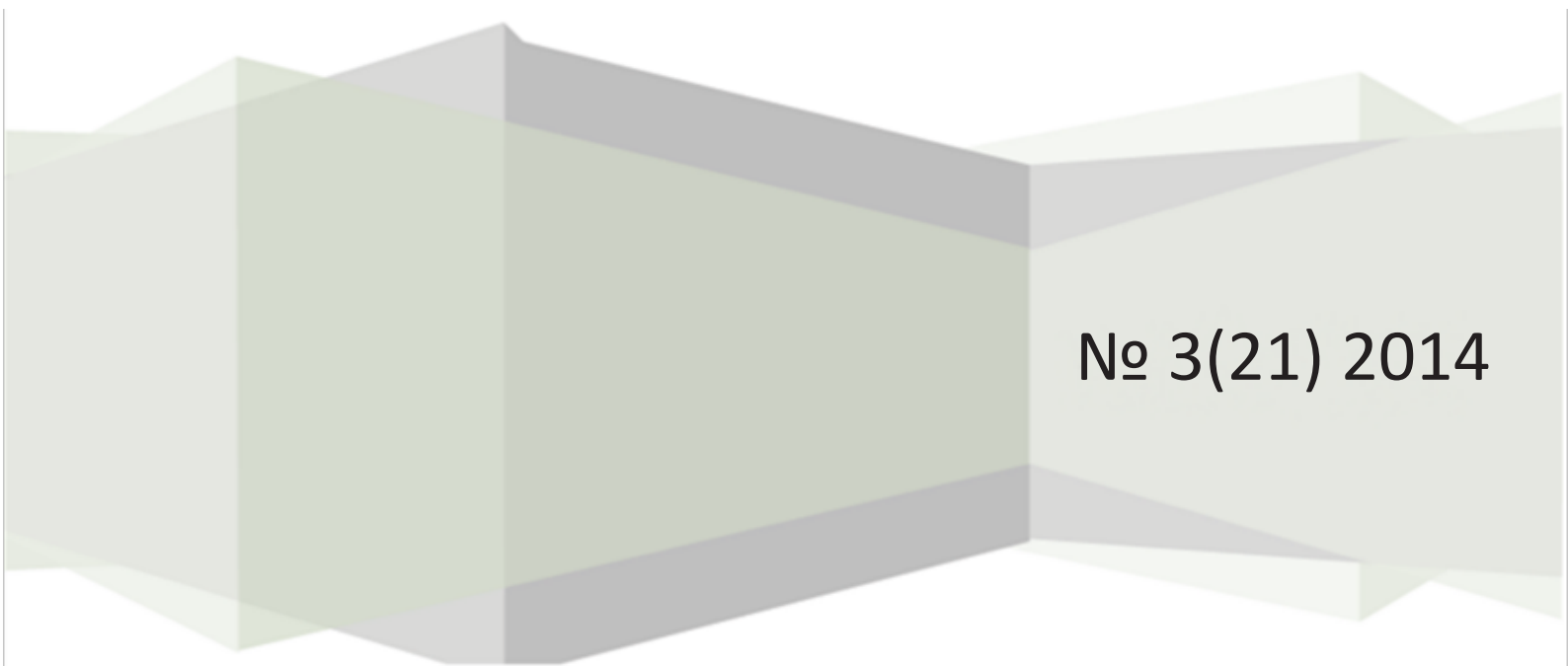


ISSN 1997-9347

Components of Scientific and Technological Progress

SCIENTIFIC AND PRACTICAL JOURNAL



№ 3(21) 2014

Paphos, Cyprus, 2014

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Journal “Components of Scientific and Technological Progress” is published 4 times a year.

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Scientific news of Cyprus LTD

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Subscription index of Agency
“Rospechat” No 70728 for
periodicals.

Information about published
articles is regularly provided to
Russian Science Citation Index
(Contract No 124-04/2011R).

Website:

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UDK 81'25

Prospects of Translation Studies in the Framework of Cultural Linguistics Concepts

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Key words and phrases: cultural transfer; culture; intercultural exchange; reader; text; translation.

Abstract: The paper studies the concepts of translation as cultural transfer in modern translation studies and other humanities. The author focuses on the dialectical relationship between these two concepts and examines prospects for interdisciplinary studies.

Translation is a contemporary and controversial subject of research in humanitarian sciences both in Russia and abroad. The translation concept is known to have been evolving substantially during the last three decades. This is mainly due to the development of a dynamic paradigm and an activity-based paradigm in translation studies. As the researches note, since the 1990s, translation has been increasingly considered as a pivotal phenomenon in cross-cultural communication while losing its marginal status [1, p. 63]. Simultaneously, the translation concept is expanding through including “forms which continue the original’s life” [1, p. 33]. Translation is increasingly studied as an integrated process of interlingual and cross-cultural interaction, attention being mainly focused on its social and cultural factors.

At the same time, translation problems are dealt with by cultural linguistic research. This is primarily due to the development of concepts concerning national and cultural aspects of meaning (A.A. Zalevskaya, Ye.M. Vereshchagin, V.G. Kostomarov, I.A. Sternin), national and cultural linguistic consciousness specifics (N.V. Ufimtseva, Ye.F. Tarasov, A.A. Zalevskaya) and language behaviour (A.A. Leontyev, D. Hymes et al.). M. Espagne, a French researcher, stresses “that historical review of any community or culture is related to semantics ... No scientific understanding of culture is possible without studying the word as working in linguistic and cultural context” [6, p. 5]. In Russia, this school is represented, in particular, by V.V. Vorobyov who, in the 1990-ies, laid the theoretical foundations of cultural linguistics by introducing such terms as “linguistic culturema” and “linguoculturological field”. Among pivotal scientific concepts in this school, one should note the linguoculturological theory of cultural concepts (S.G. Vorkachev, V.I. Karasik, N.A. Krasovsky, Yu.S. Stepanov et al.), the concepts of culture-specific information (T.G. Pshonkina), linguistic culturemas (V.V. Vorobyov, L.I. Vedenina), realia (N.A. Fenenko, M. Schreiber) and, especially, the hole theory (Yu.A. Sorokin, I.Yu. Markovina et al.). All these concepts share interest in linguistic meaning-to-cultural sense relationship. One of the most interesting and argumentative concepts in Western Europe is the cultural transfer theory which was introduced in the 1980-ies by M. Espagne and M. Werner, Germanist philologists. The scientists define the target concept using French and German cultural and linguistic material: cultural transfer covers “historical entities which are actualized in texts, documents and, broadly, in collective ideological discourse, thus taking part in construc-

tion of Germany reference in France". In this connection, text referral is noteworthy. According to Yu.M. Lotman, immanent development of culture is impossible without continuous inflow of external texts ... A certain part in this process belongs to alien texts produced by a different national, cultural, areal tradition [2, p. 117]. Since "cultural transfers are possible between various cultural spaces while both the concept itself and the theory are applicable to any periods and cultural communities" [7], we can conclude that cultural transfer aims at construction of the source culture reference in the target culture from texts and discourses. Noteworthy, cultural transfer research strategy was adopted from "cultural content" oriented sciences, the key roles among them belonging to semiology, the discourse theory and "philology which deals with translations and relationships between speech communities" [7]. Particular attention is paid to sociocultural specifics of cultural transfer intermediaries, whose activity promotes cultural diversity, including translators. This area enables research at the crossover of translation and cultural linguistics. Thus, quite a number of papers deal with translation-based transferability of cultural senses (J. Jurt, J-R. Ladmiral, M. Ballard, G. Misri, M. Schreiber, S.V. Ivanova, L.K. Latyshev, I.Yu. Markovina, I.L. Panasyuk, I.K. Sitkaryova, Yu.A. Sorokin, Z.Z. Chanysheva et al.). We believe the current state of linguoculturological paradigm to be highly promising for translation studies. Let us discuss some of them.

1) **Viewing translation as cultural transfer.** The target concepts are identified by quite a number of papers. Thus, many authors agree that "cultural transfer is essentially translation since it involves switching over from one code to another" [8, p. 106]. As I.E. Klyukanov notes, "translation is equated with intercultural exchange while the main aim of translation is considered in the contest of the target culture" [1, p. 30]. This can be exemplified by literary translation, particularly poetic one, localizations of computer games, user interfaces, gadget menus, a number of documents in technical and commercial communication (warranties, etc.). However, the target concepts are not completely identical which allows to set another line of research.

2) **Viewing translation-to-cultural transfer relationship.** As M. Schreiber, a German researcher notes, translation is not necessarily associated with cultural transfer: the idea is exemplified by translations of statutes in EU institutions. In turn, 'cultural transfer does not necessarily involve translation, for example, when the text is intended for a recipient who speaks the same language as the sender [9, p. 186] but may represent a different culture. The translation-to-cultural transfer dialectics was dealt with by Jurt 2007, Schreiber 2007, Obolenskaya 2010, Sorokin 2003, Panasyuk 2010, et al. The researches position translation as a necessary direction, a result, a type, or a material substrate of cultural transfer, where the target culture plays an active or even a crucial role. Let us look at an example from filmmaking. In 1990-ies, Russia showed high interest in American cinema while Soviet cinema repertory was in decline. For a certain period, foreign motion pictures became the storm centre in Russian cinema and a source of behaviour patterns, plots, ideas. The genre selection is also of interest: North America became an inexhaustible source of action films while South America became the pacesetter in television series which consolidated their positions in Russian TV repertory for a long time. Strong inflow of foreign motion pictures is in considerable excess of the target culture's technical and legal capacities, so the films are mostly translated in voice-over manner, not infrequently right during the show. Later on, the target culture underwent a change in its policy towards foreign cinema translations: voice-over translation was gradually supplanted by dubbing-in due to legalization of the cinema market and general increase in technical performance level of formal releases. This, however, does not currently depopularize the original translations with some of the viewing audience. Thus the translations themselves become an epoch's cultural artifact. This allows to define the following research prospect.

3) **Recognizing translations and their impacts in intercultural exchange as relatively autonomous phenomena.** As B. Joyeux stresses, 'cultural transfer involves autonomous and asymmetrical systems. Therefore, any book, any theory can function in a manner substantially different from the way they did in the source culture [7]. Speaking about literary communication, Yu.L. Obolenskaya notes that cross-cultural communication ... is impossible without translation since masterpieces of the world literature are known in translations to many more readers than in the originals in their native countries [3, p. 15]. This allows to study the role of translations in "transfer, propagation, reception and reinterpretation of other cultures' heritage" [6]. One example is Russian formal release of "Bienvenue chez les Ch'tis" (France, 2008), a film about cultural and linguistic difficulties between South France and North France. To perform cultural transfer, the translators were to compensate the specifics of Picard language. To do this, they developed an artificial language based on the same principles as Surzhyk. According to viewers' forums, the dubbed version caused distinct associations with Ukraine which is no wonder, but also with other Slavic cultures, such as Polish and Czech ones. This example demonstrates a change in translation's function: in mostly switches over from construction of source culture references to actualization of new cultural parallels in the recipient's mind.

In conclusion, we would like to note that the "cultural component" of translation is viewed as an intersection in both research schools, cultural linguistics and translation studies, which is due to mutual interest in semantic and textual problems. This enables translation to be studied as cultural transfer. Nevertheless, it makes sense to study mutual borders and dialectic relationship between these somewhat different concepts. Research shows that, in practice, cultural transfer and translation mostly tend to overlap, translations being a fundamental tool of assimilation and interpretation other cultures' heritage. Their role, however, is not limited to this because translations themselves can generate cultural transfers while actualizing new cultural senses in the target cultural and lingual media.

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Перспективы исследования перевода в ракурсе лингво-культурологических концепций

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Ключевые слова и фразы: культура; культурный трансфер; межкультурное взаимодействие; перевод; реципиент; текст.

Аннотация: Статья посвящена изучению концепций перевода как культурного трансфера в современном переводоведении и других гуманитарных дисциплинах. Изучается диалектическое соотношение этих двух понятий и анализируются перспективы междисциплинарных исследований.

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UDK 528.854

Recognition and Classification of Visual Images

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Key words and phrases: binary matrix; “edge” function; layer perceptron; Matlab; neural network.

Abstract: This article is a detailed description of the software created by the authors. The purpose of the study is the solution of recognition and classification of visual images. Matlab programming environment was chosen for the solution of the problem.

The study of the problem of recognition and classification of images allows you to automate many of the processes that are still tied only with brain activity. The urgency of this problem is confirmed by the development of cybernetics: what can and cannot make a car?

In order to solve the problem of visual recognition and classification of images software with a friendly graphical interface was created by the authors in Matlab (Fig. 1).

GUI contains the following elements: a window to display the video stream and text information on the status of the image detection that allows real-time tracking of the program correctness, a list to select a video device connected to the computer. Besides, this window contains a graphical interface to reflect the path to store the database of images of objects and classes of masks, and the contents of databases. Through these you can check whether any object of any class, is in the database.

Check result is an inscription in the text box. Inscription contains object similarity coefficient defining the class and object investigated for membership, as well as an answer to the question of ownership “YES” or “NO”. GUI also includes a set of control buttons enabling to run the video

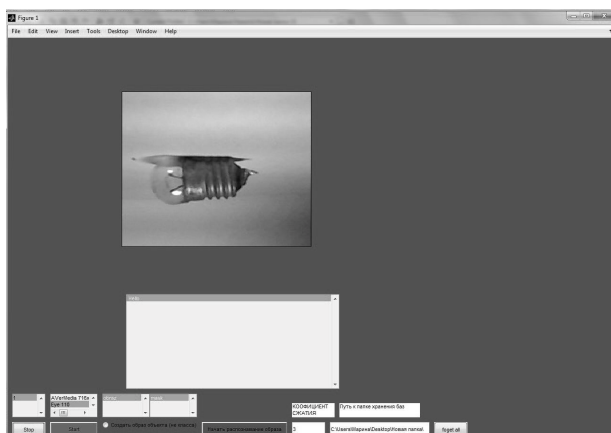


Fig. 1. Graphic interface



Fig. 2. One of binary matrices



Fig. 3. Result of the second layer of perceptron



Fig. 4. Result of the third layer and all perceptron in general

stream, stop it, compare selected data objects (masks classes, images of objects), and delete them.

The main block of the program dealing with is built on fuzzy logic element, such as a neural network. The neural network is used in this program to create a mask based on the images extracted from video frames and is a perceptron. The learning process is a procedure that sets up all the weights of neurons in order to reduce the difference between the desired results and those obtained at the output. In this program, the authors did not use the classical method of training a neural network called "Learning without a teacher." This perceptron comprises three layers: a layer of the sensor, or receptors, an associative layer and a third layer consisting of a single filter element.

A sensor layer consists of a set of binary matrices. Actually, layer sensors simulate physical objects, light-sensitive cells of the retina or photoconductive camera matrix. Each sensor can be in one of two states – rest or excitation. If the sensor is at rest, then a binary matrix corresponding to a given cell in the sensor will be "0", otherwise "1". Matrices which consist of a sensor layer objects are created from images using the edge (Fig. 2). The edge functions as borders which in this case implements a built-in method, such as Canny edge detector. The sensor is considered excited when shooting if a subject at the sensor hits the photons emitted from the border color of the object. Consequently, the entire layer contains information about the overall geometrical shape of the objects belonging to the same class.

The next layer is called associative, because each such element generally corresponds to a set of elements of the first layer. In this case, the associative layer is a matrix in which each element is the sum of corresponding elements of the matrix sensor layer. The part of the matrix layer contains information about how often each sensor is excited by the first layer. Each element of the second layer (Fig. 3) can be called a neuron, and the number stored in it is the weight of the neuron. It can be assumed that the more often this sensor responds to the object of this class and the higher is its weight, the more likely is that the sensor is located opposite the geometric contour lines common to the entire class of objects. Consequently, the state of excitation of the sensor part is characteristic of the class, and this testimony must be considered when working on the identification of neural network objects of this class.

The last layer of the neural network (Fig. 4) is intended as a time to filter characteristic for

this class of sensors that are not characteristic of the sensors. The authors believe that the optimal threshold for the filter is at the level of 0.5, which is fully consistent with the theory of neural networks. In other words, neurons, whose mass after the learning process does not exceed half of the maximum possible mass, are considered not meaningful for this class, and their mass is zero. All other neurons (weighing more than half of the maximum possible mass that is characteristic for this class of objects) remain unchanged. The result of neural network training is the result of the last layer, the so-called mask class, representing a weights array of neurons. Further, this mask is used to identify the images to belong to this class.

When testing this neural network, it was observed that one and the same object during recording can be provided in different parts of the image. And, consequently, the sensor layer is the same to make different sensors responsive, which makes this learning process useless. This problem was solved by using the following algorithm: first matrix is stored in sum without any changes. Each of the following matrices is added to the result of a summary of previous matrices several times with different offset, and then were selected those offset coordinates at which was achieved the highest total of the sums of positive elements of two matrices. Thus, the program goes through all the possible movements of the object within predetermined amplitude and chooses the most probable movement. Further transformation described in this section will be called: re-coordination function. Identification of objects in the same function is based on the re-coordination principle.

To create a mask object class you need to select one from a list of video device connected to the computer and press the "Start". Start the video stream coming from the selected camera. All images are processed using the edge and saved. The resulting matrices are the matrices of the first layer in terms of learning a neural network. After pressing the "Stop" image capture stops. The resulting set of matrices is processed using the re-coordination function. Further, the matrices are obtained as an output argument of re-coordination used as input arguments in the function role of the third (filtering) layer of neural network. At the end of which, the user will be prompted for a file name to save the created mask. The mask class can be used to determine an object supplies to the class.

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Распознавание и классификация визуальных образов

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Ключевые слова и фразы: *Matlab*; бинарная матрица; нейронная сеть; однослойный

персептрон; функция «край».

Аннотация: В данной статье приведено подробное описание созданного авторами программного обеспечения. Цель исследования состоит в решении проблемы распознавания и классификации визуальных образов. Среда программирования *Matlab* была выбрана для решения поставленной задачи.

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UDK 37

The Authors' Methods of Physical Exercises and Physical Rehabilitation for Athletes with Myopia

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Key words and phrases: myopia, accommodative disorders, physical rehabilitation, exercise, sports, children and adolescents.

Abstract: Studies have shown that one of the most effective methods in the treatment of myopia is self-massage. Another one is massage of the neck-muscles, and it has a beneficial effect on the eye-accommodation and to the eye's blood supply. Athletes affected by nearsightedness can do a series of exercises to improve vision, as recommended by Indian yoga, or such exercises as relaxation, or eye-fixation, or self eye-massage, or hatha yoga for school children, or exercises for the neck and eyes.

Over the past decade, the number of people suffering from myopia has increased a lot. People wearing glasses have become an integral part of modern life. There are 1 billion people in the world, who wear glasses. Myopia affects mainly young people. Therefore, according to many authors, myopia among schoolchildren ranges from 2.3 % to 16.2 %, and more. This percentage is even higher at University students. A fairly substantial role in the development of myopia is the hereditary factor, although it is not always the determining factor.

The results of studies in recent years, particularly with regard to mechanisms for the origin of myopia, have allowed re-evaluating the possibility of physical culture for the visually impaired. Studies have shown that one of the effective methods of treatment of myopia is a self eye-massage on a closed eye. The massage of the neck muscles has also a beneficial effect on the accommodation and on the blood supply to the eye. A series of exercises to improve vision to people who suffer from nearsightedness are recommended, such as Indian yoga, or relaxing eye fixation, or eye massage, or eye rinsing, or practicing hatha yoga for school children, or exercise for the neck and eyes. Popular in the 1920s and 1930s was a system of training invented by the American ophthalmologist William Bates. This training included elements of massage, visual-motor exercises and psychogenic auditory training. These exercises are effective in cases where they stimulate and enhance the natural compensatory mechanisms.

Action of physical and mental exercises is to mobilize the body's own powers, their own compensatory systems. This method is good where the ailment has basically no anatomical character, as for example, with increased visual fatigue, asthenopia of various origins, or pseudomyopia. Less impressive results are obtained from these exercises, created to fight myopia, where one needs to develop the opposite or "negative" accommodation, not inherent accommodation. However, the method of H.S. Bates can be used for training, and it can take its rightful

place, in the handy treatment of children's visual disorders.

G.G. Demirchoglyan and A.G. Demirchoglyan (2000) proposed an automatic device for training the periocular muscles, which turns eyeballs in different directions. Using muscle training, a student looks for fast-moving subjects projected on a semicircle by a light source. Auditory training eye method, proposed by G.G. Demirchoglyan, allows rendering any effects on the nervous system of the eye by means of various forms of self-hypnosis. With the help of anger management, one can relax the muscles, to create a state of rest, and overcome pain, and fatigue. Y.A. Utekhin (Y.S. Tarhanova, 2000) for the treatment of visual function expects to use bifocal glasses of a spherical-prismatic shape (**BSPO**). The prismatic part of BSPO reduces the visual axis on the subject or takes over the job of muscles, while the spherical lens is doing the work.

It is necessary to look into the distance through the upper part, and through the bottom – to read. H.S. Bates and M.D. Corbett (1990) suggest that treatment of low vision, without the aid of glasses, should achieve a state of rest and relaxation of the mind. H.S. Bates (1990), Aldous Huxley (1997), M.D. Corbett (1999) use in their program a way to restore, with exercise, "palming", dynamic relaxation, exercises on memory, and mental performance. W. Bates has developed his own methodology for the treatment of myopia, which in essence is performing a series of simple exercises. One of the exercises is the so-called shifting, which is a natural function of the eye, and is used for the correction of visual analyzer and relaxation. Shifting usually starts with a little practice, and then the visual analyzer such as eyes, eye muscles, brain, and body, do return to normal function. The eye yields to the adjusted habit of seeing correctly all the time, i.e. the brain memorizes an automatic subconscious habit of proper vision.

For clear vision, it is necessary to perform eye movements from one side to another, looking at an object up and down, as well as looking at an object from different angles. It is necessary to use your own imagination. Firstly you should take a look at a picture for 15–20 seconds and try to remember as many details. Then close your eyes, and try to see the image you saw earlier. After that, you should open your eyes and compare what you were able to see with your closed eyes, and compare it with how the picture really is.

Bates also recommended the use of palming, and a relaxing-bath in bright sunlight. M.D. Corbett came up with his own method of training and rehabilitation of eyesight, by exposing the intra-ocular and peri-ocular muscles, which could be dramatically tense, as a result of high visual load. According to him, the muscles surrounding the eyeball, not only provide the movement of the eye, but also affect the size of the longitudinal axis of the eye. Therefore, with the help of exercises, one can achieve the same effect, which gets points, bringing it in focus. But it can also disaffect the retina with nearsightedness or farsightedness.

Corbett believes that for the normalization of your sight, it is necessary to learn to relax the body and eyes, using the following methods: palming, such as Bates proposed, or solarization, or large and small rotations, or learn to relax the mind, using imagination, or train the eye to do rapid movement while reading or writing. You need to train the eye to be brief every day, and never overwork.

Corbett method for improving eyesight (solarization) includes the following exercises.

1. Face bright sunlight with your closed eyes. You have to turn your head and body right and left, standing on your heels. You need to practice in the open air and in the sunlight.
2. Face the sun, with one eye covered by hand. Look to the ground and to your feet with the eye, which is not covered by hand, while blinking continuously with both eyes. You should then turn and look directly to the sun. Repeat with the other eye, closing both eyes.
3. You should get back in the shadow and do palming. Close your eyes and cover them

with your hands so that the light does not pass through the gaps and try to achieve mental peace. This exercise should last two times longer than solarization's exercise.

4. Face the room's window, with your feet apart. Turn your head and shoulders alternately to the right and toward the left wall, transferring the force of gravity of the body on one leg, and lift the heel of the other foot when turning. Breathe deeply. Open and close the window to the room about 60 to 100 times. This exercise is conducted in the morning and the evening.

5. Put your index finger in front of your nose. Turn your head from side to side, looking to a pointed up finger. Do this several times a day for 20 to 30 times each, while breathing deeply.

Having analyzed the Russian authors' special exercises, we found that most of the proposed methods, those developed by E.S. Avetisov, Artamonova, G.G. Demirchoglyan and A.G. Demirchoglyan have a large number of repetitive exercises.

For example, E.S. Avetisov's method was developed by the author to train accommodation, using the technique called "label on the glass". To perform the exercise on a windowpane just below the eye level of a standing person, attach a label or a fragment of newspaper text of 20 to 30 lines. Undo the eye bandage. Train eye in such a way that the patient open his or her eyes and looks through the window at an infinitely distant objects, or reads newspaper text or a label with the maximum possible clear vision, alternately for 15 to 20 seconds. The number of sessions should be 3 or 4 daily. These exercises are performed constantly, for the normalization of the accommodative ability of the eye.

Exercises first proposed by the author E.S. Avetisov, are aimed at strengthening internal (ciliary) muscles of the eye. These include general developmental exercises that can be combined with eye movements. All these exercises are recommended to be performed by using the equipment available at the Gym, or the Sports Hall. Accordingly, E.S. Avetisov's exercises are performed with different kinds of balls, such as tennis ball, volleyball, soccer ball, etc. In addition, the emphasis is on game elements, such as volleyball, basketball, throwing a tennis ball over the net, etc.

So among the set of exercises, as suggested by E.S. Avetisov and by Artamonova, we should note the rotating of the eyes, exercises for tired eyes, running from a starting position, while standing or sitting, or doing corrective exercises for the eyes, or doing an exercise called "line of sight to the horizon".

In addition, the exercises include blinking, fixation on the tip of the nose, fixation on the right/left shoulders, rotation, and rotation of the eye, as well as methods of central fixation.

There are techniques that offer relaxation combined with activity, arguing that the passive response is achieved by conscious relaxation as a way to avoid excessive muscle tension. Dynamic relaxation is a state of mind and body, which is close to normal or natural body functioning. Artamonova and Avetisov also offer exercises to strengthen the muscles of the abdomen, or upper body, back, chest, neck, and frontal abdominal wall. For example, Artamonov insist that exercises should be performed with a stick or ball at the initial standing or lying on the back, and performing breathe-control. These exercises are accompanied by more eye-motor exercises.

Exercises to strengthen the muscles of the anterior abdominal wall are based on the fact that the forward leaning torso of a myopic man during standing, walking or sitting, helps to relax and weaken the muscles of the frontal abdominal wall, so the bulk of the recommended exercises is carried out from a position lying on your back or sitting on the floor, and they are directed, respectively, to strengthen the muscles of the frontal abdominal wall.

As for the massage eye techniques, the main methodological approaches used to massage the eye are the same as Avetisova and Artamonova's methods, as well as Demirchoglyan's methods. In our opinion, the authorship and methodological primacy here, belongs to the people

who perform these exercises, as well as to the Helmholtz Research Institute, and personally to Avetisov.

Approaches to do-it-yourself massage of the neck are also virtually identical; it is recommended to massage the back of the head and neck with fingertips from the top down, and stroke in a circular motion, while rubbing the skin. Therefore, analyzing the previously developed methodology, we have found the need to create our own set of exercises, aimed at correcting refractive errors and eye-accommodation in young athletes.

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**Авторские методики физических упражнений и физической реабилитации
при работе с пациентами с миопией**

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Ключевые слова и фразы: аккомодационные расстройства; дети и подростки; миопия; спорт; физическая реабилитация; физические упражнения.

Аннотация: Исследования показали, что одним из эффективных методов в комплексном лечении близорукости является массаж и самомассаж мышц шеи, оказывающий благоприятное влияние на аккомодацию и кровоснабжение глаз. При близорукости ряд упражнений для улучшения зрения рекомендует индийская йога, такие как расслабление глаз, фиксация взгляда, массаж глаз, хатха-йога для детей, упражнения для шеи и глаз.

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UDK 58.009

Evolution of Flora of the Samara Region over the Last Century

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Key words and phrases: dynamics of the flora; recreational load; suburban woods.

Abstract: A comprehensive analysis of flora composition of the Samara region forests was conducted on systematic, biomorphological, areal and phytocenotic aspects. Some rare species were identified. The data was based on personal long term research. Modern and historical floras were compared. In the paper, the peculiarities of anthropogenic transformation of these areas are examined.

Introduction

Information about the flora composition is used as a major method to determine the state of plant communities. The study of flora dynamics during a long time allows an observation of biological diversity of plants and makes it possible to identify the main trends of anthropogenic transformation of vegetation in connection with the problem of the study and conservation of the biological diversity of species and sustainable use of plant resources. Similar studies of flora suburban forests Samara experiencing significant impact recreational impacts are important and are of practical interest

Research methodology

Plant species composition was studied in the field seasons from 2005 to 2012 in the 5–12 blocks of Samara forestry, the total area of which is about 3314 hectares. A comprehensive analysis of the flora was conducted during the processing of the collected data [1; 4]. Furthermore, the comparison of the historical and modern flora of Samara neighborhood was based on N.S. Scherbinovskiy's the research (1919).

Results and discussion

As a result, 415 species of vascular plants referring to 4 departments and 65 families and 241 genres were found [3]. It represents approximately 22.3 % of the flora of the Samara region [5]. In the beginning of the XX century, N.S. Shcherbinovskiy contributed a lot into studies of the plant cover of this area. 234 species of the Samara region were described by the author (1919) (tab. 1).

Currently Magnoliophyta department contains the largest number of species of vascular plants (406 species or 97.8 %). 9 species belong to the Spore plants. At present, more species have been noted in the class Magnoliopsida than in 1916 by 0.1 %. At the same time, Liliopsida is smaller by one family.

Since the beginning of the XX century, the flora composition of the Samara region has undergone considerable changes (tab. 2).

At the beginning of the twentieth century the rate of the leading families was 62.8 % of the total number of species, but now it is actually higher and reaches 66.3 %. Families *Asteraceae*

Table 1. Taxonomic structure of the flora of the Samara forests (1916–2012)

Taxon	The number of species, abs. / in %		The number of families, abs. / in %	
	the list of 1916	the modern list	the list of 1916	the modern list
Departments:				
Equisetophyta	1/0.4	4/1	1/1.6	1/1.4
Polypodiophyta	5/2.1	4/1	5/8.1	4/5.5
Pinophyta	1/0.8	1/0.2	1/1.6	1/1.4
Magnoliophyta	227/96.6	406/97.8	55/88.7	66/91.7
Including:				
Classes:				
Magnoliopsida	199/84.9	352/84.8	45/72.6	57/79.2
Liliopsida	28/11.7	54/13	10/16.1	9/12.5
Total:	234/100	415/100	62/100	65/100

Table 2. Leading families of the flora of the Samara region forests (1916–2012)

№	Families	The number of species. absolute / in %			
		the list of 1916	not registered species. compared to 1916	noted new species. compared to 1916	the modern list
1	Asteraceae	25/10.7	1	36	61/14.7
2	Fabaceae	26/11.1	1	13	38/9.2
3	Poaceae	12/5.1	–	18	29/7
4	Rosaceae	15/6.4	–	13	28/6.7
5	Lamiaceae	20/8.5	1	6	25/6
6	Caryophyllaceae	12/5.1	1	11	22/5.3
7	Ranunculaceae	11/4.7	–	8	20/4.8
8	Brassicaceae	6/2.5	–	11	17/4.1
9	Scrophulariaceae	8/3.4	–	5	13/3.1
10	Apiaceae	4/1.7	–	9	11/2.7
11	Boraginaceae	8/3.4	–	3	11/2.7
Total for leading families:		147/62.8	4/66.7	130/69.9	275/66.3
Other families:		87/37.2	2/33.3	56/30.1	140/33.7
Total:		234/100	6/100	186/100	415/100

and *Fabaceae* are as dominant as before. In *Asteraceae* and *Poaceae* 36 and 17 new species have been registered compared to 1916. 8 species have not been revealed in the modern flora list (*Driopteris cristata* (L.) A. Gray. *Alnus glutinosa* (L.) Gaertn. *Diantus andrzejowskianus* (Zapal.) Kulcz. *Astragalus testiculatus* Pall. *Galeopsis ladanum* L. *Centaurea cyanus* L. *Alisma plantago-aquatica* L. *Phragmites australis* (Cav.) Trin. Ex Steud.). One of the reasons for such decline could be gathering of those plants by the local population for medical or other purposes.

The composition of food plants has changed under the influence of grazing in the previous years. So, *Lathyrus lacteus* M.B. *Trifolium arvense* L. *Festuca ovina* L. have not been found. Besides, *Aegopodium podagraria* L. has not been found which used to be dominant species in all suburban forests.

At the same time, according to N.S. Scherbinovskiy, we can underline that there has been an increase in the plant composition over the last century: 186 species from leading families have been found (*Thalictrum flavum* L., *Humulus lupulus* L., *Chenopodium album* L., *Parthenocissus quinquefolia* (L.) Planch., *Bryonia alba* L., *Alliaria petiolata* (Bieb.) Cavara et Grande, *Symphoricarpos rivularis* Suksdorf., *Orobanche libanotidis* Rupr., *Ambrosia artemisiifolia* L., *Sonchus oleraceus* L., *Bromus squarrosus* L., *Hordeum jubatum* L.). For the first time the representatives of the *Chenopodiaceae*. *Vitaceae*. *Cucurbitaceae*. *Resedaceae*. *Pyrolaceae*. *Grossulariaceae*. *Balsaminaceae*. *Oleaceae*. *Elaeagnaceae*. *Orobanchaceae* families were marked. These families contain 12 species including 2 weed species, 3 monocarpic and 5 trees and shrubs. 3 of which are cultural plants. 5 are alien plants (3 species are North American).

Generally, 24 weed plants have been added to the new list (*Silene vulgaris* (Moench.) Garcke. *Stellaria media* (L.) Will. *Chenopodium album* L. *Polygonum convolvulus* L. *Oenothera biennis* L. *Erodium cicutarium* (L.) Her., *Clinopodium vulgare* L. *Conyza canadensis* (L.) Cronq., *Cyclachaena xanthifolia* (Nutt.) Fresen., *Lactuca serriola* L., *Sonchus oleraceus* L., *Bromus arvensis* L., *Bromus squarrosus* L., *Poa annua* L.). Also, 43 monocarpic (*Ceratocephala testiculata* (Crantz.) Bess., *Silene viscosa* (L.) Pers. *Polygonum convolvulus* L. *Barbarea vulgaris* R. Br. *Erysimum cheiranthoides* L. *Reseda lutea* L. *Androsace septentrionalis* L. *Impatiens noli-tangere* L. *Galium aparine* L. *Echium russicus* J.F. Gmel. *Acinos arvensis* (Lam.) Dandy., *Ambrosia trifida* L., *Crepis tectorum* L., *Lactuca tatarica* (L.) C.A. Mey., *Onopordum acanthium* L., *Hordeum jubatum* L.) and 28 adventitious species (*Aquilegia vulgaris* L., *Cardaria draba* (L.) Desv., *Chorispora tenella* (Pall.) DC., *Descurainia sophia* (L.) Webb. Ex Prantl., *Lepidium ruderae* L., *Grossularia reclinata* (L.) Mill., *Ambrosia artemisiifolia* L., *Conyza canadensis* (L.) Cronq.) were added. 10 species of these plants are North American. 8 species are Irano-Turanian and 5 species are Mediterranean by origin.

The *Asteraceae* family (31.8 %) contains the greatest number of weed species. They are mostly monocarpic herbs (77.3 %), mesophytes (63.6 %) and plants introduced from other regions (59.1 % of adventitious species). The overwhelming percent of monocarpics are in *Brassicaceae* (91 %) and *Asteraceae* (33.3 %). The introduction into the flora of the advent species is due to the economic development of the region, powerful transport and new agrocenosis, in particular.

The lack of *Driopteris cristata* (L.) A. Gray. – KKS0 (3/G), *Centaurea cyanus* L. (now, it is getting rarer to the south) compared to 1916 is connected with the increase in the anthropogenic factors. Several decorative plants are gathered by population. For this reason there is a decrease in *Diantus andrzejowskianus* (Zapal.) Kulcz., *Astragalus testiculatus* Pall.

Comparing historical and contemporary flora of the Samara region, we note significant changes in vegetation cover (tab. 3–5).

Spectrum of life forms shows that the largest part of total species composition (59.3 %) is accounted for hemicryptophytes, which was typical of the early last century (56 %). Actually, the number of therophytes is higher (by 1.9 %) as it is resistant to recreational loads (*Chorispora tenella* (Pall.) DC., *Lepidium ruderae* L., *Oenothera biennis* L. *Erodium cicutarium* (L.) Her., *Ambrosia artemisiifolia* L., *Ambrosia trifida* L. *Conyza canadensis* (L.) Cronq., *Cyclachaena xanthifolia* (Nutt.) Fresen. *Sonchus oleraceus* L. *Hordeum jubatum* L.). More phanerofytes have been noted (by 1.6 %) due to a high proportion of exotic species (*Ribes aureum* L. *Grossularia reclinata* (L.) Mill. *Acer negundo* L. *Syringa vulgaris* L. *Elaeagnus argentea* Pursch. *Sambucus*

Table 3. Distribution of biomorphs by K. Raunkier (1916–2012)

№	The life forms	Number of species in the list for 1916		Number of species in a modern list	
		abs.	in %	abs.	in %
1	Phanerofytes	31	13.2	48	11.6
2	Hamefites	11	4.7	18	4.3
3	Hemicryptophytes	131	56	246	59.3
4	Cryptophytes	31	13.2	42	10.1
5	Therophytes	30	12.8	61	14.7
Total:		234	100	415	100

Table 4. Coenotic groups of plants of the flora Samara surrounding forests (1916–2012)

№	Coenotic groups	Number of species in the list for 1916		Number of species in a modern list	
		abs.	in %	abs.	in %
1	Meadow-steppe	13	5.6	19	4.6
2	Forest-steppe	78	33.3	125	30.1
3	Forest	63	27	103	24.8
4	Meadow	24	10.3	42	10.1
5	Meadow-forest	19	8.1	42	10.1
6	Desert-steppe	1	0.4	1	0.2
7	Semidesert-steppe	–	–	1	0.2
8	Mining-forestry	1	0.4	2	0.5
9	Mining- steppe	2	0.8	12	2.9
10	Coastal-water	2	0.8	2	0.5
11	Steppe	11	4.7	30	7.2
12	Marsh	–	–	1	0.2
13	Cultivate	–	–	2	0.5
14	Weed	20	8.5	33	8
Total:		234	100	415	100

racemosa L. *Symphoricarpos rivularis* Suksdorf.). Fewer cryptophytes (by 3.1 %) have been re-recorded due to its instability to anthropogenic impact.

The most vulnerable coenotic groups are the forest and forest-steppe species. Their number decreased by 2.2 % and 3.2 %, respectively, compared with the beginning of the last century. This occurs due to the forest communities' exposure to the recreational load, construction, and cutting. At the same time, the number of steppe and meadow-forest species has increased by more than 2.5 % and 2 %, respectively.

In the updated flora list, the number of species which belong to mesophytes xeromesophytes is less by 1.9 %. Though, the part of mesokserophytes and xerophytes has grown by 1.8 % and 2.2 %, respectively, which shows the xerophytization of the plant cover. Also, the helophytes mentioned by N.S. Shcherbinovsky (*Alisma plantago-aquatica* L., *Phragmites australis*

Table 5. Ecological groups of plants of the flora of the Samara region forests (1916–2012)

№	The ecological group	The number of species in the list for 1916		The number of species in a modern list	
		abs.	in %	abs.	in %
1	Mesophytes	142	60.7	244	58.8
2	Xerophytes	31	13.2	64	15.4
3	Hygrophytes	1	0.4	1	0.2
4	Mesokserophytes	19	8.1	41	9.9
5	Kseromezophytes	31	13.2	47	11.3
6	Mesohygrophytes	1	0.4	4	1
7	Hygromesophytes	7	3	12	2.9
8	Hydrophytes	–	–	1	0.2
9	Mesogalofites	–	–	1	0.2
10	Helophytes	2	0.8	–	–
Total:		234	100	415	100

(Cav.) Trin. Ex Steud.) were missing, but mesogalofites (*Amoria fragifera* (L.) Roskov.) and hydrophytes (*Carex vesicaria* L.) which had not been registered before were observed.

Findings

Analyzing the received information, we can conclude that changes of the flora composition of the Samara region, rare composition of forage (during the grazing), ornamental and medicinal plants (gathered by the population) occur under the influence of direct or indirect anthropogenic impact. Natural plant communities are being replaced by anthropogenically changed plants which contain the weed species.

The major factors of the plant cover transformation are habitat destruction due to the construction of buildings and new roads, land reclamation, melioration, uncontrolled cattle grazing, mowing, recreational load on the suburban areas that are places of recreation, development of landscape gardening companies, etc.

Collected data can become a basis for the subsequent studies and analysis of the forest flora of the Samara region.

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Изменение состава флоры окрестностей г. Самары за последние 100 лет

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Ключевые слова: динамика флоры; пригородные леса; рекреационная нагрузка.

Аннотация: Проведен комплексный анализ флоры окрестностей г. Самары в систематическом, биоморфологическом, фитоценотическом и экологическом аспектах. На основе материалов собственных исследований и изучения литературных данных сопоставлены современная и историческая флора и рассматриваются особенности антропогенной трансформации флоры.

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**International Scientific Practical Conference
“The Role of Science in the Development of Society”
(October 1–3, 2014, Rome, Italy)**

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UDK 159.99

The Analysis of Flight Attendants' Job Burnout

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Key words and phrases: flight attendants; job burnout; prevention.

Abstract: The paper describes the causes, symptoms and ways of prevention of flight attendants' job burnout.

Job burnout is also called occupation burnout. The word "burnout" was introduced by Fruedenbenger in 1974 and since then it has been widely used in different areas of science. In the field of psychology, various studies have been implemented. For example, clinical psychologists study the symptoms of job burnout and mental health problems; social psychologists check for relationship between subject and object and their corresponding situation factor; management psychologists focus on the effective factors about job burnout to promote preventive measures [1]. Maslach (1982) defined burnout as "a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who do 'people work' of some kind" [11].

Flight attendants are considered as a vulnerable group as they provide services to customers and deal with people.

Symptoms of job burnout

The symptoms of job burnout include tiredness, depression, anergia, anxiety, depression, insomnia, irritability and others; at the same time, after a long-lasting mental tension fatigue, the organism reduces disease-resistance and leads to functional disorders.

Job burnout adversely affects the condition of human communication of human service workers. As a result of physical and psychological burnout they do not want to interact with colleagues and clients. It also affects their personal life, leads to conflicts and low family harmony.

Job burnout analysis. Cognitive factors

In general, most people become flight attendants because they are driven to succeed in helping people and have higher career aspirations. They must have an array of knowledge and a skillset that helps them understand people, both as individuals and within groups. This requires knowledge of a variety of factors in human behavior. Flight attendants must be familiar with human development, how culture and society impact behavior and the influence of economic structures on human behavior. Unfortunately, whatever they do might lead to the cognitive dissonance. As time passes over, their demands for self-realization cannot be easily fit, their enthusiasm decreases and causes job burnout.

Personal factors

As one of the reasons causing job burnout is personal qualities of an individual. Some people are not able to work under pressure and are never relaxed. If things go on like this, those people can easily develop emotional exhaustion. Besides, some people are not optimistic and believe in fate. When they meet pressure, they feel they can not solve any problem and get rid of stress.

Skills factors

The industry of aviation services looks like a simple field but in fact it is a complicated one. People who provide services in aviation meet all kinds of customers with different personalities, attitudes and requirements. This requires from them to have basic skills and occupational knowledge, observation ability and interpersonal skills as well as the ability to respond quickly in emergency. All kinds of these skills are factors that flight attendants must have to work efficiently. Once faced with a couple of problems they can lead to job burnout in flight attendants.

Job factor

On commercial flights, compared with marketing management group, sales managers, sales agents, pilots and telephone booking personnel etc., flight attendants have advantageous conditions to meet various customers, communicate with them and provide services to them. They are supposed to make customers feel safe and comfortable. Just like an actor in a movie, a flight attendants must combines several jobs: a host, waiter/waitress, friend, baby-sitter, bodyguard, lifesaver and so on. The biggest challenge that all these roles must be played on one flight. Frequent changes of roles can cause tiredness and stress. As some studies suggest, there is a close link between job burnout and conflict of roles in occupations.

In addition, a flight attendant must meet all customer requirements as a customer is always right. When conflict occurs between a customer and a flight attendant, the aircraft company usually sacrifices interests of its staff for the sake of the customer, especially in a competitive market. This adds to stress and results in job burnout in the near future.

Apart from this, flight attendants do not work regular hours, there are delays and cancellations which negatively affects personal life of flight attendants. They suffer from physiological and psychological disorders, anxiety, tension, insomnia, gastroenteritis etc.

Working environment

Flight attendants work in a very stressful environment. This is due to airborne radiation, cabin pressure, hypoxia, noise, vibration, etc. It causes such occupational disease as headaches, hearing loss, otitis media with effusion (OME), varicose veins, sleep disorders, lumbar cervical muscle strain etc. Mutual influences between physiological and psychological reactions will exacerbate symptoms of job burnout.

Those who work on international flights suffer from jet lags. They have to adapt to new places which are different from their domestic conditions.

Factors of society and family

Society puts a lot of pressure on flight attendants as they have to meet people's expectations which tend to be quite high. These requirements include patience and the ability to work with all types of people. If they fail to meet these expectations they can be fired. Low job security is one of the factors that makes flight attendants feel insecure about their jobs, they tend to pessimistic and disappointed. The research of Pennsylvania State University in 2000 shows that job burnout can be caused by forcing a person to smile to a rude fellow. [2] Besides, flight attendants have to explain the delays and other problems which they are not responsible for and get customer negative feedback.

Young women working as flight attendants have to meet the challenges of having a family and getting ahead in their career. This also adds to stress and causes job burnout.

Job burnout prevention

Flight attendants have to realize that they need to play different roles in their job. If they learn to play these occupational roles effectively, they will manage to cope with stress and deal with customers, especially when it comes to resolving interpersonal conflicts.

Another important thing is to be able to observe psychological and physiological symptoms of burnout. To achieve this they need to do some training which will help them to keep healthy.

As harmonious family is the basic of the society, special emphasis is put on the family. Family members have to provide support and share responsibility with them.

Civil aviation companies need to develop human resource policy to assist flight attendants. This can include rest programme, logistic services, health care system, professional development plan, etc.

Rest programme is supposed to provide flight attendants with sufficient amount of time to restore their working capacity, build up an easy-going atmosphere to ensure plenty of rest.

Logistic services are expected to support flight attendants in their family issues, relieve their family conflicts, especially with children.

Health care system must ensure training in human relationships, social skills and team cooperation, interpersonal competence abilities. If necessary, it must be implemented timely as a kind of Psychological Guidance and help flight attendants to master a skill to control job burnout.

Professional development plan is supposed to help flight attendants to do further training so as to change their job and get a new one.

Public Relations

Flight attendants need to increase public awareness of the job and eliminate the myths of this occupation. It is important to improve people's understanding of flight attendants' job. As flight attendants deal with lots of people, they are subject to conflicts and mood swings. They need to understand their priorities which are safety of passengers and effective communication.

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Анализ профессионального выгорания бортпроводников

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Ключевые слова и фразы: бортпроводник; профессиональное выгорание; профилактика.

Аннотация: Рассмотрены причины, симптомы и способы профилактики профессионального выгорания бортпроводников.

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UDK 373.31

Children Adaptation to Learning in School: Theoretical Aspects of Psycho-Pedagogical Support

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Key words and phrases: adaptation; interaction between teachers and psychologists; younger students.

Abstract: The paper focuses on interaction between teachers and psychologists to ensure children adaptation to learning in school. The authors describe the principles and main directions of cooperation among the participants of educational space.

Modern social and economic reforms in the Russian Federation, as well as the introduction of new state educational standards involve the development of a new curriculum, various kinds of educational activities, ways of optimizing the educational process and new technologies of psycho-pedagogical support of education and children development in terms of variable construction of educational activities.

The main objectives of educators and psychologists of educational institutions is the support of children personality development and their mental health preservation. One of the most important points for achieving this goal is to ensure children's adaptation to the educational environment. Organization of interaction between all participants in the educational process at different levels of education provides not only the mastery of key competencies (meta-subject, object, personality), but also promotes physical and mental health of students.

Successful children adaptation at an early stage is determined by several factors: professionalism of teachers, their willingness to ensure a comprehensive, purposeful interaction with all members of the educational system, on the one hand, and inclusion of parents of first-graders or their legal representatives, on the other hand.

The problem of teachers' professional activity and learning technologies while ensuring the child's transition from preschool to primary school was discussed by V.V. Davydov, R.S. Bure, G.A. Zuckerman, D.B. Elkonin, V.V. Rubtsov, E.A. Bugrimenko, K.N. Polivanova, N.F. Talyzina, N.N. Poddyakov, I.V. Rivina, E.E. Sapogova, A.L. Sirotyuk, etc. The problem of professional psychologist interaction with other participants in the educational process has been discussed in studies of I.V. Dubrovina V.V. Zatsepina, E.I. Kazakova, R.S. Nemov, and R.V. Ovcharova.

Currently, problems of psychological and pedagogical support of children adaptation to learning at school are not fully developed, which brings us to the need to define principles of the interaction between psychologists and teachers.

- Integrative, systematic approach to the object of professional activity of teachers and psychologists. The implementation of this approach involves the consideration of the child's personality formation.
- The principle of dialogue is aimed at a joint professional activity of a psychologist and a

teacher in order to adapt children to school, which is incorporated into the overall scheme of interaction of educational space participants.

- Continuous professional research into teachers and psychologists' work presupposes continuous science-based diagnostic and prognostic monitoring of professional experts development in the course of their professional activities.

- The principle of reflexivity implements systematic feedback generalization by a professional from all the subjects of the educational space.

- The principle of the correspondence of professional activity and the specifics of child development and the registration of the age and individual psychological characteristics of children's development. A set of common, age, individual characteristics of the child's transition from preschool to senior primary school age determines the direction of professional work of teachers and psychologists.

- The principle of using health-preserving technologies in professional activities.

- The principle of professional development. Professional experience of a specialist should be considered as a unique neoplasm requiring comprehensive generalization.

- The principle of continuous monitoring of specialists' interaction involves active discussion of joint activities and participation examination of all professionals in the overall educational process. Its result is the emergence of professional reflection, aimed at the comprehension of the work's meaning and value.

- Supporting of specialists' individual style of activity, developing their own techniques of generalization of professional experience.

- Registration of actual and formal relations established between the teacher and psychologist, as well as resource development of professional interaction microclimate.

- Implementation of ethical standards in the course of joint activities aimed at both: children rights observation, and respecting the work of colleagues, who deal with children's readiness for school.

The interaction between educational space participants involved in children adaptation to school has a comprehensive and systematic character. Joint activities of teachers and psychologists are integrated in the overall interaction of educational space participants. Cooperation with parents, administration, teachers and psychologists, and finally the central figure of educational space - a child – is of great importance.

Interaction of educational space participants includes:

- Ensuring the continuity of the child's development;
- Psycho-pedagogical education;
- Methodological support of specialists;
- Professional support;
- Exchange of information;
- Compilation of professional experience;
- Examination of work, including the interaction of specialists;
- Emotional support.

Ensuring of the continuity includes the interaction between psychologists, school and preschool, educators and teachers, administrators, and psychologists. The intensity of the interaction is determined by a variety of cooperation forms, co-existence of formal and informal ways of working together.

Thus, the successful solution of optimization of the adaptation process of children to learning at school is possible if the cooperation of specialists is based on a systematic approach. Accounting and implementation of designated theoretical principles enables to create a comfortable learning environment, which provide high quality education and guarantees the protection and promotion of physical, psychological and social health of students.

Supported by the Russian Foundation for Humanities (Project № 13-06-00665).

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Адаптация детей к обучению в школе: теоретические аспекты психолого-педагогического сопровождения

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Ключевые слова и фразы: адаптация; взаимодействие педагогов и психологов; младшие школьники.

Аннотация: Статья посвящена вопросам организации взаимодействия педагогов и психологов по обеспечению адаптации детей к обучению в школе. Выделяются принципы и характеризуются основные направления взаимодействия субъектов образовательного пространства.

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UDK 316.45

Russian Education: Practice of Informal Payments

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Key words and phrases: education; informal payments; parents community; social practice.

Abstract: The problem of informal payments as a practice which parents use in public education system was considered in this article. Based on the results of sociological studies which were conducted in Yekaterinburg we showed that parent community uses the practices of informal payments to get a place in an educational institution and secure good education for their children.

The process of reforming the Russian education that has been lasting for more than one decade has both positive and negative sides. Modern legislation guarantees free general secondary education, but in reality the situation is different. Today, one of the problems is informal payments, which are widely used at all levels of the educational system. Informal payments as direct payments in cash have become everyday social practices of the parent community.

On the one hand, social practice is a fundamental macro-sociological category with an ontological basis, because social reality is social practice of individuals, social groups and communities. On the other hand, social practice as a micro-sociological category represents a complex of measurable actions and interactions of individuals and groups that can be also empirically interpreted [1; 2].

The generation of new social practices is primarily due to dissatisfaction with the old ones which no longer meet social interests. The basic precondition of its emergence is the obsolescence of social practices. The inability to fully meet the needs of individuals in the achievement of certain goals causes new practice.

Sociological studies conducted in 2008–2012 in preschools and secondary schools of Yekaterinburg show ($n = 440$) that informal payment practice is, firstly, based on parents' desire to get a budget place for their child in an educational institution in conditions of scarcity; and secondly, the need to make more comfortable environment for their children's education.

The practice of informal payments, intended at achieving these goals, occurs in two basic forms: bribing of administration or sponsorship for modern equipment, renovation etc. Respondents tried to avoid direct answers to the question of informal payments, only 1.5 % of respondents admitted using such form of payment as a bribe, but talked about sponsorship more willingly. "... *My husband went to negotiate a place in a kindergarten – said one respondent (woman, 29). – He was told what to do for the kindergarten. We sat down and understood that it would cost us at least 60,000 rubles*".

As parents say, it is rather difficult to get a place in a desired kindergarten legally, because in Yekaterinburg there is still a shortage of kindergartens. In addition, there is a preferential order: for example, children of prosecutors have a priority right of enrollment in an educational in-

stitution, as well as children of police officers, soldiers; children from large families have a high-priority right. The “queue” for ordinary people, according to 90 % of parents, moves slowly, and the chances of getting a place at the right preschool are very low.

Parents who are trying to get their children admitted to prestigious schools face a similar situation. They are directly or indirectly asked to pay the so-called “enrolment fee”, which reached € 2,000 in a big city like Yekaterinburg in 2008–2009. Such a situation is typical of many large Russian cities. However, 63 % of parents believe that informal payments are acceptable, because they want to give their child quality education at a prestigious school. The prohibition on admittance to desired educational institutions forced some parents to buy illegally an official residence registration from people living in the school district.

The study showed that informal payments don't end after enrollment a child in a kindergarten or school. It is also necessary to make conditions for a successful educational process and buy the necessary equipment and teaching aids. According to the research findings, teachers themselves openly acknowledge the fact that they accept various forms of financial support for their activities. Heads of educational institutions give the following reasons for the behavior of those who accepts parents' informal payments: *“The state provides funding for salaries and building maintenance. It is possible to acquire equipment and toys, and to do redecoration only by raising additional funds. These could be provided by parents interested in improving the conditions in which their children are studying. That is why some heads directly accepted donations into the school fund or created the so-called non-commercial parental organizations, which have a legal right to attract sponsorship for a kindergarten or school. That was until 2012. Now many schools are forced to become self-governing institutions to take parents sponsorship officially”* (School Director, professional experience 20).

Gifts as a form of gratitude to teachers of kindergarten and school have a special place in informal payments. Parents traditionally give expensive varieties of sweets and coffee as presents. Typically, these gifts are given to some teachers with the aim of drawing attention to their child and standing them out from the mass of other children.

It should be noted that the informal payment practices in the educational system are acceptable not only in Russia. These practices are reproduced and developed not only in big cities of Russia [4], but also in almost all post-socialist space [3]. Legal practices in education don't satisfy to requirements of social groups; they are poorly realized in concrete educational institutions, that's why they are replaced by informal norms and becoming a means of adaptation to new conditions and requirements of social environment. Parents justify their actions by saying that the local authority doesn't provide a high quality of education by most schools in the city. If the state breaks the proclaimed principle of equality of citizens in getting a high level of knowledge by all the kids, each person actually gets the right to decide this issue.

Studies show that parents in finding the solution to this problem use all available resources, often neglecting their legality. Economic resources are the very powerful tool for solving: *“I personally paid for my son to make sure he is in the right school”*. Parent community also uses other social resources (family, colleagues, acquaintances, etc.): extensive social contacts allow getting the desired place in an educational institution. Some parents try to use professional resources. So, while dealing with specialists of education departments, heads of kindergartens or school administrators, parents offer their own professional services free of charge: repairs, legal support, banking, etc.

Thus, the social practice of informal payments is successfully “implemented” in Russian education. 88 % parents have used this practice, and those people who often give bribes or become sponsors are in the high-income groups, with a higher education.

The spread of informal payments as social practices in the Russian education has serious

negative consequences. Firstly, informal payments weaken the economic system of the state, and it hinders its further social development. Secondly, people lose faith in moral justice and the equality of all citizens. Equal chances, accessibility of general education, that are proclaimed by the state, are often poorly implemented in real life. Thirdly, increased social polarization as a consequence of the spread of informal payments could spark protest behavior and lead to destructive actions of those social groups, for whom access to education of high quality is really limited.

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Российское образование: практика неформальных платежей

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Ключевые слова и фразы: неформальные платежи; образование; родительская общность; социальная практика.

Аннотация: В статье рассмотрена проблема неформальных платежей как практика, которую используют родители в системе общего образования. Опираясь на результаты социологических исследований, проведенных в г. Екатеринбурге, показано, что родительская общность формирует и воспроизводит практику неформальной оплаты для получения места в образовательном учреждении и создания условий успешного обучения детей.

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UDK 93

The Scientific-Theoretical Justification of the Small-Scale Production: Issues and Options for Action

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Key words and phrases: crafts; small-scale production; trade crafts.

Abstract: The article summarized the problems of separation of small-scale production. The author conducted a detailed analysis of the research on small-scale production terminology. The approaches to the definition of the scientific and theoretical basis of questions crafts and home industries were considered.

At the present stage of development of the significant role of science in society's development is well recognized. It plays a leading role in many industries and areas of modern life. However, many aspects of science are still only partially described in the literature. These should include scientific and theoretical basis for small-scale production as the basis of the Russian business. It should be recognized that until today in terms of small-scale production is no generally accepted approach. Researchers often combine unequal concepts "crafts", "handicraft" and "domestic crafts".

For a detailed scientific and theoretical basis of small industries, it is necessary to analyze the historically transitional forms of small-scale production: domestic industry, handicraft and cottage industries.

Initially, small-scale production existed in the form of home industry, i.e. processing of raw materials in the farm for their own consumption. This form was expressed in the manufacture of products at home for domestic use from raw materials grown or produced on the farm, which was typical of subsistence farming.

As the decline of subsistence farming, social division of labor and development of market, different types of raw material processing began to separate from agriculture. The first form of industry, separated from agriculture, was craft, namely production on demand. Crafting was characterized by the property of craftsmen, who were the owners of the workshop, raw materials and tools. Separation of crafts from home industry was gradual and prolonged. But the craftsmen were not producers, as product of their work belonged to the customer. They received for their work a fee, the product of labor in the market did not appear, and the work was mostly occasional.

It is important to note that crafts were different from trade crafts by commodity circulation. Craftsmen received monetary payment for their work. At the same time, craftsmen purchased tools, raw materials, etc. Thus, a new type of craftsmen, who worked on their own materials and tools, and sold the products of their labor on the market, was created. Those craftsmen became producers as a significant portion of their products became a commodity. At first, their participation in the market was purely random (sale of products remaining on hands), but the growth of the productive forces fueled the production for the market. Allocation of commodities,

its gradual increase gives trade crafts the nature of small-scale production with a dominant performance on the market.

Craftsman sold their products on a small local market, sometimes directly into to consumers [4]. That was the lowest stage of development of commodity production. It isn't easy to distinguish artisans from craftsmen. Craftsmen worked independently of the others, using their own materials and selling products of their labour on the market. Initially, he gave up for sale only the excess of its economy. Initially, they sold only excessive products.

At the same time, the development of trade crafts was good for the market. Craftsmen sold their products in the market and bought materials and tools for production.

However, it should be noted that in the historiography of "craft industry" is still not clearly defined.

The next discussion point in the conceptual framework of the craft industry is the question of the scientific sense of the word "artisan". On the one hand, it was defined as a producer, working exclusively on the market. On the other hand, artisans were often considered as craftsmen. P.A. Khromov tried to identify controversy in the meaning of the word "artisan". In his study "Economic Development of Russia" he allocated five basic forms of industry: domestic production, crafts, small-scale commodity production, manufacture and factory. He clearly showed the differences between them. Furthermore, considerable attention was paid to the evolution of forms industry. Starting with domestic production, P.A. Khromov described a long way of development from small-scale production to manufacture. In addition, he tried to identify the time of transfer from to artisanal production to trade crafts. He assumed that it was in the 17th, but nevertheless points to the impossibility of ascertaining the specific chronological period.

Based on the analysis of the process of formation of handicrafts, P.A. Khromov concluded that "artisan" was a smaller producer of goods for sale in the market [5].

However, it should be noted that the dispute in the definition of "artisan" still does not have a logical conclusion. The main reason is the ability to change the nature of sales of manufactured products. Producers could craftsmen and artisans at the same time. In addition, certain difficulties are related to the lack of ability to clearly define the extent of the work on request. The complexity in the allocation of small artisan producers was traced during migratory crafting, which developed in the 17th century. Departing from their homes, small producers worked on different conditions. They produced goods for the market and on request. Moreover, it caused the expansion of sales, thus creating the preconditions for the transition from production for a limited consumer market to mass market [4].

Thus, summarizing the analysis of the positions of researchers in determining the scientific and theoretical basis of small-scale production, the author identified certain similarities and differences. The most important similarity is in defining artisans as small producers, who manufactured products for sale in the markets, for own consumption and on request. In this case, it is impossible to relate craftsmen to some form of industry in general. Hence, the term "artisan" means the direct manufacturer of any product, who was gradually involved in the market economy in the course of historical development.

Accordingly, the domestic industry is defined as a kind of small manufacturing industry, with a predominance of manual labor, and family organization of production (home industry), the use of hired labor, market-oriented, tax-free and not subject to jurisdiction of the Factory Inspectorate. Craft production involved small domestic production of goods on the market or decentralized manufactory. The most common form was supply of raw materials for processing for a fee.

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Научно-теоретическое обоснование мелкотоварного производства: проблемы и варианты решения

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Ключевые слова и фразы: мелкотоварное производство; промыслы; ремесло.

Аннотация: В статье обобщаются проблемы, затрудняющие разделение форм мелкотоварного производства. Автор провел подробный анализ исследований по терминологии мелкотоварного производства, рассмотрев подходы к определению научно-теоретического обоснования вопросов кустарных промыслов, ремесла и домашней промышленности.

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UDK 316.422

Human-Information Space in the Context of Contemporary Virtual Communications

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Key words and phrases: information security; multimedia tools; natural communication; virtual communication.

Abstract: The article contains the results of many years' studies of the authors in the area of virtual communications and human-to-multimedia interaction tools. An analysis was performed referring to a dramatic change of the human-information space, some main clauses and results were summarized, and tasks were set for further research in this area.

Introduction

Informational space of contemporary people is determined by a variety of sources of information of natural and artificial origin, while the information comes both from natural and artificial, virtual communications [1] caused by human activities.

Natural communications form the real worldview, which is appropriate to physical reality while virtual communications basically distort the worldview due to the technical possibilities, impromptu requirements of social environment and specific projects.

Virtual communication emerged as of the time when one person provided another one with some information, which was not perceived by the latter with his or her sense organs. Naturally, this new communication has some new features as compared with natural communication supported by own sense organs. Therefore, a new information technology emerged as a process of formation of worldview through virtual communications.

These information technologies gradually enhanced with emergence of such great inventions and innovations as written language which enabled transmission of information for future generations, book printing providing access to knowledge for broad masses of people and eliminating irregularities of copies. The tools for bilateral exchange of information were developed for distances significantly exceeding biological abilities of human being (wire service, phone, radio and finally television).

Development of computers as a tool, that made it possible to use new approaches to information spaces and made virtual communications dominant, further advanced the development of information technology to create virtual worlds in the human minds.

It is to note that the number and speed of improvements of modern information technologies is steadily accelerating. Time of aging of information is three – five years now. This situation is subject to an analysis of this phenomenon and appraisal of further development prospects of information technologies.

Introduction of such term as virtual communication in the context of this analysis enabled us to determine in terms of quality and quantity the role and specific features of information flows coming to contemporary people [13].

Term of virtual communication

The realities of the modern world explicitly show how the type of communication is changing from natural communications based on natural tools to artificial communications based on artificial technics and other man-made tools [16]. Therefore, we need to focus on the phenomenon of modern communications by utilizing the term “virtual communication”.

The term “virtual” in the context of this work has a meaning which is closely related to the cotemporary ideas of the virtual reality; it means “apparent”, e.g. fictitious, not existing in the real world but simulating the reality [1]. This meaning is as close as possible to the phenomenon of artificial communication which ever more replaces natural communication.

An important feature of virtual (artificial) communication is a principal distortion of source information [2]. It is changing the model of the world in the mind of people as a result, and creates a false worldview, as utilizing other virtual communication eventually represents another reality. The surrounding reality transforms to virtual one which is affected by specific features of one or another virtual communication. According to N. Berdyaev, a human lives at the crossing of real and imaginary worlds [3].

Communication will be natural for natural environment of objects of communication, but virtual if mediated in time and space in case of discordance of local environments, e.g. discordance between location of objects of communication in that specific point of time and spatial point.

When there is an artificial object between objects of communication which enables such communication, this communication may be called as virtual one, as this object due to specific features pre-set by its creator affects the information provided and even forms new communication which differs from natural one. For example, communication between a doctor and patient in coma is supported by means of different sensors providing information about patient condition.

On the one hand, an artificial communication channel reduces possibilities for communications because of limitations of communication channel, i.e. distortion of the information during presentation; on the other hand, the possibilities arise that extend natural communication [2].

In case of natural communication the information is transmitted to our four sense organs, but today it is possible to transmit information to all eight sense organs thus providing new possibilities and enhancing quality of communication.

The probability of information manipulations in case of virtual communication is much more higher [5] than that of the natural communication where the accuracy of the information may be verified by using of the aggregate data which is simultaneously arriving at different biosensors.

The philosophic human-to-machine problem becomes a practical task making us to find technological solutions with consideration of human abilities of perception and transmission of the information. Transition to virtual communications implies a number of problems related to specific features of presentation of the information, i.e. connection with human biosensors and presentation of the information by the machine, not to speak of psychological and ethic issues. Knowledge of specific features of human perception of the information is necessary for to analyze processes of socialization in the contemporary society and develop information systems, e.g. management systems, educational systems etc.

The idea of virtual communication enables us to estimate in terms of quality and quantity [8; 11; 13] the virtuality level of communication, identify information flows of communication, simulate effects of transition to virtual communications using data-flow and information approach.

Nowadays, the virtual communications play an important role, displacing or even replacing

the natural communication and implementing new ways of presentation and perception of information, which were absolutely unknown before [5]. The volumes of information coming from virtual communications are in large excess over the volumes of information from natural communication [4–6; 8]. The complete technology of gaining, presentation and processing the information is changing. Virtual communications make enable us to take part in the remote events, which occur in a distance in space and time.

Education and business information space

Dramatic changes in social and technological aspects of life necessitated changes of the entire system of education. Education as the most important component of socialization of people undergoes reforms, which are ever more influenced by structural changes in the society in lieu with implementation of the new information technologies. The whole paradigm of education has been changing and is now based on principals of affordability, openness and continuity [9]. Urgency of these principles is foremost determined by the changes in data aging rates, as the information becomes obsolete in less than three – five years. For instance, continuous changes of computing performance result in development and implementation of the new and more advanced technologies. Therefore, the knowledge gained within the framework of old traditional education gets out of date very quickly. This requires from specialists to continuously update their knowledge within their area of specialization, i.e. additional professional education (APD) is strongly required. The APD system extends to about 70 % of employees in the USA, 60 % – in Europe, 80 % in Japan, and only 20 % in Russia, which is not sufficient to maintain the required level of expertise up to the contemporary standards [22].

Implementation of the above principles is obviously possible only if the traditional education is supplemented with distance learning systems based on up-to-date virtual communications. Today, in the world there are hundreds of millions of those who study and improve their qualification with the use of distant learning technologies.

The advanced virtual communications extended the information space due to the so called corporate mobility which was required for implementation of the distant work concept which makes it possible for managers to stay within their workflow space practically in any point outside their office. Cloud computing technologies provide freedom of gaining and exchanging the information within one virtual space thus guaranteeing prompt, accessible and confidential communications. It makes it easier to use and control the advanced automated management systems.

The contemporary information space demands from the man to acquire new information culture which provides opportunities for gaining and exchanging information with the use of advanced information technologies [21]. Information culture is formed within the framework of the contemporary virtual space basing on virtual communications, i.e. virtual reality becomes the natural live environment of modern people. Furthermore, it reduces the possibility to gain knowledge by way of natural communication and natural experience. The most important challenge for the new informational culture is to formulate its ethical basics [7; 10]. Today humanization of this culture within the framework of universal human values is required.

Multimedia technologies and tools

Important components of modern virtual communications, which mostly determine the success in perception of information, are multimedia technologies and tools.

Multimedia kits of the real world are real and may be physically perceived. This direction implements presentation of the information within the frameworks of traditional technologies of the real world. They are developing by enhancing the quality and scaling up the information to be presented.

The corporate mobility in organizational systems is implemented by means of mobile

multimedia kits. Further development of such means supports corporate informational space including corporate data systems and connection to Internet and Intranet.

Today it is very difficult and even sometimes impossible for us to perceive information without multimedia tools, but technical tools require specific methods of presentation of information. This issue arose after creation of large volume databanks. Special language tools were required to present the queries in the most optimal way, as human abilities were inadequate to rationally present the information. Therefore, some special language tools were developed to present data of data – “meta data” that are basically multimedia tools for information systems.

Multimedia tools of virtual world present the information in the virtual space, even though they cannot be physically perceived people may conceive and interact with them. An interactive virtual communication is implemented in the virtual space, where the man is an element of this virtual space and the activities are of virtual kind.

Multimedia technologies in the virtual space may include cloud technologies, which are actively developing, now based on formation of virtual computing structures.

Another direction of multimedia tools is presentation of information on subconscious level is also developing now.

Due to psycho-informational technologies it will be possible to present information and impact on human's minds so that affected people practically cannot control or prevent this [5; 7; 9–12; 20]. It should be noted that this is a very hazardous area for individuals and the entire society, therefore such technologies require special supervision.

The contemporary multimedia tools use new principles of presentation of information, enabling us to perceive information as comfortable as possible. Transition from verbal, especially written information to video sequences which are as a rule quite comprehensive and may be understood without translation from one language into another. For these purposes the information from different sources may be presented on one screen etc.

Therefore, the multimedia technologies, which are used nowadays, are quite versatile and applicable in all life spheres. They are the elements of real and virtual worlds originating from virtual communications. We may see that new principals of presentation of information are used now. Presentation of information by multimedia tools is supported both through conscious activities and on the subconscious level.

Globalization Challenges

Globalization gave rise to many processes in social, economic, political life and many other areas of human activities. It changed customary patterns of searching, processing, storing and accessing information [4; 6]. After a very short period of rapid development lots of different information sources became available. The complete structure of organization of joint work has changed.

Integration processes extend practically to all areas of human activities, thus enhancing efficiency of production, organizing new economical, political and public structures [17; 18]. Globalization results in formation of an absolutely different information space, which practically includes all worlds' sources of information.

Internet worldwide network has significantly extended informational potential of traditional sources of information such as radio and TV, foremost due to interactivity and freedom in selection of information sources. The modern radio and TV are integrated with Internet, which in many aspects forms the human-information space.

The features of virtual communications are fully implemented in Internet. Here it is practically impossible to make any distinctions between the real and imaginary worlds. Principal

distortions of the real world are possible here with practically limitless technical possibilities of presenting the information. And finally, it implies great opportunities for integration of traditional sources of information – radio and TV mostly due to interactivity with formation of different social networks with apparently limitless grade of freedom inside. However, as practice shows it is not the case. The real bans and limitations were replaced by the global control and informational management of masses of individuals that leave no chances for independent thinking.

Emergence of the global information network was that posed new problems of safety of individuals and generally of the state – information security [5; 12].

Information Security

Safety of the state depends nowadays not only on military security and not to that extent but primarily on the information security where we can see now unprecedentedly sharp battles resulting in social, economic and political disasters, murdering of lots of people.

In the modern society the issue of information security becomes ever more urgent with implementation of new informational technologies. The information coming from virtual communications is mostly beyond the control of the society; therefore, the destructive information may be available in huge amounts. Furthermore, today the advanced technologies of information control are actively used to resolve social, economic and politic issues in the interests of specific groups of the society and some countries.

The examples of the latest Arabian revolutions and Ukrain show, how important for the government and society is to retain control over informational flows to masses of people in the context of modern virtual communications. Emergence of revolutionary situations in these countries is mostly related to specific informational impact on people (basically, young people who became familiar with information technologies) who will easily believe in any even absolutely absurd information for the lack of social experience and knowledge, resulting in developing of firm response stereotypes to one or other situation. This is what is used for implementation of informational management of masses of people [12].

Technologies of virtual communications enabled us to extend possibilities for presentation of information that are mainly implemented by the advanced mass media tools. On the other hand, new problems of psycho-informational security emerged which are generally related to specific issues of human perception of information [15; 16; 21; 22].

Today the issue of psycho-informational safety in digital sources of information (Internet, disks, TV, radio etc.) emerges to prominence as the advanced information technologies make it possible to easily embed some psycho-informational impact tools to audiovisual information. Today, these technologies are widely used in digital mass media despite all applicable bans [11]. Monitoring of technical quality of TV-programs, other digital sources of information will spot and identify features, which may bear risks of hazardous psycho-informational impact on the audience (users) [15].

Conclusion

Over the past 10–15 years the human-information space has experienced significant changes. The value navigators, forms of information delivery have changed, the need for continuous information gaining emerged, the role of virtual communications enhanced, technologies of information control and management improved.

Globalization has expanded to all spheres of human activities including the economy with its interpenetration and integration challenges, information space thus extending the available area of knowledge and opportunities for its acquisition, and finally social globalization implying living standards, communications, social life etc.

The advanced multimedia technologies make it possible to represent the information

as effectively as possible, produce the information that is not available in case of natural communications, create the virtual world with the human being as an active subject. However, the advanced technologies of informational control and management reached such high level of development so that today the matter of information security and safety is as urgent as never before, both for individuals and generally for the whole society.

In lieu with the fact that the information is aging very quickly which is related to a rapid development and implementation of information technologies, the sphere of education also experienced significant changes and currently it is based on principles of openness, affordability and continuity which are implemented on basis of new and advanced IT-systems.

All these processes resulted in a dramatic change of informational space and hence it has become extremely important for the people.

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**Информационное пространство человека
в условиях современных виртуальных коммуникаций**

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Ключевые слова и фразы: виртуальная коммуникация; естественная коммуникация; информационная безопасность; средства мультимедиа.

Аннотация: Статья отражает результат многолетних исследований авторов в области виртуальных коммуникаций и взаимодействия человека с мультимедийными средствами. Проведен анализ кардинального изменения информационного пространства человека, отражены основные положения, результаты, поставлены задачи для дальнейшего исследования в данной области.

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UDK 697.1

Optimization of Task of Boiler Room Designing

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Key words and phrases: boiler room; boilers; engineering; pumps.

Abstract: The authors described the problem of boiler room designing through a series of simple interconnected tasks. The amount of solutions for each task allows getting a general solution of boiler room designing. All tasks have to be optimized; therefore they are formulated and solved with extremum function, which allows getting an optimal solution of the original problem.

Boiler room designing is a complicated, multi-step task. We divided the original problem into a number of small tasks:

1. Calculating of heating object:
 - water supply calculation;
 - heat supply calculation.
2. Calculation of boiler room:
 - equipment selection;
 - equipment placement;
 - equipment tracing.
3. Economic calculation.

Boiler room engineering task can be formulated as follows: it is necessary to design a boiler room to provide the given power output with the lowest cost. Optimality criterion for given task is technical and economic costs to design the given boiler room.

The task of calculating the heating object is reduced to calculating water flow, hot water supply and heat supply, required for a particular object.

1.1. Water supply calculation is based on the selected water supply scheme in accordance with the requirements of calculated object and includes: calculation of given system input and output water flow, the required quantity of feeding water, hot water supply, water circulation. The initial data include:

- the object height, building size, type of building, water and heat supply requirements, quantity of buildings;
- water supply scheme;
- length of the pipeline;
- climatic conditions.

The purpose of the given calculation is the hourly average water consumption analysis and producing characteristics, determining the type and quantity of the AC pumps, the circulator pumps, the re-feed water pumps and the hot water supply pumps which are installed in designed boiler rooms.

1.2. Calculation of heat consumed requires the data on heating and ventilation, hot water

supply of the given object considering losses. Losses are taken to equal to 2 percent from the sum heat load of the heating supply system.

2. Calculation of boiler room. Type and quantity of equipment depends on the type and performance of selected heating scheme. Calculated boiler room equipment includes:

- centrifugal water pumps;
- hot water boilers.

Total power and total heating output shall be defined as sum power and heating output of each individual pump and boiler.

2.1. Equipment selection task is reduced to boiler and pump selection to provide the given power output. The number of boilers and pumps in the heating scheme is determined by the researcher as a result of the technical and economic calculation [2]. The main characteristics of the pump use its performance, power and hydraulic head.

2.2. Placing equipment in the boiler room is a particular task. The selected placement scheme depends on the simplicity of installation, maintenance and repair of the boiler room equipment. Statement of the problem can be formulated as follows: taking into account all the rules, determine requirements and restrictions is the spatial arrangement of boiler room equipment with a given technological structure and dimensions of placement, the cost of the engineered volume would be minimal.

The problem under consideration belongs to the class of extremum combinatorial problems of the discrete programming and defined on the variety of possible arrangement of the placed equipment [1]. Due to the complexity of the problem, currently, there are no universal methods for solving them. Well-known methods for solving discrete programming problems can be divided into the two parts – exact and approximate. Nowadays, the several general schemes of exact methods of discrete programming are offered. The first is the scheme of the branch-and-bound, as well as the scheme of time-series techniques.

2.3. Equipment tracing. The given task can be formulated as follows [3]: find $T^* = \arg \min \{I^2(T) \mid T \in H^2 = m^2(D^2)\}$, where D^2 is the variety of options of tracing technology communications; H^2 is the variety of admissible choices of design solutions; I^2 is the criteria; $I^2 = R_{TH} + E_N(I_1 + I_2 + I_3)$, where I_1 is the cost of the pipeline; I_2 is the cost of the pumps; I_3 is the cost of the boilers.

$$T = \{T_j \mid T_j = \{(X_{jn}, Y_{jn}, Z_{jn}), n = \overline{0, K_j}\}, j = \overline{1, L}\} - \text{trace option.}$$

3. Economic calculation was carried out based on the quantitative value of the unit of conventional fuel and electricity. All calculations were made on the basis of the annual boiler room requirements in given resources.

Annual fuel consumption of the boiler room described by the sum of the thermal energy, generated to ensure efficient operation of the object and the energy produced for the hot water supply due the summer and winter periods.

The annual fuel demand is:

$$S_f^{year} = B^{year} f(Z),$$

where $f(Z)$ is the cost of the conventional fuel; B^{year} is the annual fuel consumption.

The annual electricity demand is:

$$S_e^{year} = E_{sum}^{year} g(Z),$$

where $g(Z)$ is the cost of electricity; E_{sum}^{year} is the annual electricity consumption.

Thereby, the problem of minimizing the cost of purchasing raw materials to ensure the required boiler room performance is solved.

$$S_{sum} = S_f^{year} + S_e^{year} \rightarrow \min.$$

The suggested method of solving the task of boiler room designing allows optimizing the calculation to ensure the given performance with a high degree of accuracy.

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Постановка задачи оптимизации при проектировании котельной

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Ключевые слова и фразы: котельная; котлы; насосы; техника.

Аннотация: Проектирование и расчет котельной описано через серию простых взаимосвязанных задач. Количество решений для каждой задачи позволило получить общее решение задачи по проектированию котельной. Все задачи были оптимизированы, сформулированы и решены с функцией экстремума, что позволило получить наиболее оптимальное решение исходной задачи.

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UDK 658; 005

Global Optimization of Innovative Enterprise Logistics System Based on the Method of Machine Learning

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Key words and phrases: global optimization; machine learning; quantum cybernetics; steady-state gain matrix; utility curve.

Abstract: The paper investigates the problem of improving the integrated logistics management under the influence of globalization. New approach and principles of quantum cybernetics for knowledge-intensive production were discussed; an example of problem solving for optimizing micro-activity in equilibrium based on industrial studies was given.

The analysis of the current state of logistics management assures that the theory of general economic equilibrium, which is currently dominant in management science, does not adequately reflect the reality of what is happening. Its use does not always lead to accurate results in the study of microeconomic objects in an inconsistent state. On the other hand, scientific and practical conclusions follow from the theory of evolution, features significant radicalism in relation to established ideas of management science, the desire to adopt a rather unconventional principles and approaches.

Phenomenal acceleration of technological progress determines the need for a new approach allowing for a more flexible application of the various theoretical and methodological materials and ensuring system-wide dealing with problems of innovative development of advanced high-tech enterprises in the non-equilibrium conditions. Understanding the innovative enterprise system elements can be described in terms of economic theory of stable conditions (steady state economics), developed by H. Daly (Daly, 1991). This theory, in particular, allows increasingly pay attention to market research microeconomic problems of system optimization, using experience of the cybernetic approach.

In the quantum cybernetics adaptation is defined as the process of goal-directed change the structure of innovative enterprise logistics system. The main purpose of adaptation is to find the reasons that violate the coordinated interaction of elements within logistics system and finding mechanisms to promptly and timely self-organized system. Damping negative cyclical functioning of the world economy, reducing the depth of the economic crises that periodically shook most of the countries of origin are examples of such mechanisms.

Product I (in particular, the incoming and outgoing information flows about the internal state of the production system, about the state of the global market) enters the logistics system, based on this information formed the weak/strong regulatory impact R. Regulatory impact strength determined by the signal S, which is identified in the integration subsystem and a sensor returns to regulatory subsystem (Fig. 1).

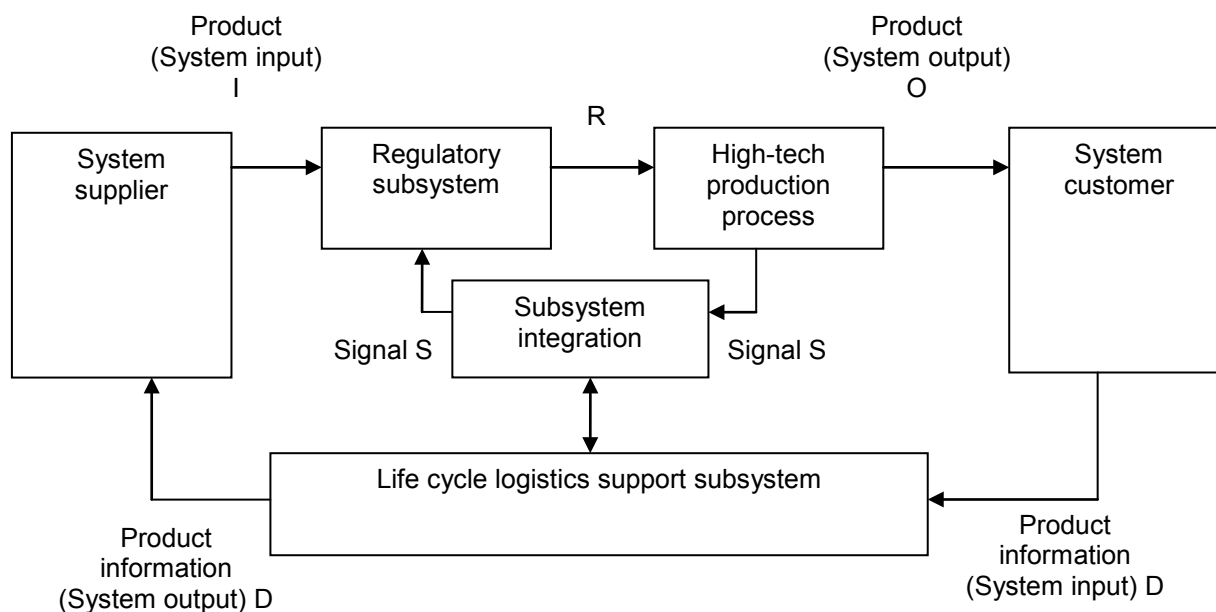


Fig. 1. Logistics system model for innovative enterprise

The mechanism of self-organization in the innovative enterprise logistics system is ensured by using the feedback principle. Positive feedback reinforces the input action impairs the stability of the system and adjusts the operation of the regulatory subsystem toward mutual gain influence factors, negative feedback – in the direction of weakening them, i.e. it helps to restore the balance in the event of logistics system violation by disturbing influences. Through this approach, a bypass is provided contradictory problems of stability and transformation of the production system, due to which there is “competition for time”, the main circuit and generating. Thus, for the advanced development in a logistics system should dominate the positive feedback – rapid scientific and technological progress, new ventures, etc. Negative feedback regulates the processes in a system does not allow them to grow excessively, but weakens its effect as soon as they begin to decline.

Logistics system management performance depends on tackling synchronization life cycle of new product development: life cycle processes should proceed in a coordinated, rhythmically and continuously. To ensure the resiliency for the high-tech production systems require rational organization of logistics flows: the rate of production and supply of products must match the pace of new product design. The dynamics of external environment in which modern innovative enterprise operating, product lifecycle minimization, the struggle for the performance and stability of laboratory equipment in the crisis, individualization of production, diversification of demand – requires compliance with the dynamics of the internal environment of organizations to develop a new external conditions product.

Formation and development of logistics system is impossible without systematic use of advanced machine learning method and quantum computers (Busemeyer, 2012). Machine learning system will quickly get market information, analyze it and prepare options for management decisions. From the perspective of scientific and industrial practice, filling the operating side of logistics system can become elements of control mechanisms of supervisory control of production that does not exclude the involvement of other means and techniques. Fundamentally important it should be emphasized that a characteristic feature of the regulatory

subsystem activity is not simply responding to a production system from certain stability parameters, and use them to launch its latent potential for self-organization in a new way.

Knowledge-intensive production system goes through a series of target states, the transition to which is arbitrary, not unidirectional, stochastic, resulting in a kind of non-linear motion trajectory. Important, these states the system contains in some twisted form. Transitions between states can be inferred from the accumulated knowledge and not identified by an exact description of the production system, but its method of robust analysis and simulation experiments.

Homeostasis is the process of holding the system in equilibrium; its mechanism is based on the interaction of all elements logistics system with each other and with an external environment, as well as the required action of self-organization. The process of homeostasis is constantly active and caused property logistics system adapts to changing conditions, i.e. with the transformation of state information and the working environment in the state of the system so that the parameters of the system of information flows do not exceed certain limits.

Possible interpretation of entropy logistics is self-information flows. This means that the self-organization – through the mechanism of homeostasis – supports the entropy of a system of information flows in knowledge-intensive production at a stable level, preventing the growth of non-equilibrium of the system, i.e.

$$\|x\|_2^{\max} = \frac{\|r\|_2}{\sigma_n(G)}, \quad (1)$$

where: G is steady-state gain matrix; x is vector of control parameters; r is vector of results; σ_n is minimum singular value of the static gain matrix.

From equation (1) follow, that in order to minimize the static singular value matrix growth process requires a maximum regulatory impact x for any intended result r . Nevertheless, self-learning system for knowledge-intensive production suggests that logistics systems goals can be achieved with the least time consumption. Controller of regulatory subsystem triggers synergies factors (tacts, cycles, delays) for bandwidth knowledge-intensive production system in framework conditions desired characteristics controlled action.

Problems associated with restrictions on control parameters, can be damped, based on the fact that the required regulatory impact is usually much smaller than the upper limit of the vector of control parameters. Thus, in terms of robustness, the goal of any control scheme knowledge-intensive production processes should be a clear incentive to maximize the minimum singular value of a static gain matrix G .

In general, a control system with the highest minimum singular value of the static gain matrix is less prone to vibration and eliminates uncertainty in operating models knowledge-intensive production process, while maintaining the stability of the closed loop:

$$\|G_p - G\|_2 < \sigma_n(G), \quad (2)$$

where: G_p is value of steady-state gain matrix; σ_n is minimum singular value of the static gain matrix.

For reasons of controllability, robustness and manufacturability logistics system parameters for optimal distribution within the logistics department must work to operations research and production equipment describes a process that has the maximum singular value of the static gain matrix.

Based on the fact that the global optima in logistics system can exist only in a state of

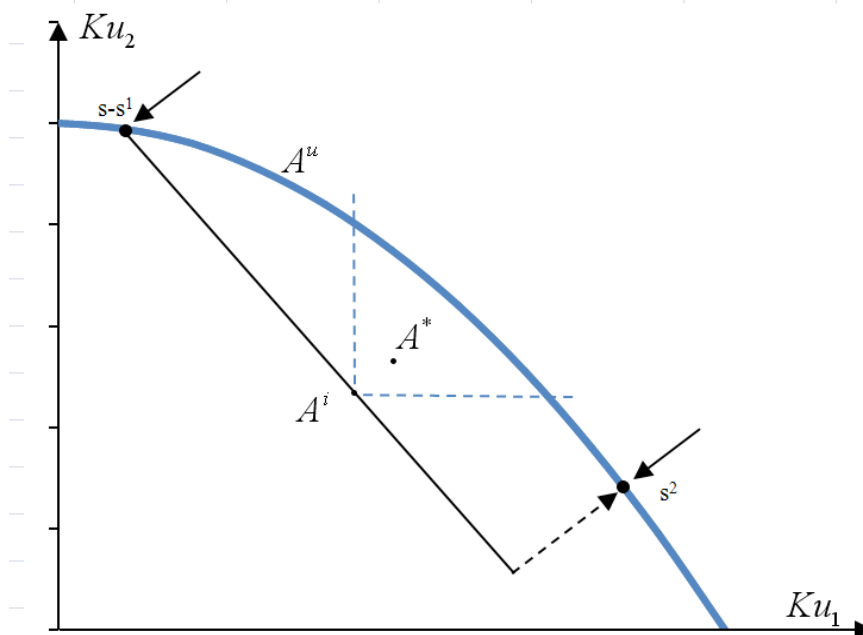


Fig. 2. Pareto optimal competitive equilibrium agents of global market

equilibrium flow of information, we can formulate a hypothesis: if between the agents of the global market there is a mutual commercial benefit, i.e. Pareto optimum, then we have the logistics balance of global information flows. Converse is also true: if the global market equilibrium established global information flows, each agent reaches its optimum activity or, equivalently, between the agents to establish the optimal world economy.

According to the first theorem of welfare economics, the competitive balance of global market can't exceed the Pareto equilibrium market with limited information. Fig. 2 shows the equilibrium states of two agents of global market without any information. At the limit of the possible welfare agent 2 enters signal 1, and it describes the most probable point of competitive equilibrium of this agent in a global market. This is also true for the agent 1, if the signal 2 is received. Expected utility curve connecting two competitive equilibrium of these agents is listed below.

Only in terms of the equilibrium state is reached a mutual commercial benefit of the parties, in particular, suppliers and customers of high-tech enterprises, i.e. Pareto optimum are achieved. Logistics for innovative enterprise reveals the equilibrium conditions of information flows in a global market, and this balance is inherent in Pareto optimum, i.e. the so-called global optimization. Many factors formally form a vector, whose components are the result of an alternative choice and should be acceptable for a global market, and therefore also for partners. Thus a compromise and a Pareto optimum are obtained.

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**Оптимизация системы материально-технического обеспечения
инновационного предприятия на основе метода машинного обучения
в условия глобализации**

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Ключевые слова и фразы: глобальная оптимизация; квантовая кибернетика; кривая полезности; машинное обучение; стационарная матрица коэффициентов стационарного усиления.

Аннотация: В статье исследуется проблема совершенствования управления комплексными логистическими системами в условиях глобализации. Рассмотрены новые подходы и принципы квантовой кибернетики для наукоемких производств, приведен пример решения задачи по оптимизации микродеятельности в равновесии.

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UDK 336.7

Funding in Commercial Banks: Contents and Principles

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Key words and phrases: bank; bank resources; funding; principles of funding.

Abstract: The paper investigates the fundamental requirements, which should be based on a strategy of commercial bank funding in the capital markets. The authors formulated the principles of funding focused on maintaining proportionality of financing structure, providing a multiplicity of forms, methods and tools to enable the maximum number of possible sources of funding, covering funding risks with liquidity reserves and anticipatory funding allowing the leveling effect of money depreciation over time.

The problem of ensuring the commercial bank resources, which in the scientific and business literature is formulated as the problem of finding sources of funding, in the current conditions of Russian banks reduced access to international capital markets, is extremely acute. Inability to refinance previously obtained loans in the long term will inevitably force many banks to reconsider their strategies for funding. In this regard, we consider it important to pay attention to the principles of bank managers funding that from a methodological point of view, occupy a central place in the understanding of the laws of the processes of financial security banking.

Considering the “principles” as the basic requirements that form the mechanism of transformation of the goals and objectives of the specific standards, methods, guidelines and algorithms for certain activities [1–3], we propose to adopt as principles of funding the following basic requirements: proportionality of the financing structure; multiplicity of forms, methods and tools to enable the maximum number of possible sources of funding; covering the risks of funding with liquidity reserves; anticipated funding.

Let's consider these principles in detail.

The principle of proportionality is a leading financing structure when deciding on how to obtain financing and construct an effective system of control over it. In financial management the issue of proportionality of the financing structure is investigated in terms of optimizing the ratio between debt and own capital of the enterprise; its change influences the company performance in such a way that higher profitability is achieved as a result of the growing share of debt capital in the structure of the sources of funds.

Despite the fact that this behavior takes place in the performance of any company, it is not so relevant for banks, a specific feature of which is to work with the greatest possible leverage, the optimal value is set for the control (indirectly through capital adequacy). At the same time, it does not mean that banks have no problem of ratio between equity and debt capital.

The growth of fundraising means the growth of risky investments and, therefore, the

potential losses in the future, which is intended to cover the bank's equity. At the same time, increase in the amount of funding is accompanied by an increase in the interest expense, the amount of which is fixed and does not vary depending on the bank's borrowers will perform their obligations under the loan or not. Losses caused by the execution of bank liabilities on interest payments in the amount not overlapped by income on loans, are also covered by the bank equity capital, reducing the amount of previously accumulated profits. In addition, credit default indicates lack of funds from the bank to fulfill obligations on deposits, which, in the absence of liquid reserves has to be covered by new borrowings. Thus, losses that may be caused by deterioration in bank asset quality, loss of income, and the need for new term loans, lead to the fact that the ratio between debt and equity capital of the bank, prevailing at a particular time, is constantly changing due to the fact that the debt capital grows and equity conversely decreases. This situation is justified as long as the ratio of "equity – debt capital" will remain within the boundaries within the boundaries set by the regulator maximum, maintenance of which is a prerequisite for the continuation of the bank.

This circumstance forces one to consider the problem of the financing structure not from the perspective of the optimization of the "equity – debt capital," and a few from a different angle: the debt and equity capital of the bank shall be interconnected in a certain proportion, so that the accumulation of risks associated with increasing amounts of funding accompanied by an adequate increase their own capital.

The principle of multiplicity of forms, methods and tools to enable the maximum number of possible sources of funding is considered in terms of the law of requisite variety, the essence of which is that a complication of management tasks must constantly improve the management by changing its structure and techniques. Applying the requirements of this law to finance activities of the bank, it can be argued that with the expansion of the range of financial instruments that are used in banking, the growth of financial innovation and the changing institutional structure of the financial system, as well as under the influence of state regulation of banking structure and funding mechanisms must be continually changed and modified to ensure their greater diversity.

This principle is manifested in the fact that the decision on the new scale and orientation of the target task forces banks at every stage of development to use new, more flexible and adapted to the needs of time tools, forms and methods of raising funds, and implemented in the activities of managers of the bank to raise funds from the maximum possible number of sources.

The principle of covering funding risks with liquidity reserves is explained by the need to form buffer stocks of liquid assets due to specific risks of liability loss as a source of funding. Despite the fact that modern risk management system has a sufficiently diverse set of techniques and methods to control all of them in one way or another, they are connected with the risk limitations, selling distressed assets, eliminating part of the income or total refusal from risky operations. In the process of financing the bank can control the structure of sources through the limitation; however, it cannot refuse to raise funds from various sources. Due to these reasons the priority method of risk management for the bank financing becomes risk coverage from liquidity reserves.

The creation of such reserves suggests that part of the attracted funds will not be used, and will retain thin e form of money, or take the form of highly liquid assets that have the ability to be converted into absolute money.

The principle of anticipatory financing is based on the concept of time value of money, which is based on the assertion that in the long term value of money decreases.

This effect in terms of financial security of banking activities means that to save cost of resources changing with time but necessary for the resumption of funding, the scope of raising

funds must always increase. Thus, the task of maintaining the level of activity in the future requires that the bank increases the amount of its debt steadily.

Guided by the principle of anticipatory financing a bank in addition to continuously increasing the volume of funds raised to absorb the effect of reducing the cost of resources over time, should be aware that not all sources of funding are subject to this effect equally. Private sources of funding are less sensitive to the adverse effects of the factors influencing the time value of resources. It follows another manifestation of the principle of anticipatory financing, i.e. long-term components of the funding sources must grow more rapidly, including their equity with the properties to maintain and increase their value over time.

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Фондирование в коммерческих банках: содержание и принципы

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Ключевые слова и фразы: банк; принципы фондирования; ресурсы банка; фондирование.

Аннотация: Статья посвящена исследованию основополагающих требований, на которых должна базироваться стратегия коммерческого банка в области фондирования на рынке капитала. Сформулированные принципы фондирования ориентированы на поддержание пропорциональности структуры финансирования, обеспечение множественность форм, способов и инструментов, позволяющих задействовать

максимальное число возможных источников фондирования, покрытие рисков фондирования резервами ликвидности и опережающее финансирование, позволяющее нивелировать эффект обесценения денег во времени.

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UDK 004.93

The Customs Union in Cooperation with the WTO

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Key words and phrases: cooperation between the WTO and the Customs Union; the international trading system of the WTO; the countries of the Customs Union.

Abstract: This article analyzes the issues of interaction between the WTO and the Customs Union, since in the international trading system the WTO plays a key role. At this point, out of the three countries of the Customs Union only Russia became a WTO member. The current state of international relations requires a systematic approach to the solution of common problems in the framework of the Customs Union and closer cooperation on a range of issues.

Although the Customs Union (CU) was established in 2007, we can already draw some conclusions.

Import figures of the CU from other countries show that September 2012 – August 2013 were characterized by the highest import volumes during the period immediately after the start of the new version of the Unified Customs Tariff updated with regard to the obligations of Russia to the WTO in October-December 2012

The volume of foreign trade in goods of the countries-members of the Customs Union and the Common Economic Space with third countries in January-May 2014 amounted to 369.8 billion USD, including export – 242.8 USD, import – 127 billion USD. Compared to the same period of 2013 the volume of foreign trade fell by 0.5 %. Exports of goods increased by 2.1 %, while imports declined by 5.2 %. Foreign trade balance showed a surplus of \$ 115.8 billion USD.

The export structure is dominated by the European Union. It accounts for 57 % of all exports. In the second place is APEC countries (China, USA, Thailand, Canada, Japan, Korea, etc.) – about 20 %. CIS countries accounted for about 8 %.

The structure of imports share is distributed in a similar way: the EU accounts for slightly less than 44 %, the APEC countries – 37 % (mainly due to imports from China and Korea), other countries – 11 %, and the CIS – 8 %.

The largest share of trade of the Customs Union is China (17 %), in the second place is the Netherlands (15 %). In the third place is Germany (12 %), mainly machinery and equipment, Italy (10 %) – light industrial products and food. Trade with China is about 45 % of trade with APEC (115 billion USD out of 246 billion. USD for APEC as a whole), while the Netherlands, Germany and Italy is about 50 % of trade with the EU (245 billion USD out of 493 billion USD for the EU) [1].

In connection with the introduction of sanctions against Russia the structure of the foreign trade in the CU will certainly change. At this stage, it is quite difficult to predict the effects of

Table 1. The structure of the Customs Union trade

	Russia		Belarus		Kazakhstan	
	% export	% import	% export	% import	% export	% import
Fuel and energy products	72.6	0.6	56.7	1.5	81	2.2
Chemical products	4.9	16	16.8	18.1	0.8	14
Metals and products from them	7.3	6.5	5.3	8.7	8.1	11.6

* According to the ECE Statistics

restrictions on imports of certain goods from countries that imposed sanctions. However, the country leaders declare that the required import volumes will be compensated from other countries (Brazil, Argentina, India and some others). The share of Latin America and Asia in the volume of foreign trade of the Customs Union can be expected to increase.

The major problem is the lack of diversification of the economies of the participating countries of CU, which affects the activity of the entire association. We consider the proportion of 3 groups of goods in the import / export of each country for 2013. We analyzed fuel and energy products; chemical products; metals and products from them.

In all three countries, these 3 groups occupy more than 80 % of total exports. Their share in the total volume of imports varies by 2–5 %. It shows that any problem in the national economy is fully reflected in the CU activities. The global market downturn, the global crisis - all this will affect equally both the economy of each of the participants as well as the activities of the entire association.

In the economies of some EU countries there are serious problems; however, the structure of foreign trade of the largest economies in Europe is different, which can significantly reduce external risks.

Features of relations among the countries of the Customs Union

In accordance with the terms of the agreement dated 6 October 2007, the formation of CU involves the creation of a single customs territory, within which shall not apply customs duties and restrictions of economic nature, with the exception of special protective, antidumping and countervailing measures. It means that there is no overall objective for the participants apart from the formal establishment of a common customs territory.

Other associations of the world have more apparent objectives. Thus, in MERCOSUR (Common Market of Latin America), the strategic goal is to create a combination that can ensure economic growth of its members on the basis of intensive mutual trade and the efficient use of investment as well as to increase the international competitiveness of the economies of the participating countries.

Of course, we can talk about the independence of the economic policies of the countries participating in the various integration associations in the world. Thus,

there is a development of the whole group. According to analysts, in the CU each of the countries has a greater freedom of action. Take for instance, recent embargo of Russia on certain types of food.

This is also confirmed by fairly low volumes of mutual trade. Over the past five years there has been a decline in the share of Russia and Kazakhstan in the total volume of exports to the CU (8–11 %). The share of Belarus is much bigger – about 35 %. If we consider the longer-term trend, it can be noted that for Russia, this figure has always always characteristic, while the

share of Kazakhstan and Belarus has strongly reduced.

Russia, Kazakhstan and Belarus are to varying degrees dependent on mutual supplies. The highest degree of dependence on trade with the CU member countries shows Belarus: in 2012, more than 50 % of total imports amounted to Belarus imports from Kazakhstan and Russia. Kazakhstan is also characterized by high dependence on import flows from Russia and Belarus (40 %). Proportion of countries-members of the CU in the total Russian imports is small – less than 10 %.

Out of the CU countries only Russia became a member of the WTO. In this case, the WTO included a country and its customs territory, its system of regulation of foreign trade and customs administration that is transparent trade regime. The WTO could have started operations with the CU; nevertheless, Kazakhstan and Belarus didn't become the WTO members.

Since Russia is a key player in the CIS, its WTO accession is strongly influenced by the organization of foreign policy in the CIS and in the first place – the Eurasian Economic Community.

In October 2011, the Commission of CU brought all the rules of the Customs Union in full compliance with the WTO rules. In addition, it was agreed that in case of accession to the WTO, the rules of the organization will have a greater effect than the norms of the CU.

For every country becoming a member of the WTO the transition period can be introduced. However, Russia had serious problems even in the first year of membership in the WTO. They were associated with the introduction of scrappage tax.

Once again, we pay attention to the introduction of sanctions against Russia (related to the events in the Ukraine) and its response.

If a neighboring country does not want to accept the goods, it is necessary to offer to sell it in Belarus or send for processing. This is the position of President Lukashenko. He offers to buy products from countries that have imposed sanctions against Moscow only for the domestic market. This is due to the fact that the border has accumulated a very large amount of traffic to the paid items (often perishable).

According to the agreement on the Customs Union, Russia cannot impose sanctions on the import of food for more than six months, if the other members of the CU did not support such restrictions. This was declared on August 12, 2014 during a round table "Grocery wars: Western sanctions and response of Russia", by the chairman of the Consumers Union of the Russian Federation Peter Shelisch.

He also noted the following: "I wish the current political situation would not ruin the Customs Union. After all, the agreement says that in this situation over the period of six months the other members of the CU are required to take measures against the delivery of prohibited products into the territory of the member which introduced the sanctions. But how it should be done in practice is unclear, because there are customs posts between CU countries".

In addition to global problems and the world economic situation, there are local difficulties. They are associated with a variety of procedures for issuance of goods, corruption, etc. So, on entry into the territory of CU the cargo van spends an average of 3 hours, while in Europe this period is no longer than 20–30 minutes. Only recently the Institute of Authorized Economic Operator was introduced in Russia. Companies that have this status, get a very solid franchise. For example, loads of trustworthy companies are not physically inspected, and they themselves shall be granted facilities for the payment of customs duties. This practice has long been prevalent in the world.

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Особенности работы Таможенного союза во взаимодействии с ВТО

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Ключевые слова и фразы: взаимодействие ВТО и Таможенного союза; международная торговая система ВТО; страны Таможенного союза.

Аннотация: В статье проанализирован ряд проблем взаимодействия ВТО и Таможенного союза, поскольку в международной торговой системе ВТО играет ключевую роль. На данный момент из трех стран Таможенного союза только Россия стала членом ВТО. Современное состояние международных отношений требует системного подхода к решению общих проблем в рамках Таможенного союза и проведения более тесного сотрудничества по ряду вопросов.

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UDK 338.4

Innovation and Technology Clusters in the Gas and Petrochemical Industries

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Key words and phrases: cluster; energy, fuel and energy complex; gaz; oil; Russia.

Abstract: The economic development of the country is one of the main economic problems in the Russian Federation. One of the possible solutions can be the creation of the economic clusters. The article examines the pan of the creation of the clusters in gaz and oil sector in Russia.

One of the main conditions for the transition to a qualitatively new economic growth is the increase in the competitiveness of Russian enterprises. Therefore, the assessment of the competitiveness of products (services) in conditions of the market economy is the question of big importance. It turned out that many domestic products, designed and created in manufacturing and process industries, for various reasons were not able to compete not only in the external world markets, but also in the domestic Russian market. The lack of competitiveness can be explained by planned command economy, low level of technology used and the lack of effective mechanisms to assess the potential competitiveness.

Creation of the competitive products or improvement of company competitiveness is a challenging task, but it is solvable in the market economy. However, the increase in the competitiveness of a particular industry or ranking country in the world is the problem which is complex and long term. The achievement of greater competitiveness of the country cannot be realized without the coherent, long-term policy reforms in the economic and social fields.

Among the sectors of the Russian economy which are the most competitive are the export-oriented industries and industries that are based on the relatively advanced technologies. This is confirmed by the study conducted by the Russian Center for Industrial Restructuring in one of TACIS projects. In the course of the study the researchers assessed the competitiveness of a number of industries in the domestic and global markets. The main sectors of the Russian economy ranked by the researchers by the degree of competitiveness in the world market were subdivided into four categories:

- very strong competitive position – iron and steel industries;
- strong competitive position – non-ferrous metallurgy, electric power, petrochemical, forestry, defense, communications and telecommunications industries;
- mediocre competitive position – chemical, automotive, shipbuilding (civil), engineering, instrument-making;
- weak competitive position – aircraft (civil), electronic, textile industries.

Moreover, at the moment the industries with the relative competitiveness are connected with fuel and raw materials, first of all, gas and oil production sector. Government of the Russian Federation approved the Plan of gas and petrochemical industries for the period up to 2030, providing for the development on the territory of the Russian Federation eight district

petrochemical clusters [2]. Plan for the development of gas and petrochemistry in Russia for the period up to 2030 (I stage) identified six key clusters: Western Siberia, Volga, Caspian, North-West, East-Siberian, Far East cluster [4].

There is no contradiction between these regions. According to the experts, each of the clusters can develop self-sufficiently. Once these regions have actively implemented investment projects, five of the six existing clusters, according to the Ministry of Energy, acquired their new economic shape. Well underway is executed the building of the three large-scale projects, including: the production of polypropylene in Tobolsk, acrylonitrile-butadiene-styrene (**ABS**) plastic in Nizhnekamsk, polyvinyl chloride (**PVC**) Kstovo [3].

Also, five more major investment projects were launched: NGL-wire from Purovsk to "Tobolsk-Petrochemicals" for transportation of natural gas liquids, "Caspian gas chemical complex", "Eastern Petrochemical Company" in the Primorye Territory. And also the plan gave its start to the expansion of the power of pyrolysis on the platform "Angarsk Polymer Plant" and the construction of a new production of foamed polystyrene "Nizhnekamskneftekhim" [3].

In 2010, on the territory of the West Siberian cluster 0.25 million tons of ethylene was produced. It is expected that by 2030 this figure will rise to nine times and will be 2.25 million tons. In the sector of basic polymers on the territory of West Siberian cluster the production in 2010 amounted to 0.37 million tons, the consumption reached 0,52 tons. In 2030, the projected production will be 4.03 million tons; consumption will reach 2.35 million tons [3].

Volga cluster, according to the experts, is considered to be historically strong, and have good prospects for development, mainly related to the integration of petrochemical and refining enterprises. In the Volga Federal District two regional petrochemical clusters were developed several years ago – one is in Tatarstan and another is in Bashkortostan. Now, it is planned to create three more clusters: Nizhny Novgorod, Samara and Saratov clusters [3].

Volga cluster, despite its distance from the sources of raw materials, according to experts of "SIBUR Holding" has several advantages over the others. The main advantage is that in Volga cluster petrochemicals were integrated with refining. Petrochemical plants in the region can produce a large number of products that cannot be made in Western Siberia. These are polystyrene, polyvinyl chloride (**PVC**), polyethylene terephthalate (**PET**). The second advantage is the ability to integrate production and the creation of systems with a compact geography that allows optimizing logistics processes [3].

Caspian cluster is called mono-corporative, since its foundation is the project of "LUKOIL" for the extraction of hydrocarbons in the Caspian Sea with their further processing. In 2010, the production of ethylene was 0.32 million tons. It is planned that by 2030 it will increase by 2.9 times to 0.93 million tons. On the territory of the Caspian cluster 0.41 million tons of bulk polymers was produced, consumption reached 0.47 million tons. It is expected that by 2030, the production will rise to 1.68 million tons, while consumption will increase to 2 million tons. In 2010, on the territory of this cluster there were no plants producing ethane. Its consumption was 0. It is planned that by 2030, the production of ethane will be 4.6 %, while its consumption will reach 11.8 % [3].

The development of the East Siberian cluster is closely related to the projects of the development of gas fields in the region. In 2010, the territory of the cluster produced 0.2 million tons of ethylene. It is expected that by 2030, its output will increase by 5.3 times to 1.07 million tons. The production of large polymers in 2010 was 0.34 million tons, consumption was 0.17 million tons. In 2030, the production figures will increase to 1.54 million tons, consumption will go up to 0.66 million tons [3].

Far East cluster is encouraged to develop in two phases. In the first phase there will be the concentration of petrochemical raw materials. Once raw materials come to the region from the

Eastern Siberia, primarily from Chayandinskoye field, according to experts, there will begin the second phase of the development, which they call “promising”. In 2010, the Far Eastern cluster didn't produce the ethylene. Here, according to the plan for 2030, its production will reach the level of 2.6 million tons. Bulk polymers in the Far Eastern cluster are also produced. However, their consumption was 0.1 million tons. It is planned that by 2030 the production of the bulk polymers will be 3 million tons, while consumption will reach 0.55 million tons [3].

At the stage of the study there are projects of the Northwest cluster. They belong to the so-called “second wave” of investment projects with the planned completion of the implementation in 2020. In the Northwest Cluster in 2010 the production of ethylene was organized, in 2030 this cluster, presumably, will produce 3.6 million tons of this product. Production of bulk polymers in the region was not developed, however, in 2030 it is planned to reach the volume of 3.38 million tons [3].

Basic infrastructure problems for the West Siberian cluster, according to the Energy Ministry, are the limit of the capacity of the rail transport in some areas of the Sverdlovsk Railway, which exports significant volumes of cargo of oil and petrochemical companies. Another difficulty is the small capacity of the road “Tobolsk – Surgut”. Complexity adds the workload of gas transportation system. Its load, according to experts, can partially remove the transition work Karasulskoy compressor station in the reverse mode, which will redistribute the excess volumes of dry stripped gas [3].

The main infrastructure limitations of the Volga cluster are undeveloped Kama railway junction, as well as a number of low-bandwidth stations of Sverdlovsk and Kuibyshev Railways. Along with this, the region also has congestion federal highway M-7, low bandwidth Nizhnekamsk industrial hub, as well as product lines and primary piping between Ufa refineries node. In addition there is a lack of development of pipeline infrastructure of individual enterprises [3].

For the Northwest cluster the major problem is also the lack of development of railway infrastructure in the region. Among the limitations of the Caspian cluster can be identified the insufficient development of the railway infrastructure and the unresolved question of the supply of gas to the energy industries located in the Krasnodar Territory and Rostov Region [3].

According to the experts of the Ministry of Energy, the main problem of the petrochemical industry is the current situation, in which there is excess of the petrochemical feedstock (LPG, naphtha, ethane) and constantly increasing demand for petrochemical products in the apparent shortage of facilities for the production of the basic monomers of ethylene and propylene – pyrolysis. In this regard, in accordance with the “Plan of gas and petrochemical industries in Russia up to 2030” it is scheduled to execute the active construction and expansion of the ethylene pyrolysis capacity by 4.8 times. Thus, it was decided to change the situation with a deficit of the facilities for the production of monomers [3].

According to the Plan, in 2030 it is forecasted 5.8 times increase in the production of basic plastics. By this time, for certain types of basic plastics in Russia, according to the expert estimates, the deficit will remain even with the implementation of the company's statement of investment projects. This situation, according to the representatives of the Ministry of Energy, may be real for the polyvinyl chloride, polyethylene terephthalate, polystyrene and ABS plastics [3].

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Инновационно-технологические кластеры в газо- и нефтехимии

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Ключевые слова и фразы: газ; кластер; нефть; Россия; ТЭК; энергия.

Аннотация: Экономическое развитие страны является одной из главных экономических проблем в Российской Федерации. Одним из возможных решений может стать создание кластеров. В статье рассматривается возможность создания кластеров в области газо- и нефтехимии в России.

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UDK 336.113.1

Analysis of financial statements of the municipality to assess its financial stability

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Key words and phrases: financial stability; financial statements of the municipality; horizontal analysis; investments; investment activity; investment attractiveness; the coefficients increase financial capacity, and comparative factor analysis; trend analysis.

Abstract: The authors described the traditional methods of financial analysis of financial statements of local municipalities. It was proposed to assess the financial sustainability of the municipality through ratio analysis, which characterizes the investment activity and attractiveness.

During the execution of the budgets financial bodies of municipalities conduct financial analysis of incoming revenues and expenses budgets. Financial analysis is carried out by conducting horizontal and trend analysis, in addition to comparative and factor analyses.

The horizontal (time) analysis is performed by comparing the individual financial statements of previous periods. The essence lies in the comparison of the values of individual indicators of the financial statements for the period preceding the reporting, in addition, mandatory comparison of the actual values with the planned values (established by the budget estimates) of income and expenditure, in order to identify deviations and make operational decisions.

The essence of the ongoing trend analysis is the analysis of changes over time, i.e. the analysis of their dynamics; mainly such analysis is carried out on indicators that generate income for the local budget. In addition, this analysis is performed in relation to the investment of financial resources allocated for the execution of municipal target programs.

The core of the conducted comparative (spatial) analysis is the comparison of the figures obtained in the result of the horizontal analysis during the reporting period, with similar figures for the prior period in order to identify trends in performance reporting.

Factor analysis is conducted to identify the effects of individual factors (reasons) on the indicators of the financial performance of the municipality. Typically, this analysis is carried out by two methods:

1) direct factor analysis (the analysis), which explores effective index as a whole and its individual parts;

2) inverse factor analysis (synthesis) where for the purposes of the analysis individual indicators are combined into the overall effective rate.

In our opinion, for the assessment of investment activity, it is not enough to make horizontal, trend, comparative and factor analyses of the municipality, but it is necessary to calculate financial ratios.

We believe that only a complete financial analysis of financial statements will define the

investment activity of the municipality, the extent and availability of financial capacity, and the degree of its independence from higher budgets and external funding sources. Under the proposed methodology the analysis of financial statements of the municipality refers to the identification of synergies and interdependencies between the various indicators of its financial and economic activities included in the statements, that is, refers to the calculation of financial ratios that will help the user statements to evaluate the financial condition of the municipality on the basis of the annual financial report and make an informed business decision. The analysis of financial statements on the basis of calculation of financial ratios can be recognized as high-speed universal method for assessing the financial condition of the municipality, which will to some extent be characterized by its investment activity and attractiveness.

In the analysis of financial statements to assess the investment activity with the calculation of the growth rates of financial capacity, it is reasonable:

1) to calculate the coefficients of total revenues, tax revenues, increase in other non-tax revenues (structural indicators) for the reporting period;

2) to compare the figures obtained for the assessment increase the financial capacity of the municipality during the reporting period compared with the previous period.

1. The ratio of total revenues:

$$\text{To PR, the total income} = (O_1 - O_0)/O_0,$$

where: O_1 is total revenues in the reporting period; O_0 – total revenues in the previous period.

2. The growth rate of tax revenues:

$$\text{To Pralgo} = (H_1 - H_0)/H_0,$$

where: H_1 is tax income for the reporting period; H_0 is tax income for the prior period.

3. The annual growth rate of non-tax revenues:

$$\text{To PR other Neal, DOH} = (P_1 - H_0)/H_0,$$

where: P_1 is other non-tax revenues during the reporting period; H_0 is other non-tax revenues for the prior period.

4. The annual growth rate of revenue:

$$\text{To Prviously} = (B_1 - B_0)/B_0,$$

where: B_1 is revenue from the sale and use of property during the reporting period; B_0 is revenue from the sale and use of property for the prior period.

5. The growth rate of revenues from paid services:

$$\text{To Preplate services} = (N_1 - V_0)/V_0,$$

where: N_1 is revenues from paid services during the reporting period; V_0 is revenues from paid services for the prior period.

6. The growth rate of the size of subsidies:

$$\text{To PR, subsidies} = (D_1 - D_0)/D_0,$$

where: D_1 is the size of the resulting equalization of budget sufficiency in the reporting period; D_0 is the size of the resulting equalization of budget sufficiency in the previous period.

7. The growth rate of the size of subventions, subsidies:

$$\text{To Prassed, subventions} = (C_1 - C_0)/C_0,$$

where: C_1 is the amount of received subsidies, subventions for the implementation of target programs of the reporting period; C_0 is the amount of received subsidies, subventions for the implementation of target programs in the previous period.

We offer financial ratios describing the financial stability to be calculated as:

- 1) the ratio of items and the results of the individual sections of the financial balance sheet, income and expenditure of the parts shown in different compiled reporting forms;
- 2) the ratio of the individual items of income and expense recognized in various forms of reporting.

In our opinion, using foreign and domestic theories of financial analysis, it is necessary to determine the liquidity ratios of current assets of the municipality. Under the liquidity of assets is understood as their ability to quickly and without much loss in value to apply to money.

Unfortunately, in the Russian practice, the concept of liquidity is associated with the concept of their ability to pay, which is quite unacceptable notion to characterize the liquidity of the assets of the municipality. Using the forms of the annual statements, logically it is not possible to calculate the current urgent and absolute liquidity of the assets at the beginning or the end of the reporting period. This is because, as a rule, at the beginning and end of the financial year there are virtually no funds in the local budget.

The financial sustainability of the municipality is characterized by the availability of financial resources, which are the sources of financial capacity and investments in the development of the municipality. This definition can confirm the composition of the coefficients characterizing its financial stability.

Group ratios of financial sustainability include the following factors:

- 1) independence factor (financial stability);
- 2) the ratio of dependence on borrowed funds;
- 3) the ratio of grants (budget based).

The technique of financial analysis with the calculation of financial ratios, in general, in combination with other indicators of socio-economic development of the municipality is assessed by the ability to use the existing internal financial reserves, which will significantly improve its investment climate and investment attractiveness and investment activity using financial instruments of investment policy of the municipality.

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Анализ финансовой отчетности муниципального образования для оценки его финансовой устойчивости

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Ключевые слова и фразы: горизонтальный анализ; инвестиции; инвестиционная активность; инвестиционная привлекательность; коэффициенты прироста финансового потенциала; сравнительный и факторный анализ; трендовый анализ; финансовая отчетность муниципального образования; финансовая устойчивость.

Аннотация: Авторами статьи показаны традиционные методы проведения финансового анализа финансовой отчетности местных бюджетов муниципальных образований. Предлагается для оценки финансовой устойчивости муниципального образования проводить коэффициентный анализ, который будет характеризовать его инвестиционную активность и привлекательность.

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UDK 81.27

Interpretation of English Legal Terms by Native Speakers (on the Material of Key Terms in Labor Law)

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Key words and phrases: English labor law; interpretation; semes; terms.

Abstract: The paper deals with the native speakers' interpretation of basic concepts of labor law in England. By the results of the survey the main semes of interpretations of terms of labor law were identified; features of perception, depending on education and age were discussed.

Legal language is an isolated language subsystem directly related to the law. Depending on the area of law you can distinguish sub-styles of legal language: in private law there is the language of the civil law, labor law, family law, etc.; in public law there is the language of constitutional law, administrative law, criminal law, environmental law or others.

Legal language is a specific subsystem with a functional-social nature, as firstly, it performs a specific function, and secondly, it is used by a particular social group [2]. Legal language is a separate and distinct system with its own semantic features [3]. Semantic shifts in terms of legal language, as well as its social limitations led to a contradiction with its functions: legal language is designed to serve public relations, but it is not clear or obscure to the majority of speakers, not directly related to the legal activity [2]. This question requires an examination, and the subject of the current work is the perception of legal terms used in the English labor law by native English speakers. Labor and Employment Law was chosen for the study because it, unlike, for example, the criminal law, is connected with the majority of the population.

In Labor law there are several most important terms like contract of employment, employer and salary. To determine the features of the interpretation of these terms 32 native English speakers were surveyed. Respondents were asked to give a detailed interpretation of the terms of labor law. Sample of informants was balanced on the following factors: gender, age, and education.

Definition of contract of employment is the following: "A written legal agreement between an employer and an employee, giving details about the employee's job, pay, working hours, etc". The main semes in this definition are written, legal, agreement, employer, employee, details, job, pay and time. As you can see in tab. 1 only three of these semes are used by more than a half of respondents. What is more important is that people with higher education tended to understand this term closer to the legal definition. They divide semes agreement and contract, while younger respondents and respondents without higher education lack the difference in this semes. We also see that people aged under 25 usually speak about people in general, whereas older people clearly define employers and employees while talking about employment. That leads to a conclusion that with more experience people understand labor law much better compared to people who didn't get a chance to face employment themselves. Younger people who lack life experience use general interpretations when talking about labor law in general and em-

Table 1. The frequency of semes in the interpretation of the term *contract of employment*, %

Semes	Total	Under 25 y.o.	Over 25 y.o.	Without higher education	With higher education
agreement	62.5	50.0	75.0	37.5	87.5
person	56.3	68.8	43.8	75.0	37.5
job	50.0	50.0	50.0	43.8	56.3
employer	50.0	37.5	62.5	37.5	62.5
contract	37.5	50.0	25.0	62.5	12.5
company	37.5	31.3	43.8	25.0	50.0
employee	31.3	31.3	31.3	25.0	37.5
to give	28.1	37.5	18.8	37.5	18.8
organization	25.0	31.3	18.8	31.3	18.8
legal	18.8	18.8	18.8	12.5	25.0
details	12.5	6.3	18.8	0.0	25.0
pay	12.5	18.8	6.3	12.5	12.5
written	6.3	0.0	12.5	0.0	12.5
time	3.1	0.0	6.3	0.0	6.3

Table 2. The frequency of semes in the interpretation of the term *employer*, %

Semes	Total
to employ	68.8
organization	62.3
company	31.3
person	31.3
to give	25.0
work	12.5
job	12.5

ployment in particular. We also see that people with higher education show more attention to the problem of details in contracts as well as to their legal aspects. In our questionnaire we also faced with the fact that few people see time periods as an important part of contract of employment. Only several people mentioned this seme in their interpretation, and as a matter of fact, all these people were older than 25 and had higher education. When we closely looked at this point we found out that those people had legal or financial education, what leads us to a conclusion that not every higher education gives the right understanding of legal terms, rather, it is the sphere that people study in.

It should be noted that contract of employment is a specific legal term that has a lot of semes in itself. Other key terms of labor law have less semes. For example, term employer which means a person, company, or organization that employs people.

This term is very close to general language and we couldn't find any significant differences in the interpretations of people of different age or education. Only a few people misinterpreted this term. As you can see in tab. 2 a pair of semes from the legal definition was used by

more than half of respondents. Though some aspects of legal definition were mentioned quite rare, we can't say that they defined the level of understanding of term employer, because even semes that don't belong to legal definition stay very close to it. Semes to give work/job are similar to the seme to employ. As a result, we can state that term employer is understood by all of respondents.

To sum everything up, we can say that the basic terms of the labor law of England are perceived by respondents in different ways. The higher the level of specialization of the term, the more difficult it is to understand. If you analyze the terms of the basic level of the labor law, their interpretation is almost common for all respondents. However, the more we delve into specialized terminology, the more we find differences in interpretation of the respondents. At this level, a clear understanding of the functional relation between the legal terms of age and education profile of the person is at place. Humanitarian education in the field of law and finance gives a much clearer understanding of the specialized legal terms of labor law, rather than the lack of higher education, or education of a different profile.

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Толкование английских юридических терминов носителями английского языка (на примере основных терминов трудового права)

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Ключевые слова и фразы: английское семейное право; семьи; термины; толкование.

Аннотация: В статье рассматривается восприятие носителями языка базовых понятий трудового права Англии. По результатам анкетирования выделены основные семьи среди толкований юридических терминов трудового права, отмечены особенности восприятия в зависимости от пола и возраста.

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COMPONENTS OF SCIENTIFIC AND TECHNOLOGICAL PROGRESS
№ 3(21) 2014
SCIENTIFIC AND PRACTICAL JOURNAL

Manuscript approved for print 20.09.14
Format 60.84/8
Conventional printed sheets 9.07
Published pages 5.30
200 printed copies

Printed by Zonari Leisure LTD. Paphos