodies to Ch.trachomatis - 19 patients (19.4%); vulvovaginal candidiasis - 16 patients (16.3%); the carrier of Staphylococcus aureus - 8 patients (8.16%); IgG antibodies to CMV - 3 patient (3.06%); mixed carriage of pathogens found in 28 women (28.6%).

In the group of women with various embodiments of the mixed carrier was an increase of LF concentration > 4.9 mg / l and the reduction albumin < 37 g / l in serum and amniotic fluid was an increase in the level of α -2-MG $> 0,08$ g / l, albumin > 2.4 g / l, Lf level was reduced < 5.0 mg / l. High levels of α -2-MG and albumin in amniotic fluid indicates an increase in the permeability of the placental barrier to exposure of proteins from the blood in the amniotic fluid.

The content of LF > 4.1 mg / l increases and decreased albumin < 36 g / l in serum of the patients with the presence of IgG antibodies to Ch.trachomatis, carriers of Staphylococcus aureus, Candida albicans. The level of LF in the serum of pregnant with IgG antibodies to herpes simplex 1,2 lowers < 3.5 mg / l.

The level of α -2-MG > 3.2 g / l and α -1-AT $> 4,0$ g / l was increased in the cord blood of newborns with IUI implementation in carriers of Candida albicans. All infants had reduced the level of LF < 2.4 mg / l. The exceptions were the children born of the mothers with IgG to Ch.trachomatis. In our opinion, these results indicate that the products of the inflammatory reaction, the mother get into the fetal circulatory system, increasing the overall anti-proteinase potential of umbilical cord serum as increasing the total concentration of the major proteinase inhibitors - α -MG-2 and α -1-AT.

The amniotic fluid showed a significant increase in the level of α -2 MG > 0.05 mg / l and albumin > 2.4 g / l against decrease LF < 4.8 mg / l at the birth of children with IUI, indicating increased permeability of placental barrier and reducing antibacterial and antiviral protection of the fetus.

The greatest change in the level of immunoregulatory proteins have been identified by us in the presence of IgG to Ch.trachomatis, therefore we decided to further explore the concentration of some pro-inflammatory cytokines (IL-6, IL-8, TNF α) in maternal serum, umbilical cord blood and amniotic fluid in the ratio with

protein content. Cytokine content in biological liquids have been studied are subject to considerable individual variability. In the analysis of the results attracted attention a significant increase in the concentration of pro-inflammatory cytokines IL-8 ($24358,0 \pm 4261,3 \text{ pg / ml}$; $p = 0.0246$) and TNF α ($38,6 \pm 9,2 \text{ pg / ml}$; $p = 0,0387$), that normally should suppress the synthesis of albumin and α -2-MG, but their levels were also significantly increased. This indicates a serious increase hemato amniotic barrier at IUI and excess of TNF α activates phenomena of apoptosis and synthesis of metalloproteinases, which together with an excess of 2- α -MG can damage tissue, reducing the bactericidal potential of the amniotic fluid. Thus is created a negative inflammatory background, promotes the development of infection of the fetus.

Conclusions. Thus, these data used to determine the level of immunoregulatory proteins to evaluate the functional capacity of the fetoplacental complex, forecasting and reduce the risk of IUI.

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Anatomic-physiological peculiarities of the development and built of the paranasal sinus in humans

Abstract: The research deals with the analysis of the paranasal sinus built and functions in phylo-and ontogenesis. While comparing the anatomic-morphological data in phylogenesis before and after palate development, we can state that some animals have changes in the maxillary sinus. Here we suggest the sinus has possible thermoregulation functions for the brain.

Keywords: paranasal sinuses in humans and animals, functional importance of the sinuses, thermoregulation of the brain.

Topicality. In humans brain and facial skull are separated by a net of very thin bones including numerous intraosseous cavities. All these formations are connected with the upper and middle nasal passages due to which they are generally called paranasal sinuses. This is logical but still needs more investigation, especially the functional significance in breathing, olfaction, speech. Thus, the paranasal sinuses functional significance still remains a contradictory topic.

The aim of the research is to analyze the paranasal sinuses development peculiarities in phylo-and ontogenesis and clarify its functional significance.

Materials and methods. In the research we used data of the comparative anatomy of the paranasal sinuses of the humans and animals in phylo-and ontogenesis. We have analyzed the morpho-functional peculiarities of the internal nose.

Results of the research. The built of the paranasal sinuses and their importance for fish, amphibians, reptiles, birds and mammals is different. Initially they

appeared as olfactory pits, canals, sockets in coldblooded animals; in mammals and humans they received new characteristics which are not investigated yet. It's commonly thought that the paranasal sinuses serve for moisturizing and warming the inhaled air, decrease the skull mass, improving the sound resonance, increase of the olfactory epithelium surface, innasal pressure regulation [1, p. 116]. Each of these statements has possible significance though real significance can be clarified on the basis of the phylo-and ontogenesis data received in the morpho-functional researches.

In the main end of the body the olfactory organ in the form of olfactory pits first appears in chordates. In some fish these pits connected by a special canal have a special opening. Though, only in double breathing fish first appears connection of olfaction and respiratory system. The olfactory organ starts actively take part in the respiratory act in amphibians. Their olfactory sac already has a nostril and a primary choana opening in the roof of the mouth cavity. In reptiles on the exterior surface of the oral nasal cavity first appears an evident pit - the maxillary concha, that is additional bosom. Dislocation of the primary choanae to the back, development of the maxillary concha accompanies by the development of the side palatal folds and development in some reptiles (crocodiles, turtles) elements of the secondary palate which allows breathing during grasping and pushing food in the oesophagus. In birds on the nasal sides there develop three more pits (conchas), besides they all are connected with the base of the brain skull.

In mammals paranasal sinuses have more complicated built which is connected first of all with the sphenoid and ethmoid bones' development. In the range of the axial skeleton bones the ethmoid bone ossification is observed in the last moment.

It's worth to admit that these bones develop from cartilages of the axial and original cranium. While dividing the cranium on brain visceral these bones belong to the brain skull. In some mammals sinuses are placed in parietal (elephants) and temporal bones. Most investigators determine sinuses functions as air-breathing, air-warming, and serving for alleviation of the skull mass.

In ontogenesis in an embryo nasal additional bosoms start developing on the 3rd month of the embryonic development that is after the soft and hard palate development. On the external nasal side till the end of the 3rd month in the epithelial tissue appear limited fissured outgrowths which further develop maxillary, frontal,

ethmoid bosoms. Frontal sinus first is observed on the 4th month of the embryonic development and the anlage of the sphenoid bone is the latest to develop [2, p. 4]. Final development of the paranasal sinuses in humans finishes till 17-20, that means till the time of the growth completion.

Results of the discussion. It's known that while coming through the nose from the paranasal sinuses the air mixes with the inhalant and warms it [1, p. 117]. The given fact can be possibly explained though comparing the volumes of the inhalant air and the sinuses volume we doubt the mention fact. Thus, total volume of the paranasal sinuses is in average from 30 to 65 sm³ [1 p. 119, 3 p. 711]. At the same time the volume of the inhalant air is 0,5-0,6 l. and with the full inspiration - from 1,5 to 2 l [4, p. 94]. Thus, the air from the paranasal sinus cannot possibly warm the inhalant air of larger volume.

To our mind the paranasal sinuses function is better to investigate together with the skull basis and the brain contact. In the form of innerbone cavities the bosoms are in a close contact with the eye-socket, frontal cranial pit to the Turkish saddle. Thus, being inside of the sphenoid bone the main bosom through a quite thinned bone borders the hypophysis, bridge of Varolius, inner carotid, internal optic nerve, cavernous sinus [3, p. 527].

The ethmoid bone is in the direct contact with the brain through the ethmoid plate, besides the top point of the ethmoid bosom roof can be placed 17 mm higher the ethmoid plate level [5 p. 82]. Blood circulation of the ethmoid sinuses is implemented by the systems of the externals and internal carotid arteries, besides the frontal ethmoid artery goes through the eye-socket, ethmoid bone cells – in the frontal cranial pit. Thus, the closeness of the brain to the paranasal sinuses is evident. The sinuses development happens later than the secondary palate development, in 3-4 months term of the embryonic development and continues after birth. Comparatively smaller size of the medium zone of the child's face are connected with the gradual development of the dentition (transitional dentition), bland nutrition (not hot, mostly soft food), which does not presuppose special thermoisolation of the developing brain by the paranasal sinuses [6, 7].

In adults the need in thermoregulation is much higher, due to this the system of the inner bone cavities is developed more. Besides, from the mouth cavity these cells are limited by bone sides of the upper jaw, thermostable mucous membrane of the hard palate. Mucous membrane of the maxillary bosom is 2-3 times thicker than

the mucous ethmoid maze and the main bosom [8, 9]. Thus, the recommended temperature of the first course, tea and coffee is 75⁰.

At the same time brain as a highly energetic structure has a high temperature 38⁰C (due to different data it differs from the human nucleus for 0,39 - 2,5⁰C). The brain temperature is higher for 1-2⁰C from nasopharenginal [10, 11, 12, 13]. The temperature difference of the new cortex and hypothalamus is 1⁰C. Despite the fact the human brain is a part of the body it presents a physiologically autonomous system with the main characteristics of metabolism, central blood circulation, temperature, water and ionic exchange. We have found out that the temperature of the brain is connected with the temperature of the brain basis [14, 15]. Data on the arterial blood temperature influence on the brain temperature are not identified and need further investigation, but closeness of the big arterial vessels to the paranasal sinuses and the direct contact of the vessel side with the bosom cavity with the bone absence is well-known in anatomy [3 p. 371]. At the same time brain areas with the high temperature don't contact with the environment only through the paranasal sinuses. Brain is very sensitive to temperature change; thus, temperature higher for 2-3⁰C during very short period of time can be critical for all the body.

Thus, we believe that the paranasal sinuses function of thermoregulation is supposed to be one of the most important and significant.

In phylogenesis the differentiation of the olfactory organ in fish, amphibians and reptiles developed on the way of the pits increase, folds, cells development increasing the area of the olfactory epithelium.

During the secondary palate formation, brain development and nutrition character change in mammals (warmblooded) paranasal sinuses start playing a protecting and thermo regulating role. The prototype is the principle of the cellular material use for warming an apartment widely used in building construction.

Thus, the partansal sinuses are a protector and a thermoregulator for the structures of the brain and skull, having an intensive energetic exchange and high (subfebrile) temperature.

Conclusions

1. Function of warming and moisturizing of the inhalant air by the air from paranasal sinuses is important for the human body but not the main for the sinus.

2. The paranasal sinuses are presented in the form of the thermoregulative structure between the skull basis, brain and hard palate with the thick mucous membrane.

3. One the functions of the paranasal sinus is thermoregulation.

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Study influencing factors in quality for recommended tablets "Piracetam"

Abstract: This following report presents the results of the study about affecting factors in the quality of tablets piracetam on 0.2 g and 0,4 g. Obtained data from the study of quality indicators recommended tablets piracetam are also given as disintegration, the height to diameter ratio, breaking strength, abrasion, etc.

Keywords: nootropic agents, tablet, compaction pressure, quality, friction, mold, a hydraulic press, disintegrants, strength, fracture, abrasion.

Introduction. Present days, a number of medicines have been used in the medical practice psychotropic activity. Nevertheless, majority of these medicines, together with its major pharmacological effects have a number of undesirable side effects. From a biopharmaceutical point of view, this fact requires a search for new medicines with high psychotropic activity or improve their technology, but with a low risk of side effects. Prospects for the improvement of pharmaceutical technology determined by requirements of modern pharmacotherapy, which suggests create the most effective therapeutic point of view of medicines in the content of these minimum medicinal substances that do not have side effects. The consistent increase in the level and quality of life, respect for basic social guarantees, including by ensuring access to quality health and pharmaceutical care is the main goal of social policy. [1.2].

Among nootropic drugs piracetam hitherto maintains its leadership. Piracetam - is practically harmless and effective drug which is used as a nootropic agent. It speeds up the metabolic processes in the brain, improves the conductivity of the nerves, improves the blood circulation [3].

In connection with the above we have conducted research on the improvement of tablets "Piracetam" technology.

The main aim of this study is to investigate the factors affecting the quality of tablets recommended "Piracetam". To study the technological properties of the compressible mass, quality indicators and the impact of compaction pressure, the quality of piracetam tablets technology on the recommended structure and technology.

Materials of this study was a powder (substance) piracetam. Piracetam - nootropic drugs - chemically pyrrolidone derivative is 2-pyrrolidone-acetamide, or 2-oxo-pyrrolidone acetamide practically harmless and effective drug which is used as a nootropic agent. When heated piracetam with sodium hydroxide solution, ammonia is released, which is detected by smell and blue litmus paper red (carboxamide group). According to sensory analysis, they are powders in white, odorless, crystalline structure of the particles is. Structurally-mechanical properties of the substances under study were examined by an optical microscope «LEITZ» company «Biomed» with an increase of 330 times. The study of the technological properties of Piracetam tablet mass conducted by conventional methods given in SP XI, issue 2, p. 154., In the literature and the relevant specification [3].

Fractional composition of the tablet weights were determined on a shaker instrument company "Erweka". The flowability of the test mass was studied in the EP-12A device according to the known method for literature. To determine the residual moisture in the tablet mass used "Kett" firm moisture meter, as well as determined by the method of drying to constant mass at the GF XI. Determination of bulk density of the tablet mass was carried out on the device model 545 AK-3 Mariupol. Compactability coefficient studied in compactor loose masses - AK-3 type UPR-42-25 GOST 162640-85. Moisture sorption properties tablet mass were studied by the method of S.A. Nosovitskoy at different relative humidity values of the environment.

Experimental part. Development of the expedient technology was considered tablet forms of piracetam from the viewpoint of biopharmacy.

In the preparation of tablet dosage forms are powders of different processing steps of processing - sieving, milling, mixing, granulation, compression and humidification. In this regard, for tablet dosage forms of stable quality control is needed for the industrial processability of incoming raw materials, the choice of which is determined by the specifics of production and simplicity of their information content definition.

Based on the foregoing, in the preparation of piracetam tablet dosage form should be used excipients and separate technological operations.

The quality of granules and tablet mass, and also the quality of tablets, is influenced by many factors, including the dispersion of drug substance and form of the particles. Since the particle size range depends on substance technology tablet equipment and method of granulation, if necessary, strength and density of the obtained pellets and accordingly, mechanical properties of the tablets themselves, their disintegration and dissolution [8]. The next stage of the research devoted to the study of the properties of the resulting granulate. The results obtained by the following indicators: mass of compressible homogeneous granules of white color with a specific smell, fractional composition -2500 +2000 μ -8.32%, 1000- -2000 + 40.18% + 500 -1000 43.41%, -500 250 + 5.72%, -250 - 2.37%, flowability of 6,5 kg / s, the bulk density of 603 kg / m³, 60 H compressibility, compressibility coefficients (1.23), compactability coefficient: 2.3, residual moisture (700C) 3%. The findings of the research to determine the residual moisture has a predictive value for the drying of tablet masses in their preparation by wet granulation. Fractional composition results indicate that most of the substance is distributed in the range of - 500 to 1000 microns. Using excipients improved some technological properties of the substance. Such technological characteristics as bulk density (603 kg / m³), flowability (6,5 • 10⁻³ kg / s), the coefficients of compressibility (1.23), compactability (2,3), and others. Have a positive value at the pressing weight than the substance, indicating that the proper selection of excipients and the course of the process. The optimal residual moisture is in the range of 3 - 3.5%. Also, according to the data obtained, it can be noted that the free-flowing substance in the pellets increased twice increased bulk density. granulation results indicate a significant coarsening of the particle size, where the bulk of the mass fraction corresponds -1000 + 500 microns.

The third phase of the study devoted to the choice of tablet technology. Research began exploring the possibility of receiving piracetam tablets by direct compression, which is known to have a number of advantages. Research study of technological parameters showed the need for additives of auxiliary substances that improve the technological properties of substances. glucose, lactose, potato starch, microcrystalline cellulose, calcium carbonate, magnesium oxide, calcium stearate, etc. Especially noticeable influence of the shape and size of the substance particles..

In the experiments the various excipients recommended SP XI, both individually and in combination, were used on the technological characteristics of tablet mass intended for direct compression. Tablet blends for direct compression, as is known, must have a number of optimal processing properties, such as good flowability (at least 5.6 g / s), high compressibility (not less than 70-100 N), the optimum value of bulk density (at least 0.4-0.5 g / ml, angle of repose low (less than 400).

Since the compression molding is increasingly being implemented in the pharmaceutical industry due to its obvious economic benefits, and advent of modern high-speed tablet presses with high efforts of compression, particularly relevant are the studies aimed at studying and standardization of technological and rheological parameters of tablet mixtures, as well as their components, have active ingredients and auxiliary components. These studies are particularly in demand at the present time has increased dramatically the number of firms-suppliers of drug substances, which sometimes differ significantly from batch to batch in their physico-chemical and technological parameters [4].

However, the tablets obtained by direct compression does not meet requirements of the relevant technical documentation in appearance, disintegration and strength. Therefore, in subsequent experiments, using a wet granulation method. Proposed and tested more than 20 prescriptions with different composition and content of the excipients. Selection of excipients quantitative was based on previous experiments.

Further hydration starch paste was performed with different concentrations (2, 7, and 10%). According to the results of research showed that low concentrations of starch paste lengthen disintegration time of tablets, also affect the quality of the tablets. Quality indicators pressed mass was evaluated on the following parameters: friability, bulk density, fractional composition, residual moisture, compressibility, compact ability coefficient. Analysis of the finished tablets, their quality indicators were carried out according to pharmacopoeia methods. Tablet mass was compressed on a tablet machine impactor company «ERWEKA» (Germany) with a diameter of 9 mm punches. These piracetam tablets were white color, valium forms with a facet and with a smooth surface. The diameter of the tablets – 9 mm, height - $3 + 0.01$ mm, which corresponds to the requirements of the GF XI.

Disintegration of the resulting tablets was determined on the device "Rotating basket". The strength of the tablets was investigated on the hardness tester

«ERWEKA». Piracetam tablets obtained corresponded pharmacopoeian requirements for strength and disintegration. The quantitative content of Piracetam tablets were determined by UV spectrophotometry. The optical density of the solution prepared from the powder pounded piracetam tablets was measured with a spectrophotometer at maximum absorption 209 ± 2 nm in a cell with 10 mm layer thickness.

Piracetam on 0.2 g tablets prepared with an average weight of 0.25 grams per manual hydraulic press with a diameter of 9 mm and piracetam on 0.4 g with an average weight of 0.55 g per mold with a diameter of 12 mm, intended for the production of tablets flat cylindrical form. Tablet mass was pressed at a pressure range of 50 to 300 MPa.

Next we were studied such physico-chemical indicators such as disintegration, the ratio of height to diameter, breaking strength and friability of tablets. Physical and mechanical properties were studied by conventional methods given in SP XI, the published methods and the relevant specification.

Fracture strength under these conditions increased from 20 N to 90 N, and the abrasion resistance was increased from 97% to 100%. Specific pressing pressure was 150-200 MPa.

From the literature known, that the compaction pressure affects the physical and mechanical indicators of tablets. Current research to develop new and improved technologies used in tablets are multifaceted. The problem of friction during tableting, its impact on the process, manufacturability, quality tablets and ways of its leveling using adjuvants, affected only fragmentary studies [4].

Contacting materials rubbing process are pressed mass particles, tablet, working surface feeder and press instrument, friction occurs when all technological operations tableting. When dosing the cohesive forces, including sliding friction between component particles usually exceed gravitational force that holds a form stable clusters impeding the flowability of the material, and consequently, disruption of tablet weight uniformity. During extrusion, except internal friction progresses external pressed material from the channel matrix surface. Part of the compacting pressure is spent to overcome, there is a height redistribution of density of tablets. Loss pressing force to offset external friction increasing pressure and friction coefficient are dependent on the powder material in the pair - the material of the matrix, the cross-sectional size and quality of processing walls, the presence of

lubricant. The friction operations for ejecting the tablets from the die depends on the fineness of the powder, the shape and surface state of the particles, the mechanical properties of the material, the elastic properties of the mold and compaction pressure. In addition, compensation of friction causes an increase in pressure and increase power operating conditions of the press - the instrument, reducing its performance and increasing the possibility of contamination of food tablets wear [5].

Thus, in this study proved their impact on non-uniform, spontaneous increase in the size of the tablet when removed from the pressure side surface uniformity, the presence of chipping, cracks and mechanical strength of the tablets.

Conclusions

1. Studied dependence of the quality finished product (piracetam tablets) from the volume-compressible mass technological properties.

2. Determined quality indicators of piracetam tablets obtained on the recommended structure and technology that all the physical and mechanical characteristics fully comply GF XI.

3. On the basis of these studies determined the optimal compression pressure for tablets "Piracetam" on 0,2 g and 0,4 g recommended for advanced composition. The optimum compaction pressure is 150-200 MPa. The dependence of the quality of the tablets from the pressing conditions.

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The study of quality indicators of dry extract "Meliflos"

Abstract: This report presents the results of the research study of the physico-chemical and technological properties of the resulting collection of "Meliflos" dry extract. The studies found that the studied extract is hygro-scopic dry, fine powders from red to dark brown color with a specific smell and has a high capacity moisture sorption.

Keywords: technological properties, extract moisture sorption, physico-chemical, expiration dates.

Introduction. Medicinal plant as a source of biologically active substances, and allows you to introduce into medical practice new medicines. From the literature conducted experiments in the field of preparation of tablet formulation shown that process parameters and the properties of the finished product depends on all the complex physico-chemical and technological properties of the starting materials. Physical and chemical parameters affect the technological properties of powdered drugs. To optimize the production is important to examine the relationship between physico-chemical and technological properties of materials, study approaches to the selection of the optimal excipients and technological schemes of dosage forms [1,2].

The purpose of this research was to study the physical, chemical and technological properties of the resulting collection of "Meliflos" dry extract.

The object of study is dry extract "Meliflos" received the recommended methods and technologies. Experiments were carried out by methods and devices listed in the literature. The experiments were performed using the following instruments: hygrometer firm "Kett" (Japan), optical microscope - LEITZ "Biomed", Electron Microscope - "B-242 E" (Czechoslovakia), a device for determining the flowability of powders - VP-12-TU set sieves and shakers of the company "Erweka" device for determination of bulk density - 545 AK-3, etc. In order to investigate the

authenticity and quantitative content of the main active ingredients have been developed spectrophotometric and chromatographic methods of quantitative spectrophotometric determination of the amount of flavonoids and coumarins in the composition of the dry extract.

Method of storage in natural conditions and the method of "accelerated aging": To establish the shelf life of dry extract "Meliflos" The following methods were used. Experimental studies of the natural method of storage was carried out in laboratory premises at $220 \pm 2^{\circ}\text{C}$. In every 6 months preparation exposed to certain qualitative and quantitative indicators.

The method of accelerated aging was carried out according to the Temporary Instruction on work to determine the shelf life of the drug and, 42-2-82. The studies kept the temperature conditions of 40°C . In the experiments dry extract was packaged in the following 4 types of packaging:

1. Contour - cellular packaging according to OST 64-074-91 membrane of polyvinyl chloride according to GOST 25250-88;
2. Contour-cellular packaging according to OST 64-074-91 aluminum foil printed patent TU 48-21-270-78;
3. Banks made of colorless glass type TU 13-73080001-477-85;
4. Banks of sun glass type BNS -25 TU 64-228-84.

Studying of physico-chemical properties of dry extract "Meliflos" showed that the extracts are hygroscopic dry, fine powders of dark brown color with a specific smell. In determining the dry extract moisture in the device «Kett» Japanese firm installed the moisture content of the dry extract is 4.45%, the quantitative content of biologically active substances 97.45%. Also determined loss mass were on drying, the content of heavy metals and microbiological purity of the resulting dry extract. The results of these studies are shown in Table 1.

Table 1

**Results of the study physico-chemical properties of the collection
dry extract "Meliflos"**

Definable indicators	Reseived results	Method for determination
Appearance	Dry hygroscopic, amorphous powder from red to dark brown color with a specific smell	SP XI, issue 2, organoleptically
Authenticity:	Respectively.	Sianidin reaction

a) the amount of flavonoids b) coumarin c) quercetin	UV absorption (max 271 ± 3 nm); UV absorption (max 430 ± 3 nm)	UV spectrophotometry; UV spectrophotometry
Heavy metals, %	less than 0.01	SP XI, issue 2, P. 161
Humidity, %	4,45	SP XI, issue 2, P. 161
Microbiological purity	In 1 g of the drug is not more than 10 ⁴ total bacteria, total fungi 10 ² , 10 ² other grammotritsa-negative bacteria. Bacteria family Escherichia Coli, Pseudomonas aeruginosa, Staphylococcus aureus missing	SP XI, issue 2, P. 193 and measuring № 2 from 29.09.2005 y.

Further studies were devoted to the study of dry extract "Meliflos" as a substance for the development of tablet technology.

When studying the technical characteristics defined dry extract-was isolated: fraction composition, flowability, bulk density, angle of repose, compressibility and compaction factor. The results of the study of technological properties dry extract listed in Table 2.

As a result of investigations conducted by the above determined that studied substance (dry extract) is a hygroscopic dry, fine powders from red to dark brown color with a specific smell. The results of fractional composition suggests that the bulk of the particles have a size less than 250 microns (32.20%), characterized by poor flowability values (0,601.10⁻³ kg / s), low bulk density (241,35 kg / m³), high compression ratio , angle of repose (44 degrees), increased residual moisture values (up 10.23%).

Table 2

The results of studying technological properties dry extract "Meliflos"

Investigated indicators	The unit of measure	Values parameter
Appearance		Hygroscopic, amorphous powder from red to dark brown color with a specific smell.
Fractional composition +2000	mcm, %	1,74

-2000+1000		18,10
-1000+500		26,59
-500+250		21,37
-250		32,10
Flowability	10^{-3} kg/s	0,601
The angle of escarpment	degree	44
Bulk density	kg/m ³	241,35
Compressibility	N	84
Coefficient compactibility		3,8
Residual moisture	%	10,23

From these results it can be concluded that the dry extract "Meliflos" has poor flowability and at the same time quite satisfactory moldability.

Thus, unsatisfactory results investigated process parameters the dry extract to be assumed need for adjuvants.

Structurally-mechanical properties of particulate systems are largely dependent on their water content. In developing the technology for a particular substance, which depend on the residual moisture indicators and moisture sorption many properties and process parameters to some extent can be adjusted. These rates in turn affect the technological characteristics of the substance [4,5].

Based on a residual moisture content of the samples "Meliflos" dry extract were studied on the above contact. The residual moisture content was determined on a hygrometer Japanese firm «Kett», at 40 degrees temperature. The kinetics of the dry extract moisture sorption collection "Meliflos" studied the method recommended Nosovitskoy. As indicated in the method moisture sorption properties were studied in special klimokamerah with relative humidity of 58, 79, 90 and 100%. These conditions were established using solutions of sodium bromide, ammonium chloride and purified water, respectively. The results determine the kinetics moisture sorption presented in Figure 1.

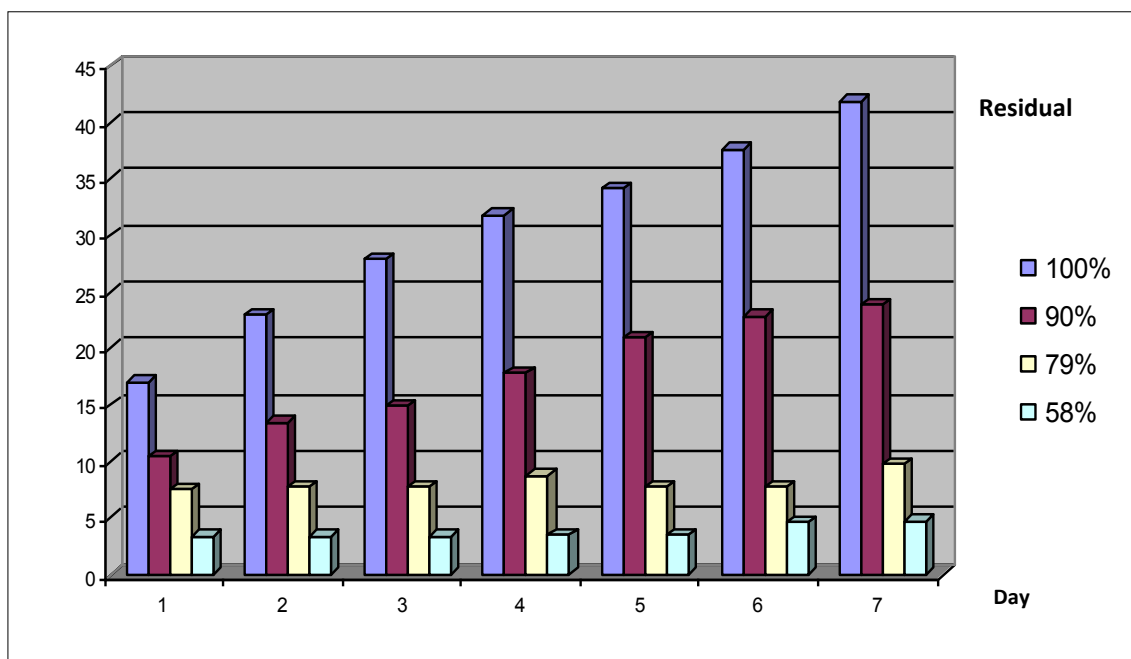


Figure 1. The results of studying moisture sorption properties of the powder "Meliflos" dry extract

From the above results it should be noted that at 58% relative humidity for 7 days, the amount of adsorbed moisture increased in a cumulative basis. The amount of adsorbed moisture through 1,3,5,7 day is within 15,45-18,98%; 43,87-47,08%; 58,14-66,67%; 74,91-78,92%, respectively. At ambient relative humidity to 79, 90 and 100% increase moisture sorption properties of the samples of the dry extract. Thus, for the experimental period, the number of adsorbed moisture is 90.86; 106.67 and 121.55, respectively. Further studies with an increase in the amount of adsorbed moisture changes in the aggregate state of the powders was observed in the samples. Moisture Sorption worsened technological properties of dry extract. After three days, the samples in all conditions becomes a thick mass.

Thus, the results of the study indicate moisture sorption properties expressed strongly hygroscopic properties dry extract "Meliflos" test samples and naturally, their prove unsatisfactory properties with regard to tableting. The results of these studies have predictive value for the drying of tablet masses in their preparation by wet granulation [3,6].

The next stage of experimental research was planned to study the storage conditions and shelf life during which the dry extract is obtained by us will meet all the requirements of the reference document that TPA. As seen from the table during

the dry extract experiment inadequate. Thus, it was found that all types of packaging within the term studies did not change the physical and chemical indicators of dry extract. The content of active ingredients is within normal limits. According to, the timing of the received data validity of dry extract "Meliflos" - 2 years.

Conclusions

1. As a result of the research found that the studied extract is hygroscopic dry, fine powders from red to dark brown color with a specific smell.

2. The studies found that the dry extract "Meliflos" moisture sorption has increased capacity, which is a linear function of ambient relative humidity, and is less dependent on the magnitude of the surface area of the sample. High concentrations of residual moisture, the dry extract moisture sorption properties indicates expressed powder adhesion properties.

3. The results of fractional composition suggests that the bulk of the particles have a size less than 250 microns (32.20%), characterized by poor flowability values (0.601 10^{-3} kg / s), low bulk density (241.35 kg / m³), a high compression ratio, the angle of repose (44 degrees), increased residual moisture values (up 10.23%) and porosity (81.74%).

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***Research of the influence auxiliary substances
on technological properties of the pressed mass
"Ibuasktamol"***

Abstract: In this report the results of studies of the effect of excipients on the technological properties of the new combined preparation "Ibuasktamol" in tablet form for the treatment of inflammatory processes also presents data obtained from the study of the effect of excipients on "Ibuasktamol" model mixture qualitative properties of the tablet mass. As a result of the research set science-based optimal tablet technology.

Keywords: technological properties, adjuvants, tablet, physico-chemical, substance.

Introduction. Summary of product characteristics, determining application in medical practice, made up of three components: safety, efficiency and quality. The role of adjuvants in providing these properties drugs currently high, since their use can significantly extend the range of drugs with different predetermined degree of bioavailability. For a long time adjuvants considered secure. However, appearing in scientific journals published in recent years have forced to reconsider their role in ensuring the safety and efficacy of the drug [2].

Excipients perform a crucial role in formulation technology and finished pharmaceuticals regardless of the dosage form. For the production of tablets, they help to ensure uniformity of drug dosing, mechanical strength, disintegration, solubility, stability of the tablets during storage, containment site of action, the release rate of the active ingredients, as well as manufacturability tableting process. Research in compression of different materials, and the properties of the finished product depends on all the complex physico-chemical and technological properties of the starting materials. Tablet weight has individual technological properties, which

ensures the correct accounting of eventually obtaining the necessary quality indicators of the finished product [1,4,5].

Due to the urgency of development domestic products, especially in the framework of the state program the import substitution, at the department of industrial technology medicines in the Tashkent Pharmaceutical Institute in conjunction with the «SAMO» LLC carried out research on the development of structures and technology of new medicines in the form of tablets, including tablets codenamed "Ibuasktamol".

The *aim* of this work studying the effect of excipients on the technological properties of the new combined preparation "Ibuasktamol" in tablet form for the treatment of inflammatory processes.

The object of research was the model mix "Ibuasktamol" drug. In previous studies, taking into account the scientific approach to the problem of creating three-medicinal substances for the treatment of inflammation and taking into account the presence of comorbidities in this group of patients, we have the following combination of active ingredients were selected: ibuprofen – is a medicine a non-steroidal anti-inflammatory medicine from the group of propionic acid derivatives, has analgesic and antipyretic action of paracetamol (acetaminophen) – is a medicine, analgesic and antipyretic of anilide group, has antipyretic effect, and ascorbic acid – is an organic compound, is one of the main substances in the human diet, which is necessary for the proper functioning of connective and bone tissue. Performs reducing biological functions and certain metabolic processes, an antioxidant, from technological point of view, it improves absorbability of medicines.

In this phase of the study, we studied the technological properties such as particle size and shape, the fractional composition, bulk density, flowability, angle of repose, compressibility and compactibility coefficients, porosity, residual moisture properties, moisture sorption substance. In the following quality indicators obtained pellets were examined in accordance with the requirements of the GF XI, as well as other conventional methods [3].

The studies examined the shape of the particles using an optical microscope «LEITZ» company «Biomed» with an increase of 150 and 330 times, and while photographing. To determine the fractional composition using a special set of screens 5 arranged one above the other, holes with a diameter of 2, 1, 0.5, 0.25, mm. The exact substance weighed (100 g) was placed on the top sieve apertures

with a diameter of 2 mm. Whole set shaken on a shaker for 5 min. Then sieve alternately removed and the contents weighed, finding the percentage content of each fraction.

Determination of bulk density of the powder was carried out on the device model 545P-AK-3 Mariupol plant process equipment or in the cylinder with a certain diameter holes. To determine the flow properties using the device Erweka brand EP 12-A. The device consists of a conical funnel with a taper angle 600, shorter stem and outlet diameter of 10 mm.

The second phase of research devoted to the study of the quality of the recommended tablets obtained by different adjuvants. To determine the resistance to crushing of tablets weighed weighing 0.3 g was pressed into a tablet diameter of 9 mm on a hydraulic press at a pressure of 120 MPa and then measured for strength of the resulting tablets apparatus from "Erweka" (Germany). Force ejection from the matrix tablets was determined by pushing the lower punch pressing received with the registration on the gauge pressure extrusion press.

Composition of tablets and their production technology depends on the physico-chemical properties pharmaco technological substances and their amounts in the dosage form. Analysis of the results studying of the crystallographic characteristics of the active substances emerging tablets, their physico-chemical and pharmaco technological properties showed that all substances are crystalline powder with particles aniso diametric shape, are group of weak current materials have different compressibility, which indicates the impossibility of making tablets by direct compression without use of additional components (adjuvants). Since the necessary is a rational, evidence-based selection and study of excipients to give the tablet mass necessary structural-mechanical and technological properties. In the first stage of the research dedicated to the manufacture of tablets by direct compression. One of the main requirements for the tablet mass in direct compression is the high turnover of the powder mixture and its ability to compression, so the next step was studying effect of excipients on "Ibuasktamol" model mixture qualitative properties of the tablet mass. The next stage of our research was studying excipients with the necessary structural and mechanical and technological characteristics.

The data obtained are presented in Table 1.

Table 1

Results of the study of technological properties auxiliaries

The name of substances	Particle shape	Particle size, microns	Flowability, g/s	Compressibility, N
Lactose-80 M	Prismatic	10-199	7,9±0,17	43,2±4,3
Lactose 200 M	Prismatic	10-98	8,0±0,21	49,5±2,7
MCC	Fibres and conglomerates	100-253	5,1±0,09	179,1±2,0
Starch potato	Polyhedra with rounded corners	10-49	2,7±0,11	119,9±2,1

Studies to determine the fracture toughness of the model mixture of active ingredients have shown that tablets "Ibuasktamol" these indicators were 21 N. The data obtained are unsatisfactory for the preparation of tablets by direct compression. Therefore, studies of the dependence of the resistance of tablets to fracture toughness on the content of microcrystalline cellulose (MCC) were conducted. This auxiliary substance mixtures were added to concentrations of 5, 10, 20, 30, 40%.

The results are shown in Fig. 1.

As shown in Fig. 1, when the concentration of MCC in the composition of the mixture model "Ibuasktamol" resistance to crushing of tablets increases. Introduction of the MCC mixture of 5% of the average weight of the tablet strength increases to 40 N. With further increase in the content of MCC dynamics observed increase in this indicator. Thus, at a concentration of 30% MCC in blends index resistance to crushing of tablets is 98 N.

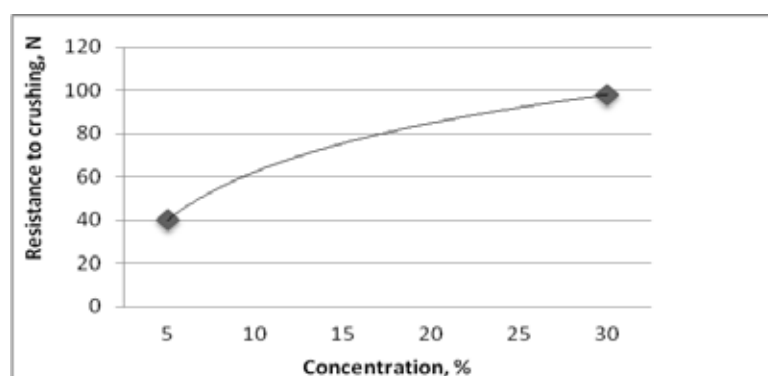


Fig. 1. The effect of the concentration of MCC to the fracture toughness "Ibuasktamol" tablets

Thus, adding MCC in compositions of the samples developed combined tablets an amount of 10-30% is optimum, it allows to improve the technological properties of model compounds, namely durability. Increasing MCC content of more than 30% in the tablet composition does not substantially change the strength of the tablets is not feasible.

Further, it was necessary to select excipients that would ensure satisfactory performance of the tablet mixture flow. The filler has been selected lactose monohydrate and studied the effect of the concentration on the change in yield. We studied the tablet mass with a mixture of active ingredients "Ibuasktamol" various concentrations of lactose monohydrate, between 35 and 50%. The data obtained are presented in Fig. 2.

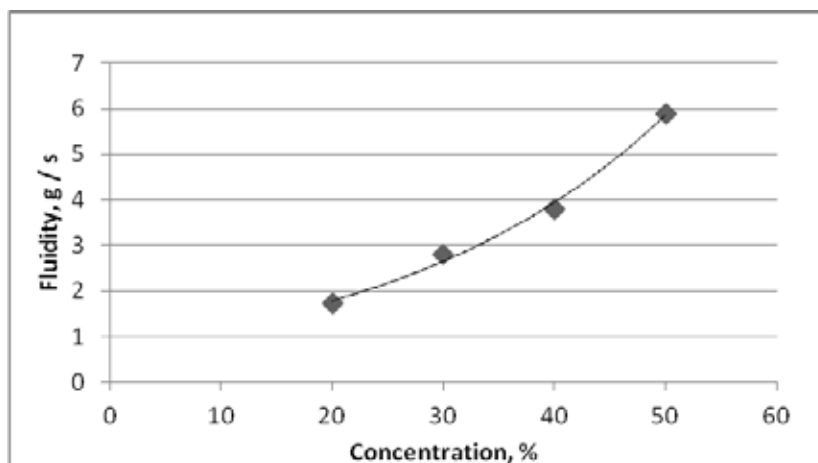


Fig. 2. Effect of the concentration of lactose monohydrate in the tablet mass

Received experimental data (Figure 2) show that technological parameter - the fluidity by adding a mono-hydrate lactose mixtures "Ibuasktamol" significantly improved. Fluidity of the mixture of active ingredients was initially 1.74 g/s. By adding lactose monohydrate in concentrations ranging from 35 to 50% of the figure of a model mixture of 3.8 g/s - 5.9 g/s, increased 4.3 times. The data show an improvement flow model mixtures, confirm the need for the addition of lactose monohydrate and provide a basis for further research on the creation of tablets by direct compression.

Further studies were carried out disintegration time and it turned out to be significant, more than 15 minutes, which does not meet the requirements of the SP XI. Therefore, from a range of local auxiliaries had to choose one that would improve this figure. We have chosen a simple and economically informed excipient - potato

starch. The results of experiments to determine tablet disintegration, depending on the amount of starch in the potatoes which are shown in Fig. 3.

From the data presented in Fig. 3 shows that the administration of the tablet mass "Ibuasktamol" potato starch in an amount of 2% of the average weight of the tablet disintegration time reduced to 15 minutes. 10% - up to 10 minutes. The optimum content of the potato starch in the tablets, based on experimental data, the amount of 10%, which complies the requirements of the SP XI.

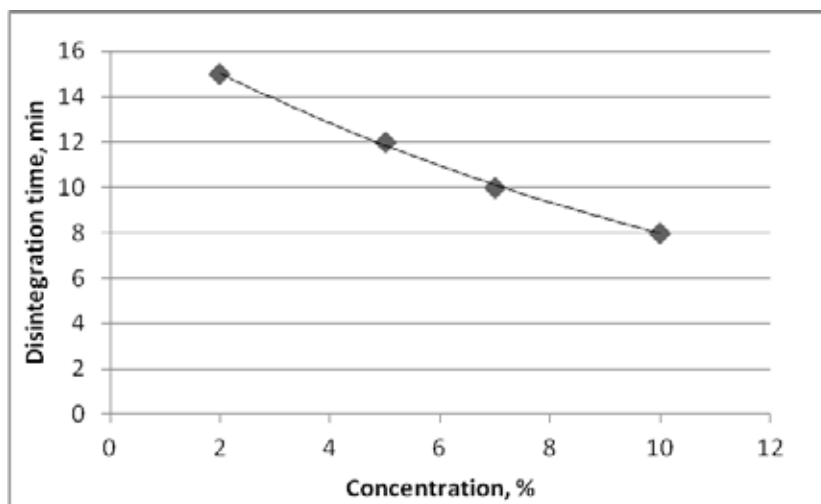


Fig. 3. The dependence of the disintegration time in tablets "Ibuasktamol" on the amount of potato starch

Given the experimental data on the effect of excipients on tablet mass properties with mixtures of active substances, it is appropriate to include in the tablet of MCC and lactose monohydrate, which greatly improve the physicochemical and pharmaco technological properties in tablet mass (strength and flowability). Adding starch potato reduced the disintegration time of tablets.

In order to improve the ejection of tablets from the die press and removal tool attachment studies were performed using a tablet composition antifriction agents: stearic acid, calcium stearate, magnesium and calcium.

The results are shown in Fig. 4.

The data in Fig. 4 show that ejection force model matrix tablets from the press - the instrument is dramatically reduced when using a magnesium, calcium stearate, stearic acid and from 16.1 N to 3.7 N. However, considering that further promotes calcium stearate electrostatic discharge with powder particles, which also improves the fluidity, we chose calcium stearate.

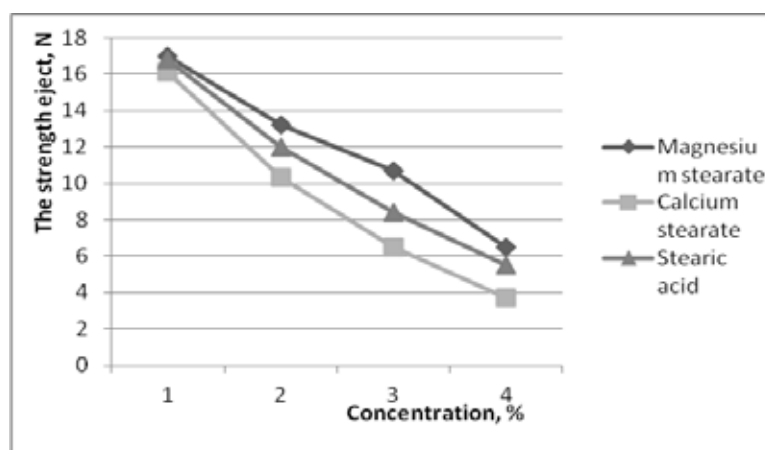


Fig. 4. Dependence tablet ejection force "Ibuasktamol" content from magnesium stearate, calcium stearate and stearic acid

As a result of the experiments found that the addition of excipients, such as MCC, lactose monohydrate, potato starch and calcium stearate significantly improves the technological properties of a tableting mixture "Ibuasktamol".

Conclusions

Thus, studies of the effect of excipients on tablet mass pharmaco technological properties enable further work on the development of an optimal technology for the new combination tablet with anti-inflammatory effects by direct compression.

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***Structural functional parameters of the heart in patients
with coronary heart disease with concomitant obesity
depending on genotypes of gene of tumor necrosis
factor- α (G-308A)***

Abstract: The article deals with influence of different genotypes of gene of tumor necrosis factor- α on changes of structure and function of the myocardium in patients with coronary heart disease with concomitant obesity by means of examination of 222 patients.

Keywords: polymorphism of gene of tumor necrosis factor- α , coronary heart disease, obesity.

Introduction. One of the main causes of formation of chronic cardiac failure in coronary heart disease is left ventricular remodeling [1]. Left ventricular remodeling resulting from chronic myocardial ischemia is always accompanied by immunoinflammatory activation [2]. It has been established that the levels of proinflammatory cytokines, especially tumor necrosis factor- α (TNF- α), are definitely decreased in blood plasma of patients with coronary heart disease [3]. Tumor necrosis factor- α is an important parameter of postischemic systemic and cerebral immunoinflammatory reactions [4]. It induces expression of adhesive molecules through glial and endothelial cells, involves blood-brain barrier, enhances neutrophilic infiltration of the cerebral parenchyma etc. [5].

Taking genetic regulation into account, the level of production of proinflammatory cytokines significantly depends on mutations located in non-coding parts of a gene (promoter, intron) that is functional single nucleotide polymorphisms (SNP). Functional SNP of a gene do not affect structure of a protein but they change velocity of transcription of template RNA and, thus, influence velocity of protein synthesis. TNF- α gene is located on the short arm of the sixth chromosome. Several functional SNPs of this gene are known. Single nucleotide substitution of guanine by adenine in position 308 (promoter region) of the gene of TNF- α leads to significant changes of the level of production of TNF- α . Particularly, allele A of gene-308 G/A of TNF- α gene is associated with definitely decreased levels of TNF- α in the blood of conditionally healthy people [6] as well as in patients with increased systemic inflammatory response after surgical revascularization of the myocardium [7].

The data concerning connection of SNP-308 G/A of TNF- α gene with indices of cardiohemodynamics in patients with coronary heart disease with concomitant obesity were not found by us in literature.

Probably SNP-308 G/A of TNF- α gene is of the factors of more severe clinical course of coronary heart disease and more intensive postischemic inflammatory response in patients with obesity.

Purpose. To assess structural functional parameters of the heart in patients with coronary heart disease with concomitant obesity depending on genotypes of gene of tumor necrosis factor- α (G-308A).

Materials and methods. The study encompassed 222 patients with coronary heart disease (CHD) and obesity who were undergoing treatment at Cardiology Department of CHPI (Communal Health Protection Institution) Kharkiv Municipal

Clinical Hospital No 27 which is the base health facility of Department of Internal Medicine No 2, Clinical Immunology and Allergology of Kharkiv National Medical University of Ministry of Health of Ukraine. Complete physical examination was provided for all of these patients. The experimental group was made up by 115 patients with CHD whose body weight was within normal limits. The control group was represented by 35 apparently healthy people. Additionally, the patients with CHD and obesity were divided into subgroups depending on genotype of TNF- α gene (G-308A): group 1 was made up by carriers of A/A genotype (n=58), group 2 – by G/A genotype (n=90), group 3 – G/G genotype (n=74). The groups were compared according to age and sex. The study did not involve patients with severe comorbidity of organs of respiration, digestion, pathologies of the kidneys and people suffering from oncological diseases.

The diagnosis was made in accordance with valid orders of Ministry of Health of Ukraine.

All patients underwent common clinical and instrumental investigations. Echocardiographic study was carried out in accordance with Feigenbaum's standard technique by means of RADMIR (Ultima PRO 30) ultrasonography (Kharkiv, Ukraine). In M-mode the following parameters of the left ventricle were estimated: end-diastolic dimension (cm), end-systolic dimension (cm), thickness of posterior wall (cm), thickness of interventricular septum (cm). End-diastolic volume (EDV) and end-systolic volume (ESV) (ml) of the left ventricle were calculated due to Simpson's method (1991). After that left ventricular ejection fraction (LVEF) (%) was assessed. The mass of the left ventricle myocardium was calculated in accordance with the formula provided by R. Devereux and coauthors: $1,04 \times [(\text{thickness of interventricular septum} + \text{thickness of posterior wall of the left ventricle} + \text{end-diastolic dimension})^3] - [\text{end-diastolic dimension}]^3 - 13,6$. Calculation of relative thickness of the left ventricle myocardial wall was carried out in accordance with the following formula: relative thickness of the left ventricle myocardial wall = $(\text{thickness of posterior wall of the left ventricle myocardium} + \text{thickness of interventricular septum} + \text{end-diastolic dimension}) / \text{end-diastolic dimension}$. The dimension of the left atria (cm) and aorta (cm) was assessed as well.

Left ventricular diastolic function (LVDF) was studied due to recording of Doppler transmitral diastolic flow. Peak velocity of early (E) and late (A) (cm/s) filling of the left ventricle, ratio of them (E/A) (un), time of isovolumetric relaxation of the left ventricle (iVRT) (ms) were assessed. The structure of diastolic filling of the left

ventricle was classified according to standard criteria. Pseudonormal type of transmitral flow was identified by means of Valsalva's test.

The study of polymorphous locus G-308A of TNF- α gene was carried out by means of the method of polymerase chain reaction with electrophoretic detection of findings with the use of SNP-ЕКСПРЕС assay kit produced by LLC Литех (Russian Federation). DNA purification out of the whole blood was performed owing to the reagent «ДНК-експрес-кров» produced by LLC Литех (Russian Federation) according to the instructions provided. Accuracy of genotype frequency distribution was assessed by means of correspondence of Hardy-Weinberg Equilibrium ($p_i^2 + 2 p_i p_j + p_j^2 = 1$). In accordance with Declaration of Helsinki all patients were informed about clinical study and they gave their consent to assess polymorphism the gene in question.

The obtained findings are represented in the form of average value \pm standard deviation from average value ($M \pm m$). Statistical processing of the findings was carried out by means of Statistica package, version 6.0. In order to make an assessment of differences between groups in distribution, close to normal one, Pearson's criterion was used. Differences in $p < 0.05$ were considered to be statistically valid.

Findings and consideration. The analysis of indices of structural functional condition of the left ventricle with genotypes of TNF- α gene (G-308A) in patients with CHD and obesity made it possible to reveal significant differences concerning such parameters as end-diastolic dimension, end-systolic dimension, end-diastolic volume, end-systolic volume, mass of the left ventricle myocardium and ejection fraction in all patients who were examined in comparison with the control group (Table 1). End-diastolic dimension in the control group was 4.36 ± 0.48 cm that was 20.29 %, 7.04 % and 12.17 % less than in patients with A/A, G/A and G/G genotypes, where the values of this index were 5.47 ± 0.48 cm, 4.69 ± 0.40 cm and 4.68 ± 0.37 cm respectively ($p < 0.05$). End-systolic dimension was 25.62 %, 11.44 % and 10.12 % larger in patients with A/A, G/A and G/G genotypes respectively than in the control group representatives (4.06 ± 0.38 cm, 3.41 ± 0.41 cm and 3.36 ± 0.38 cm vs 3.02 ± 0.44 cm) ($p < 0.05$). End-systolic volume in the control group representatives was 68.57 ± 11.5 ml, end-diastolic volume – 139.21 ± 28.4 ml that by 14.07 % and 19.22 % exceeded the value of these indices (79.8 ± 9.5 ml and 172.33 ± 28.9 ml) in patients with A/A genotype; by 11.41 % and 17.70 % – in patients with G/A genotype

(77.4±10.3 ml and 169.15±27.4 ml); by 10.13 % and 17.39 % – in patients with G/G genotype ($p<0.05$). The mass of the left ventricle myocardium was by 32.62 %, 24.94 % and 24.07 % less in the control group than in patients with A/A, G/A and G/G genotypes respectively (281.4±49.2 g, 252.6±50.3 g and 249.7±48.9 r vs 189.6±43.5 g) and ejection fraction on the contrary was by 32.14 %, 19.32 % and 17.18 % higher in the control group than in patients with different genotypes of TNF- α gene (G-308A) (62.38±11.1 % vs 42.33±7.6 %, 50.33±8.2 % and 51.66±8.4 %) ($p<0.05$).

Comparison of indices of cardiohemodynamics according to genotypes of TNF- α gene (G-308A) showed that significant differences concerning dimensions of the aorta, left atrium, right atrium, end-diastolic volume, end-systolic volume, thickness of posterior wall of the left ventricle, thickness of the interventricular septum and relative thickness of the wall ($p>0.05$) were not revealed. End-diastolic dimension was by 14.26% and 14.44 % larger in patients with A/A genotypes in comparison with patients with G/A and G/G genotypes that corresponded to the following values: 5.47±0.48 cm, 4.69±0.40 cm and 4.68±0.37 cm respectively ($p<0.05$). In patients with A/A genotype end-systolic dimension by 16.00 % and 17.24 % was higher in than that one in patients with G/A and G/G genotypes (4.06±0.38 cm vs 3.41±0.41 cm and 3.36±0.38 cm) ($p<0.05$). Mass of the left ventricle myocardium was by 10.24 % and 11.27 % higher and ejection fraction - by 15.90 % and 18.06 % lower in patients with A/A genotype than those ones in patients with G/A and G/G genotypes ($p<0.05$).

Table 1

Interrelation of structural functional parameters of the heart in patients with CHD and concomitant obesity with genotypes of TNF- α gene (G-308A) (M±m)

Echocardiography indices	Genotypes of TNF- α gene (G-308A)			Control group (n=35)
	A/A (n=58)	G/A (n=90)	G/G (n=74)	
Aorta, cm	3.39±0.26	3.33±0.27	3.31±0.28	3.02±0.26
Left atrium, cm	3.94±0.18	3.92±0.20	3.89±0.19	3.24±0.23
Right atrium, cm	4.13±0.25	4.09±0.31	4.11±0.27	3.61±0.31
End-diastolic dimension, cm	5.47±0.48*	4.69±0.40*#	4.68±0.37*#	4.36±0.48

End-systolic dimension, cm	4.06±0.38*	3.41±0.41*#	3.36±0.38*#	3.02±0.44
End-diastolic volume, ml	172.33±28.9*	169.15±27.4*	168.51±29.7*	139.21±28.4
End-systolic volume, ml	79.8±9.5*	77.4±10.3*	76.3±9.2*	68.57±11.5
Thickness of posterior wall of the left ventricle, cm	1.29±0.07	1.29±0.09	1.28±0.10	1.22±0.10
Thickness of interventricular septum, cm	1.30±0.08	1.29±0.10	1.29±0.08	1.13±0.08
Mass of the left ventricle myocardium, g	281.4±49.2*	252.6±50.3*#	249.7±48.9*#	189.6±43.5
Relative thickness of the wall, cm	0.52±0.08	0.52±0.06	0.53±0.05	0.53±0.06
Ejection fraction, %	42.33±7.6*	50.33±8.2*#	51.66±8.4*#	62.38±11.1

Note: difference of indices is significant in comparison with the following: * – in control group, # – in patients with A/A genotype ($p < 0.05$)

Thus, in patients with CHD and obesity with genotype A/A of TNF- α gene (G-308A) more significant disorders in structure and function of the myocardium are observed, that is increased dimensions of the left ventricle, its mass associated with reduced contraction ability, which results in unfavorable left ventricle remodeling in patients, who were examined, and can be explained by negative inotropic activity and induction of apoptotic death of cardiomyocytes caused by action of anti-inflammatory cytokine of TNF- α , expression of which is increased in patients with A/A genotype.

Differences in indices of diastolic function in patients with CHD and obesity in different genotypes of TNF- α gene (G-308A) were taken into consideration (Table 2): in patients with A/A genotype increased ratio of E/A peaks was observed. It was 1.81 ± 0.04 units along with reduced time of isovolumetric relaxation (iVRT) to 84.5 ± 2.5 ms and index of time of delay of early diastolic flow (DT) to 198.3 ± 6.8 ms that is considered to be indicative of diastolic function of restrictive type.

Table 2

Changes of diastolic function of left ventricle myocardium in patients with CHD and obesity depending on genotypes of TNF- α gene (G-308A) (M \pm m)

Subgroups Indices	Genotypes of TNF- α gene (G-308A)			p
	A/A (n=58)	G/A (n=90)	G/G (n=74)	
E, mm/s	86.83 \pm 2.5	63.35 \pm 2.4	62.18 \pm 2.7	p ₁₋₂ <0.05 p ₁₋₃ <0.05 p ₂₋₃ >0.05
A, mm/s	48.11 \pm 1.6	72.28 \pm 1.5	71.43 \pm 1.4	p ₁₋₂ <0.05 p ₁₋₃ <0.05 p ₂₋₃ >0.05
IVRT, ms	84.5 \pm 2.5	106.4 \pm 2.7	105.8 \pm 2.4	p ₁₋₂ <0.05 p ₁₋₃ <0.05 p ₂₋₃ >0.05
DT, ms	198.3 \pm 6.8	233.8 \pm 7.1	229.9 \pm 6.9	p ₁₋₂ <0.05 p ₁₋₃ <0.05 p ₂₋₃ >0.05
E/A, un.	1.81 \pm 0.04	0.88 \pm 0.04	0.87 \pm 0.04	p ₁₋₂ <0.05 p ₁₋₃ <0.05 p ₂₋₃ >0.05

Therefore, A/A genotype of TNF- α gene (G-308A) in patients with CHD and obesity potentiates progression of impairment of structure and function of the left ventricle that can result from inflammation of endothelial cells induced by TNF- α , expression of which is increased under conditions of carriage of A allele, with the following neutrophilic degranulation of granulocytes, acceleration of lipid peroxidation. It can cause impairment of structural integrity and function of the endothelial cells that leads to imbalance in the endothelial cells which secrete active substances. Decreased synthesis and release of vasodilating substances and increased secretion of vasoconstrictors result in increase of vasoconstriction as well as increases peripheral resistance and AP. Low state of perfusion is caused by capillary contraction [8,9]. The data provided make it possible to explain mechanisms of hemodynamic disorders at the level of pathogenetic significant ones.

Conclusions. In patients with CHD and obesity with genotype A/A of TNF- α gene (G-308A) more significant disorders in structure and function of the myocardium are observed, that is increased dimensions of the left ventricle, its mass associated with reduced contraction ability, which results in unfavorable left ventricle remodeling and development of diastolic dysfunction of the left ventricle.

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The changes of periodontal indices in 12-year-old children depending on the body-weight index (BWI)

Abstract: The given article covers the problems of the changes of the indices of periodontal and hygienic indices in children depending on body-weight index (BWI). The comparative data on the state of periodontal tissues, the level of hygiene in 12-year-old children from Ilichiovsk and Odessa a year after the common hygienic procedures are presented in the publication. The general preventive procedures connecting the periodontal diseases do not give hope for the high ultimate result. This fact speaks of the necessity of giving up the routine approach in prevention. The children with deviations in the BWI to hypotrophy were shown to be more susceptible to periodontal diseases.

Keywords: children, **body-weight index (BWI)**, periodontium, oral hygiene.

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Изменение пародонтальных индексов у 12-летних детей в зависимости от показателя индекса массы тела (ИМТ)

Аннотация: Представленная статья посвящена вопросам изменения показателей пародонтальных и гигиенических индексов у детей в зависимости от показателя индекса массы тела (ИМТ). В публикации представлены сравни-

тельные данные о состоянии тканей пародонта, уровне гигиены полости рта у детей 12 лет г. Ильичевска и г. Одессы через год после проведения общепринятых гигиенических мероприятий. Общепринятые профилактические мероприятия в отношении заболеваний пародонта не дают возможности надеяться на высокий конечный результат, что свидетельствует о необходимости отказа от шаблонного подхода к профилактике. Показано, что дети с отклонениями в показателе ИМТ в сторону гипотрофии более склонны к заболеваниям пародонта.

Ключевые слова: дети, индекс массы тела, пародонт, гигиена полости рта.

Многочисленные исследования показывают, что наиболее частой формой заболевания тканей пародонта у детей является хронический генерализованный катаральный гингивит (ХГКГ). У детей 12-летнего возраста это заболевание возникает в 64-75 % случаев, достигая 90-98 % в возрасте 15-18 лет [1, 2, 3].

На состояние пародонта оказывают влияние многие факторы: наличие пародонтопатогенных бактерий [4, 5], уровень иммунитета [6], функциональная активность слюнных желез [7], общесоматическая патология [8, 9], а также характер питания [10, 11], от которого зависит развитие орального дисбиоза [12].

Инфекционно-воспалительному фактору – пародонтопатогенной микрофлоре, отводится ведущая роль в патогенезе заболеваний пародонта, особенно у подростков и лиц молодого возраста [13, 14].

В механизме патогенного воздействия эндогенной микрофлоры главную роль играют микробные токсины, среди которых следует особо выделить кишечный эндотоксин (липополисахарид, ЛПС), образуемый грамм-отрицательными бактериями (все они относятся к патогенным или условно патогенным). Как показали исследования, в том числе, и выполненные в Институте стоматологии НАМН, ЛПС запускает в отдельных органах и в организме в целом воспалительную реакцию, которая определяет патогенез практически всех неинфекционных заболеваний, в том числе, и стоматологических [15].

Нарушение оптимального соотношения численности пробиотических и условно патогенных бактерий в пользу последних называется дисбактериоз (дисбиоз).

В наших предыдущих работах [16, 17] было показано, что при обследовании школьников в двух населенных пунктах состояние пародонта и гигиены полости рта в значительной степени зависит от показателей индекса массы тела (ИМТ). При этом была отмечена интересная особенность: более высокие показатели пародонтальных и гигиенических индексов наблюдались у лиц со сниженным уровнем воспалительной реакции, которую оценивали с помощью биохимических маркеров в ротовой жидкости (активность эластазы, уреазы, содержание МДА).

Целью настоящей работы стало определение состояния пародонта у этих же школьников спустя один год.

Материалы и методы исследования

Всего было обследовано 151 учащийся 6-7 классов (45 % – мальчики, 55 % – девочки) в двух школах (79 человек в г. Одессе, гимназия № 1 и 72 – в г. Ильичевске, школа № 6). Обследование детей осуществляли в условиях стационарного стоматологического кабинета отделения стоматологии детского возраста и ортодонтии ГУ «Институт стоматологии НАМН» (г. Одесса) и в стационарном стоматологическом кабинете общеобразовательной школы (г. Ильичевск). Для этой цели использовали стандартный набор инструментов и стандартные методики [18, 19]. Данные обследования заносили в специальные карты, разработанные в Институте стоматологии [20]. Определяли следующие показатели: РМА, кровоточивость десен, проба Шиллера-Писарева, СРITN, индексы Silness-Loe и Stallard.

I обследование было проведено осенью 2014 года, II обследование – осенью 2015 года (в течение года – двукратный осмотр, санация, профессиональная гигиена полости рта с использованием пасты «Дентик», 2 урока гигиены в классах, 2 урока гигиены с родителями).

Полученные результаты и их обсуждение

В таблице 1 представлены результаты определения показателя индекса РМА в зависимости от уровня ИМТ. Из этих данных видно, что хотя этот показатель у детей города Одессы существенно выше ($p < 0,05$) у лиц с повышенной массой тела ($ИМТ > 25$), однако он значительно (почти на 39 %) снижается после стандартных гигиенических мероприятий, тогда как у остальных групп намечается лишь тенденция к снижению. У детей г. Ильичевска существенных изменений показателя индекса РМА не наблюдается.

Таблица 1

**Изменение показателей РМА у детей 12 лет в зависимости
от показателя ИМТ в течение одного года**

№ п/п	Группы	2014 г.	2015 г.	Изменение индекса РМА, %
Одесса				
1.	ИМТ = 20-25 (норма)	17,99±3,85	16,14±2,79 p>0,5	-10,5
2.	ИМТ>25	31,09±4,07	18,99±2,28 p<0,05	-38,9
3.	ИМТ<20	25,12±3,28	20,23±2,32 p>0,1	-19,5
Ильичевск				
1.	ИМТ = 20-25 (норма)	20,19±2,49	19,75±2,04 p>0,5	-2,5
2.	ИМТ>25	18,7±2,95	18,62±2,13 p>0,6	-2,7
3.	ИМТ<20	26,67±5,94	25,55±5,67 p>0,5	-4,5

За 1 год наблюдений показатели распространенности заболеваний пародонта существенно не изменились. Надо отметить, что в группе детей г. Одессы с ИМТ<20, этот показатель снизился на 3,45 %, в то время как у детей этой же группы г. Ильичевска показатель увеличился на 7,15 %. Возможно это связано с субъективным критерием отношения детей и родителей к выполнению гигиенических процедур. В остальных группах показатель распространенности остался на тех же высоких цифрах: 80-87% - дети г. Одессы и 90-92 % - дети г. Ильичевска.

Показатели индекса кровоточивости у детей 12 лет существенно различаются (таблица 2). Так, у детей с показателями ИМТ = 20-25 в течение года наблюдалось снижение кровоточивости, тогда как у детей с гипотрофией (ИМТ<20) наблюдалась тенденция к увеличению кровоточивости. У детей с ИМТ>25 наблюдается достоверное снижение кровоточивости (г. Одесса), а у детей г. Ильичевска, напротив, наблюдается увеличение показателей кровоточивости.

Таблица 2

**Изменение показателей индекса кровоточивости десен у детей 12 лет
в зависимости от показателя ИМТ в течение года**

№ п/п	Группы	2014 г.	2015 г.	Изменение показателей индекса кровоточивости, %
Одесса				
1.	ИМТ = 20-25 (норма)	0,29±0,09	0,21±0,06 p>0,3	-27,6
2.	ИМТ>25	0,44±0,08	0,21±0,04 p<0,05	-52,3
3.	ИМТ<20	0,26±0,06	0,28±0,05 p>0,5	+7,7
Ильичевск				
1.	ИМТ = 20-25 (норма)	0,25±0,04	0,21±0,04 p>0,3	-16,0
2.	ИМТ>25	0,19±0,05	0,32±0,06 p>0,05	+68,4
3.	ИМТ<20	0,26±0,06	0,43±0,06 p>0,05	+65,4

В таблице 3 представлены результаты пробы Шиллера-Писарева. Видно, что достоверные изменения этого показателя наблюдаются лишь у детей из Одессы с ИМТ>25.

В таблице 4 показаны результаты определения уровня СРІТN. Во всех случаях наблюдается снижение этого показателя в результате проведенных профилактических мероприятий, причем в большей степени у детей из Одессы.

Таблица 3

**Изменение показателей пробы Шиллера-Писарева у детей 12 лет
в зависимости от показателя ИМТ в течение года**

№ п/п	Группы	2014 г.	2015 г.	Изменение уровня пробы Шиллера-Писарева, %
Одесса				
1.	ИМТ = 20-25 (норма)	1,15±0,04	1,20±0,04 p>0,3	+4,3
2.	ИМТ>25	1,44±0,14	1,13±0,04 p<0,05	-21,5
3.	ИМТ<20	1,36±0,08	1,32±0,05 p>0,3	-2,9
Ильичевск				
1.	Норма (ИМТ = 20-25)	1,29±0,08	1,24±0,04 p>0,3	-3,9
2.	ИМТ>25	1,26±0,05	1,23±0,05 p>0,5	-2,4
3.	ИМТ<20	1,43±0,11	1,38±0,08 p>0,5	-3,5

Таблица 4

**Изменение показателей СРІТN у детей 12 лет в зависимости
от показателя ИМТ в течение года**

№ п/п	Группы	2014 г.	2015 г.	Изменение СРІТN, %
Одесса				
1.	ИМТ = 20-25 (норма)	0,54±0,14	0,20±0,06 p<0,05	-63,0
2.	ИМТ>25	0,85±0,09	0,19±0,04 p<0,05	-77,6
3.	ИМТ<20	0,59±0,09	0,28±0,08 p<0,05	-52,5
Ильичевск				

1.	ИМТ = 20-25 (норма)	0,53±0,07	0,19±0,03 p<0,05	-64,1
2.	ИМТ>25	0,48±0,09	0,31±0,05 p>0,05	-35,4
3.	ИМТ<20	0,77±0,19	0,42±0,08 p>0,05	-45,5

В таблицах 5 и 6 представлены результаты определения гигиенических индексов. Достоверные изменения индекса Silness-Loe наблюдаются у детей с ИМТ равным 20-25 (г. Одесса), а индекса Stallard – у детей с ИМТ > 25 (также г. Одесса).

Таблица 5

**Изменение показателей индекса Silness-Loe у детей 12 лет
в зависимости от показателя ИМТ в течение года**

№ п/п	Группы	2014 г.	2015 г.	Изменение показателей индекса Silness-Loe, %
Одесса				
1.	ИМТ = 20-25 (норма)	0,88±0,13	0,97±0,11 p>0,3	+10,2
2.	ИМТ>25	1,33±0,11	0,93±0,07 p<0,05	-30,1
3.	ИМТ<20	1,10±0,11	1,09±0,01 p>0,8	-0,09
Ильичевск				
1.	ИМТ = 20-25 (норма)	1,31±0,09	1,06±0,09 p>0,05	-19,1
2.	ИМТ>25	1,39±0,11	1,23±0,10 p>0,3	-11,5
3.	ИМТ<20	1,38±0,16	1,37±0,12 p>0,9	-0,70

Таблица 6

**Изменение показателей индекса Stallard у детей 12 лет
в зависимости от показателя ИМТ в течение года**

№ п/п	Группы	2014 г.	2015 г.	Изменение Stallard, %
Одесса				
1	ИМТ = 20-25 (норма)	1,12±0,19	0,11±0,16 p<0,01	-90,2
2	ИМТ>25	1,21±0,13	0,97±0,13 p>0,3	-19,8
3	ИМТ<20	1,15±0,11	1,15±0,10 p=1	0
Ильичевск				
1	Норма (ИМТ = 20-25)	1,40±0,12	1,28±0,09 p>0,3	-8,6
2	ИМТ>25	1,49±0,09	1,31±0,18 p>0,3	-12,1
3	ИМТ<20	1,48±0,16	1,42±0,13 p>0,3	-4,1

Таким образом, можно сделать **вывод**, что общепринятая гигиеническая профилактика воспалительных заболеваний пародонта недостаточно эффективна и требует использования эффективных медикаментозных средств.

В то же время можно отметить, что характер изменений пародонтальных и гигиенических индексов зависит как от места проживания, так и от показателей ИМТ. Так, пародонт у детей из одесской школы более сильно реагирует на патогенное воздействие, чем пародонт детей из г. Ильичевска.

Дети с отклонениями в показателе ИМТ в сторону гипотрофии более склонны к заболеваниям пародонта.

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The structure of Phyllophaga domination in biotopes of greenhouses cucumber

Abstract: The paper presents the data of the study of biodiversity and structure of phytophagous domination in vegetable consortium using as an example greenhouse complexes with different design and cultivation technology (photoculture) of cucumber.

Keywords: biodiversity, structure of domination, consortium, consumers, phytophagous, phyllophaga, biotope.

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Структура доминирования филлофагов биотопов огурца закрытого грунта

Аннотация: В статье изложены результаты научных исследований по оценке биоразнообразия и структуры доминирования фитофагов овощных культур консорциев закрытого грунта на примере тепличных комбинатов с различной конструкцией теплиц и технологиями возделывания (светокulturой) огурца.

Ключевые слова: биоразнообразие, структура доминирования, консорциии, консументы, фитофаги, филлофаги, биотоп.

Для условий закрытого грунта в Республике Беларусь научных исследований по оценке биоразнообразия и структуры доминирования фитофагов

овощных культур ранее не проводилось, хотя исследования взаимодействий организмов в консорциях необходимы для решения вопросов комплексной вредоносности консументов-фитофагов.

Изучение формирования структуры консортных сообществ и последовательность появления видов фитофагов на автотрофном растении проводились нами на учетных площадках при естественном заселении посадок вредителями независимо от проводимых агрохимических мероприятий. Для сравнительной оценки взяты комбинаты, отличающиеся конструкцией теплиц (высотные энергосберегающие теплицы, многопролетные блочные теплицы), а также технологией возделывания культуры (светокультура). Это филиал «Весна-энерго» РУП «Витебскэнерго» Полоцкого района Витебской области (биотоп 1) и ЧУП «Озерицкий-Агро» Смолевичского района Минской области (биотоп 2) – многопролетные блочные теплицы; ОАО «ДорОрс» Минского района Минской области (биотоп 3) и УП «Минский парниково-тепличный комбинат» (биотоп 4, светокультура) – высотные энергосберегающие теплицы.

Отличие в технологии возделывания культуры связано в основном с формированием растений огурца [1]. В старых тепличных комбинатах с низкой кровлей (биотоп 1 и биотоп 2) верхушку основного побега прищипывают над 3–5 узлом после перерастания им шпалерной проволоки. Из пазух последних листьев основной плети отпускают боковые побеги, которые прищипывают через каждые 4–5 листьев с оставлением побега продолжения до высоты 1 м от поверхности укрывающей пленки. В высотных энергосберегающих теплицах формируют 1–2 стебля и по мере их роста проводят удаление «лишних» завязей в узле и боковых побегов в пазухах листа, нижних листьев, укладку главного стебля на поверхность подстилающей пленки.

На культуре огурца закрытого грунта из растительоядных фитофагов (консументов) доминируют обыкновенный паутинный клещ (*Tetranychus urticae* Koch.), табачный (*Thrips tabaci* Lind.) и западный цветочный (*Frankliniella occidentalis* Pergande) трипсы, белокрылка тепличная (*Trialeurodes vaporariorum* Westw.) и бахчевая тля (*Aphis gossypii* Glov.). В зимне-весенней культуре наиболее вредоносны из них – обыкновенный паутинный клещ и табачный трипс, которые появляются практически одновременно, нанося существенный вред растениям. В частности, гибриды Данди и Пакто (филиал «Весна-энерго») в наибольшей степени повреждались паутинным клещом (76 и 77% соответ-

ственно гибриду); поврежденность гибридов Тристан и Кураж была на уровне 33,8–39%, а гибридов Яни (КСУП «Светлогорская овощная фабрика») и Сигурда (ЧУП «Озерицкий-Агро») – на уровне 59,3–62,5%. Поврежденность листовой поверхности трипсами у гибридов Пакто, Сигурд, Церес, Яни, Кураж практически соответствовала поврежденности растительной частью клещами.

Формирование структуры тепличных консортных систем определяется типом рассадного отделения: неизоллированные и изолированные рассадники (неизоллированные рассадники способствуют массовому и равномерному заселению растений фитофагами на ранних этапах органогенеза растений); пространственным перераспределением фитофагов в пределах одного агроценоза при одновременном возделывании нескольких гибридов, которые отличаются между собой по морфологическим и физиологическим признакам – в частности возделывание гладкоплодных и бугорчатых гибридов огурца (огурцы гладкоплодных гибридов в большей степени заселяются фитофагами по сравнению с бугорчатыми гибридами); культурооборотом (зимне-весенний и летне-осенний обороты), фитосанитарным состоянием предшествующего культурооборота, качеством проведения истребительных и профилактических мероприятий между оборотами, а также чередованием культур.

Формирование комплексов филлофагов зависит от развития автотрофного растения и культурооборота: *в зимне-весенней культуре* в рассадный период – паутинный клещ; выход растений на шпалеру (высота растений не более 1 м) – паутинный клещ, табачный трипс (возможно появление цветочного трипса); в период массового плодоношения – паутинный клещ, табачный трипс, цветочный трипс, белокрылка тепличная (возможно появление бахчевой тли); *в летне-осенней культуре* – одновременное появление паутинного клеща и трипсов в рассадный период и при выходе растений на шпалеру; в период массового плодоношения – массовое развитие паутинного клеща и трипсов, далее спонтанное появление тепличной белокрылки и бахчевой тли.

Видовой состав филлофагов, формирующихся на культуре огурца не зависел от конструкции теплиц (высотные энергосберегающие теплицы, многопролетные блочные теплицы) и технологии возделывания культуры, за исключением светокультуры. Особенности возделывания огурца в осенне-зимнем обороте (светокультура) отразились на видовом составе фитофагов (2 вида) и формировании комплексов, состоящих из одного или двух видов (белокрылка

→ паутинный клещ: белокрылка → белокрылка → паутинный клещ: белокрылка).

Обобщая результаты собственных исследований, а также литературные сведения по данному вопросу необходимо отметить, что формирование структуры тепличных консортных систем определяется в начале вегетации растений антропогенным фактором, в частности качеством проводимых санитарно-профилактических и карантинных мероприятий, а также фитосанитарным состоянием предшествующего культурооборота. Однако общим для всех биотопов является последовательность появления филофагов: паутинный клещ, табачный трипс, белокрылка тепличная. Комплексы фитофагов на культуре огурца различных биотопов отличались между собой плотностью популяций и их соотношением в различные периоды онтогенетического развития растений, достигая суммарной величины в третьей декаде июня.

Отличие в технологии возделывания культуры огурца по различным комбинатам связано в основном с формированием растений. В старых тепличных комбинатах с низкой кровлей верхушку основного побега прищипывают над 3–5 узлом после перерастания им шпалерной проволоки. В высотных энергосберегающих теплицах формируют 1–2 стебля и по мере их роста проводят удаление «лишних» завязей в узле и боковых побегов в пазухах листа, нижних листьев, укладку главного стебля на поверхность подстилающей пленки.

Формирование растений огурца, как и антропогенный фактор, оказывает существенное влияние на пространственное размещение особей популяций растительноядных фитофагов. Установлено, что независимо от морфологических особенностей гибридов исходное заселение главного побега трипсами и клещами, независимо от типа теплиц, проходит примерно одинаково. Однако в дальнейшем при формировании растений в блочных теплицах высотой до 5 м вредитель наиболее активно заселяет боковые побеги; в блочных энергосберегающих теплицах, наоборот, наблюдается интенсивная миграция фитофагов из листьев нижнего яруса вверх на листья верхнего яруса.

Для сравнительной оценки биоразнообразия биотопов использовали индекс видового богатства и индекс разнообразия. Однако для биотопов закрытого грунта при ограниченном количестве видов (2–4) величина этих показателей почти линейно зависит от общего числа особей составляющих биотоп и доли каждого вида в сообществе. Для закрытого грунта с ограниченным числом ви-

дов и неконтролируемой высокой плотностью отдельных из них – показатель разнообразия низкий, что и подтверждается нашими исследованиями. Единственным из показателей, приемлемым для применения в закрытом грунте, является показатель выравненности по Пиелу, который характеризует равномерность распределения видов по их обилию в сообществе.

Таким образом, индексы биоразнообразия, широко используемые для характеристики полевых биоценозов с большим числом изменяющихся видов, не всегда приемлемы для характеристики биоразнообразия биотопов закрытого грунта, для которых характерно ограниченное число видов с высокой плотностью отдельных из них.

Один и тот же вид из разных биотопов закрытого грунта по классификации H.D. Engelmann [2], в зависимости от общей численности консументов (растительноядных фитофагов) в биотопе, можно отнести к разным классам доминирования. В частности, по данной классификации класс доминирования для растительноядных клещей и тепличной белокрылки в зависимости от биотопа может колебаться от субдоминантов до эвдоминантов; трипсов – от субдоминантов до доминантов. По шкале Любарского [3] получается аналогичная зависимость, что связано с тем, что в республике нет идентичных комбинатов. В большинстве из них соблюдается только температурный и влажностный режим воздуха; остальное – определяется антропогенным фактором (одновременное возделывание гладкоплодных и бугорчатых гибридов огурца, фитосанитарным состоянием предшествующего культурооборота, качеством проведения истребительных и профилактических мероприятий между оборотами, а также чередованием культур и т. д.).

По встречаемости видов в пробах из различных биотопов культуры огурца закрытого грунта растительноядные клещи и белокрылка тепличная относятся к постоянным видам, трипсы – к добавочным видам.

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Development of conditions for sertraline analysis by the method of thermodesorption surface-ionizing spectroscopy

Abstract: The procedures for determination and identification of sertraline by the method of thermodesorption surface-ionizing spectroscopy have been developed. It was established that alcoholic solutions of sertraline had maximum absorption at $\sim 131 \pm 15^\circ\text{C}$ and $\sim 190 \pm 15^\circ\text{C}$. The linear-dynamic range is in the interval of 50-300 $\mu\text{g/mL}$ of substance concentration in the sample. Sensitivity of the method is 0,5 $\mu\text{g/mL}$. The developed method is recommended for analysis of sertraline in biological liquids.

Keywords: thermodesorption surface-ionization spectroscopy, sertraline, biological fluids.

Sertraline, (Altruline; Serad; Zoloft; Asentra; Serlift; Stimuloton) is the medicine. White or almost white crystalline powder. Sertraline is the antidepressant. Despite the widespread use of sertraline in medical practice the cases of the manifestation of their toxic effects are not excluded (in overdose and individual hypersensitivity), as evidenced by cases of acute and chronic poisoning with these drugs described in the literature [1,2,3]. Sertraline is associated with the increased suicide risk in different age groups: in youth, adolescents and adults. In connection with this the study of sertraline in the biopharmaceutical and chemical and toxicological regard is the crucial task. The purpose of this study is to develop the analytical procedure for sertraline by thermodesorption surface-ionizing spectroscopy (TDSIS) method and the application in the study of biological liquids.

Experimental part. For the study the method of thermodesorption surface-ionization spectroscopy was used. The essence of the method lies in the temperature-programmed regime of evaporation of molecules of required substances in the extracts from biological samples with their subsequent entry the surface ionization detector, the signals of which are recorded in the form of thermodesorption spectra. These thermodesorption spectra are quite specific for certain test substances. The basis for registration is the principle of operation of surface-ionization detector. In the diode detector as the anode there is thermo emitter, and as the cathode – there is the collector of positive ions. While passing through the diode of the analyzed mixture, the molecules entering the surface of the emitter can be desorbed in the form of ions that are delivered to the collector by the electric field for registration.

In the detector, due to its high selectivity for the ionization potential the molecules of organic solvents (alcohols, ketones, aldehydes, esters, hydrocarbons, etc.) and simple gases are practically not ionized by surface ionization. The detector allows to register only the molecules of nitrogen bases, the derivatives of which are many narcotics, alkaloids and other synthetic nitrogen compounds [4,5].

The authenticity of the substances is established according to the effective temperature of desorption using standard samples of the studied drugs.

For the detection of sertraline by the method thermodesorption surface-ionization spectroscopy (TDSIS) the analysis was performed under the following conditions: the emitter – oxidized molybdenum, having iridium in its composition; emitter voltage – 405 V; emitter temperature – 390-420°C; temperature of evaporation – 20-505°C; air flow – 50 l/hour, (the voltage of the compressor is 12 V); volume of the test sample taken for analysis - 1.0 µl; analysis time – 3 minutes; recording of the spectra is performed directly by using computer program.

To conduct the study the standard solutions of sertraline were prepared. Accurately weighed quantity of 0.01 sertraline is dissolved in 95% ethyl alcohol in 10 ml flask. Solution is diluted with 95% ethyl alcohol to the mark. From this solution working standard solution (100 µg/ml) was prepared and from which 1 µl of solution was taken by micro syringe and injected into cylindrical cavity of evaporative tape of PII-N-S "Iskovich-1" apparatus, and thermodesorption surface-ionization spectra were received. At the temperature of $\sim 131 \pm 15^\circ\text{C}$ and $\sim 190 \pm 15^\circ\text{C}$ the appearance of peaks was observed typical for sertraline (Figure 1).

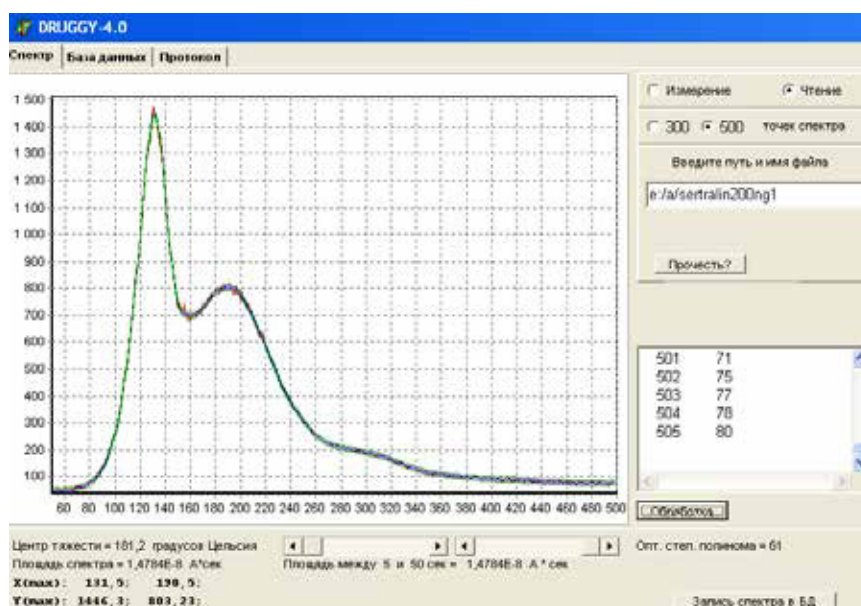


Fig. 1. TDSI spectra of sertraline

The obtained thermodesorption spectra were recorded as the references to the database of the computer. The sensitivity of the method is within 0.5 µg/ml range.

Further, we examined the specificity of the conditions of sertraline analysis by TDSIS method. The temperature of the surface-ionization spectrum of sertraline was differ from the above temperatures of the studied antidepressants. The results are shown in table 1.

Table 1.

The results of study of specificity of the conditions of sertraline analysis by TDSIS method

Test substance	Temperature of maximum ionization, °C
Fluoxetine	~123±10°C and ~203±10°C
Fluoxetine	~96±15°C and ~212±15°C
Paroxetine	~144±15°C and ~230±15°C
Sertraline	~131±15°C and ~190±15°C

Quantitative determination was carried out according to calibration graph drawn up according to the exact concentration of the standard nominal solution. To construct the calibration curve 1 ml of standard alcohol solution in the concentrations of 50, 100, 150, 200, 250, 300 µg/ml, respectively by using micro syringe is injected

into the cylindrical cavity of the evaporative tape of PII-N-S "Iskovich-1" apparatus and their average values are obtained (based on the peak of sertraline at $\sim 131 \pm 15^\circ\text{C}$). The results of the analysis are given below in table 2 and on Fig. 2.

Table 2.

The results of study of the linear dependence of sertraline analysis conditions by TDSIS analysis (sertraline $\sim 131 \pm 15^\circ\text{C}$) $n=5$)

Solution concentration, $\mu\text{g/ml}$	Amount of sertraline, ng	The height of TDSI spectra (at current intensity $(I \times 10^{-12}\text{A})$)
50	50	451
100	100	748
150	150	1082
200	200	1446
250	250	1856
300	300	2130

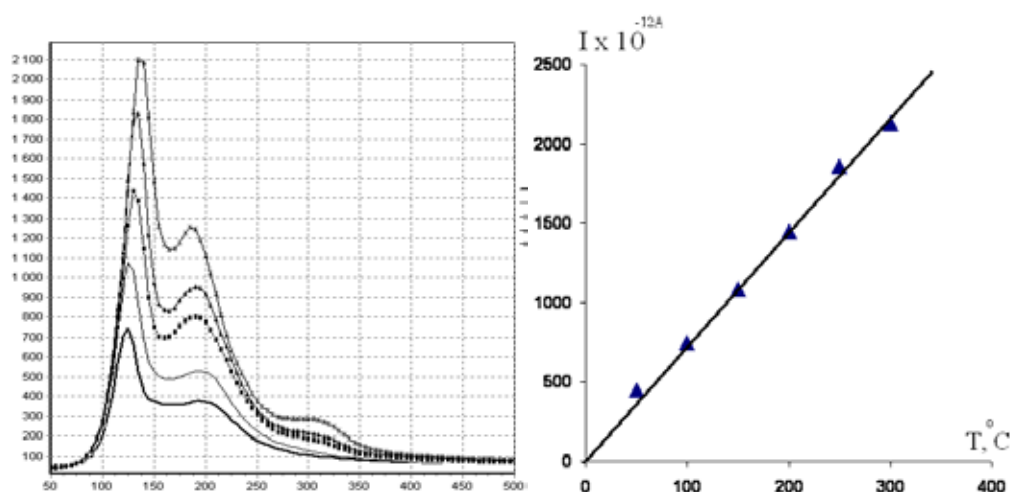


Fig. 2. Graph of TDSI sertraline spectra height dependence on the solution concentration

After quantitative determination of sertraline by TDSIS method metrological calculation was conducted. The results are shown in table 3.

Table 3.

The results of study of accuracy and reproducibility of sertraline analysis conditions by TDSIS analysis

Preparation amount, $\mu\text{g/ml}$	Obtained amount		Temperature of maximum ionization, $^{\circ}\text{C}$	Results of metrological calculation	
	ng	%			
150	151,9	101,27	130,5	$X_{\text{mean}}=100,08$ $S^2=2,959$ $S=1,720$ $S_x=0,769$ $\Delta X=4,783$ $X_{\text{mean}}=2,139$ $\varepsilon=4,779\%$ $\varepsilon_{\text{mean}}=2,137\%$	
150	148,4	98,93	130		
150	146,8	97,87	129		
150	153,2	102,13	131		
150	150,3	100,20	130		

Thus, in the result of the analysis of sertraline TDSIS we have $X_{\text{Sr}} = 100,08\%$, the average relative error is $E_{\text{Sr}} = 2,137\%$.

In the next stage of study the verification of the developed procedure was conducted in the analysis of sertraline extracted from biological fluids (blood and urine).

Extraction of sertraline from blood and urine. 2 ml of blood and 5 ml of urine model sample (containing 300 μg of sertraline) are diluted with 10% aqua ammonia to pH = 8,0-9,0 and 5 ml of chloroform. Samples were shaken for 5 minutes and then centrifuged for 5 minutes at 3000 rpm. Chloroform extracts were passed through anhydrous sodium sulphate and evaporated to dryness on a water bath. Dry residue was dissolved in ethyl alcohol and cleaned from ballast substances by TLC method in the system of organic solvents, benzon-chloroform-ethanol (2:1:2). Then sertraline was eluted from the sorbent of chromatography plate with ethyl alcohol and quantitative determination was carried out by TDSIS method. The results are shown in table 4.

Thus, at the analysis of the determination of sertraline from dosage forms and physical evidences (blood, urine) we have achieved positive results.

Conclusions. 1. The procedure of sertraline detection has been developed by the method of thermodesorption surface-ionization spectroscopy. Here it was established that alcoholic solutions of sertraline at $\sim 131 \pm 15^{\circ}\text{C}$ and $\sim 190 \pm 15^{\circ}\text{C}$ have maximum absorption.

Table 4.

**The results of quantitative determination of sertraline extracted
from biological fluids**

Amount of sertraline		Statistic processing of results	
$\mu\text{g/ml}$	%		
blood			
174,42	58,14	$X_{\text{mean}}=59,57$	$S^2=2,4971$
178,17	59,39	$S=1,5802$	$S_x=0,7067$
185,78	61,93	$\Delta X=4,3931$	$\Delta X_{\text{mean}}=1,9646$
180,62	60,21	$E=7,3746\%$	$E_{\text{mean}}=3,2980\%$
174,55	58,18		
urine			
228,42	76,14	$X_{\text{mean}}=73,51$	$S^2=3,0557$
218,16	72,72	$S=1,7481$	$S_x=0,7818$
221,64	73,88	$\Delta X=4,8596$	$\Delta X_{\text{mean}}=2,1733$
214,15	71,38	$E=6,6110\%$	$E_{\text{mean}}=2,9565\%$
220,27	73,42		

2. The indicators such as specificity, accuracy, reproducibility, linear dynamic range and mean result accuracy have been studied. Linear dynamic range is in the interval of concentration of 50-300 $\mu\text{g/ml}$ in the sample. The sensitivity of the method is 5 $\mu\text{g/ml}$.

3. With the help of calibration curve the quantitative content of sertraline was calculated. It was established that quantitative determination of sertraline by TDSIS method makes up in average $X_{\text{mean}} = 100,08\%$, and $E_{\text{mean}}=2,137\%$. The possibility of application of this method is shown in quantitative analysis of sertraline isolated from the biological fluids. In this case, from the blood and urine sertraline is isolated in the amount of 59,57% 73,51%, respectively.

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Could Mean Platelet Volume and Red Cell Distribution Width Predict Vitamin B12 Deficiency?

ABSTRACT

Aims: Vitamin B12 deficiency causes an increase in homocysteine levels which is associated with inflammatory conditions. Mean platelet volume (MPV) and red cell distribution width (RDW) are also associated with inflammation. Therefore, we aimed to compare hematological parameters in patients with and without vitamin B12 deficiency to find out whether they could predict vitamin B12 deficiency.

Methods: Patients who underwent vitamin B12 assessment grouped based on the serum level of vitamin B12. We grouped 116 patients, whose B12 level was lower than 250, in first group and 62 patients, whose B12 \geq 250 pg/ml, in second group.

Results: Red cell distribution width was significantly higher in group 1 (patients with a vitamin B12 level lower than 250 pg/ml) compared to those in group 2 (patients with a vitamin B12 level higher than 250 pg/ml). Mean platelet volume was significantly lower in group 1 compared to group 2.

Conclusion: We suggest that MPV and RDW should be an indicator of vitamin B12 deficiency especially in early stages of the disease. However, prospective studies with larger cohort are needed to confirm our results.

Keywords: Vitamin B12; mean platelet volume; red cell distribution width; inflammation.

1. INTRODUCTION

Vitamin B12 is an important nutrient which can not be produced in vivo by human. Vitamin B12 deficiency occurs as a consequence of reduced oral intake or impaired absorption. Vegetarian diet, alcohol consumption, smoking, gastric acid suppression and drugs (i.e Metformin) may cause vitamin B12 deficiency [1-4]. Hematologic (anemia alone or accompanied with leukopenia or thrombocytopenia) and neurologic disorders occur usually in later periods of the deficiency [1,5]. Diagnosis of the disease is easy in these stages, however, early diagnosis, which is very important to avoid irreversible neurological damage, is confusing due to laboratory methods and lack of symptoms [6,7]. Macro-ovalocytosis in erythrocytes and hypersegmentation in the nuclei of neutrophil are two major findings of Vitamin B12 deficiency in peripheral blood smear. On the other hand, hematocrit (Htc) and mean corpuscular volume (MCV) might be normal in vitamin B12 deficiency even in cases presented with neurological disorders [8].

Homocysteine levels increase in serum of the patients with vitamin B12 deficiency [9-11] and lead to hyperhomocysteinemia, which is considered as a risk factor for atherosclerosis [11,12]. Treatment of vitamin B12 deficiency not only corrects the level of vitamin B12, but also reduces serum homocysteine levels [13]. On the other hand, inflammation had been found as an underlying pathological mechanism in atherosclerosis [14].

Mean platelet volume (MPV), and red cell distribution with (RDW) are hemogram parameters that authors speculate that both two were associated with inflammation and inflammatory conditions [15,16]. Moreover, atherosclerosis is characterized with subclinical inflammation and data in literature suggest that it is associated with both RDW and MPV [17,18].

In present retrospective study, we aimed to compare hematological parameters in patients with and without vitamin B12 deficiency to find out whether they could predict vitamin B12 deficiency.

2. MATERIALS AND METHODS

Patients who underwent vitamin B12 assessment grouped based on the serum level of vitamin B12. Laboratory data obtained from computerized database of our institution. Patients with chronic inflammatory disease, diabetes mellitus, coronary artery disease and congestive heart failure were excluded from the study

because these conditions may affect MPV and RDW levels. We also did not include subjects with an elevated white blood cell count which probably indicates recent infection. Patients with iron deficiency or with a history of iron replacement therapy in last six months were also excluded. Remaining 178 patients grouped into two groups according to the serum B12 level. Previous studies usually grouped patients at a cut point B12 level of 250 pg/ml [19], therefore, we grouped 116 patients, whose B12 level was lower than 250, in first group and 62 patients, whose B12 \geq 250 pg/ml, in second group. The reference range of serum Vitamin B12 was 191-663 pg/ml in the laboratories of our institution.

The complete blood count analyses were performed in automatic analyser of LH 780 model of Beckman Coulter device (Beckman Coulter Inc.; Bre CA). Electrochemiluminescent assay performed in the detection of serum vitamin B12 assessment (Roche Cobalte 601).

Patients' characteristics and laboratory data; white blood cell count (WBC), neutrophil count (neu), lymphocyte count (lym), eosinophil count (eos), hemoglobin (Hb), hematocrit (Hct), mean corpuscular volume (MCV), red cell distribution width (RDW), platelet count (PLT), mean platelet volume (MPV), platelet distribution width (PDW) recorded.

SPSS software (SPSS 15.0 for Windows Chicago, IL, USA) used for statistical analysis. Patients characteristics and laboratory data of the groups compared either with student t test (for normal distributed variables) or with Mann Whitney U test (for non normally distributed variables). A spearman correlation analyze performed to detect correlation of the variables. Statistically significance set on $p < 0.05$ level. The study was approved by local ethics committee of Abant Izzet Baysal University.

3. RESULTS

General characteristics and laboratory data of the patients in study groups summarized in Table 1.

Age was not significantly different between groups ($p=0.23$). Similarly, gender was not different between groups ($p=0.91$), either. There was no significant difference between study groups in terms of following laboratory parameters: WBC, Neu, Lym, Eos, Hb, Hct, MCV, PLT and PDW (all $p > 0.05$).

Table 1. Characteristics and laboratory data of the study groups

		Group 1 (VitaminB12<250pg/ml)	Group 2 (VitaminB12≥250pg/ml)	p
Gender (n)	Male	27	14	0.91
	Female	89	48	
		Median (Min-Max)		
Age (years)		23.5 (20-73)	25 (19-75)	0.23
WBC (u/mm ³)		6.4 (4.1-9.8)	6.7 (4.3-9.6)	0.24
Neu (u/mm ³)		3.7 (1.7-7)	3.7 (1.7-6.7)	0.87
Lym (u/mm ³)		1.9 (0.6-4)	2 (0.8-3.9)	0.27
Eos (u/mm ³)		0.1 (0-0.5)	0.1 (0-0.9)	0.21
RDW (%)		16.5 (15.6-18.8)	16.3 (14.4-18.1)	0.031
MPV (fL)		8.2 (6.3-11.4)	8.6 (4.9-12)	0.026
PDW (%)		13.7 (11.6-28.9)	13.8 (11.5-27.4)	0.48
VitB12 (pg/ml)		180 (150-247)	315 (250-899)	<0.001
		Mean±Standard Deviation		
Hb (g/dL)		13.6±1.1	13.7±1.2	0.89
Htc (%)		40.1±3.4	40.5±3.4	0.58
MCV (fL)		87±4.7	87.7±5.2	0.40
PLT (u/mm ³)		262±60	268±94	0.62

RDW was significantly higher in group 1 (patients with a vitamin B12 level lower than 250 pg/ml) compared to those in group 2 (patients with a vitamin B12 level higher than 250 pg/ml) [16.5 (15.6-18.8) in group 1 and 16.3 (14.4-18.1) in group 2]. The difference was statistically significant (p=0.031).

Mean platelet volume was significantly lower in group 1 compared to group 2 [8.2 (6.3-11.4) in group 1 and 8.6 (4.9-12) in group 2], and the difference reached statistically significance (p=0.026).

Serum vitamin B12 level was significantly lower in group 1 [180(150-247 pg/ml)] compared to group 2 [315(250-899 pg/ml)] (p<0.001).

In correlation analysis, we figured out that vitamin B12 was significantly correlated with MPV (p=0.017) (r=0.178). However, serum vitamin B12 level was not correlated with any other hemogram parameters.

4. DISCUSSION

We found that RDW and MPV were significantly different in patients with vitamin B12 deficiency compared to the patients with normal vitamin B12 serum levels.

MPV refers the size of circulating platelets and red cell distribution width refers the size variability of erythrocytes. Literature is full of data reported association between both these two hemogram parameters and overt or subclinical inflammatory processes [16,20-23]. Vitamin B12 deficiency may be associated with

occult inflammation by homocysteine increasing pathway. It is well established that serum homocysteine levels increase in vitamin B12 deficiency [9] and homocysteine is considered to be associated with inflammation [24]. Because homocysteine plays important role in inflammation, one can conclude that vitamin B12 deficiency should be associated with inflammatory conditions. The results of our study encourage this hypothesis.

Elevation in serum homocysteine has been described as a risk factor for atherosclerosis, and for arterial and venous thromboembolism [11] and similarly, MPV has been found to be associated with such conditions too [18,25]. Therefore, we can suggest that homocysteine and MPV act interrelated in the course of inflammation. The results of Mohan et al's study reporting that homocysteine promoted platelet activation, suggest this hypothesis [26].

Why RDW increase in Vitamin B12 deficiency? A deficiency in vitamin B12 results on a defect in DNA synthesis, therefore, leads to unbalanced growth and impaired division of hematopoietic cells. Thus, larger and normal sized erythrocytes should be produced in bone marrow which causes an elevation in RDW. Another explanation could be about the association between vitamin B12 deficiency and inflammation. Since RDW has been found to be related with inflammatory conditions and vitamin B12 deficiency is considered to be connected with inflammation via homocysteine increase, an elevated RDW in vitamin B12 deficiency should reflect the inflammatory burden of the disease. Similar to the results of present study, elevated RDW in vitamin B12 deficiency has been reported in literature by Ponstaporn et al. [27] and Bhatia et al. [28].

We showed that MPV was lower in patients with vitamin B12 deficiency than in the patients without vitamin B12 deficiency. Similar to our results, some authors pointed an involvement of MPV in inflammation [16,20]. Furthermore, changes in MPV have been found to be related with acute myocardial infarction, an important outcome of atherosclerosis (18). Possible reasons for this difference in MPV in vitamin B12 deficiency may be include inflammation related to vitamin B12 deficiency may interact with megakariopoiesis in bone marrow and cause production of smaller platelets. Another explanation should be that active platelets tend to be larger in diameter and they involve in inflammatory conditions. After utilization of active platelets in inflammatory processes, remaining smaller platelets may be responsible of the reduction in MPV.

Our results indicated that RDW and MPV changes occur in such an early stage of the deficiency before other well established hematological changes developed are very important. Because, authors do not rely on MCV in the diagnosis of vitamin B12 deficiency due to that it has been reported to be normal between reference range even in patients with suspected vitamin B12 deficiency [28,29]. Besides, Loikas et al reported that neither anemia nor macrocytosis predicted vitamin B12 deficiency [30].

Retrospective design and relatively small study population are two important limitations of present study. Moreover, we could not discuss the homocysteine levels of our study population because of retrospective design.

5. CONCLUSION

In conclusion, we think that MPV and RDW should be an indicator of vitamin B12 deficiency especially in early stages of the disease in patients without cytopenias. However, prospective studies with larger cohort are needed to confirm our results.

CONSENT

Not applicable.

ETHICAL APPROVAL

Present study was approved by local ethics committee of Abant Izzet Baysal University.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Primary Small B-cell Lymphoma (MALT Lymphoma) at Lingual Tonsil: A Case Report

ABSTRACT

Aims: Primary non-Hodgkin's lymphomas of the oropharyngeal region are rare. We report a case of a small B-cell lymphoma (MALT lymphoma) involving base of tongue. The patient was successfully treated with wide excision of the lesion followed by radiotherapy. **Presentation of Case:** A 75-year-old female Caucasian patient was referred to our clinic with complaints of foreign body sensation in the throat and progressively worsening snoring over 4 months. Oropharyngeal examination revealed a 3x3-cm smooth mass originating from the left side of the base of tongue and moving with protrusion of the tongue. Excisional biopsy revealed a low-grade small B-cell lymphoma with lambda monoclonal plasmacytic differentiation [extranodal marginal zone lymphoma of mucosa-associated lymphoid tissue (MALT) with lambda monoclonal plasmacytic differentiation]. The neoplastic population was consisted of small lymphoid B-cells and lambda monoclonal plasma cells. Lymphoid cells showed CD20(+), CD5(-), CD23(-), CD10(-), BCL-6(-), IgD(-), BCL-2(+). In the neoplasm were seen few mitoses, and cellular proliferation marker Ki-67 was approximately 15%. Magnetic resonance imaging of the head and neck showed a well-circumscribed solid mass originating from the base of left side tongue. Bone marrow aspiration biopsy showed no evidence of disease. Computerized tomographic scans of the thorax and magnetic resonance imaging of the abdomen showed no adenopathy. Tumor was determined to be at Stage I.

Discussion and Conclusion: Primary non-Hodgkin's lymphomas involving oropharyngeal region should be considered in differential diagnosis of all lesions located in this region. To our knowledge, a case of small B-cell lymphoma of the base of the tongue is rarely reported. An appropriate evaluation of the clinical presentation along with histopathologic and immunohistochemical evaluation of biopsy specimen may aid in the diagnosis and effective treatment.

Keywords: lymphoma; small B-cell lymphoma; extranodal marginal zone lymphoma of mucosa-associated lymphoid tissue (MALT); base of tongue; non-Hodgkin lymphoma.

1. INTRODUCTION

Lymphomas are malignant neoplasm of the lymphocytes which mainly involves lymph nodes, spleen and other non haemopoietic tissues [1]. They are mainly classified as Hodgkin or non-Hodgkin lymphoma (NHL), either of B-lymphocyte or T-lymphocyte in origin [1]. About 10 to 40% of cases of NHL are of extra nodal origin [2,3], while Waldeyer's ring lymphomas make up 50-80% and lingual tonsil lymphomas constitute about 3-18% of extranodal lymphomas of the head and neck [3,4]. In general, small B cell lymphoma is classified into Mantle cell lymphoma (MCL), Follicular lymphoma (FL), Small lymphocytic lymphoma (SLL) and Marginal zone B-cell lymphoma of the mucosa-associated lymphoid tissue (MALT). MALT lymphoma in the lingual tonsil is rare [5]. Ninety percent of oropharyngeal cancers are squamous cell carcinomas. Furthermore, regarding the site of origin, primary lymphomas of base of tongue in the oral cavity are still uncommon. Given that cervical lymph node involvement and manifestation as an ulcerated exophytic lesion has been indicated in most of the reported cases of primary extranodal NHL of the tongue [6], herein, we describe a rare case of MALT lymphoma in a 75-year-old female presenting as a swelling of the lingual tonsil, without any superficial ulceration or lymph node involvement.

2. PRESENTATION OF CASE

A 75-year-old female Caucasian patient presented with foreign body sensation in the throat of 4 months duration along with progressively worsening snoring and shortness of breath, without other systemic symptoms.

Oral examination by observation showed an obvious lobulated smooth mass at the base of the tongue (Fig. 1). Physical examination findings were otherwise unremarkable and chest X-ray revealed normal findings. Laboratory investigation including complete blood count, Westergren sedimentation rate for erythrocytes, glucose and electrolyte levels also revealed normal findings.

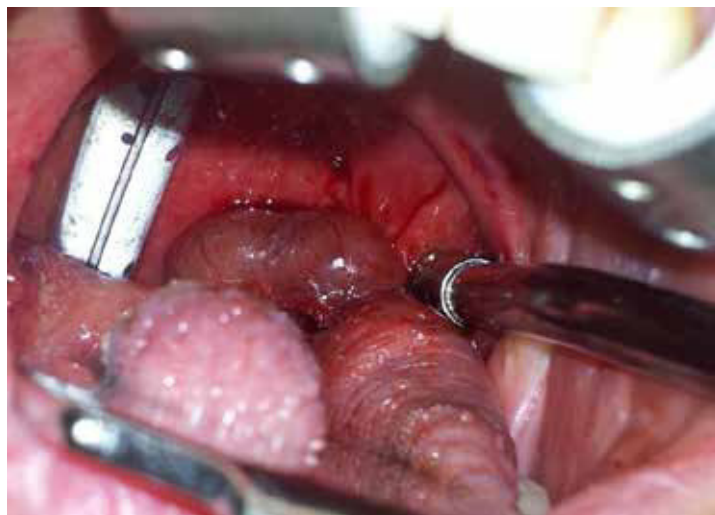


Fig. 1. Oral examination showed an obvious lobulated smooth mass at the base of the tongue

Preoperative T1 and T2 weighted fat saturation (FATSAT) turbo spin echo (tse) axial and coronal magnetic resonance imaging (MRI) of the head and neck showed a well-circumscribed solid mass originating from the left side of the base of the tongue (Fig. 2a-f). There was no adenopathy.

Studies using lymphocyte markers under immunohistochemical staining (Technic of Ventana-Benchmark) revealed a phenotype typical of B-cells. Lymphoma cells expressed CD20(+), CD5(-), CD23(-), CD10(-), BCL-6(-), IgD(-), BCL-2(+) (Fig. 5). The lymphoid population consisted of small lymphoid B-cells with few mitoses and the cellular proliferation marker Ki-67 was 15% approximately. The plasma cells show lambda(+) monoclonality (kappa(-)) (Fig. 5). Serum and urine protein electrophoresis values showed that there was no monoclonal gammopathy.

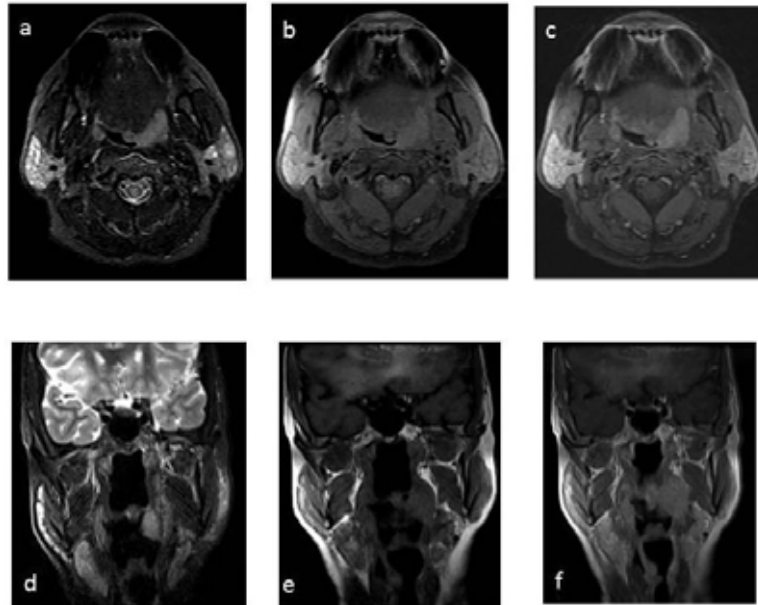


Fig. 2a-f. MRI showed a solid mass originating from the left side of the base of tongue.

2a: T2w-tse-FATSAT axial image. 2b: T1w-se-FATSAT axial image (precontrast). 2c: T1w-tse-FATSAT axial image (postcontrast).

2d: T2w-tse-FATSAT coronal image.

2e: T1w-tse-coronal image (precontrast).

2f: T1w-tse-coronal image (postcontrast)

Histopathological evaluation of the specimen obtained via an excisional biopsy (Fig. 3) was performed.

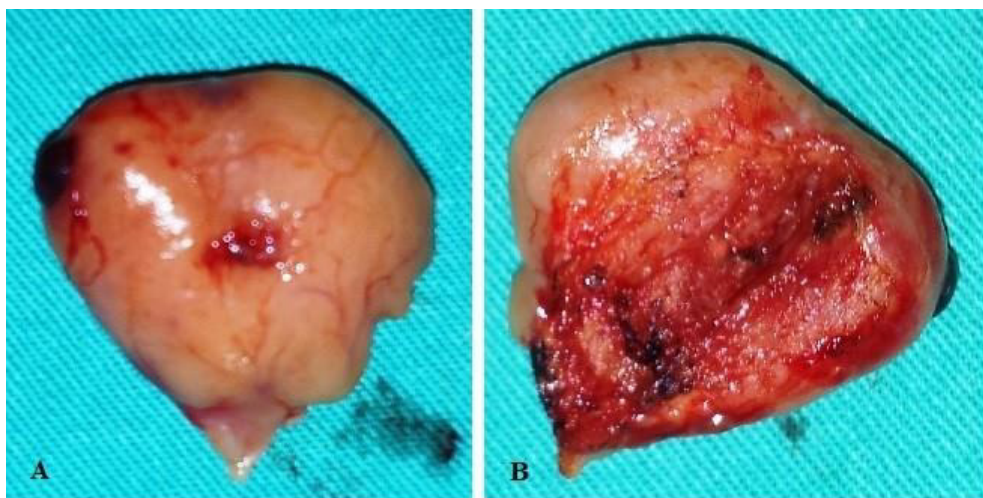


Fig. 3. Specimen obtained via an excisional biopsy. A Surface B Base

Evaluation of hematoxylin and eosin stained specimen under light microscopy revealed presence of neoplasms composed of small lymphoid cells and plasma cells (Fig. 4).

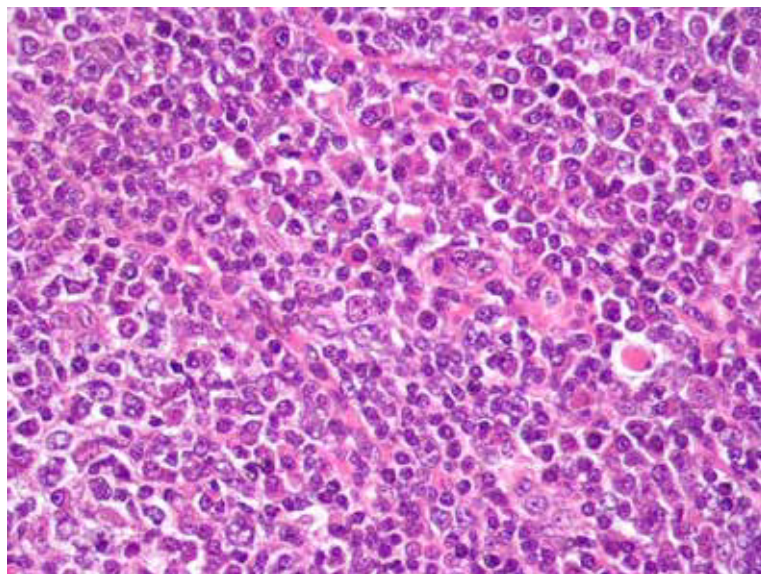


Fig. 4. Neoplasms of small lymphoid cells and plasma cells on stained tissues. Hematoxylin and eosin under light microscopy (H&E stain x 40)

Studies using lymphocyte markers under immunohistochemical staining (Technic of Ventana-Benchmark) revealed a phenotype typical of B-cells. Lymphoma cells expressed CD20(+), CD5(-), CD23(-), CD10(-), BCL-6(-), IgD(-), BCL-2(+) (Fig. 5). The lymphoid population consisted of small lymphoid B-cells with few mitoses and the cellular proliferation marker Ki-67 was 15% approximately. The plasma cells show lambda (+) monoclonality (kappa(-)) (Fig. 5). Serum and urine protein electrophoresis values showed that there was no monoclonal gammopathy.

In the postoperative period, no tumor was noted on the left side of the base of the tongue in the T1 and T2 weighted FATSAT axial and coronal cross-sectional view (Fig. 6 a-f).

Bone marrow aspiration biopsy did not show any evidence of disease. Computerized tomographic (CT) scans of the thorax and magnetic resonance imaging (MRI) of the abdomen showed no adenopathy. Based on these findings, the tumor was considered to be at Stage I.

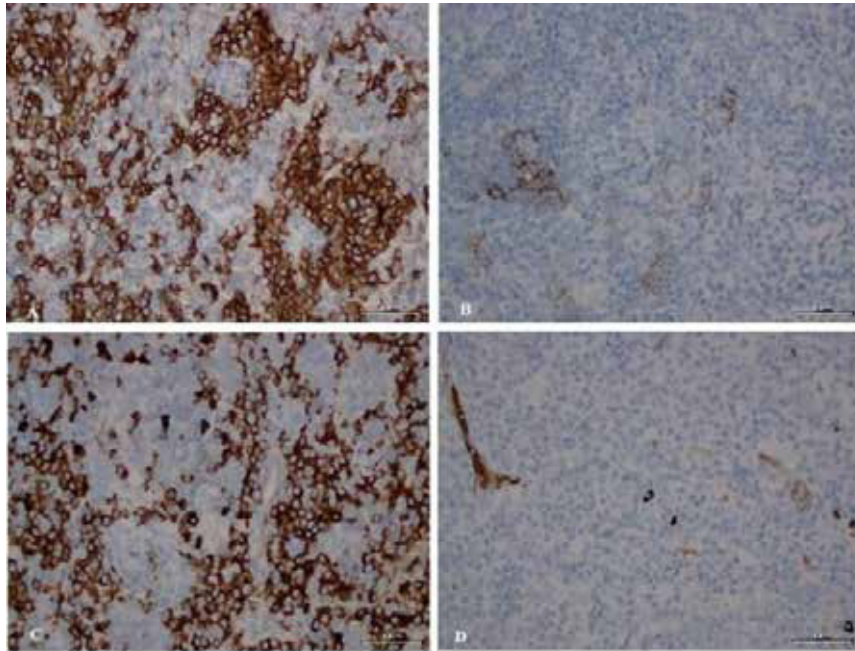


Fig. 5. Immunohistochemical staining revealed a phenotype of B-cells. Lymphoma cells expressed CD20(+) (A), negative with CD23. CD23 revealed lymphoma cells colonized in the lymphoid follicul via follicular dendritic meshwork in the basis of neoplasm. Plasma cell component of lymphoma stain with lambda light chain (C), and negative with kappa light chain (D)

The patient was referred to the Tumor Research Commission of the hospital for further therapy. Depending on the early stage of the tumor, and the lack of adenopathy or findings suggestive of sustaining dysplasia, radiation therapy was undertaken. The patient had a good clinical outcome after the radiation therapy with no problems to date within the nine months of follow-up.

3. DISCUSSION

The head and neck is the second most common region for extranodal lymphomas following the gastrointestinal tract [7]. Lymphomas represent the 3rd most common group of malignant lesions of oral region, following squamous cell carcinoma and salivary gland neoplasm [8]. About 20 to 30% of the NHL arise from extranodal sites [3], while only 3-5% of these lymphomas have oral and perioral location, most of them appearing in Waldeyer's ring which is an area encompassed by the nasopharynx, the tonsils and the base of the tongue [3,8]. Oral cavity is a less common extranodal site for NHL than for Hodgkin's disease and for B-cell

lymphomas than T-cell lymphomas, while NHL of the tongue is an extremely rare event [9,10].

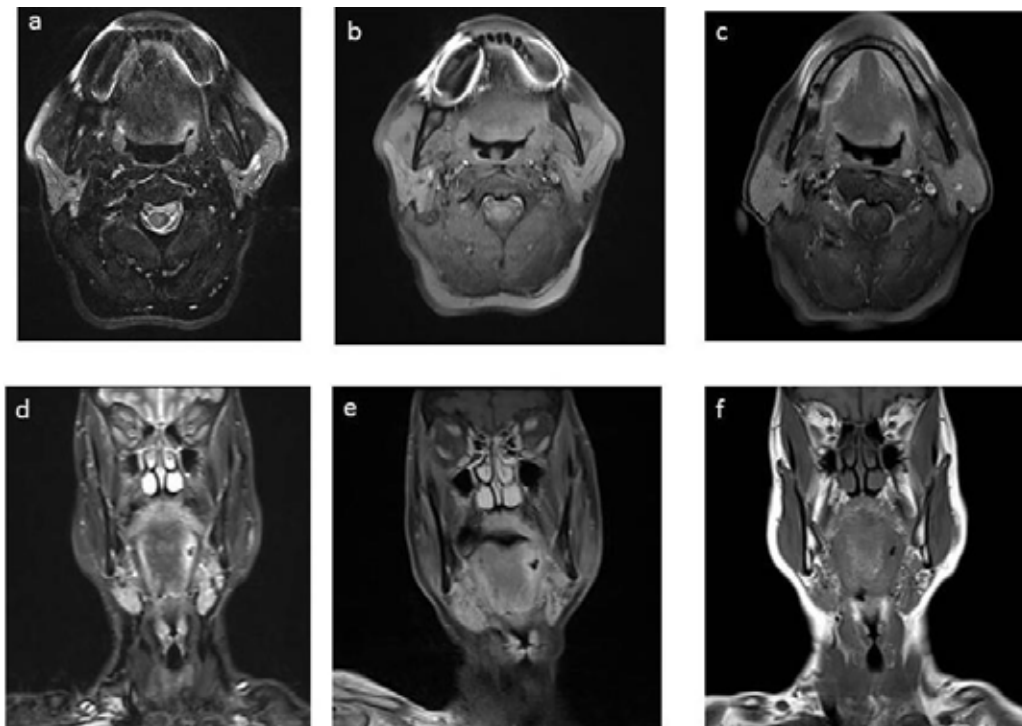


Fig. 6 a-f. MRI showed no mass from the left side of the base of the tongue. 6a: T2w FATSAT axial image (postoperative). 6b: T1w FATSAT axial image (precontrast-post operative). 6c: T1w FATSAT axial image (postcontrast-postoperative). 6d: T2w FATSAT coronal image (postoperative). 6e: T1w coronal image (precontrast-postoperative). 6f: T1w FATSAT coronal image (postcontrast-postoperative)

The nose and paranasal sinuses, orbit(s), salivary glands are other sites in head and neck affected in descending order of frequency [11-13]. It generally affects the elderly, especially over the 6th decade of life, and the male: female ratio was 2:1 [14].

Little is known about the etiological factors for primary lymphoma of the oral region. Few cases of oral lymphoma have been reported in association with the acquired immunodeficiency syndrome [9]. Another hypothesis suggested that lymphomas develop as a result of imbalanced immunoregulation, however in the great majority of malignant lymphomas; there is no overt immunologic abnormality.

Malignant lymphomas are thought to arise in the oral cavity from components of the lymphoreticular system in the oral submucosa, usually Waldeyer's ring [9,11,12].

Some cases of MALT lymphoma can present prominent plasma cell differentiation, and less commonly, monoclonal gammopathy. The differential diagnosis of these cases from other NHLs with plasmacytic differentiation or plasma cell neoplasms is very difficult [15,16]. Our case differentiate from small lymphocytic lymphoma (chronic lymphocytic leukemia) by negative CD5 and CD23, and differentiate from lymphoplasmacytic lymphoma by without involvement of bone marrow.

Primary NHL of the tongue may manifest as a submucosal mass, a polypoid bulky mass with a smooth mucosal surface, or as an ulcerated lesion associated cervical lymph node involvement. The most common presenting symptoms are local swelling, pain, or discomfort and ulcer, while occasionally upper airway obstruction may occur [6]. In this regard given that swelling of the lingual tonsil leading progressively worsening snoring and shortness of breath was the presenting symptom in our case without any superficial ulceration or lymph node involvement, our findings refer to a rare case of extranodal primary NHL of tongue, primary small B-cell lymphoma (MALT lymphoma) at lingual tonsil. Albeit based on a limited number of case reports, similar atypical manifestations including a mass with no exophytic lesion or ulceration [17-19] and lack of cervical lymph node involvement [18-20] were also reported in the literature.

Although MRI and CT are diagnostic in most cases, confirmation should be obtained by incisional or excisional biopsy of the extranodal mass and immunohistochemical, cytogenetic and flow cytometric studies [14,21]. Differential diagnosis includes metastatic tumors in the base of tongue, poorly differentiated squamous cell carcinomas, poorly differentiated adenocarcinomas, melanomas, and rare tumors such as rhabdomyosarcomas, neuroblastomas and Ewing's tumor [3,8,20].

The paucity of cases challenges the understanding of the biological behaviour and therapeutic options of lymphoma involving the oral region [14,18]. Although oral lymphoma of the tongue is very uncommon, it should always be considered in differential diagnosis of various benign and malignant lesions in this region due to distinct therapeutic and prognostic course [9,21,22].

The oral lymphoma responds well to chemo and radiotherapy [8,21,22], while the prognosis of the NHL has been related to the stage of the tumor, the aggressiveness of the malignant cell type and the response to treatment [7,9,11,22].

Our patient was treated with radiotherapy following excision of the lesion as histopathology proved it to be poor grade lymphoma. She remained without evidence of disease 9-months after the treatment.

4. CONCLUSION

Although oral NHL of tongue is very rare, it should always be considered in differential diagnosis of various benign and malignant lesions in this region, because the treatment and prognosis for these conditions are quite different. A proper clinical evaluation, histopathologic as well as immunohistochemical evaluation of biopsy specimen may aid in the diagnosis and thus, help in proper management.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

ETHICAL APPROVAL

The study was conducted in accordance with the ethical principles stated in the "Declaration of Helsinki" and written informed consent was obtained from the patient for publication of this case report and accompanying images.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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The role of melatonin in the regulation of the functional activity of endothelial

Abstract: A method of laser Doppler flowmetry found that by 10 times with daily administration of melatonin (1 mg/kg) there is a significant increase in functional activity of endothelial 154%, ($p \leq 0,05$) relative values recorded in intact animals. This leads to the growth of integrated indicators microhemodynamics, indicating that increase peripheral tissue perfusion and blood flow in microvessels modulation by increasing the endothelium-dependent vasodilatation. Possible mechanisms of action of melatonin on microhemodynamics.

Keywords: laser Doppler flowmetry, microhemodynamics, functional endothelial activity of melatonin.

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Роль мелатонина в регуляции функциональной активности эндотелия

Аннотация: Методом лазерной доплеровской флоуметрии установлено, что при ежедневном 10-кратном введении мелатонина (1 мг/кг) происходит достоверное увеличение функциональной активности эндотелия на 154%, ($p \leq 0,05$) относительно значений, зарегистрированных у интактных животных. Это приводит к росту интегральных показателей микрогемодинамики, что свидетельствует о об увеличении перфузии периферических тканей и модуляции кровотока в микрососудах за счет повышения эндотелий-зависимой вазодилатации. Рассматриваются возможные механизмы действия мелатонина на микрогемодинамику.

Ключевые слова: лазерная доплеровская флоуметрия, микрогемодинамика, функциональная активность эндотелия, мелатонин.

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ВВЕДЕНИЕ

Повышенное внимание исследователей привлекают исследования регуляторной роли эпифиза и его основного гормона мелатонина (МТ) в различных физиологических функциях организма. Ключевая роль МТ определяется тем обстоятельством, что ритмам его продукции подчинены все эндогенные ритмы организма. В частности, наличие циркадианной ритмики артериального [1] и центрального венозного давления у людей [2] свидетельствует об участии МТ и в регуляции функций сердечно-сосудистой системы.

Однако на сегодняшний день получены противоречивые сведения о влиянии МТ на тонус сосудов. Одни исследования свидетельствуют о вазоконстрикторном действии МТ [3], другие, наоборот – вазодилататорном [4]. Амбивалентность действия МТ объясняется тем, что в сосудистой стенке идентифицированы две функционально различные субпопуляции МТ рецеп-

торов. Как установлено с помощью меченого агониста йодмелатонина и ауторадиографии, низкие наномолярные концентрации МТ «запускают» МТ₁, рецепторы, ответственные за сужение сосудов, их расширение – следствие включения МТ₂ рецепторов при более высоком уровне гормона в крови [5].

В этой связи целью настоящего исследования явилась оценка характера влияния МТ в физиологических концентрациях (1 мг/кг) на функциональную активность эндотелия у крыс линии Вистар.

МАТЕРИАЛЫ И МЕТОДЫ ИССЛЕДОВАНИЯ

Экспериментальная часть работы выполнена на 20 белых крысах-самцах линии Вистар массой 180-250 г. Все исследования проводились согласно международным принципам Европейской конвенции «О защите позвоночных животных, которые используются для экспериментов и других научных целей», норм биомедицинской этики.

Для экспериментов отбирали животных одинакового возраста, характеризующихся средней двигательной активностью и низкой эмоциональностью в тесте «открытого поля». После предварительного отбора животных разделили на 2 группы по 10 крыс в каждой.

Животные обеих групп находились в обычных условиях вивария. Крысы первой группы являлись биологическим контролем (контроль), им ежедневно в утренние часы в течение 10-ти суток внутрибрюшинно вводили физиологический раствор объемом 0,2 мл. Крысам второй (экспериментальной) группы вводили 1 мг/кг МТ (Sigma, China), который разводили физиологическим раствором объемом 0,2 мл. Доза МТ выбрана в соответствии с данными литературы [6, 7].

Исследование изменений параметров микроциркуляции крови проводилось методом лазерной доплеровской флоуметрии (ЛДФ) при помощи лазерного анализатора кровотока «ЛАКК-02» во втором исполнении (производство НПП «Лазма», Россия) с использованием программы LDF 2.20.0.507WL. Исследование базального кровотока проводилось в течение 6-ти минут на 1, 5 и 10 сутки эксперимента, что соответствовало 1-, 5- и 10-кратному введению МТ. ЛДФ-метрию проводили через 1 час после введения МТ (у экспериментальной группы), и физиологического раствора (у контрольной группы).

Поскольку метод ЛДФ-метрии является высокочувствительным, то, для сведения к минимуму внешних помех, крысу на время записи помещали в

прозрачный пенал из оргстекла, ограничивающий подвижность животного. Размер пенала регулировался индивидуально и подбирался так, чтобы животное могло свободно дышать, и ни одна часть тела не была плотно зажата. Хвост крысы фиксировали на ровной поверхности на одной линии с телом в горизонтальном положении тканевым пластырем. Оптоволоконный зонд прибора «ЛАКК-02» также фиксировался тканевым пластырем перпендикулярно у основания хвоста. Запись сигнала велась, когда животное сидело неподвижно и спокойно.

В качестве параметров, анализируемых методом ЛДФ, регистрировали неосцилляторные показатели базального кровотока: показатель перфузии (ПМ, перф. ед.), среднее квадратичное отклонение (флакс, СКО, перф. ед.), коэффициент вариации (КВ, %) [8]. С помощью вейвлет-анализа ЛДФ-сигнала определяли амплитуду колебаний кровотока с низкой частотой (0,0095-0,02 Гц), которая характерна для эндотелиальных колебаний, обусловленных периодическими сокращениями цитоскелета эндотелиоцитов. Эндотелиальные колебания отражают воздействие гуморально-метаболических факторов на микрососудистое русло и характеризуют состояние нутритивного кровотока [9]. Статистическая обработка результатов проводилась с использованием пакета «STATISTICA – 8.0». Поскольку распределение значений переменных отличалось от нормального, то оценка достоверности межгрупповых различий проводилась с помощью U-теста Манна-Уитни.

РЕЗУЛЬТАТЫ ИССЛЕДОВАНИЯ И ИХ ОБСУЖДЕНИЕ

В результате исследования установлено, что у животных экспериментальной группы уже после однократного введения МТ существенно увеличивались амплитуды колебаний эндотелиального генеза (Аэ, на 23 %, $p \leq 0,05$) относительно значений, зарегистрированных у интактных животных. Данная динамика сохранялась на протяжении последующих измерений, и после 10-тикратного введения МТ Аэ составила 154 % ($p \leq 0,05$) относительно показателей в контрольной группе животных. Поскольку Аэ синхронизированы с периодическим релизингом оксида азота (NO) эндотелием сосудов [10], то повышение данного показателя свидетельствует об увеличении секреции NO эндотелием и, как следствие, развитие эндотелий-зависимой вазодилатации.

Данные изменения микрогемодинамики нашли свое отражение в увеличении неосцилляторных показателей базального кровотока (рис. 1),

динамика которых была схожа с таковой осцилляторных показателей. Так, после первого введения МТ наблюдалось достоверное увеличение ПМ на 29 % ($p \leq 0,05$), СКО – на 25 % ($p \leq 0,05$) и Кв – на 27 % ($p \leq 0,05$), а после 10-тикратного введения данные показатели увеличились соответственно на 44 % ($p \leq 0,05$), 35 % ($p \leq 0,05$) и на 28 % ($p \leq 0,05$) относительно значений этих показателей, зарегистрированных у животных контрольной группы, что указывает на увеличение перфузии крови и модуляцию кровотока во всех частотных диапазонах.

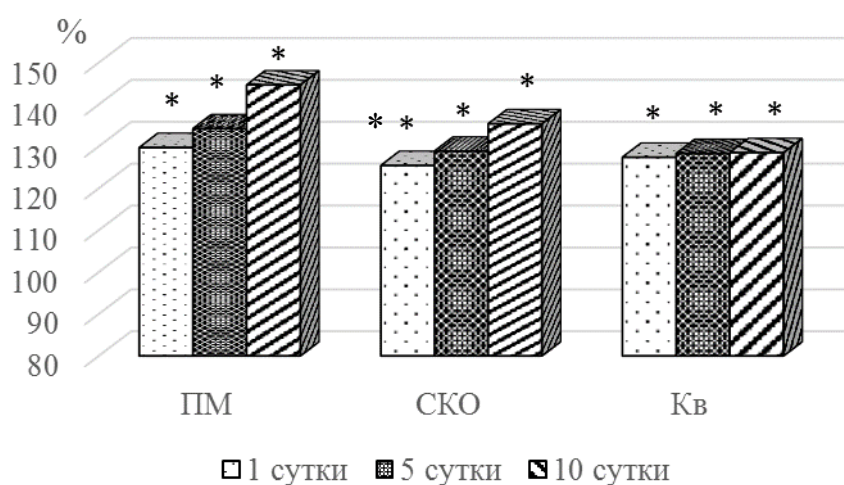


Рис. 1. Динамика неосцилляторных показателей микроциркуляции у животных после 1-, 5- и 10-тикратного (соответственно 1, 5 и 10 суток эксперимента) введения МТ, что соответствовало 1, 5 и 10 суткам эксперимента (в % по отношению к значениям данных показателей в контрольной группе, принятым за 100 %)

Таким образом, введение экзогенного МТ приводило к улучшению тканевой микрогемодинамики за счет увеличения эндотелий-зависимой вазодилатации, усилению метаболической активности эндотелия. Необходимо отметить, что увеличение кратности применения МТ привело к прогрессивному увеличению вазотропных реакций, и как следствие – снижению тонуса микрососудов, что согласуется с результатами исследований [11], которые показали, что в среднем на 5-е сутки введения МТ развивался стойкий эффект, являющийся гипотензивным.

Действительно, в большом числе исследований на животных в условиях повышенного тонуса артериальных сосудов *in vitro* и *in vivo* продемонстрировано, что МТ оказывает значимый сосудорасширяющий эффект [12]. В экспериментах на животных выявлено, что пинеалэктомия приводит к стойкому повышению артериального давления [13], уровень которого снижается до нормальных цифр при экзогенном введении МТ. У пинеалэктомизированных животных также определена повышенная чувствительность рецепторного аппарата сосудов к вазоконстрикторным агентам [14]. Совокупность экспериментальных и клинических данных является основанием называть МТ одним из главных эндогенных центральных гипотензивных факторов [15].

Выявлено, что экзогенное введение МТ достоверно увеличивает эндотелиальные осцилляции, что отражает увеличение метаболической активности эндотелия. Вероятно, это обусловлено стимулирующим влиянием МТ на продукцию NO-синтазы клетками эндотелия сосудов с последующим увеличением продукции оксида азота и вазодилатацией. Данный механизм показан в эксперименте на крысах со спонтанной гипертензией [16]. Кроме этого, отмечено повышение продукции оксида азота на фоне приема МТ по сравнению с исходным уровнем [17].

Показанное в настоящем исследовании увеличение неосцилляторных показателей микроциркуляции является интегральной характеристикой улучшения тканевой микрогемодинамики, вклад в которую могут вносить не только сосудистые осцилляции, но и реологические свойства крови. В пользу этого свидетельствуют данные о способности МТ замедлять агрегацию тромбоцитов, на которых обнаружены места его специфического связывания, через ограничение выработки тромбксана и, наоборот, активацию синтеза простаглицлина. Показана прямая зависимость между уровнем гормона в крови людей, степенью дезагрегантного эффекта и подавления продукции тромбксана. Наконец, его способность подавлять высвобождение тромбоцитарного серотонина, обуславливающего сужение сосудов, служит дополнительным источником вазодилатации [18]. Кроме того, МТ может понижать периферическое сосудистое сопротивление току крови за счёт своего антиатерогенного действия. Под влиянием гормона снижается плазменное содержание атерогенных липидов и тормозится их перекисное окисление [19].

Таким образом, МТ в физиологической дозе обладает способностью оказывать вазодилататорное действие на микрососуды. Вероятно, именно с непосредственным влиянием на микрогемодинамику связан его гипотензивный эффект при системной артериальной гипертензии. В тоже время, как показали результаты настоящего исследования, МТ оказывает влияние и на внесосудистые компоненты регуляции сосудистого тонуса, что подтверждает многочисленные сведения о его универсальном модулирующем действии на деятельность центральной нервной системы, а также периферических органов и тканей, демонстрируя высокий терапевтический потенциал при различных заболеваниях [20], особенно, связанных с нарушением циркадианной ритмики, к которым можно отнести практически все «болезни цивилизации».

Результаты нашего исследования вносят существенный вклад в понимание механизмов терапевтической эффективности МТ и демонстрируют перспективность дальнейших исследований действия МТ на микрогемодинамику в различных экспериментальных моделях.

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