International Journal of Applied Exercise Physiology

2322-3537 www.ijaep.com

Vol.9 No.4

Doi: 10.26655/IJAEP.2020.4.1

International Journal of Applied Exercise Physiology (IJAEP)

ISSN: 2322 - 3537

www.ijaep.com

info@ijaep.com

Abstracting/Indexing

ISI Master List

Web of Science Core Collection (Emerging Sources Citation Index) by Thomson Reuters

DOI (form Vol. 6(3) and after)

ProQuest Centeral

NLM (Pubmed)

DOAJ

COPERNICUS Master List 2017

PKP-PN, (LOCKSS & CLOCKSS)

GS

Crossref

WorldCat

Journal TOCs

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The Formation of System of Knowledge about Oncology Diseases and Their Prevention of Future Biologists

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Abstract

Background. Taking into consideration the current health condition of Ukrainian population, the topicality of oncology diseases and their prevention proficiency is the focus of this article. Oncology diseases are the most spread kind of illnesses that cause rising mortality in Ukraine and in the world. Prevention and early detection of these diseases are possible under the condition of people's awareness about the essence of illness, reasons of its onset, main risks and initial symptoms for the first place. However, it has emerged that non-medical specialty students have superficial knowledge about such kind of diseases and their causes.

The Objective of the article is to prove theoretically and examine the formation effectiveness of knowledge system of oncology diseases and their prevention proficiency of future biologists by applying oncology related course content to biological disciplines.

Methods. The questionnaire on oncology diseases and prevention awareness of students was implemented within the study, the 091 "Biology" course content was also analyzed and complemented by oncology related educational material; the pedagogical experiment was organized to check formation of oncology diseases and their prevention proficiency of students, the validity of results was verified by means of mathematical statistics methods.

I-IV year students studying at the specialty 091 "Biology" were involved in the questionnaire. In total, 161 students have been involved in the experiment. All future specialists were divided into two groups similar in number and the level of proficiency: the control group (81 students) and experimental one (80 students).

Results. During the experiment the studying process in the control group has encompassed traditional methods, whereas educational material of the experimental group has been supplemented by information related to oncology diseases and their prevention.

Students studying at specialty 091 "Biology" underwent a comparing analysis of oncology diseases proficiency level that has been performed before and after the experiment. It has been revealed that after the implementation of oncology elements into various subjects the performance results of experimental group students went up by 31,6%.

Conclusion. The application of oncology oriented material to biology courses' content has a positive effect on the formation of oncology diseases and their prevention proficiency of 091 "Biology" students, which is a predominant condition of future specialists' healthcare competence development.

Keywords: Knowledge system, oncology diseases proficiency, biology subjects, course outline, educational material

1. Introduction

Due to reformation of national education, the traditional focus shifts to competence and practice-oriented training that does not aim to give theoretical knowledge but to provide key competence skills development as well as their practical application in non-routine situations.

2. Literature Review

The healthcare skill is one of the most important competences: it conveys gaining valeological knowledge, formation of healthy lifestyle habits and organization of healthcare activity.

Oncology diseases can be distinguished as the most spread kind of illnesses that are one of the main causes of rising mortality in Ukraine and in the world. According to Ukrainian cancer-register 919100 cancer cases were registered as of January 1, 2017 [12]. Currently more than a million of patients with cancer are estimated in Ukraine and more than 130 thousands of new cancer cases are registered every year (143 thousands of cases in 2017) [7]. Thus, the cancer increasing tendency is observed in our country and in the world.

It is reasonable to accept scholars' opinion that neglecting of oncology diseases is the main problem which should be solved by timely diagnosis for successful cancer treatment [2]. Prevention and early detection of these diseases are possible under the condition of people's awareness about the essence of illness, reasons of its onset, main risks and initial symptoms for the first place.

Practical aspects of teaching oncology in Ukraine have already been covered in the works of B. Bilynskyi [1], H. Bondar, Yu. Dumanskyi, I. Siedakov, O. Popovych, A. Rusyn [2; 3], I. Bondarenko, V. Zavizion [6], A. Shevchenko [10] and others.

None of these scientific researches, however, do not deploy the problem of oncology diseases and prevention measures proficiency of nonmedical specialties students, future biologists particularly.

3. Method

3.1. Participants 3.2. Materials 3.3. Procedure

The Objective of the article is to prove theoretically and examine the formation effectiveness of knowledge system of oncology diseases and their prevention proficiency of future biologists by applying oncology related course content to biological disciplines.

Methods. The questionnaire on oncology diseases and prevention awareness of students was implemented within the study, the 091 "Biology" course content was also analyzed and complemented by oncology related educational material; the pedagogical experiment was organized to check formation of oncology diseases and their prevention proficiency of students, the validity of results was verified by means of mathematical statistics methods.

4. Results

In our society the word "cancer" terrifies people to such extent that they try to avoid oncologists as long as possible. The given situation makes early diagnosis of malignant growth impossible and decreases the chances of successful recovery. Meanwhile a large part of the population does not have enough competence for prevention treatment.

Future teachers as well as psychological and natural science faculty students (III and IV year of study) of Rivne State University of Humanities underwent the questionnaire in order to estimate oncology diseases and prevention treatment proficiency of nonmedical specialties students. The total number of 334 respondents were involved in the questionnaire. According to the results of our study, it was established that 51,5% of surveyed students have primitive concept of oncology diseases since they have read literature on the given topic or have relatives who faced this problem. Regarding the reasons of illness' onset, every third student could name plausible causes of malignant growth. Only 21,3% of students could answer the question of cancer prevention treatment. 34,4% of respondents could not explain the meaning of the word "carcinogenic", whereas 66,5% of students believed cancer to be incurable disease that leads to human death.

The questionnaire results listed above afford ground to claim that the level of students' cancer awareness is insufficient. Therefore, it defines the necessity for general reconsideration and implementation

of theoretical oncology elements into courses content, biology related ones in particular.

Considering the fact that 091 "Biology" specialty is closely related to medicine, the educational outlines of its professional disciplines were analyzed during this scientific research.

Disciplines as "Genetics", "Immunology", "Gerontology" and "Ecology" are determined to mention oncology diseases. However, this information is covered superficially: an insufficient amount of attention is pied to disclosing of this topic.

Within the following research there were developed changes aimed to form oncology diseases and prevention measures awareness, they were also introduced into studying material of biology subjects.

Pedagogical experiment has been implemented on the base of Department of Biology, Oncology, and medical Physiology of Rivne State University of Humanities over a period of four years (2014–2018). Psychological and experimental sciences faculty students studying at specialty 091 "Biology" (I-IV years of study) were involved in the questionnaire. In total, 161 students have been involved in the experiment. All future specialists were divided into two groups similar in number and the level of proficiency: the control group (81 students) and the experimental one (80 students).

During the experiment the studying process in control group has encompassed traditional methods.

Educational material of the experimental group has been supplemented by information related to oncology diseases and their prevention.

Hence, the content of the "Ecology" course discloses an environment influence on the development of oncology diseases and appearance of new scientific direction on the margin of ecology and experimental oncology – ecological oncology (ecooncology).

As for inorganic and organic chemistry, the particular attention was focused on substances that possess carcinogenic qualities; students were also informed about physical carcinogens within physics related courses.

The content of the "Human anatomy" classes was supplemented by cancer cases of different organs (osteoblastic sarcoma, lung cancer, stomach cancer, pancreatic carcinoma, colon cancer, rectal carcinoma, breast cancer, cervical cancer, ovarian carcinoma, testicular cancer, skin cancer) [8].

While covering the "Blood" topic of the "Human Physiology" courses, the focus is on blood test values that can indicate oncology disease (increase of erythrocyte sedimentation rate, decrease of hemoglobin level, low erythrocyte concentration, expansion in the number of leukocytes, white blood cell abnormality) [1; 3; 10].

The "Biochemistry" course is supplemented by information about blood chemistry value alternation in case of oncology disease. Particularly, glucose escape, increase of bilirubin, enzymes (ALT, AST, LDH), and alkaline phosphatase level, globulin concentration and downregulation of total protein as well as albumin can signify oncology diseases [1; 3; 10].

The "Radiobiology" has sufficient potential for interdisciplinary relations realization. The content of this course includes the "Human radiation carcinogenesis" that discloses the notion of malignant growth and its types, genetically determined elevation of radiation risk and carcinogenesis, radiobiological factor of radiation therapy for people suffering from cancer [5].

During the "Microbiology and virology" course students have been introduced the "Viruses as the reason of neoplastic process" topic that deploys certain cancer causing viruses. To such oncogenic viruses we can classify T-cell leukemia virus, Epstein-Barr herpesvirus (can cause Burkitt's tumor), papillomavirus (can lead to cervical cancer) and others. Students review medical books, giving their own suggestions and examples from particular scientific publications of leading oncologists [3; 10; 11].

Future biology specialists detect main reasons of oncology diseases and basics of prevention treatment on the "Age-specific physiology and healthcare science" course. Regarding the prevention measures, students are highly recommended to avoid smoking, drinking alcohol and visiting solarium, they are also urged to be physically active, watch their weight and have a healthy diet.

Immunotherapy of cancer and its perspectives are revealed to students during the "Immunology" course. The major emphasis is made on the fact that the development of cancer directly depends on the immune system condition, therefore a stimulation of organism's protective mechanisms and immune cells modification with the purpose of cancer cells combating is the objective of immunotherapy [4].

During the course of "Genetics", future biologists deal with the "Genetics of oncological condition" topic, become familiar with genetic researches in the realm of oncology, genetic abnormalities that can lead to malignant growth development. On the practical sessions future specialists discuss the role of hereditary factor in oncology diseases onset.

It has been revealed that meetings with professional mammologist and oncologist after classes effectively contribute to the formation of oncology diseases and prevention treatment proficiency. On these meetings students have broaden their knowledge about nonmalignant and malignant growths, reasons of cancer onset and prevention measures.

Covering the "Molecular basics of hereditary diseases" topic as the part of the "Human hereditary illnesses" course provides study of oncogenesis molecular mechanism and characteristic of particular genes which take part in carcinogenesis (viral oncogenes, proto-oncogenes, tumor suppressing genes, mutator genes).

Within the "Biotechnology" course, students maintain discussions about the future invention of cancer medication on the basis of "Gene therapy in oncology" topic.

Thanks to the "Gerontology" discipline future specialists pay attention to the fact that seniors suffer from oncology diseases more often. In particular, students study the scientific research about connection between aging and pathology development (notably cancer) processes, implemented by Ukrainian scholar V. Frolkis [9].

Separate knowledge on oncology were gained during other courses. Thus, the whole system of knowledge on oncology diseases was formed.

Before and after the implantation of pedagogical experiment that was based on the application of oncology oriented educational material to students studying at specialty 091 "Biology", the final assessment of control group as well as experimental one has taken place in order to determine the level of students' awareness about oncology diseases and preventive treatment. Future biology specialists responded to the group of questions related to the essence of oncology diseases, kinds and reasons of their onset, cancer symptoms and methods of its diagnosis along with the basics of preventive treatment. The results of final assessment are showed in a Table 1.

Table 1: The observed levels of oncology diseases and their prevention treatment proficiency in control and experimental group of students

Level of proficiency	Control group (n=81)				Experimental group (n=80)			
	Before the experiment		After the experiment		Before the experiment		After the experiment	
Low	29	36%	24	30%	29	36%	10	12%
Middle	31	39%	27	33%	33	42%	27	34%
Satisfactory	16	20%	23	28%	13	16%	33	42%
High	5	6%	7	9%	5	6%	10	12%

Hence, the number of students with high level of oncology diseases and prevention treatment proficiency went up by 6%, the number of students with satisfactory and low levels of knowledge went up by 26% and 24% respectively, whereas the total of students with middle level of cancer awareness went down by 8%.

The control group also reveals shifts; however, they are not that significant. The number of students with high and satisfactory levels went up by 3% and 8%, as for the middle and low levels of proficiency, both of them went down by 6%.

The average increase in knowledge about oncology and prevention treatment in experimental group is 31,6%, whereas in control group – 10,2%, which is three times less than in experimental one.

Regarding the data mentioned above, there are all evidences to claim that during the experiment not the separate elements but the whole system of knowledge about oncology diseases and measures of their

prevention has been formed.

In the given experiment we used statistic criterion χ^2 (Pearson's chi-square test) with 5 per cent significance level (a = 0,05), so the probability level is 95%. for statistics processing of results. According to the results of the experiment in the control and experimental groups, the observed value of the criterion $\chi^2_{cn} = 25{,}97$ is greater than the critical value of the criterion $\chi^2_{кр} = 7{,}82$.

The given data confirms that difference in the results of the control and experimental groups are not accidental; it is caused by the implementation of the methodology aimed to form awareness about oncology diseases and prevention treatment.

Hence, it can be concluded that in comparison with control group, the proficiency level of experimental group students has significantly increased.

The results of the study give grounds for asserting the effectiveness of the experimental methodology aimed at the formation of a knowledge system about cancer diseases and their prevention through the introduction of the relevant educational material in the 091 "Biology" disciplines content.

5. Discussion and Conclusion

Hence, the number of students with high level of oncology diseases and prevention treatment proficiency went up by 6%, the number of students with satisfactory and low levels of knowledge went up by 26% and 24% respectively, whereas the total of students with middle level of cancer awareness went down by 8%.

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Conclusion

The application of oncology oriented material to biology courses' content has a positive effect on the formation of cancer diseases and their prevention proficiency of 091 "Biology" students (the average increase in knowledge is +31,6%), which is a predominant condition of future specialists' healthcare competence development.

Oncology related educational material is also introduced to the students of natural science faculty of Poltava V. G. Korolenko National Pedagogical University and to the future specialists studying at educational and scientific Institute of Health Sciences of National University of Water and Environmental

Engineering.

We see prospects for further research in the development and implementation of educational materials for students of other specialties, in particular, specialties 014 "Secondary education (biology and healthcare)", 227 "Physical therapy, ergotherapy".

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and material

Not applicable

Competing interests

Not applicable

Funding

Not applicable

Authors' contributions

Not applicable

Acknowledgements

Not applicable

Authors' information (optional)

Not applicable

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Adaptation Mechanisms of First-Year Pupils to Learning Environment of a Polyethnic School

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Abstract

Actuality of the analized problem of socialization and social adaptation of first-year pupils to learning environment of a multinational school can be proved by the fact that during recent 30 years migration processes have intensified to the point that the number of monoethnic schools in Europe for this period has become 2,5 times less. Therefore, adaptation of first-year pupils to a multinational class is becoming the foundation for their successful life in future in a multinational society under conditions of globalization and it is necessary to search for new technologies in order to carry out this practice.

The purpose of the paper is to define and describe the stages and mechanisms of integration junior pupils into the learning community and activities, as well as socializiation mechanisms according to those stages.

The main research method together with comparative analysis of literature were the following: pedagogical modelling study, pedagogical experiment and informational and communicational technologies applied for development and implementation the interactive electronic study guide for parents "Meet your child!"into the educational process. The main approach of the reasearch was approach of personal activities as the foundation for developing learning.

As a result of the research the barriers of pupils' socializing in a multinational first-year class have been defined; stages of integration junior pupils into learning community and activities, as well as corresponding socialization mechanisms have been defined and proved by the experiment; peculiarities of realization of socialization mechanisms for junior pupils at physical training lessons have been identified and presented. Based on the given results the paper offers developed principles of activity organization with junior pupils and with the representatives of their families in order to form physical culture of a person using the interactive study guide. The paper contains recommendations on use of the interactive electronic study guide for parents developed by the authors of the research.

The materials of the article may be useful for elementary school teachers, for parents of junior pupils and also for specialists of system of supplementary education in their work with polyethnic children groups, as well as for social care teachers working with migrant families for creation of non-conflict educational environmen.

Keywords: Social adaptation of first year pupils, Socialization mechanisms, Barriers in socialization, Stages of social adaptation of junior pupils, Physical culture of a person, Interactive guide.

Introduction

Actuality of the research is the fact that it is common practice in modern society to include junior pupils in meaningful social activities. When they represent fully functioning members of social processes it means, in other words, they reveal their personal position [1]. Though it was stated by psychologists that we can speak about a fully functioning personality not earlier than teenage years [2, 3, 4]. There is a contradiction between the need of junior pupils to demonstrate stable personal qualities in an activity – on the one hand, and not complete maturity of the mind – on the other hand. Little attention paid to slow social adaptation of first year pupils in educational organizations brought the necessity to search new socializing mechanisms and making a copmlete program on first year pupils' adaptation to meaningful social activity. The explained contradiction can be felt even more sharply in the environment of a polyethnic educational organization with representatives of different national cultures being present among the students. Thus, the

purpose of the research of the authors was to define ways and means of social adaptation of first year pupils by means of school, family and national cultural education by the example of attracting junior pupils to the consciously healthy lifestyle.

The indicator of successful and timely socialization of junior pupils is the appearance of such new forms that represent the basis of personal development. Among them psychologists name formation of an adequate evaluation and evaluative activity [5,6]; personal reflection of cognitive activity, communication, social interaction and creativity [7,8]; making motivation for achieving success and due to this - fall in anxiety and aggressiveness and providing conditions for optimization of the aspiration level [3,9].

Materials and methods of the research

Socialization stages are usually subdivided according to the change of the leading activity [2], however for junior pupils learning activity is the leading one during the whole period of study at an elementary school, nevertheless socialization mechanisms being realized are different, and for first year pupils it is social adaptation, mainly at school. Individualization processes and and finding own image as a member of learning process and creative activity develop later. Only by the end of elementary school study practical implementation of integration mechanism into the socially approved types of activities can be possible. That is why our research considers social adaptation mechanism of first year pupils. To assess the success of this process from the above-mentioned resluts the following new formations were selected that may chang significantly during one school year, such as:

1. Adequate self-esteem that allows junior pupils to set and achieve possible but difficult goals according to the principle of developing education by L.V. Zankov - "reasonable difficulty" [9]. Nowadays such result of social and educational adaptation is formed with troubles and many children have misplaced high self-esteem ("princess syndrome") [10], which is revealed in incorrect apprehension of the society and own future. Fall in desire for hard working and revelation of late infantilism, petulance and aggressiveness in the desire to manipulate people in own interests may be also seen. At the same time the level and the volume of study load is increasing according to Federal educational Standard for compulsory education result in lower motivation for study and development of motivation for avoidance of failures instead of development of motivation for achieving success.

2. Personal reflection as projection of primary evaluation activity of processes and phenomena of subjects and intersubjective cooperation. First year pupils demonstrate it in the ability to realize their knowledge and lack of knowledge, find reasons for mistakes, compare results of their activity and other people's activity, thus development of attitudes to the environment and social life. Formation of this result may be hindered by excessive interest of teachers in innovative activity, which results assessment criteria are connected with development of psychic functions, understanding abstract notions and complex connections and principles that are too difficult for children. Research method in education, inventions and problem learning do not mean active use of game during the learning process and other methods to form the images of the world. However the imagery thinking is connected with curiosity, imagination and finally the emotional side of learning to the biggest extent [11].

3. Involvement of a pupil in socially approved forms of communicaiton and interaction can be at the same time the means , the result and the indicator how successfully a pupil is adapted socially: to the learning group, to the conditions and contents of studies, to his new social status of pupil, to society requirements, to his rights and duties. Besides, it is the interaction and communication particularly that reveal inclinations, interests, attitudes and express culture and value orientation of a child. Earlier involvement of children in virtual communication environment may be the barrier for formation of the positive result, so much that teachers have to correct their communication structure, speech and sphere of interests in first class. The matter is that network communication is activity-free, however the most socially productive communication is based on common goals of activities done together. It can't be possible in a society to communicate carelessly, the way the communication is carried out in gadgets, hoping that one's mistakes will be corrected automatically. A computer game allows to perform any action with no damage but with no real result as well, it can be repeated many times, but the skills acquired are not useful in social life. Overcoming all mentioned barriers, as noted by some authors, is possible with involvement of children

in personally important types of social activities [12, 13]. Physical culture and engaging children in healthy lifestyle fully belong to them.

The presented mechanisms are realized in both monoethnic and polyethnic educational organizations. It is interesting to note that in modern Russia more and more schools are becoming multinational. As follows there is a classification of polyethnic organizations based on the dychotomy by T.Y. Usha, according to the characteristics we may distinguish 4 types of polycultural schools in Russian-speaking regions [14]:

1. Schools where the number of non-native nationalities of European part of Russia does not exceed 15 %. As the authors' aknowledgementconfirmative research carried out in eight Russian regions (Nizhny Novgorod region, Tula region, Novgorod region, Vladimir region, Samara and Saratov regions, Chuvash republic and Mari El) has shown, the above-mentioned type usually include lyceums and gymnasioums where children are selected basing on their talent. In such schools working on development of a child's ability is performed mostly on the basis of individual approach and does not mean many group activities, which does not support socialization of gifted children regardless of their ethnicity.

2. Schools where non-native nationalities represent from 15 to 25% of the pupils. In such institutions learning demands are developed with consideration of specific international dialogue and interpersonal relations between representatives of different cultures. However this demand is revealed only in some types of learning and educational activities but the purposes and basic contents of education are invariable.

3. Educational organizations with equal proportions of non-native and native representatives (30-60%). For such schools classes of inclusive education are provided, where variable courses with invariable and specific modules are offered.

4. Schools with manily non-Russian representatives. Such schools were not found in regions under consideration, but schools of the first and the second types prevail significantly with correlation of 78% and 22% correspondingly.

Results of the research

As the research has demonstrated the most difficult situations regarding socialization and social adaptation of junior pupils may be seen at schools of the second type, because little time and attention there is devoted to cross-cultural interpersonal relations due to small percentage of representatives of non-native nationalities. This elevates the barriers and creates new problems. Among the problems found in learning and extended activities the following are considered the most important [15, 16]:

1. Fall in the level of motivation for sport and physical activity among representatives of all ethnicities, for group physical activity in particular;

2. Lack of experience in interlingual adaptaion leads to localization of ethnic groups in class and difficulties in organizing sport and active team events;

3. Difficulties in organization of competitive activity is connected with the fact that evaluation of competition results is transferred not only to a person but also to a nationality.

Very often language barrier associates with the stated problems which in general creates a barrier not only in involvement of junior pupils into learning activitiy in physical culture, engaging them in healthy lifestyle, sport selection, and also makes it difficult to socialize them in a polycultural society in modern Russia.

In order to improve the effectiveness of social adaptation of pupils to studying at polyethnical schools of the second type the following principles of activity organization for personal physical culture development were determined. Part of the principles was described in a range of researches made by scientists from different countries.

1. Differentiation of activity based on beyond-the-ethnicity principle [17] – division of children into target and project groups [18], as well as sport teams necessarily including there representatives of all ethnicities;

2. Axiologiness of educational activity [19] where for the purposes of study and upbringing the unity of humane values of health, healthy lifestyle, cognition, personality, kindness, friendship, family and others [20] are underlined in cultures of all peoples and confessional principles of different religions;

3. Many aspects of educational influence of teahers [21], when any task is full of mediative educational contents and socially significant purpose [22];

4. Standard-oriented activity [23, 24], including sport, encourages first year pupils to fulfill necessarily norms and requirements of school charters, principles of Olympism, laws of the Russian Federation;

5. Partnership and cooperation [25] mean organizing special activities in mutual support, help and common work of first year pupils at physical culture lessons in order to unite them in a situation of shared success;

6. Combinability of educational and upbringing influence of teachers and parents of first year pupils can be achieved by creation a target system of pedagogical consultations both online and offline, separately for parents anf for the whole family;

7. Inceptiveness — teacher's support of children's initiatives [26], including his development of all initiated activities and work methods to promote creativity in children and creatice cooperation where difference in cultures enriches communication and interaction of first year pupils.

The mentioned principles became the basis for making an interactive guide on adaptation of first year pupils to school learning conditions. The information provided in the guide "Meet your child!" was explained understandably even for parents whose native language is not Russian. The guide contains planned results of education, upbringing, health improvement, creative activities of first year pupils for the whole academic year and also for quarters. It describes school and other types of socially and personally significant activities in which a child should be involved at home and also in forms of family and friendly leasure time. All sections are not more than one and a half monitor screen in size, are illustrated and provided with tasks that are different from school home tasks that can be done by all family members together with children under parents' supervision or by parents under the supervision of children.

For example, in the first quarter when children have to study a lot of rules of conduct at school, the guide contains the rules presented as short illustrated poems with tasks: «Having learned these simple rules, together with your child you may write your short poems for other cases of school and home life. It can be a good family practice, it will help to improve your relations with the child and encourage his creativity".

Mechanisms of social adaptation are not represented as universal for the whole study period but are divided in quarters and provided with a system of specific criteria. Thus in the first quarter first year pupils have to undetstand the social status of a school pupil and at the same time a code is being formed similar to codes of youth subcultures but with social and political meaning. The adaptation mechanism here is «playing school». The mechanism enables to realize both two leading types of activity for a child in a crisis of 6-7 years - game and study.

In the second quarter after vacation the secondary adaptation to school life takes place, and it is hindered by more complex study material and higher requirements for its apprehension. The situation may become a reason for anxiety if a child does not adequately evaluate the complexity of the task, time necessary for its fulfillment, his own resource of time and working ability, speed and rhythm of his performance etc. To avoid it it is necessary to develop the basics of evaluative activity in second quarter. Social adaptation mechanism here is "the reflexive mirror" when a child starts to think how he is evaluated by others for the activity carried out in a certain way; and he chooses the one that guarantees him maximum approval for his future not yet performed activity when it is realised. The guide recommends parents to explain what was good and bad in actions of a child when they discuss them and to speak about what encouraged a certain attitude.

In the third quarter when the time of quick victories has passed and it is necessary to put more and more efforts to fulfill the tasks not all of which are interesting for a pupil, motivation for studies falls, especially in reproductive activity. It means that time has come to apply "talent finding" mechanism, that is to find special talents of a child, carry out selection and improve motivation for being at school through the desire to develop a child's abilities in extracurricular activities that make classroom activities more attractive. For this purpose parents are given some criteria to define real and not imagined due to parents' unfulfilled dreams abilities of first year pupils and it enables more accurate selective work of teachers and direct involvement of children in creative activities.

During the fourth quarter when interpersonal likes and interaction patterns are clear in the group, the teacher should create an eventful environment for children to carry out development and successful realization of common projects in small groups, basing on principles of differentiation, axeologiness, partnership. This mechanism is called "cross-cultural cooperation".

In the research 2 groups of subjects of educational activity took part: first year pupils and their parents. All children, total number of 2284, study at polyethical schools of the second type in above-mentioned subjects of the Russian federation. 1556 of them are members of the target group, 728 — of the control group. Target groups of parents of first year pupils who were participants of the experiment took part in the research as well. The experimental target group consisted of 358 people, control target group – of 287. The experiment was carried out in two stages , at the first stage level characteristics of the results of social adaptation before school entrance were revealed: self-esteem; aspiration level as an indicator of personal reflection of a future pupil, and also the level of situational anxiety as the basis of inclusion in different types of activities at school.

Discussion of the results

As the research has shown, these indicators belong ing to the members of experimental and control groups and also to representatives of different nationalities demonstrated the following: self-esteem is a little higher (14,3 points with the norm of 10-12), aspiration level is quite high as well (23,1 points with the norm of 20-22), situational anxiety is also set high but not significantly (33,2 with the norm of 30).

Examination of parents showed the following criteria of their involvement into the learning process of their children:

- knowledge indicator, shows how much parents are informed about the child's characteristics as a pupil, personality, about his interests and likes, abilities and his participation in the learning process. By the beginning of the formative experiment the indicator for both target groups was 30,75% in average;

• motivational indicator that is revealed in parents' aim at informational, emotional and active integration with school in education and upbringing of their child. This indicator in average was 38,4 % (the indicators were revealed with the help of the authors' questionnary);

• practical indicator demonstrates the degree of parents' participation in project activity with their children, building eventful environment for children, preparation and realization of school fests (without considering financial aids), in average the indicator in two groups was 26,9%.

On the second stage in the experimental group were implemented mechanisms if social adaptation of first year pupils by quarters with the use of the authors' interactive guide. The results are demonstrated in chart 1.

On the second , formative stage mechanisms of social adaptation of first year pupils designed by quarters with application of the authors' interactive guide were implemented in the experimental group. By the end of every academic quarter and also in the end of the school year the children's indicators were measured. The results are demonstrated in chart 1.

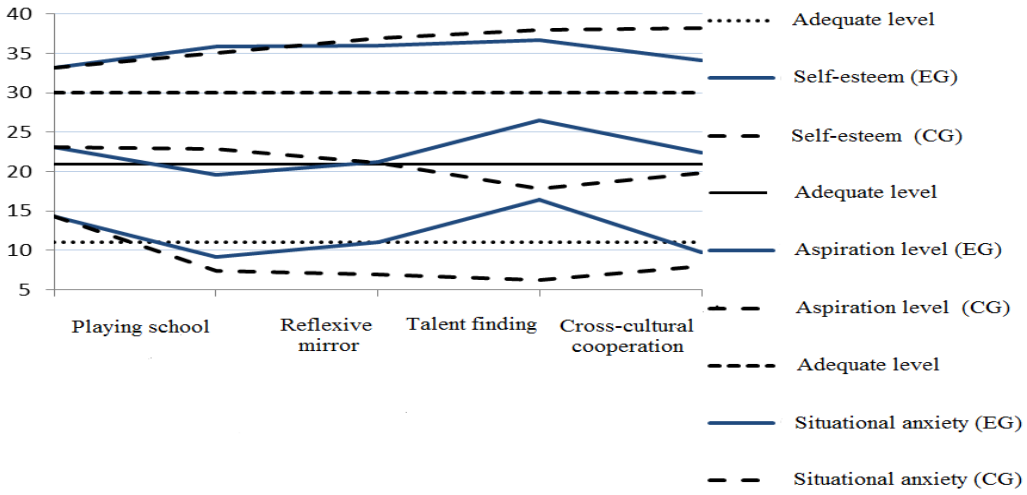

Chart 1. Dynamics of social adaptation of first year pupils in a polyethnical school

As can be seen from the chart the mechanism "playing school" has a positive effect decreasing the aspiration level that is set too high and high self-esteem, it makes the mentioned indicators more adequate but does not change much the situational anxiety, because involvement into activities in the period of understanding of the school rules is quite difficult. The mechanism of "reflexive mirror" stabilizes the children's anxiety in the area of indicators that are too high, however it enhances personal reflection through which self-esteem and aspiration level become even more adequate. The mechanism of "talent finding" is effective for increase of the aspiration level and elevation of the complexity of tasks that a child sets and does effectively and also makes the self-steem a little higher due to actualization of their creative capabilities. The mechanism of "cross-cultural cooperation" is the most important in fall of the situational anxiety because common activity means getting support from other members and supporting them too. Meanwhile self-esteem and aspiration level come back to the area of adequate meanings, which proves the necessity and applicability of independent mechanisms of social adaptation of first year pupils with division by academic quarters.

Parents that were members of the target group were examined in the end of the realization period of the formative stage. Results of primary and final examinations of the considered indicators are reflected in table 1.

Table 1. Involvement of parents of first year pupils into the educational process in conditions of a polyethnical school of the second type

Parents	Knowledge component		Motivational component		Practical indicator	
	before	after	before	after	before	after
EG	30%	64%	39%	58%	25%	31%
CG	31%	36%	37%	19%	28%	22%

As table 1 demonstrates, we may conclude that awareness of parents from the experimental group grew more than twice due to the use of interactive guide "Meet your child!", which cannot be said about the representatives of the control target group. Motivation for conscious integration of educational and bringing-up efforts of school and family rose significantly in the experimental group among representatives of all ethnic communities in addition to the common fall of this indicator in the control group. Regarding the third indicator - a rise in the experimental group is not so great as for previous indicators because the direct

participation of parents in school life is objectively difficult. However there was a fall in this indicator in the control group, the provided data prove the necessity of formation a consultation base for first year pupils on questions of upbringing and education and also on the effectiveness of the interactive guide as the instrument for this activity.

Conclusion

According to the results of the research the following conclusions can be made:

1. There are several types of schools in modern Russia according to the ethnic composition, most of them belong to polyethnic schools of the second type where the number of non-native ethnicity representatives is 15-25%.

2. Stages of inclusion of junior pupils into the learning community are the following: adaptation; individualization; integration.

3. Barriers in socialization and social adaptation of first year pupils are: fall in the level of motivation for studies, lack of experience of interlingual adaptation, difficulties in organization of competitive activities and also language barrier.

4. Social adaptation of first year pupils results in formation of an adequate self-esteem and aspiration level basing on personal reflection as well as involvement into the activity granting the situational anxiety overcome.

5. Mechanisms enabling the formation of the stated results are: in the first quarter – ″playing school″, in the second quarter - ″reflexive mirror″, int the third - ″talent finding″, in the fourth - ″cross-culturalcooperation″. All mentioned mechanisms are successfully realized with employment of the interactive guide ″Meet your child!″ and it is proved by the resluts of the authors' research.

Recommendations

The article materials may be useful for teachers of junior school, for parents of junior pupils and also for specialists of supplementary education system in work with polyethnic children groups, social teachers in their work with migrant families for creation of non-conflict educational environment.

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Role of Organic Carbon and Nitrogen of Mineral Waters in Their Neuro-Endocrine Effects at Female Rats

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Abstract

Background. Drinking mineral water, along with fresh water, is one of the environmental factors that affect the condition of the human body. Organic substances, despite their presence in all drinking mineral waters, are still considered to be active only in the water of Naftussya type (which, due to mineralization less than 1 g/L, are not formally mineral), whereas the physiological activity of true mineral waters (which mineralization is greater than 1-2 g/L) are associated with electrolytes and trace elements. The purpose of this study was to clarify the role of organic carbon and nitrogen of mineral waters in their effects on certain neuro-endocrine parameters. Material and Methods. Experiment was performed on 48 healthy female Wistar rats 240-290 g divided into 5 groups. Animals of the first group for 6 days administered a single tap water through the probe at a dose of 1,5 mL/100 g of body mass. In the second group we administered the water Naftussya from the Truskavets' layer, in the third group the water Sophiya of the Truskavets' field. The rats of the fourth group received the native water from the Gertsa (Bucovyna) field, and the last group its artificial salt analogue. The day after the completion of the drinking course in all rats HRV and endocrine parameters were registered. Results. On the basis of the correlation analysis with step-by-step exclusion, four endocrine parameters are included in the regressive model for organic nitrogen (R=0,543; R2=0,295; Adjusted R2=0,229; F(4,4)=4,5; p=0,004) and three parameters for organic carbon (R=0,407; R2=0,165; Adjusted R2=0,109; F(3,4)=2,9; p=0,045). Together, the organic components of the chemical composition of loading fluids determine their effect on the endocrine parameters by 39%. Conclusion. Organic substances of mineral waters play an essential role in their effects on the endocrine parameters of female rats.

Keywords: Mineral waters, organic carbon and nitrogen, female rats, HRV, endocrine parameters.

1. Introduction

Drinking mineral water, along with fresh water, is one of the environmental factors that affect the condition of the human body. Back in 1975, with the chemical analysis of over 300 mineral waters of the then USSR, organic matter was discovered in all of them without exception. It is shown that for water of one type, the presence of bitumen, naphthenic acids and phenols is typical, while for other types of humic, carboxylic acids and again phenols are characteristic [12]. Despite this, it is still assumed that the physiological activity of drinking mineral waters is due to their electrolytes, the concentration of which is from 2 to 30 g/L, as well as the trace elements, while the role of organic substances is ignored, apparently because of their relatively insignificant concentration (5-40 mg/L). And only for Naftussya and Berezovs'ka waters, which are not formally mineral, because they contain less than 1 g/L of electrolytes, organic substances are considered as active principles [1,7,9,10,13,14].

We adduce data by OR Dats'ko et al [2] about organic compounds (in mg/L) water Naftussya obtained by Solid Phase Extraction method and mass-spectroscopy by using as Sorbents Tenacle GC 60/80 and Polysorb-2. Paraffins 4,10 and 4,20; monoolefins 1,67 and 1,75; dienes and monocycloolefins 0,84 and 0,85; alkylbenzene 1,55 and 1,54; alkenylbenzene 0,47 and 0,46; esters of aromatic acids 1,32 and 1,33; alkyl phenols 1,14 and 1,14; polyaromatic hydrocarbons 0,077 and 0,059; oxygene-containing connections (acids) 1,12 and 1,14; sulfur-containing connections 0,30 and 0,31; alkylnaphthalenes 0,53 and 0,53; unidentified polyaromatic hydrocarbons 0,19 and 0,19; connections required subsquent identification 0,48 and 0,50 respectively. Early have been shown that detected in Naftussya phenols (0,5-4,1 μg/L) [8].

As such a complete analysis is extremely labor intensive and expensive, the organic component of water is usually judged by the gross organic carbon and nitrogen content.

Previously, we have shown that drinking water with different contents of electrolytes, trace elements and organic substances has both general [16,17] and different effects on the parameters of metabolism [5,15] and the neuroendocrine-immune complex [6] in female rats, which they have been drinking for 6 days.

In the next study, we identified the role of organic carbon and nitrogen of mineral waters in their effects on certain parameters of metabolism. On the basis of the correlation analysis with step-by-step exclusion, four metabolites of blood as well as five metabolites of urine are included in the regressive model for organic carbon ($R=0,697$; $R^2=0,486$; Adjusted $R^2=0,347$; $F_{(10,4)}=3,5$; $p=0,0025$). Organic nitrogen of mineral waters affects five metabolic parameters of urine only, but with approximately the same force ($R=0,621$; $R^2=0,385$; Adjusted $R^2=0,312$; $F_{(5,4)}=5,3$; $p=0,0008$) [11,18].

The purpose of this study was to clarify the role of organic carbon and nitrogen of mineral waters in their effects on certain neuro-endocrine parameters.

2. Method

2.1. Participants 2.2. Materials 2.3. Procedure

Experiment was performed on 48 healthy female Wistar rats 240-290 g divided into 5 groups. Rats of the first (control) group for 6 days administered a single tap water through the probe at a dose of 1,5 mL/100 g of body mass. In the second group (reference for the organic component) was given daily drinking of animals with water Naftussya from the Truskavets' layer, in the third group (reference to the salt component) the rats were louded with the water Sophiya of the Truskavets' field. The rats of the fourth group received the native water from the Gertsa field, and the second control group its artificial salt analogue. The chemical composition of the applied waters (according to Truskavetsian Hydrogeological Regime-Operational Station data) is given in Table 1.

Table 1. The chemical composition of the applied mineral waters

	Daily Water	Sofiya	Gertsa	Salt analogue	Naftussya
Electrolytes, mM/L					
Na^+	0,5	156	196,7	196,7	0,6
Cl^-	3,4	142	205	205	1,0
HCO_3^-	2,9	7,5	5,6	5,6	8,2
Ca^{2+}	3,4	5,3	3,40	3,40	2,9
Mg^{2+}	0,5	4,3	3,44	3,44	2,3
K^+	0,4	0,3	0,4	0,4	0,3
SO_4^{2-}	1,2	13,1	0,1	0,1	1,0
Trace elementes, mg/L					
H_2SiO_3	5	4,43	9,88	0	9,5
H_3BO_3	0,25	8,39	42,76	0	0,200
Br	8,3	6,7	21,17	0	0,034
J	0,025	1,29	6,62	0	0,004
F	0,95	0,52	0,57	0	0,160

Organic substances, mg/L					
C org	5,0	5,5	34	0	12,8
N org	0,02	0,8	0,14	0	0,33

The day after the completion of the drinking course in all rats we assessed the state of autonomous regulation. For this purpose, under an easy ether anesthesia, for 15-20 sec ECG was recorded in the lead II, inserting needle electrodes under the skin of the legs, followed by the calculation of the parameters of the HRV: moda (Mo), amplitude of the moda (AMo) and variational swing (MxDMn) as markers of the humoral channel of regulation, sympathetic and vagal tones respectively.

Animals were then placed in individual chambers with perforated bottom for collecting daily urine.

The experiment was completed by decapitation of rats in order to collect as much blood as possible. Adrenal glands were removed and weighed, than the thickness of glomerular, fascicular and reticular zones was measured under a microscope [1].

The plasma levels of the hormones of adaptation were determined: corticosterone, triiodothyronine and testosterone (by the ELISA); as well as plasma and urine levels of electrolytes: calcium (by reaction with arsenase III), phosphates (phosphate-molybdate method), sodium and potassium (flamming photometry) [3].

According to the parameters of electrolyte exchange, hormonal activity was evaluated: parathyrin by coefficients $(Cap/Pp)^{0,5}$ and $(Cap•Pu/Pp•Cau)^{0,25}$, calcitonin by coefficients $(1/Cap•Pp)^{0,5}$ and $(Cau•Pu/Cap•Pp)^{0,25}$ as well as mineralocorticoid by coefficients $(Nap/Kp)^{0,5}$ and $(Nap•Ku/Kp•Nau)^{0,25}$, based on their classical effects and recommendations by IL Popovych [6,16].

The analyzes were carried out according to the instructions described in the manual [5]. The analyzers "Tecan" (Oesterreich), "Pointe-180" ("Scientific", USA) and "Reflotron" (Boehringer Mannheim, BRD) were used with appropriate sets and the spectrophotometer "СФ-47".

Digital material is statistically processed on a computer using the software package "Statistica 5.5".

4. Results

The calculations by the formula:

$|r| \geq \{exp[2t/(n-1,5)^{0,5}] - 1\}/\{exp[2t/(n-1,5)^{0,5}] + 1\}$,

showed that for a sample of 48 animals, the critical value of the modulus of the correlation coefficient |r| for p<0,05 (t>2,0) is **0,28**, for p<0,01 (t>2,7) is **0,38**, for p<0,001 (t>3,5) is **0,48**.

First of all it was found that there is no correlation between the content in liquids of organic carbon and nitrogen (r=-0,12). Therefore, they represent different groups of organic substances.

It was found (Table 2) that the content of organic nitrogen in fluids is significantly positively correlated with plasma level of Triiodothyronine and the thickness of Fascicular Zone of Adrenal Cortex while negatively with $(Pp•Cap)^{-0,5}$ ratio as Calcitonin Activity. Instead, the content in fluids of organic carbon correlates with plasma level of Triiodothyronin negatively as well as positively with the Adrenals Mass Index. Of the HRV parameters, only AMo is insignificantly correlated with organic carbon.

Table 2. Matrix of correlations between the content of organic carbon and nitrogen in liquids and HRV and endocrine parameters of daily urine after weekly water-salt loads

Neuroendocrine Variables	Norg	Corg
Triiodothyronine, nM/L	**,45**	**-,33**
Fascicular Zone of Adrenal Cortex, μM	**,36**	*-,14*
$(Pp•Cap)^{-0,5}$ as Calcitonin Activity	**-,34**	*,13*
Adrenals Mass Index, %	*,07*	**,34**
$(Nap/Kp)^{0,5}$ as Mineralocorticoid Activity	,27	*-,04*
$(Cau•Pu/Pp•Cap)^{0,25}$ as Calcitonin Activity	-,25	*,06*
Glomerular Zone of Adrenal Cortex, μM	-,22	,19
$(Cap/Pp)^{0,5}$ as Parathyrin Activity	-,21	*-,12*

(Cap•Pu/Pp•Cau)^{0,25} as Parathyrin Activity	-,20	-,24
Corticosterone, nM/L	,02	,27
AMo HRV as Sympathetic Tone, %	,01	,25
(Nap•Ku/Kp•Nau)$^{-0,25}$ as Mineralocorticoid Activity	,06	,19
Testosterone, nM/L	,08	-,25
Variative Swing HRV as Vagal Tone, msec	,00	-,20
Moda HRV, msec	,08	-,15
Reticular Zone of Adrenal Cortex, µM	-,03	-,01

Despite such a structure of the correlation matrix, based on the result of regressive analysis with step-by-step exclusion, some endocrine parameters were included in the model with very small modules of their correlation coefficients with the content of organic nitrogen (Table 3) and carbon (Table 4). Instead, the Adrenals Mass Index and the thickness of Fascicular Zone of Adrenal Cortex were out of models.

Table 3. Summary of regression analysis with stepwise exclusion of metabolic parameters regarding the content of organic nitrogen in liquids

Nitrogen Organic (mg/L) as Inependent Variable		Beta	St. Err. of Beta	B	St. Err. of B	$t_{(43)}$	p-level
Dependent Variables	r		Intercpt	-,921	,480	-1,92	,062
Triiodothyronine, nM/L	**,45**	,487	,142	,411	,119	3,44	,001
(Nap/Kp)^{0,5} as Mineralocorticoid Activity	,27	,239	,137	,104	,060	1,75	,088
(Cap/Pp)^{0,5} as Parathyrin Activity	-,21	,445	,310	,223	,156	1,44	,158
(Cap•Pu/Pp•Cau)^{0,25} as Parathyrin Activity	-,20	-,522	,293	-,259	,145	-1,78	,082
	R=0,543; R^2=0,295; Adjusted R^2=0,229; $F_{(4,4)}$=4,5; p=0,004						

Table 4. Summary of regression analysis with stepwise exclusion of metabolic parameters regarding the content of organic carbon in liquids

Carbon Organic (mg/L) as Inependent Variable		Beta	St. Err. of Beta	B	St. Err. of B	$t_{(44)}$	p-level
Dependent Variables	r		Intercpt	30,92	14,96	2,07	,045
Triiodothyronine, nM/L	**-,33**	-,291	,141	-10,25	4,96	-2,07	,045
Testosterone, nM/L	-,25	-,167	,142	-,964	,820	-1,18	,246
Glomerular Zone of Adrenal Cortex, µM	,19	,150	,139	,052	,048	1,08	,287
	R=0,407; R^2=0,165; Adjusted R^2=0,109; $F_{(3,4)}$=2,9; p=0,045						

At the final stage, the canonical correlation between the content of organic nitrogen and carbon in liquids taken as a factor (argument), and the endocrine parameters of rats, taken as a productive feature (function) is analyzed.

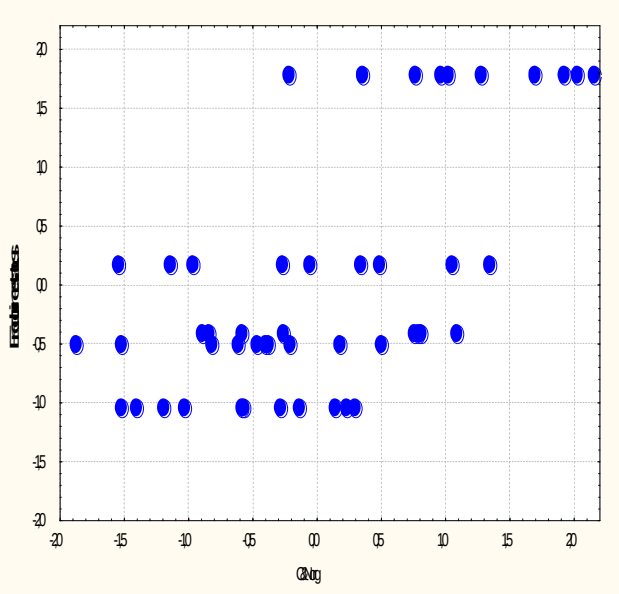
The causal canonical root, judging by the factor load, represents mainly organic nitrogen, while the factor load on it from the organic carbon is much weaker and with the opposite sign (Table 6).

Endocrine canonical root receives positive factor loadings from plasma levels of triiodothyronine and testosterone and Nap/Kp ratio as a marker of situational (morning at the time of blood collection) Mineralocorticoid Activity, instead of negative loads from basal Mineralocorticoid Activity (estimated by the thickness of the glomerular zone of the adrenal cortex) as well as from morning and mid-day parathyroid activity.

Table 6. The factor structure of the canonical correlation between the roots that represent the content of organic carbon and nitrogen in liquids and the endocrine parameters

Right set	Root
Nitrogen Organic, mg/L	**,926**
Carbon Organic, mg/L	**-,490**
Left set	Root
Triiodothyronine, nM/L	**,834**
$(Nap/Kp)^{0,5}$ as Mineralocorticoid Activity	**,335**
Testosterone, nM/L	**,213**
Glomerular Zone of Adrenal Cortex, μM	**-,389**
$(Cap/Pp)^{0,5}$ as Parathyrin Activity	**-,351**
$(Cap•Pu/Pp•Cau)^{0,25}$ as Parathyrin Activity	**-,307**

Judging by the coefficients of the multiple correlation, both organic nitrogen (aromatic acids, polyaromatic hydrocarbons, alkyl phenols and alkylnaphthalenes) and carbon (paraffins, monoolefins, dienes, monocycloolefins, alkylbenzene and alkenylbenzene) in the composition of liquids have moderately but significant effects on the endocrine status of animals loaded by them. Together, the organic components of the chemical composition of loading fluids determine their effect on the endocrine status by 39% (Fig. 1).



R=0,626; R^2=0,391; $\chi^2_{(12)}$=26; p=0,011; Λ Prime=0,544

Fig. 1. Scatterplot of canonical correlation between the roots representing the content of organic carbon and nitrogen in fluids (X axis) and endocrine parameters of rats (Y axis)

5. Discussion and Conclusion

Discussion. A search of the PubMed and PMC resources for the effect of the listed organic substances on the endocrine system found no source. Therefore, to find out the possible mechanisms of endocrine effects of organic substances, we have to refer to the preliminary results of the Truskavets Laboratory of Experimental Balneology.

Both Naftussya water and its isolated hydrophobic but not hydrophilic organic substances are known to shorten the duration of nembutal sleep [7,10], indicating the activation of nembutal hydroxylation in microsomes, mainly by hepatocytes. Shortening of nembutal sleep is accompanied by an increase in K/Na

ratio of urine, but a decrease in urinary excretion of 17-ketosteroids, that is, an increase in mineralocorticoid and decreased androgenic activity of the adrenal cortex. It was found that the negative natural logarithm of the duration of nembutal sleep as a marker of hydroxylation activity correlates positively with Ku/Nau (r=0,71) but negatively with the excretion of 17-KS (r=-0.48). The correlation between the two endocrine parameters is inverse (r=-0.49) [10]. It is known that androgens, mineralocorticoids and glucocorticoids are synthesized in adrenocorticocytes from a common precursor of pregnenolone by its hydroxylation.

This implies that organic matter activates 21-hydroxylase of adrenocorticocyte microsomes, with the shifting direction of using of pregnenolone towards the synthesis of mineralocorticoids and glucocorticoids. Accepting this hypothesis, we can explain the stimulating effect of organic substances on mineralocorticoid activity, the thickness of the fascicular area of the adrenal cortex and the level in the plasma of corticosterone combined with a decrease in the level of testosterone, the main source of which in females is the reticular area of the adrenal cortex.

Given the facts that alternative sources of ACTH are G-cells of gut mucosa and leukocytes, on the one hand, and Naftussya water as well as its organic matter increase the level of gastrin in the blood [7,13], apparently due to activation of G-cells, as well as activating the proliferation and activity of leukocyte populations [1,10], on the other hand, is also entitled to the hypothesis that ACTH is involved in the mechanism of endocrine effects of organic substances.

Increasing sympathetic tone and reciprocal reduction of vagus tone is realized, apparently, due to the irritation of the chemoreceptors of gut mucosa.

Instead, the mechanism of the action of organic substances on parathyroid and calcitonin activity as well as level in plasma triiodothyronine remain unknown.

Conclusion

The results of this and previous [11] studies, taken together, showed that organic substances of mineral waters play an essential role in their effects on the endocrine and metabolic parameters of female rats. It is obvious that the mediators of the metabolic effects are nervous and endocrine systems, which are activated by chemoreceptors of gut mucosa. In its turn, metabolic changes become the cause of other neuroendocrine reactions, that is, the results obtained fit into AI Gozhenko's concept of functional-metabolic continuum [4].

Declarations

Ethics approval and consent to participate

Experiments on animals have been carried out in accordance with the provisions of the Helsinki Declaration of 1975, revised and supplemented in 2002 by the Directives of the National Committees for Ethics in Scientific Research.

The carrying out of experiments was approved by the Ethics Committee of the Horbachevskyi Ternopil' State Medical University. The modern rules for the maintenance and use of laboratory animals complying with the principles of the European Convention for the Protection of Vertebrate Animals used for scientific experiments and needs are observed (Strasbourg, 1985).

Consent for publication

Not applicable

Availability of data and material

Not applicable

Competing interests

Not applicable

Funding

Not applicable

Authors' contributions

Not applicable

Acknowledgements

Not applicable

Authors' information (optional)

Not applicable

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Formation of Professional Speaking for Future Doctors through the Prism of Medical Terminology Study

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Abstract

The objective of the article is to test the effectiveness of the formation of professional speaking readiness of future doctors through the prism of studying medical terminology based on mastering Latin. A number of features for professional training of future physicians to use medical terminology are distinguished. The experiment engaged 386 students of medical higher schools. Control and experimental groups were separated. The number of students in control groups was 192, the experimental one consisted of 194 students. Distinguishing of the formation levels of professional-speech readiness of future doctors to use medical terminology was based on four components (motivational value, cognitive orientation, functional activity, personality development).

The motivational value component is characterized by an incentive and display of professional interest of students to study and use Latin medical terms in the future medical professional activity and influences the formation of other components (cognitive orientation, functional activity, personality-development). The formation of a motivational value component determines and mobilizes the activity of future physicians in training and influences the quality of mastering professional knowledge and skills. The cognitive orientation component involves the formation of knowledge of theoretical and methodological foundations of Latin, which determine the degree of students' scientific and theoretical willingness to use medical terminology in the professional activity of a doctor.

The functional activity component is characterized by the ability of students to apply knowledge of Latin while studying other disciplines; ability to use medical terminology in the future profession of doctor. These characteristics of the functional activity component influence the formation of motivational value, cognitive orientation and personality developmental components, as knowledge of professional knowledge of Latin and skills to use. It gives students confidence in the use of medical terminology. Formation of the personality development component influences the formation of all other components, contributing to the creation of a learning atmosphere, the desire to achieve high results in the future professional activity of the doctor.

In the structure of the future professional readiness of physicians to use medical terminology, certain components are closely interrelated and interdependent. Skills, knowledge, abilities are realized in an activity beyond which the future physician's readiness to use medical terminology in professional activity cannot be formed at all. The general state of students' readiness to use medical terminology depends on the level of formation of each of its components.

The results of the comparison of the input and the final control of the experimental study showed that the students of the experimental groups had positive changes. We note that the number of students in groups with high and medium levels of professional readiness to use medical terminology has increased as a result of the decrease among students with low levels.

Keywords: professional speaking, medical terminology, professional activity, medical students, future doctors' training, professional interest, cognitive interest.

Introduction:

Considering the increasing demands on the level of medical staff training within higher education, the problem of the quality of future doctors' professional training is becoming more urgent. It is focused on mastering a specialist medical practitioner in a foreign language, which implies correct use of professional language as a means of oral and written communication in the special fields of professional communication

of the doctor in terms of norm and style. For a medical professional, proficiency in a foreign professional language becomes his / her significant personal characteristic, which implies the ability to be engaged in professional communication using medical terminology.

Literature Review

The specificity of the future doctor professional activity requires a special approach to the organization of training of students [Tsysik, 2009]. Its result should be a professional ability to use medical terminology. Therefore, for the successful professional training of future physicians in the sphere of medical terminology use, it is necessary to consider certain features of this process.

Therefore, it is of particular importance for future physicians to study Latin as a foreign language for a professional purpose, to use special terms in the professional speech situations of the future medical professional (writing and reading prescriptions, names and characteristics of diseases in a recognized form). That is why we are trying to outline a number of features for professional training of future doctors in the use of medical terminology.

The first feature of professional training of future physicians in the sphere of medical terminology is the need to increase students' knowledge of the history of Latin.

The peculiarity of professional training of future doctors is the understanding of the importance of Latin language skills for the professional work of a modern doctor. The Latin names of medicines are used as official ones in many national pharmacopoeias, in the International Pharmacopoeia (Phragmoraea International), in WHO publications. The Latin language is used in the prescriptions that can be read by doctors in any country. The use of Latin abbreviations is allowed only in accordance with those accepted in medical and pharmaceutical practice" [Nakaz, 2015].

The third feature of professional training of future physicians in the use of medical terminology is interdisciplinary integration in the study and use of Latin. The need for learning Latin becomes apparent to future physicians as students become familiar with medical terms while studying many disciplines. Thus, the study of anatomical, histological and pharmaceutical terms at the practical classes in Latin allows students to master the basic concepts of the disciplines "Human Anatomy", "Histology", "Pharmacology", etc easily.

The fourth feature of professional training of future physicians for the use of medical terminology is the teaching of professional vocabulary for students of medical universities as a means of communication in professional activity. To read medical literature freely, to understand oral messages, to be able to understand specialists, it is necessary to quantify and qualify the desired learning outcomes, to establish specific criteria for language proficiency at phonetic, lexical, grammatical levels.

The professional readiness of the future doctor is not just about acquiring a set of knowledge, skills and abilities. It is necessary to form the mental, volitional and emotional qualities of the individual in general [Malyuga, 2011].

Results

The major feature (criterion) of future doctors' training is the *motivational orientation* of students to master Latin medical terminology, which determines the formation of the motivational and value component of the professional readiness of future doctors.

Educational motivation is related to the rational organization of students' educational activities and aimed at learning ways to acquire knowledge. In the preparation of future doctors, the educational motives include the expression of students' interest in the methods of independent acquisition of knowledge in the studying of Latin, in the ways of self-regulation of educational activity in the direction of mastering medical terminology. Positive attitude to learning is formed due to educational motives, among which the cognitive interest is especially distinguished, which determines the focus on mastering the unknown, turning ignorance into knowledge. This determines the interest and the need of the student to form a well-developed and professionally trained personality. This process can be most successful under the conditions of professional interest formation among medical university students as a basis for mastering the knowledge of

medical terminology, skills and abilities to use them in future professional activity. Their presence ensures the development of the professional competence of future doctors and, accordingly, their professionalism.

These elements of professional interest contribute to the effective formation of students' motivation for the content of professional disciplines, the application of acquired knowledge in the field of Latin and medical terminology in the study of clinical subjects, use them in practice; to the acquisition of new knowledge in the process of practical activity.

Therefore, there are some indicators of the formation of the motivational value component of the professional-speech readiness of future doctors to use medical terminology:

1. The students showed a professional and cognitive interest in the study of medical terminology as a necessary component of the readiness for future professional activity of a doctor.

2. Students' awareness of the importance of medical terms knowledge for the study of professional disciplines. The motives of students' studying are different. The emergence of professional interest of future doctors is a fascination with the study of new professional material (e.g. in Latin) and its connection with the future profession, the desire to increase the level of professional training, the desire for self-education in mastering medical terminology.

3. The desire to improve the level of medical terminology knowledge. The actual setting arises as a result of emotional stimulation and leads to the activation of emotions, causes emotions, needs that direct students to display professional and cognitive interest. Being able to learn and participate personally is something of a source of interest, and effective thinking, learning, and achievement are a consequence. The formation of a motivational value component encourages students to develop professional needs aimed at mastering the knowledge of medical terms and skills, using them in future professional activity. Therefore, an important indicator is the perceived need to master Latin as the basis of medical terminology.

The correlation between the indicators of *Table 1* shows the effectiveness of the implementation of the first pedagogical condition in the formation of the motivational-value component of future physicians' readiness to use medical terminology, since the dynamics of changes in the number of students in CG[1] and EG, which is characterized by a certain level, has significant differences

- according to the indicators of the average level in CG there was an increase of students from 24,48% to 29,69%.[2]

[1] Hereandafter, we use the following abbreviations
CG – control group
EG – experimental group
EC – entry control
FC – final control
SC - stage control
AI - average indicator
NS – number of students

[2] The average level of students' readiness to use medical terminology is characterized by the following features:

1. Future physicians have vague motives for studying medical terminology; there is no clear awareness of the personal significance of knowledge of medical terms in Latin for the study of professional disciplines; students' desire to improve their level of medical terminology is manifested periodically.
2. Students understand the essence of professional-speaking activity of future physicians using medical terminology, but have unsystematic knowledge of the nature and structure of professional terminology, forms and types of medical terms.
3. Although students use medical terminology correctly when studying professional disciplines, they do not make good use of it in professional-language interaction, and they do not always complete professional-vocabulary tasks using medical terminology successfully.
4. Future physicians periodically work with information sources, but are not always carefully engaged in the development and implementation of didactic exercises aimed at increasing the level of professional

In EG, this indicator shows a decrease in the number of such students from 24.74% to 10.83%, which is explained by a significant increase in high-level EG students.[1]

Table 1: Results of formation of motivational-value component of professional-speech readiness of future doctors to use medical terminology

Groups and number of students	SC	Levels of the motivational-value component formation of professional-speech readiness of future doctors to use medical terminology								AI
		High		Middle		Satisfactory		Low		
		NS	%	NS	%	NS	%	NS	%	
CG – 192 st.	EC	51	26,56	47	24,48	54	28,13	40	20,83	3,57
	FC	55	28,65	57	29,69	50	26,04	30	15,62	3,71
EG – 194 st.	EC	52	26,81	48	24,74	55	28,35	39	21,10	3,58
	FC	95	48,97	21	10,83	59	30,41	19	9,79	3,99

- according to the indicators of a satisfactory level, the number of students decreased from 28.13% to 26.04% in CG[2].

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and professional readiness to use medical terminology. Only the medical vocabulary that is learned in the classes is recorded in the Medical-Terminological Dictionary.

5. For the most part, the level of professional and vocational readiness of future doctors to use medical terminology is rated "good" and 4 points.

[1] High level of students' readiness to use medical terminology is characterized by the following indicators:

1. Students have a continuing interest in the study of Latin medical terminology, which is necessary for the study of professional disciplines (human anatomy, histology, pharmacology, etc.) and an important component of the doctor's future professional activity. Students are aware of the personal importance of knowledge of medical terms for the study of professional disciplines (human anatomy, histology, pharmacology, etc.), as well as strive to constantly improve the level of medical terminology.
2. The cognitive-orientation component of the high level of students' readiness to use medical terminology is determined by excellent knowledge of Latin, the nature and structure, forms and types of medical terms, understanding of the essence of professional-speaking activity of future doctors using medical terminology.
3. Students skillfully and meaningfully use medical terms in Latin when studying professional disciplines; in the simulated situations of professional activity of the future physician demonstrate a high literacy rate on the use of medical terminology in professional-language interaction at the level of "doctor - doctor", for writing prescriptions, in reading scientific medical literature.
4. Future doctors show a desire for personal development in the direction of self-improvement in the use of medical terminology; actively work with information sources (dictionaries, textbooks, online resources) to supplement the knowledge of professional terms in Latin; independently develop and carry out didactic exercises aimed at increasing the level of professional and vocational readiness to use medical terminology; systematically maintain a "Medical-terminological dictionary", in which they introduce general scientific and literary medical vocabulary, without which it is impossible to do in the study of professional terminology.

The high level of professional-speech preparation of future doctors to use medical terminology of high level of student's knowledge is characterized by a grade of "excellent" - 5 points.

[2] Satisfactory level of future vocational readiness of doctors to use medical terminology is characterized by the following features:

In EG, the number of such students increased from 28.35% to 30.41% due to the decrease in the number of future physicians with a low level of motivation-value component of vocational-readiness to use medical terminology;

- the low level in both categories of groups decreased the number of such students, but in CG there were less significant changes - from 20,83% to 15,62%, than in EG - from 21,10% to 9,79%;[1]

- on average, in CG there was a slight increase from 3.57 to 3.71 (by 0.14 points), and in EG - more significant - from 3.58 to 3.99 (by 0.41 points), which 0.27 points more than in C.

The visual accompaniment of changes in the formation of the motivational-value component of the professional-speech readiness of future doctors to use medical terminology is shown in Fig. 1. The analysis of the diagrams shows that the most significant changes in the EG occurred in the direction of increasing the number of students with a high level of formation of this component.

1. The students' motives for studying medical terminology in Latin classes are conditioned to receive only a satisfactory grade, not related to other disciplines.
2. Students have a satisfactory knowledge of the nature and structure of medical terminology, forms and types of medical terms, have a fragmentary understanding of the understanding of the professional and speech activities of future doctors using medical terminology.
3. Students do not have experience in the use of medical terminology in the study of professional disciplines, because they do not link the results of training in Latin language and the basics of medical terminology with professional disciplines (human anatomy, physiology, pharmacology, etc.); occupationally solve vocabulary tasks using medical terminology, mostly at the reproductive level.
4. Students do not strive for self-improvement by improving their level of mastery of medical terminology, their performance of didactic exercises aimed at increasing the level of professional-speaking readiness of future doctors to use medical terminology, is assessed as satisfactory, since there is no experience in using professional skills , students do not take the time to work with information sources. The terminology vocabulary is run occasionally to obtain a "satisfactory" rating only.

Satisfactory level of professional-speaking readiness of future doctors to use medical terminology is estimated at 3 points.

[1] The low level of students' vocabulary readiness to use medical terminology has the following indicators:

1. The future doctors have no motives for studying medical terminology, there is no awareness of the personal importance of knowledge of medical terms for the study of professional disciplines; students do not want to improve their level of medical terminology because they believe that they do not necessarily need to use medical terminology in their specialization.
2. Students lack systematic knowledge of the nature and structure of medical terminology; nor do they understand the peculiarities of the forms and types of medical terms because they do not attend classes periodically. Students do not understand the essence of professional-speaking activity of future doctors using medical terminology, because they consider it unnecessary to have such a luggage of knowledge for the doctor's work.
3. Future physicians avoid participating in educational situations to solve professional-language problems using medical terminology; in the study of professional disciplines are limited to knowledge of human anatomy, histology, pharmacology, etc. In ukrainian; do not use medical terminology in professional-language interaction.
4. Students do not work with additional information sources, but are limited to methodical materials for classes; show low literacy in Latin; do not participate in the development and implementation of didactic exercises aimed at increasing the level of professional and speech readiness of future doctors to use medical terminology; do not keep a "Medical terminology dictionary".

The low level of professional-speech readiness of future doctors to use medical terminology is rated “unsatisfactory”, and in points - 2.

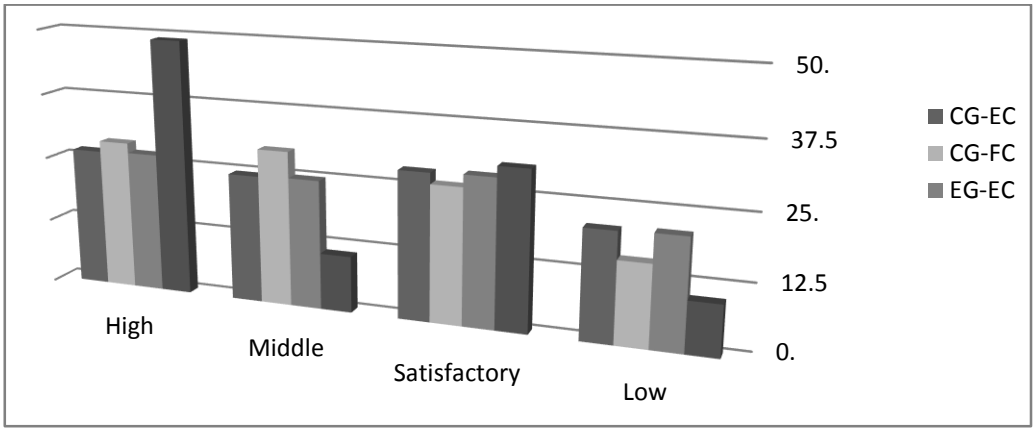

Fig. 1. Dynamics of changes in the formation of the motivational-value component of professional-speech readiness of future doctors to use medical terminology

The second component of the structure of future profetional readiness of physicians to use medical terminology is *cognitive orientation*. Its criterion is the formation of an adequate level of knowledge of Latin medical terminology among students of medical universities. The term "cognitive" comes from lat. *cognitio* - knowledge, cognition, cognition [Sotsiologo-pedagogichniy slovnik, 2004, p. 111]. Therefore, we consider the cognitive-orientation component as a set of professional knowledge of medical terminology that is needed for future doctors in their professional activity. Indicators of the formation of the cognitive-orientation component in the professional-speech readiness of future doctors to use medical terminology were conducted on the basis of the requirements of the educational-professional program (EPP) [Tsysik, 2009]. All in all, the transformation of the goal into a result is due to the assimilation of the content of the study (the subjects studied).

According to the EPP, future physicians need to know the accent rules, grammatical categories of nouns, their vocabulary form, Greek doublets and word-forming elements of nouns of all declensions; grammatical categories of verbs, systems of verb forms on the example of the vocabulary used in the recipe, the structure of the recipe, rules for its spelling; to know the grammatical categories of adjectives, the degree of their comparison, and the wrong degrees of comparison of adjectives; to know the principles of formation of nomenclature names and terms; 1000 lexical units and basic word-forming elements used in the names of the drugs, indicating their therapeutic and pharmacological action, as well as anatomical, histological and clinical terms.

The formation of this component indicates the ability of students to use medical terminology in the study of professional disciplines, the ability to apply the acquired knowledge in practice. Providing students with the necessary knowledge and skills to use medical terminology is carried out by bringing the study of Latin closer to the future professional activity of a doctor. In order to carry out cognitive professional-oriented activity, future doctors must clearly imagine the purpose of the activity, be able to plan their actions, justify them, choose activities or create new ones, select the knowledge necessary for the task, exercise self-control. By doing these actions, students are called to obtain a new cognitive result, which emerges in the form of new knowledge, new ways of activity, new combinations of already known ways. An important condition for achieving this goal is mastering the techniques of vocationally directed cognitive activity in the use of medical terminology. Among them there are comparisons, generalizations, concretization, definitions, establishment of cause and effect relationships, identification of patterns, posing questions - assumptions, evidence, estimation, analogies.

The results of the formation of the cognitive-orientation component of the professional-speech readiness of future doctors to use medical terminology are shown in table 2.

Comparative analysis of the indicators in *Table 2* shows more significant changes in the formation of the cognitive-orientation component in students of EG:

- according to the high level indicators, the number of students increased from 26.00% to 28.65% in the CG, and from 23.71% to 44.33% in the EG;

- by the average level in CG there was an increase in the number of such students from 22,92% to 26,04%, and in EG - a decrease from 24,23% to 15,46%, which is explained by a significant increase in the number of future physicians with high level;

- according to the indicators of a satisfactory level in CG there was an increase in the number of students from 29.69% to 31.77%, while in EG the number of such students decreased slightly from 30.93% to 29.38%;

- the low level in both categories of groups decreased the number of such students: in CG - from 22,39% to 13,54%, and in EG - from 21,13% to 10,83%;

Table 2: The results of the formation of the cognitive-orientation component of the professional-speech readiness of future doctors to use medical terminology

Groups and number of students	**EG**	**Levels of the cohnitive orietational component formation of professional-speech readiness of future doctors to use medical terminology**								**AI**
		High		Middle		Satisfactory		Low		
		NS	%	NS	%	NS	%	NS	%	
CG– 192 st.	**EK**	48	25,00	44	22,92	57	29,69	43	22,39	3,51
	FK	55	28,65	50	26,04	61	31,77	26	13,54	3,70
EG-194 ст.	**EK**	46	23,71	47	24,23	60	30,93	41	21,13	3,51
	FK	86	44,33	30	15,46	57	29,38	21	10,83	3,93

- on average, the CG increased from 3.51 to 3.70 (by 0.19 points), and in the EG - more significantly - from 3.51 to 3.93 (by 0.42 points), which is 0 , 23 points higher than in CG

Changes in the formation of the cognitive-orientation component of professional-speech readiness of future doctors to use medical terminology are shown in Fig. 2.

The analysis of the diagrams shows that the use of our methodology towards the implementation of the second pedagogical condition in the experimental groups leads to a significant increase in the number of students with a high level of formation of this component.

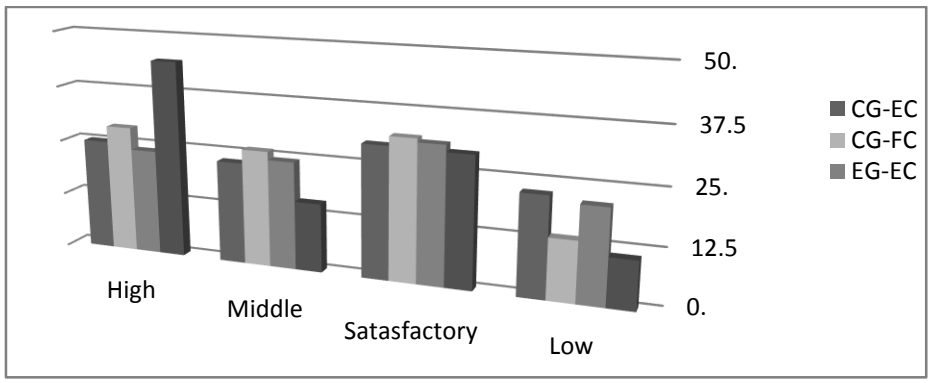

Fig. 2. Dynamics of changes in the formation of the cognitive-orientation component of professional-speech readiness of future doctors to use medical terminology

Therefore, the next component of the future professional readiness of future physicians to use medical terminology is *functionally active*.

The criterion of this component is the students' ability to use medical terminology in the sphere of professional situations. According to the requirements of the educational-professional program (EPP) [Tsysik, 2009] students should be able to: read and write Latin medical terms competently; determine the gender, basis and term of nouns, cancel nouns of all nouns, translate sentences, terms and nomenclature names with agreed and inconsistent definitions; be able to abolish and harmonize medical terms that consist of different grammatical categories of nouns and adjectives; to determine the basis and effect of the verbs, to form and translate the verbal forms of the actual, conditional and prescriptive ways of the present time of the active and passive states; be able to write a prescription competently, be able to make prescriptions for hard, soft and liquid medicines; to form and translate the names of chemical compounds, to analyze the structure of medical products' names, to distinguish their word-forming elements.

Indicators of the functional and activity component formation are: correct use of medical terminology by students while studying the professional disciplines; ability to use medical terminology in professional-language interaction reasonably; successful resolution of situational professional tasks using medical terminology.

The formation of this component indicates the ability of students to use medical terminology in the study of professional disciplines, the ability to apply the acquired knowledge in practice. Providing students with the necessary knowledge and skills to use medical terminology is carried out by bringing the study of Latin closer to the future professional activity of a doctor. In order to carry out cognitive professional-oriented activity, future doctors must clearly imagine the purpose of the activity, be able to plan their actions, justify them, choose activities or create new ones, select the knowledge necessary for the task, exercise self-control. By doing these actions, students are called to obtain a new cognitive result, which emerges in the form of new knowledge, new ways of activity, new combinations of already known ways. An important condition for achieving this goal is mastering the techniques of vocationally directed cognitive activity in the use of medical terminology. Among them there are comparisons, generalizations, concretization, definitions, establishment of cause and effect relationships, identification of patterns, posing questions i.e. assumptions, evidence, estimation, analogies.

The results of formation of functional and activity component of professional-speech readiness among future doctors to use medical terminology are presented in *Table 3*.

Table 3. Results of formation of functional activity component of professional-speech readiness of future doctors to use medical terminology

Groups and number of students	**SC**	**Levels of the functional activity component formation of professional-speech readiness of future doctors to use medical terminology**								**AI**
		High		Middle		Satisfactory		Low		
		NS	%	NS	%	NS	%	NS	%	
CG – 192 st.	**EC**	45	23,44	41	21,35	60	31,25	46	23,96	3,44
	FC	54	28,13	53	27,60	55	28,65	30	15,62	3,68
EG – 194 st.	**EC**	43	22,16	45	23,20	61	31,44	45	23,20	3,44
	FC	85	43,81	20	10,31	71	36,60	18	9,28	3,89

The results of the comparative analysis of the indicators of Table 3 show the following changes in the formation of functional activity component among students of CG and EG:

- according to the high level indicators, the number of students increased from 23.44% to 28.13%, and in the EG - from 22.16% to 43.81%;

- according to the indicators of the average level in CG there was an increase in the number of students from 21,35% to 27,60%, and in EG - a decrease from 23,20% to 10,31%, which is explained by a significant increase in students of EG with a high level;

- at the satisfactory level, the number of students decreased from 31.25% to 28.65% in the CG, and the number of such students increased from 31.44% to 36.60% in the EG, due to the decrease in the number of low-level students;

- the low level in both categories of groups decreased the number of students: in CG from 23,96% to 15,62%, and in EG - from 23,20% to 9,28%;

- by the average indicators in CG there was an increase from 3.44 to 3.68 (by 0.24 points), and in EG - from 3.44 to 3.89 (by 0.45 points), which is 0.21 points more than in CG.

Fig. 3 shows the dynamics of changes in the formation of the functional and activity component of the professional-speech readiness of future doctors to use medical terminology.

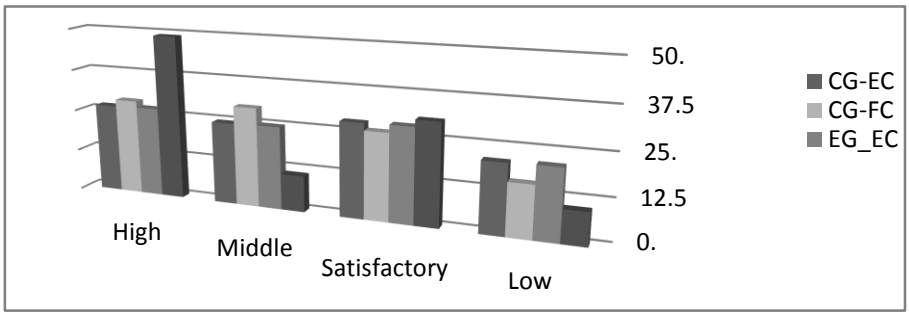

Fig. 3. Dynamics of changes in the formation of functional activity component of professional-speech readiness of future doctors to use medical terminology

The formation of the next component - personal development - is ensured by the independent professional medical training to use medical terminology. The criterion of this component is the self-educational activities of students for the personal professional development of future doctors. Formation of the personal-developmental component of professional-speaking readiness of future doctors to use medical terminology is largely a result of self-education activities of students of medical higher educational establishment, who use the acquired knowledge in the decision-making process in the course of studying the discipline "Latin language and basics of medical terminology"; orientation on the personal development of students, formation of professionally important qualities of future doctors, development of their interests, motives, values, awareness of modern problems of practical health care, which implies continuity of work in the direction of self-actualization, self-knowledge and self-development, aimed at disclose professional personality .

The formation of personality development component is determined by such qualities of the student as persistence, determination, emotionally-adequate behavior in different professional situations, the desire to solve various complex problems independently using medical terminology, a sense of responsibility for the results of their work. This testifies to the development of personality i.e. the formation of personality as a social quality of the individual as a result of his socialization and education [Goncharenko, 1997, p. 289]. Moreover, education is dominant in the development of the future physician's personality, and the development itself occurs in the educational activity, which is largely influenced by motives.

Indicators of the personality development component of the professional-speech readiness of future doctors to use medical terminology are presented in *Table 4*.

Table 4.*The results of formation of the personality development component of professional-speech readiness of future doctors to use medical terminology*

Groups and number of students	SC	Levels of the personality development component formation of professional-speech readiness of future doctors to use medical terminology								AI
		High		Middle		Satisfactory		Low		
		NS	%	NS	%	NS	%	NS	%	
CG – 192 st.	**EC**	50	26,04	46	23,96	55	28,65	41	21,35	3,55
	FC	52	27,08	51	26,56	58	30,21	31	16,15	3,65
EG – 194 st.	**EC**	48	24,74	49	25,26	57	29,38	40	20,62	3,54
	FC	84	43,30	19	9,79	72	37,12	19	9,79	3,87

According to the data of Table 4, a comparative analysis of the development of the personality development component of the students of CG and EG is made:

- according to the high level indicators in CG there was an increase in the number of students from 26.04% to 27.08%, and in EG - from 24.74% to 43.30%;
- the average level shows an increase in the number of CG students from 23,96% to 26,56%, and in the EG - a decrease from 25,26% to 9,79%, which is explained by a significant increase in students of EG with a high level;
- according to the indicators of satisfactory level in both categories of groups there is an increase in the number of students: in CG - from 28,65% to 30,21%, and in EG - from 29,38% to 37,12%;
- the number of students in CG dropped from 21.35% to 16.15% and from EG - from 20.62% to 9.79%;
- by the average indicators in CG there was an increase from 3.55 to 3.65 (by 0.1 points), and in EG - from 3.54 to 3.87 (by 0.33 points), which is 0.23 points more than in CG.

Fig. Figure 4 shows the most positive dynamics of changes in the personality development component of EG students compared to KG students.

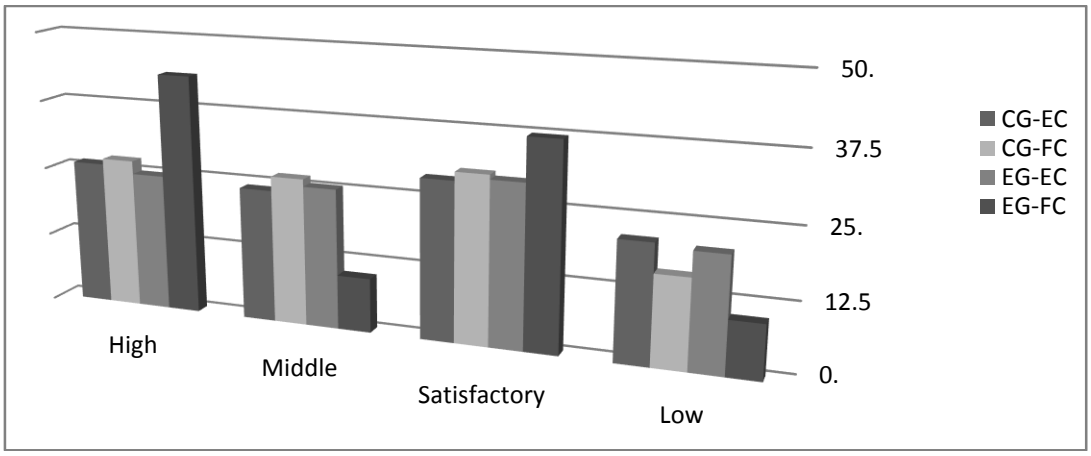

Fig. 4. Dynamics of changes in the formation of personality development component of professional-speech readiness of future doctors to use medical terminology

Conclusions

The identified components of the future professional readiness of physicians to use medical terminology are interrelated. The motivational value component is manifested mainly through professional interest in learning and using Latin in the future professional activity of the doctor and influences the formation of other components, based on the use of various forms, methods, means of professional students' training. The formation of a motivational value component determines and mobilizes the activity of future physicians in training and influences the quality of mastering vocational knowledge, skills and skills.

The cognitive orientation component involves the formation of knowledge in theoretical and methodological foundations of Latin, which determine the degree of students' scientific and theoretical willingness to use medical terminology in the professional activity of a doctor.

Thus, in the structure of future physicians' vocabulary for medical terminology, certain components are closely interrelated and interdependent. Skills, knowledge, skills are realized in an activity beyond which the future physician's readiness to use medical terminology in professional activity cannot be formed at all. The general state of students' readiness to use medical terminology depends on the level of formation of each of its components.

Considering the refined criteria, components and indicators, let us consider the structure of the levels of students' professional readiness to use medical terminology.

The process of medical students' training for the use of professional terminology implies a qualitative transition from a low level of readiness (since students had no knowledge of Latin at all) to a high one. In this regard, the level of professional-speaking readiness of future doctors to use medical terminology was used, which was necessary to evaluate the students 'motives, knowledge, skills, etc to use medical terminology and the effectiveness of future doctors' educational activities.

Under modern conditions the most effective are the models of training, in which the tasks of future doctors' training in accordance with the leading fields of future activity are most fully synthesized. Therefore, the use of such methods, tools, forms of teaching in the educational process, creating pedagogical conditions that would ensure the formation of all components of professional training of future doctors to use medical terminology, affecting the motivational, cognitive, functional and personal sphere of students' activities.

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Effects of Acute Water Intake on Body Composition Measurements by Bioelectric Impedance Analysis

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Abstract

Bioelectrical impedance analysis (BIA) is a simple and quickly applied non-invasive method used to assess body composition in clinical medicine and also sports science fort making important decision. BIA measurement is based on variance of tissue resistance to applied electric stimulation. Thus, changed of body water levels could have an impact on BIA measurements. We aimed to evaluate the impact of acute water consumption on body composition measurements using BIA in healthy females. A total of 50 subjects (mean±SD age: 21.8±1.6 years) were voluntarily participated to this study. Body composition was measured by foot to foot BIA before and 15 minutes after drank 1 litter of water. The percent of body fat mass (21.59±5.3 to 22.24±5.2, $p<0.05$) and fat mass (12.6±4.6 kg to 13.05±4.6, $p<0.05$) increased significantly after water intake compared to baseline value. Fat free mass (44.44±4.2 kg to 44.46±4.2, $p=0.6$) and total body water (31.82±3.2 kg to 31.83±3.3 kg, $p=0.8$) did not changed increased significantly ($p=0.6$) after water intakes. We show that water intake causes overestimate fat mass and percentage of body fat without any significant changes in body water levels and fat free mass values. Thus, investigator or clinicians should be considering low sensitivity of BIA application in patients or subjects with increased water levels especially under condition of existence of oedema.

Keywords: Bioelectrical impedance analysis, body composition, fat mass,fat free mass, total body water.

Introduction

Bioelectrical impedance analysis (BIA) is a simple and quickly applied non-invasive method for assessing body composition including total body water (TBW), fat free mass (FFM), fat mass (FM), percent of fat mass (% FM) other body compartments [1,2].

BIA method has been used commonly for evaluation of body compartments in many clinical and non-clinical situations [3,4,5,6]. Bioelectrical impedance is closely related with body size, amount and ionic content of body water. BIA measurements based on evaluating variation of resistance to electrical activity from different part of body [7]. However, change of body water and ionic content may have effects on valid measurements of body composition [8,9].

Effectiveness of BIA on body compositions measurements have been shown in some studies [10,11,12,13] but questioned in some other studies [14,15]. The effective measurement of body composition is an important issue in clinical medicine and sport science [16]. The assessment of body composition has long been used to obtain important information with regard health status of the individual [12,17,18]. Effects of fluid load on body composition measurements using BIA has not been clearly defined and changed [19] or unchanged [20] body composition in response to the water intake has been reported.

In the present study, we aimed to evaluate the impact of water consumption on body composition measurements using BIA in healthy females.

Materials and Methods

A total of 50 females (mean±SD age: 21.8±1.6 years; height:176±6 cm, and BMI: 22.37±2.5 kg/m^2) were voluntarily participated to this study.

The study protocol approved by the Local Ethic Committee. Signed informed writing consents were obtained from each subjects before participating study. Measurement of height and weight of the subjects were performed. The subjects were advised to have no eat or drink for the preceding 12 hours. BMI was calculated as the weight in kg divided by the square of height in meters (kg/m^2). Height was measurement to the nearest 0.1 cm without shoes using a audiometer.

Body composition was measured in morning at approximately 08:00 AM by using foot to foot BIA

(TBF 300A Tanita Corp.,Tokyo, JAPAN). After initial body composition measurements, all subjects drank 1 litter of water and after 15 minutes body composition analysis were performed.

Body mass was measured to the nearest 0.1 kg while the measurement of impedance was performed. The FM, %FM, FFM and TBW were estimated using manufacturer predictive equations and recorded to the computer for analysis. To avoid any errors may come from alteration in body fluid distribution, subjects waited for at least 10 minutes prior to testing. The subjects were asked to remove all metal, jewellery, and wearing lightweight clothes.

Paired t Test was used to the analyse significance between basal and after water intake values. $P<0.05$ was accepted as significant.

Results

Body weight was significantly greater after water intake compared to before with an average increase of 0.975±0.06 kg.

Table 1: The change of mean (±SD) values of percent of body fat (Fat %), fat mass, fat free mass (FFM) and total body water (TBW) in response to the baseline and after 1 litter of water intake, minimum and maximum values.

	Mean (±SD)	Min <-->Max
Fat %	5.47±3.4*	0.33 <--> 14.28
Fat mas (kg)	0.814±0.2*	0.2 <--> 1.2
FFM (kg)	0.148±0.2NS	-0.3 <--> 0.7
TBW (kg)	0.124±0.2NS	-1.3 <--> 1.1

*: Reflects significant differences
NS: reflects not significant differences

The change of bod fat percent with regarding body mass index for each subjects are given in figure 1. The percent of body fat mass was increased significantly after water intake from baseline values of 21.59±5.3 to 22.24±5.2 ($p<0.05$).

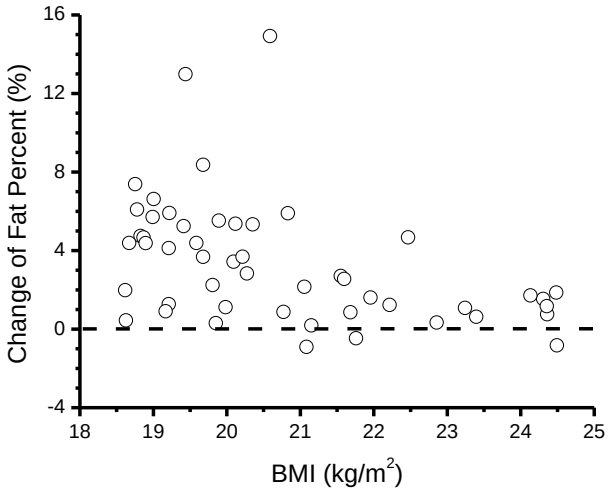

Figure 1: Measurements of change in body fat percent using bioelectrical impedance analysis in response to the 1 litter of water (n=50).

Body FM was increased significantly from baseline 12.6±4.6 kg to 13.05±4.6 ($p<0.05$) following 1 litter of water intakes ($p<0.05$). The change of bod fat mass with regarding body mass index for each subject is

given in figure 2.

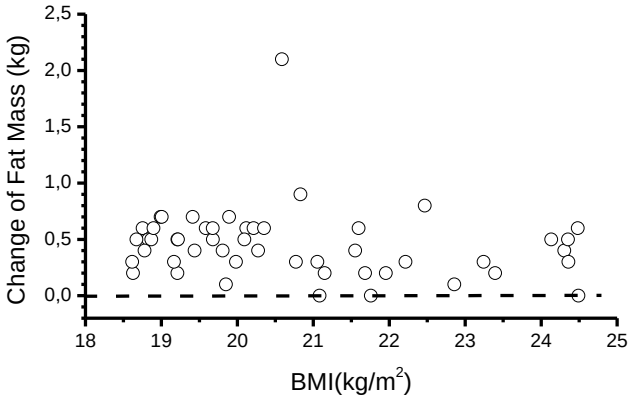

Figure 2: Measurements of change in body fat mass (kg) using bioelectrical impedance analysis in response to the 1litter of water intake (n=50).

The change of FFM varied among the subjects (Table 1) but in total it did not increased significantly (p=0.6) 44.44±4.2 kg to 44.46±4.2 (p=0.6) after water intakes. In addition total body water also did not changed significantly 31.82±3.2 kg to 31.83±3.3 kg (p=0.8) after water intakes

Discussion

The main target of the present study was to assess the accuracy of BIA method for evaluating body composition in response to acute water intakes in females. The results of this study show that failure of body composition analysis using BIA measurements in healthy populations after acute water consumption.

BIA provides many advantages for body composition assessment health and disease [21]. Accurate body composition analysis based on BIA measurements have been used widely in clinical application and scientific studies in many studies [22,23,24]. Accurate estimation of body composition analysis has been shown closely related with the fitness levels of subjects [25].

The valid measurements of body composition using BIA analysis after a small food or fluid load (350 mL) has been shown [26]. However, we have shown that water consumption (1 litter) caused significantly change din body composition analysed by BIA method. Body fat mass and percentage of body fat were both significantly increased after water intakes (Figure 1 and Figure 2). There was large variability i.e. between 0.2 kg and 1.2 kg, in fat mass measurements among the subjects (Table 1). However, we did not find any significant change in FFM and TBW despite the increase of body water levels as 1 litter (Table 1). Water intake induced plasma sodium concentration may have any significant effects on body composition analysis using BIA measurements [27]. There was markedly alteration in TBW after 1 litter of water intakes among subjects; even -1.3 kg decrease in TBW was observed (Table 1).

In clinical medicine, assessment of patients hydration status is important and benefits of BIA measurements on hydration status in the patients with changed hydration status have been reported [28]. BIA method may provide important information on nutritional and health status of cancer patients [29]. However, failure of body composition analysis using BIA method in patients with haemodialysis has also been shown [30]. Body composition analysis has been used in obesity clinics for the monitoring of progress in obese subjects [13,31]. A significant agreement between body composition measurement by BIA and DXA methods before and after weight loss obese patients has been shown [32].

We have clearly shown that water intake causes overestimate fat mass and percentage of body fat without any significant changes in body water levels and fat free mass values. Thus, investigator or clinicians should be consider low sensitivity of BIA application in patients or subjects with increased water

levels especially under condition of existence of oedema.

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The System of Pedagogical Concepts in Globalization Conditions

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Abstract

The purpose of this research is: to elaborate the essential characteristics, components and determinants of pedagogical conceptual system by analyzing theoretical approaches of historical and pedagogical scientific researches to understanding the problem of conceptual categorical apparatus; to provide the analysis of the essence evolution and the content of basic pedagogical concepts in the conditions of globalization; to study the laws of concepts system development in pedagogical science; to substantiate the theoretical basis of basic pedagogical concepts system periodization; to determine pedagogical conditions of concepts development; to outline the possibilities of transformation the ideas of the past and their extrapolation towards the conceptual pedagogical system with the aim of its modernization. The definition of the concept "human" covers all aspects of social life, because mainly the concept is important and its understanding depends on those ideas that dominate in society, and is a priority in the system of values necessary for an effective process of education and self-improvement. By comparing the conceptual constituent "human" with the help of comparative tables, we obtain the possibility of a systematic retrospective assessment of the problem, distinguishing the priority tasks for the future.

Keywords: conceptual-categorial apparatus, pedagogical concept, "human", "person".

1. Introduction

Irreversible globalization tends increase attention to the unification of educational systems with the obvious need to preserve national peculiarities. The Bologna Process initiated a search of common criteria for assessing the level of students' higher education preparation. In the nearest future, the proliferation of migration processes necessitates similar solutions in the field of general education and professional schools.

It is obvious that the quality of understanding the essence of the conceptual-categorical apparatus, its professional use in practice depends on the quality of education, which causes the effectiveness of innovative approaches, the emergence of new generation books. The relevance of the study has been related to the need to solve a number of problems in the field of pedagogical conceptual system, which are facing by modern theory and practice. Among them, there are the ambiguity of pedagogical concepts, borrowings of foreign language terms, and the introduction into the scientific circulation of new words, which gradually become basic definitions.

The actuality of studying the system of pedagogical concepts in the development of pedagogical science is due to the need to overcome the contradictions between:

- theoretical generalizations of the laws of concepts determination and the level of practical implementation of this problem;
- peculiarities of the development of the conceptual pedagogical system and the quality of philosophical generalizations;
- the significance of the basic concepts in the historical-pedagogical process and the role of predictive research;
- foreign pedagogical studies and the content of pedagogical works in individual countries.

Analysis of recent researches and publications

Difficulties in organizing, systematizing and interpreting concepts existed since the beginning of pedagogical science. Those problems have been raised on the pages of pedagogical editions, in monographs and thesis. It is worth noting that S. Goncharenko for the first time in pedagogical science tried to systematize the conceptual system. "Ukrainian Pedagogical Dictionary" is a scientific and reference publication, the main volume of which are pedagogical concepts, terms, concepts, categories, theories, etc. In addition, the author included the concepts related not only to pedagogy but also to other sciences such as philosophy, psychology, logic, medicine, physiology, computer science, etc. The advantage of this research and reference publication is that the author introducing the definition of the constituents of the conceptual categorical apparatus, which belong to other branches of scientific knowledge, reveals only their pedagogical content, but does not go into other details (Honcharenko, 1997: 123-125).

The monograph of O. Antonova "Basic knowledge in pedagogy: formation, development, technology of formation" is based on the studies of national and foreign scientists and the results of content analysis. This reserch provides a history of the formation and development of basic pedagogical knowledge and argues that the main form of scientific and pedagogical knowledge are basic pedagogical concepts (Antonova, 2014: 47).

Y. Goncharuk in his research "Pedagogical Terminology System: Problems and Ways of Their Solvin" states that the systematization of Ukrainian pedagogical science conceptual system is valuable in order to enter the international educational space. It is determined not only by the barrier of the national languages, but also by the differences in national and foreign conceptual categorical apparatus and explication of concepts (Honcharuk, 2005: p.7).

V. Lugovyi in "The problem of the conceptual-categorical apparatus of pedagogical science" defines that, "unfortunately, in pedagogy there is a sharp lack of systemic theories, while empirical conclusions predominate. Formation of concepts system and pedagogical science categories is a fundamental problem of its development" (Luhovyi, 2007: p. 134). Thus, in the last three decades several attempts have been made to construct a clear and logical classification of pedagogical knowledge system. However, by this time there has not been created a single common system of pedagogical knowledge that could be used in the process of students general pedagogical preparation.

The definition of the aim and objectives of the research – to outline the the system of pedagogical concepts in globalization conditions

Results and Discussion

National educational systems of different countries are a unique phenomenon with a peculiar conceptual categorical apparatus. Therefore, in integration conditions it is necessary to study in detail the educational systems of the partner countries of the integration process and the specifics of the functioning of basic concepts system. Because the most important disadvantage is that modern, documents and publications have literally translated pedagogical terms and concepts, in particular or quite often from English, but at the same time the concept itself stays usually without translation. It is noteworthy that, the unified communication language of managers, scientists, teachers and other participants in the educational process should be an integral part of successful educational integration and their participants would use this single conceptual categorical apparatus, because without those changes we will continue to observe the imperfect process of educational industry integration.

The aim of the EU educational strategy was the establishment of an intergovernmental organization in 1971 at an official meeting of six education ministers. In 1974, thanks to the grouped work, Education Committee was created/ It led to active work on the decision to establish a single information network as the basis for better understanding of educational policies and achievements. The European Education Network started its activities in 1980. It was developed in several areas, but the main thing was joint documentation launch, and thus the development of underlying mechanisms of conceptual categorical apparatus of the EU policy. However, further development in solving the problem of systematization and streamlining, this program has not yet ended. That has been explained by the fact that the main goal was the idea of human resources importance to enhance the competitive national economies. Nevertheless, these

unifying processes substantiate the need for a conceptual study of the basic principles and the search of effective mechanisms for entry into a single European space.

Starting within the 90-s of the twentieth century the number of scientific publications, books on this subject has been increased. Nowadays, most scholars believe that globalization is an integral social process of the end of the nineteenth to the beginning of the 20th century. Globalization includes a large number of phenomena and processes that occur simultaneously, as well as problems relating to the whole society, as they have become known as nowadays-global problems. We support the statement that "it is important to identify ways that open up the opportunity for all countries to enjoy the offspring of the globalization process, while maintaining the practical point of view in assessing its potential and risks" (Antonova, 2018: p. 98-107).

At the same time, globalization opens up broad prospects for world development, but the tempo of its implementation is not equal. We state that beginning with the last quarter of the twentieth century the development of world society is shaped by the impact of global or worldwide increasing problems. The emergence of these problems is an obvious manifestation of the world economy globalization and takes place in a conflict, problem, and contradictory form.

We share the opinion of French researcher O. Reboul: "the philosophy of education is not a doctrine, but a questionnaire which radically interprets everything that we think we know in this field. Therefore, it also challenges the importance and limits of the education sciences" (Reboul, 2010: p. 78).

The concepts formation history makes it possible to follow the development of pedagogy and allows becoming an accomplice of this process due to its involvement in "conceptual clarification" (Gadamer, 2000: p. 145). According to G.-G. Gadamer, "concepts history must be followed by thinking, which always penetrate the limits of the ordinary word-usage and separates the direction of words meaning from the side of their initial application in the expansion and restriction, comparison and distinction ..." (Gadamer, 2000: p. 151). The concepts history allows us to understand pedagogical science as an activity where changes and evolutions of separated terms and their verbal forms are considered without hypostasis of concepts and the creation of certain conceptual-categorical systems.

The process of formation and development of the conceptual-terminological apparatus of any science is rather closely associated with the process of formation and development of scientific knowledge. In its genesis, the scientific branch goes from the empirical stage to the theoretical. This process is individual for each field of scientific knowledge. For the correct definition of the essence of the main concepts, firstly it is necessary to take into account warnings based on logic, that were started from Aristotle: in the definition there can not be a concept that we determine; do not use words that require additional definition; it is inappropriate to use denial forms. Each definition must be logical, as short as possible, clear, simple and "elegant".

In pedagogical science, there is a certain contradiction between constant updating of pedagogical concepts and the need for an assiduous, thorough and troublesome preparatory work in the processing and systematization of the conceptual-categorical apparatus. Such contradiction can be neglected by changing the approach to systematizing pedagogical concepts and making pedagogical encyclopedias and dictionaries. The prospect of solving this problem will be the preparation of a series of historical and terminological pedagogical dictionaries.

The paradox of the situation is manifested in the fact that even in defining the main concept for all sciences of the humanitarian direction "Human" we have more contradictions than the established, generally accepted approaches.

With the increase of scientific knowledge, especially in the nineteenth century, when natural sciences and exact sciences accumulated a large number of new facts, a problem of systematization of scientific knowledge, concepts, and terms has been raised. In the nineteenth, century an attempt to rethink the personal world of man based on information of relationship between social and biological has been made. In the scientific circulation for the designation of adults and fosterlings, the following concepts have been used: "human", "individual", "personality". To a certain extent, they are related, because they denote a biological being - homo sapiens (a smart person), but from the point of view of pedagogy they contain certain distinct components.

Therefore, we will look through the definition "human" in conjunction with different semantic loads. For example, H. Plesner distinguishes "homo absconditus" (hidden man) as "an analogy to deus absconditus (hidden God)"; J. Mill states about "homo economicus" (human being) as follows: "a person is a consistent, rational, and self-motivated representative, usually he has subjectively defined goals"; R. Jacobson distinguishes between "homo loquens" (a man who speaks): "this phenomenon is traditionally regarded as a triad, a set of three roles, hypostases, closely related: he is a subject of communication, culture and language" (Robert Mc Henry, p. 423). For V. Gerliff, "homo ambitiosus" (ambitious man) – "money is not only a product of society, but mainly money creates a society, and is one of the tools that ensure the connection between people. Money is not the so-called economic part of human; on the contrary, people try to stand out among themselves like money. Thus, "homo economicus" does not rule the world either – it is fiction, but "homo ambitiosus" is the only real reality; "homo aquaticus" (a man who lives in water, amphibia man) - a term for denoting people living in water in accordance with the "Theory (hypothesis) of water monkeys"; futuristic vision gill breathing people" (A. Hardy) (Robert Mc Henry, p. 421). Otherwise, "homo clausus" (closed human) is proposed by N. Eliass, denotes the concept established in sociology for a person who is locked in his "inner world of the outside world"; "homo discerens" (G. Roth - a person-student, a person who studies) – "a person capable for learning and adapted to study" (Robert Mc Henry, p. 436).

A retrospective assessment of the problem allows us to distinguish a number of interesting trends. Pedagogical thought of the nineteenth century is focused on the concept of "human": what kind of person educational institutions, family, should educate; what kind of person is necessary for each country. Certainly, these statements were new to social and educational life as they give answers to kids, teachers, parents, society, and time questions. Widespread work by V. Vinogradov, devoted to the history development of such concepts as "human", "individual", "personality" to the middle of the nineteenth century became one of the fundamental researches in pedagogical science. We can add that the historical aspects of the above-mentioned conceptual-categorical apparatus also studied E. Wolski, V. Kolesov, S. Sorokin and other scientists. The discussion has been chronologically continued in time throughout the second half of the nineteenth century and it made possible to summurize such scientific and pedagogical paradigms that were further developed in the late nineteenth and early twentieth centuries. They include: humanistic, natural sciences, free development, religious (conservative), national.

The humanist theory was represented by I. Pirogov, who sharply criticized current educational system, because it imposed public demands, ideals, excessive professionalization, and did not pay much attention to human education, to its moral development, internal "I". "Do not hurry with your applied reality. Let it mature and strengthen the inner man; the outside will have time to act: he who will appear later, may not be such a skillful ..., but he will be the one for whom we can rely on; he will not do his own bussiness," – said the scientist (Ushynskyi**Error! Reference source not found.**, 1867: p. 56). K. Ushinsky's research "Man as a subject of education. The experience of pedagogical anthropology" (1868-1869) begins with the definition of the place of a person in society, where the world is considered as a whole.

After analyzing numerous scientific sources, we conclude that the most used pedagogical concept was the very concept of "human". Usually scientsts define it in three main aspects:

- anthropological;
- etymological;
- like a kind of homo sapiens.

D. Michelson says that, "from the anthropological point of view, "human" is "a distribution of races on earth. Separate groups of the human race have physical chracteristics, they differ in the stability of their character and are transmitted from one generation to another" (Mikhelson, 1865: p. 101). For example, the peculiarities between different people have become the basis for the distribution of races. And another definition of "human" as a kind of "homo sapiens" - a clever person, who has "his own vision of the world, interacts with society, is able to think independently" (Mikhelson, 1865: p. 102).

Particular attention in the context of investigated constituent of the conceptual-categorical apparatus deserves the work of N. Wessel "Guide to the teaching of general educational subjects, which are included in the course of general educational institutions". The author gives a detailed analysis: "Human" is a living

organism who is able to realize, to know, to understand the surrounding world (natural and social) and his activity, through which the world and himself changes Vessel, 1884: p.502).

In the process of analysing the system of basic pedagogical concepts we can single out the works of M. Olesnitskiy and K. Ushinskiy, who give the following interpretations of given concept: "A person is valuable creature who depends only on the ideas that exist in his personal experience. These ideas are embodied in consciousness since the appearance of the first person as a general idea of human existence. But they become aware or become a guide in life as they arrive. The essence of this idea, revealed by Socrates, is determined by the fact that knowledge acquires significance for a man only when he comprehends his content and establishes the connection of this knowledge with himself" (Olesnytskyi, 1886-1887: p. 35); "Human" - his soul - activity, everything in this world (and the state, and the people, and humanity) exists only for man, the soul - the dominant essence of man in comparison with the body, and the dominant component of the soul is activity - the work is spiritual, free, which fills the human soul" (Olesnytskyi, 1886-1887: p. 89).

It is worth noting that specialized dictionaries respectively submitted certain definitions, based on the topics presented in this source. So, in "The Dictionary of Physical and Moral Education" by P. Engalychev (1827) and in "General Church Slavonic-Russian Dictionary" by P. Sokolov (1834): "A human is brought up not by external conditions, which have some influence, but mainly due to his internal (subjective) capabilities, which should be demanded by the teacher" (Sokolov, 1834: p. 607); "Human is a being of God. He is sensual, natural, adheres to laws and social rules, thinks about eternity, the kingdom of God" (Sokolov, 1834: p. 336).

Let's add that in "Explanatory Dictionary of Living Great Russian Language" V. Dal's definition of this concept takes up to 3 pages and is quite detailed and versatile. According to this, "human"" is "every human being above the earthly creature, who is endued with mentality, will and language" (Dal, 1880-1882: p.95). His difference from the animal and the plant consists in the combination of mentality and will, moral values and conscience, which already forms not the kind, species, but the kingdom (society) of human. The following interpretation of "human" - servant, attendant, houseboy, and one more figurative meaning – "there are many people, but no human being. You do not live with richness, but with a man. Divine is not of man, but man is of God" (Dal, 1880-1882: p.97). "Encyclopedia Dictionary" by F. Brokhauz, I. Efron states that "human" is a concentrated compressed society. The development of personal and social life historically takes place in three stages: tribal, national-state, universal, since the supreme does not suppress the lower, but only modifies it; hence the establishment of a state order, instead of generic routine, the blood parentage of individuals does not lose its meaning, but only ceases to be the principle of independent groups (families), limited only to a private or home (family) union, which does not already have internal jurisdiction, nor the rights of blood revenge. Personality in the way of his unlimited desire for greater and better becomes the beginning of social progress" (Brokguaz, 1890-1907: p.53). Consequently, in the reference and dictionary sources, the concept "human" is quite extensive and multifaceted. As we can see, this definition covers all aspects of social life, because it is valuable and its understanding depends on those ideas that exist in personal development process.

In comparative analysis of the conceptual constituent, "human", let's look at foreign-language publications that present a slightly different interpretation of it. For example, A. Fletcher states: "Human is a unique, independent, moral (supports the state system) person, devoted to home duties, neighbors, country. Human development is a combination of physical and mental development, which are closely interconnected and interact with each other. The effect of physical development on mental is that each subsequent stage is limited by the level of structural component of the brain, and is commonly known as the result of physical changes in puberty. On the other hand, too rapid mental development creates a lag, and in extreme cases, stpos general physical development. Scientists distinguish between different periods of human development - newborns (infants), children, adolescents, etc., each of them are divided according to age limits, as well as mental changes" (Fletcher, 1888: p. 345). It is worth noting that the term "human" is absent, however, there is the definition of "child" – "any person till 14" and "young person" – "any person from 14 to 18 years" (Fletcher, 1888: p. 345).

V. Severance explains it in this way: "If a child experiences anger, then she becomes more like an animal than a human being. "Human" is used a male person for a profession of teacher; God is also "man"

male. The man teacher has greater power and influence on students than the woman teacher, sincebecause he is associated with a priest (also a husband) or with a God-like man, whom everyone trusts and obey. Social, political and industrial backgrounds have changed the ecclesiastical and moral nature, henceforth there is an average man who is indifferent to all the theoretical doctrines of that time, since the main purpose for him is to feed himself and his family. A priest is a wise man who serves God, has education, teaches other common people moral and spiritual values. As a result we have a completely new concept - an average person who is much lower than his status and mental abilities, or someone like a "slave" who works to feed himself and his family" (Severance, 1886: p.723).

In the "Universal Dictionary of Education and Upbringing", the author, in addition to his own definition of the concept "human" adds another interpretation of other scientists: "What is a man like? Is he really a miracle? Is he a terrible collection of incompatible things? Is he a mystery?" (A. Bossuet), "Man is God who remembers his falling from heaven" (E. Lamartine). God created man from dirt, but he created him in his likeness .... Life and death, good and evil, promise to the person that he will be the best one, given his contribution to the world. Man lives only a short period of time, and his days are full of suffering ... This is a flower that does not blossom. He flees like a shadow, and never stays in the same state ... Human life on earth is a constant struggle, and his days are like the hires of everyday life" (Campagne, 1869: p.550).

We have laconic determinations from F. Buisson and M. S. Munch: "Man is not a copy of a particular species, but an individual who must be brought to be a person" (Buisson, 1879: p.1239); "Man is created for society and the state, he must folow the rules and laws" (Buisson, 1879: p.309). In particular, A. Vogel in the "Systematic Pedagogical Encyclopedia" (1881) states that "doubt is the ultimate goal of man, because all other goals and objectives must be subordinated to the goal of improving his nature. The true man is a rationally simple being that feeds on the products of his own cooking, he is characterized by a specifically human - a person, that is, part of the absolute mind and ideal, an individualized entity that is capable of progress for the development of one's own mind" (Vogel, 1881: p. 17-20). It follows from this that the concept "human" in a foreign language has a slightly different interpretation, since, besides the definition itself, the authors add additional components: development, purpose, meaning of life, progress, etc.

In the context of our study, overlook the scientific and encyclopaedic literature of the beg. XX century, because it is a significant source-study determinant of concepts "human", "individual", "personality" explication. For example, A. Bruckner determines the concept "man" in the following way: "An entity that belongs to a society, is characterized by development, interaction with others and capable of upbringing, work, learning, and can express his own feelings"(Bruckner, 1927: p. 79).

In order to generalize the analyzed information, an analysis of various scientific sources was done. The table 1and 2 reveals the meaning of the concept of "human" in the nineteenth – begin. XX century, so summarizing the information in the form of tables clearly represent the nature of the results.

Table 1: The definition of concept "human" in domestic studies of XIX – beg. XX cent.

Author	Concept Structure																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Yanovskyi N. M (1803)								+					+			+						
Russian Academy Dictionary (1806)															+							
Engalychev P. M. (1827)																	+					

Sokolv P. I. (1834)	+	+								+								+	+			
Obodovskyi O. G. (1835)				+			+	+	+	+												
Pyrogov M. I.(1856)								+														
Dal V. I.(1863)		+					+								+					+	+	+
Mikhelson O. D. (1865)			+	+	+	+	+															
Ushynskyi C. D. (1867)	+	+					+	+														
Yurkevych P. D. (1869)								+	+			+	+		+							
Mednikov S. A. (1873)						+								+								
Vessel N. H. (1874)						+								+	+							
Dictionary (1885								+				+							+			
Ventsel C. M. (1911)								+			+											

1. Part of nature. 2. The creature of God. 3. Race on earth. 4. Endowed with physical ability. 5. Interaction with society. 6. Has character, mind, soul, will, conscience, moral values. 7. Capable for development, self-development. 8. Capable for education. 9. Has feelings. 10. A socio-biological entity. 11. Capable for learning. 12. Able to work. 13. Capable for consciousness, cognition, understanding of the surrounding world. 14. Living being, organism, earthly creature. 15. Husband. 16. Is raised not due to external conditions, but internal capabilities. 17. Follows the laws and social rules. 18. Reflects the eternal faith in God. 19. Each of the people. 20. Endowed language. 21. Moral values and conscience. 22. Satisfaction of his own needs.

Table 2: The definition of concept "human" in foreign studies of XIX – 20-ies XX cent.

Author		Concept Structure																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	Munh M. S. (1854)														+				
2.	Campagne E. M. (1869)								+										
3.	Buisson F. E. (1879)				+						+		+						

4.	Vogel A. (1881)	+			+						+		+	+		+	+	+	
5.	Severance V. B. (1886)						+		+										
6.	Fletcher A. E. (1888)	+		+	+														+
7.	Litre E. (1912)	+										+	+		+				+
8.	Bruckner A. (1927)		+		+	+		+		+		+							+

1. A unique independent being. 2. Has ability to upbringing. 3. A person devoted to the family, country. 4. Has the ability to develop. 5. Has the ability to learn. 6. Husband. 7. Iinteracts with others. 8. Services to God. 9. The essence that can express his own feelings. 10. An individual. 11. Has the ability to work. 12. A personality. 13. Has the ability to progress. 14. Follows the laws and norms. 15. Feeds by self-cooked products. 16. A part of absolute mind. 17. A race on earth. 18. Belongs to a society, supports state system. As we can see from the tables, 40 constituents of the concept "human" are presented. We have following constituents: part of nature (2), the creature of God (3), race on earth (1), endowed with physical ability (2), interaction with society (3), has character, mind, soul, will, conscience, moral values (4), capable for development, self-development (9), capable for education (3), has fellings (2), a socio-biological entity (1), capable for learning (3), able to work (2), able to consciousness, cognition, understanding of the surrounding world (2), living being, organism, earthly creature (4), husband, (1), is raised not due to external conditions, but internal capabilities (1), follows the laws and social rules (1) reflects the eternal faith in God (2), each of the people (1), endowed language (1), moral values and conscience (1), meets his own needs (1). Therefore, Table 2 shows that "human" in foreign scientists understanding consists of 18 elements: a unique independent being (3), has the ability to upbringing (1), a person devoted to the family, the country (1), has the ability to develop (4), has the ability to learn (1), husband (1), interacts with others (1), services to God (2), the essence that can express his own feelings (1), an individual (2), has the ability to work (2), a personality (3), has the ability to progress (1), follows the laws nad norms (2), feeds by own cooking products (1), a part of absolute mind (1), a race on earth (1), belongs to a society, supports state system (3). We may sum up that "human" is a living entity, an organism, an earthly, God's creature, who has character, mind, soul, will, conscience, moral values (the statement of domestic teachers). At the same time, according to foreign scientists, "human" is a unique independent being, a person capable for development.

In our opinion, the discrepancies in the definitions of the concept "human" and the differences in identification features of its determinism are only confirmed by the fact that it is part of the conceptual apparatus of several branches of scientific knowledge and determines a variety of approaches to its explication. Consequently, this constituent is actively used in pedagogy, philosophy, because person acts as the object of research, as an integral part of all the above processes.

In general, the study of scientific researches of the appearance and development of concepts has been shown that in the history of pedagogical concepts system formation can be traced several stages, indicated by the creation of conceptual terminology dictionaries, encyclopedias, investigations devoted to this issue.

Conclusion

Finally, the following conclusions can be drawn.

1. The principles and approaches used in this study, as well as general conclusions, directly influenced into the logic of allocation of periods of development and formation of the basic concepts in pedagogy. On the basis of the analysis of philosophical, psychological, logical, linguistic, historical and pedagogical sources, it is possible to distinguish five stages of pedagogical concepts system formation. Such periodization is carried out by taking into account the degree of availability and scientific elaboration of the

main components of the conceptual-categorical apparatus of a given period: Ethnopedagogical; Christian; Philosophical; Philological; Pedagogical; Integration-comparative.

2. At first sight, there may be a false impression that the definition of the essence of basic concepts is a theoretical problem, the solution of which has an academic interest. In fact, this is not true. It is no coincidence that specialists in the field of psychodydactics drew attention to the significance of knowledge at the conceptual level, which first of all presupposes the systemic nature of assimilation, understanding of the phases of "conceptual experience": motivation, categorization, enrichment, transfer, curtailment, as well as the fact that the assimilation of concepts is peculiar key to understanding the essence of the processes of students psychological (including intellectual) development. So, we can distinguish six aspects of concepts assimilation:

– their assimilation allows to organize information, understand the hidden connections, get closer to understand regularity, in the process of concepts assimilation there is an expansion of consciousness field;

– the process of intellectualization of elementary cognitive functions takes place;

– the study of concepts contributes to socialization, openness to cultural heritage;

– the inner world is enriched, in accordance with individual desires and intentions;

– conceptual experience contributes to self-knowledge, own experiences. We shuoldn't forget about the importance of these aspects for both students and teachers.

Years of cooperation with teachers and managers of educational institutions allow us to conclude that the chaos is pequliar to the definition of basic concepts essence in the scientific environment, and it influences into the definition of priorities in practice. Mainly misunderstanding of personal development priorities contributes to a mechanical set of educational events which fully do not take into consideration the regularities of the process, the individual characteristics of both the student and the teacher.

4. The gradual transition to the information society, the rapid growth of life activity tempo, the importance of the personal factor in the economy, and competition in the labor market determine the attention to the intellectual potential of the nation and interstate associations. That is why the human factor becomes a pledge of economic development, security, prospects of social welfare.

5. The priority of our century will be the needs of an individual. The level of its psychological culture, the system of motivation, readiness for innovation activity are primarily personal significance. To determine the purpose, the system of priorities, the understanding of the regularities of successful training, work activity requires understanding at the level of basic concepts, and the desire for self-improvement and success, readiness for responsible parenting and motherhood must undergo a complex and contradictory process of internal evaluation and admiration.

Conducting a series of international conferences devoted to the system of basic pedagogical concepts: person, individual, personality, development, education, upbringing, pedagogy, studying, etc., preparation on the basis of comparative studies of European pedagogical dictionaries would significantly contribute to the improvement of the quality of education, the level of pedagogical skills, integration of educational space, innovation and creativity.

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Methodological Support for Internal Control of Autonomous Institutions

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Abstract
The integrated model of the internal control system of an autonomous institution proposed by the authors considers the systematic approach, risk orientation taking into account the factors of the internal and external environment, incorporating the model into the business processes, accommodating the ultimate goal of implementation – the increase in the efficiency of business processes accompanied by cost reduction and profit growth in financial responsibility centers. The scientific and practical studies conducted have revealed the interaction of the institutional environments of an autonomous institution and internal control, in which there is a direct interaction with the internal institutional environment of the autonomous institution both at the microlevel and at the mesolevel, taking into account proper analytical support. This interaction means the priority of the institutional environment of an autonomous institution.
Keywords: autonomous institutions, institutional environment, internal control, external control

1. Introduction

An institutional environment is a set of environmental factors that affect the functioning of business entities through the activities of many political, economic, social and other institutions. In this regard, an institutional environment can be defined as a set of formal and informal rules (institutions) that affect the ratio of incentives in the activities and determine the achievement of maximum agreement between its users. In turn, according to Lefler and Gabler [22], informal institutions in the institutional environment can be presented in the form of standards and norms of behavior that are mandatory for society, and norms of behavior regulated for corporate needs.

2. Literature Review

In the scientific studies of Zain, Davidov [11, 34], and later practical studies of Mele [26], the following levels are distinguished in the institutional environment – the external and internal institutional environment, of which the external one, consisting of formal and informal institutions and providing the impact on the internal environment of an economic entity, represented by its own specific cultural and functional "micro-institutions" (formal and informal), is prevalent. At the same time, when studying the application of factors of the external institutional environment that affect significantly the formation of the internal institutional environment of an economic entity, the taxation and transfer institute [29; 32; 33], the current state budget and tax policy, and the market institution [3], including the mechanisms of state regulation of market relations, as well as various formal and informal rules and agreements on the regulation of individual markets, should be mentioned specifically [13].

3. Method

3.1. Participants

The participants of the present study based on the institutional concept and audit model proposed by Church [7], it can be assumed that the institutional approach makes it possible to consider internal control as an institution, i.e. as a set of legal norms, rules, standards, concepts and implementation mechanisms of the economic entity. In this regard, with a greater degree of probability it can be assumed that the institution of internal control consists of principles, methods, objects, basic categories and requirements and is located in the institutional environment of internal control of an autonomous institution. At the same time, the institutional environment of the internal control of an autonomous institution consists of two levels – the

external institutional and internal institutional environment of internal control. As a legal basis, the external environment of internal control of an autonomous institution is represented by formal and informal institutions, and the main formal institutions of the external institutional environment of internal control are:

- the international standards of internal control;
- Russian experience, limited by the Federal Law No. 402-FZ dated December 6, 2011 "On Accounting", as well as the federal accounting standards for public sector organizations (for institutions), the explanations at the level of the Ministry of Finance of Russia regarding the organization and implementation by an economic entity of internal control of the economic life facts, accounting and financial (fiscal) statements for commercial organizations.

Since the institutional internal environment is identical to the concept of internal control environment, according to the authors, the formal institutions of the internal environment of internal control should also be represented by local regulatory documents, reflecting the general attitude of the administration and management towards the need for control in the institution and the actions undertaken in this regard. In particular, they include: the developed regulation on the distribution of responsibility and authority; the ongoing personnel policy; the procedure for preparing financial statements for external users; the regulations for the implementation of internal management accounting and reporting for internal purposes; the regulation on the conformity of economic activity as a whole with the requirements of the current legislation, as well as the style and basic principles of the autonomous institution management, taking into account the organizational structure of an autonomous institution. In this regard, the practical application of the current institutional environment model of an autonomous institution's internal control can be represented as the following interaction algorithm (Fig. 1).

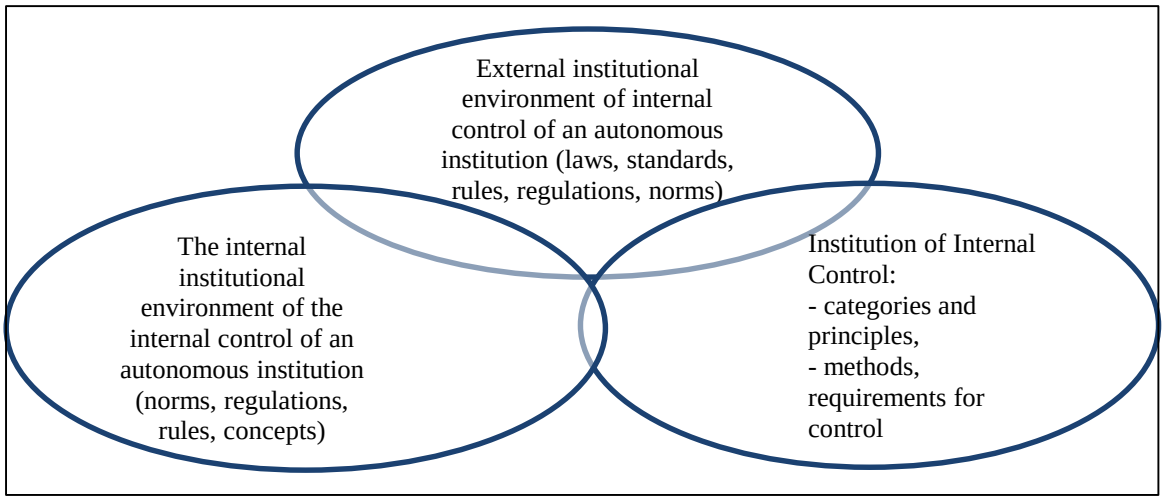

Figure 1. The interaction of the internal control institutional environment in an autonomous institution. Source: the authors' own development

At the same time, the proposed algorithm serves as one of the important areas of analysis for internal control, as well as the effective interaction of the internal institutional environment of internal control with the external institutional environment. On the other hand, it allows the analysis of the interaction of the internal institutional environment of internal control with the institutional environment of the autonomous institution as a whole. Such interaction can be not only highly productive but also fraught with conflicts and reduced efficiency.

3.2. Materials

The teaching materials used in the current study of the first interaction is generally clear and the effectiveness of this interaction includes total involvement of formal environmental institutions in the development of local legal documents on the internal control of the institution, both on the basis of these

formal rules and directly of their own, taking into account the need to develop internal control in an autonomous institution. At the same time, the essence and the effectiveness of the interaction of the internal institutional environment of internal control with the institutional environment of an autonomous institution can be presented as follows. The external institutional environment of an autonomous institution is formed by formal and informal institutions that govern the relationship of the institution with the state, consumers of work and services, suppliers, credit organizations and other legal and physical entities, and, in turn, it determines the internal institutional environment as part of formal and informal institutions (rules) that determine the development and functioning of a particular autonomous institution. In turn, the internal institutional environment of internal control directly interacts with both the internal institutional environment of an autonomous institution and the external environment. In this regard, as a practical application, the relationships between the microlevel and the mesolevel, as well as the microlevel and the macrolevel, can be represented as the following interaction (Fig. 2).

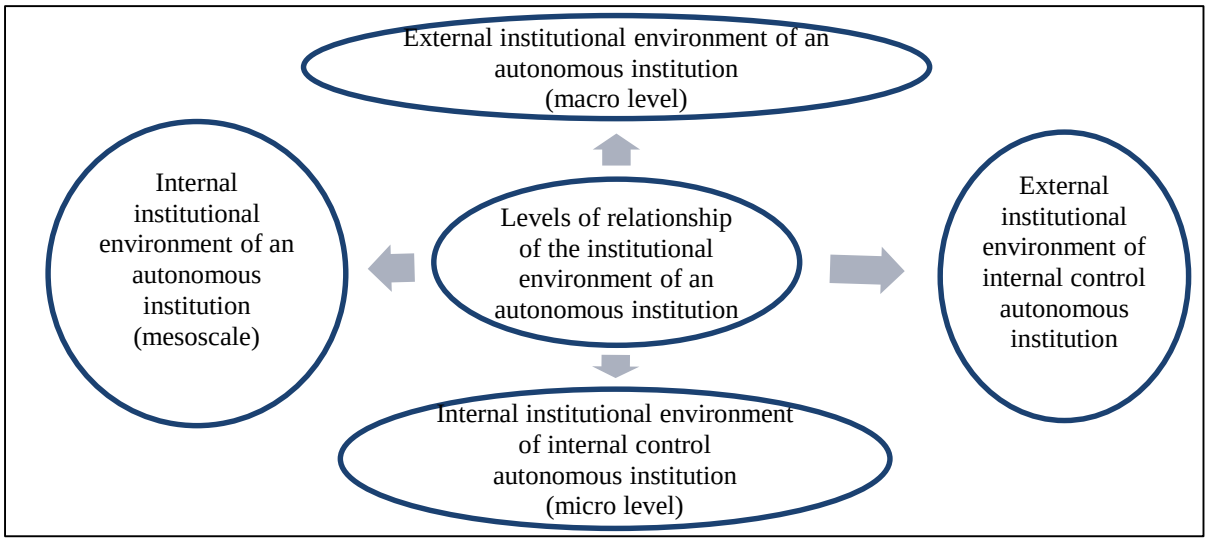

Figure 2. The mechanism of interaction of the levels of the institutional environment of an autonomous institution
Source: the authors' own development

The interaction mechanism, proposed in Fig. 2, primarily means the priority of the formal rules of the institutional environment of the autonomous institution over the formal rules (institutions) of the internal institutional environment of the institution's internal control and, therefore, requires mandatory consideration, when developing local regulatory documents on internal control and legal documents on the features of the development of autonomous institutions. In this regard, it should be noted that, from the standpoint of the institutional approach, the internal control system of an autonomous institution is the more effective, the more effective is the influence of institutional factors (economic, financial, etc.) aimed at improving the formal and informal rules on internal control in autonomous institutions, as well as the whole autonomous institution.

Special mention should go to the main factors such as the improvement of formal institutions in the field of accounting and reporting, which are both objects of control and the main sources of information support for the internal control of an autonomous institution, which is able to form a full-fledged effect for the formation of an internal control system using various practical models. The most applicable internal control models in the world practice are: COBIT developed by the Information Systems Audit and Control Association (ISACA), COSO, SAC, SAS [5], Russian internal control models based on the risk-based integrated approach [8]. At the same time, as a rule, the risks are incorporated in the systematic approach used and the main object of internal control; and the element "control environment" is incorporated in the

institutional internal environment. The advantage of the integrated model is that the new concept involves goal setting and the identification of events, and control as the instrument to increase the likelihood of goal achievement [16].

3.3. Procedure

Moreover, the practical significance of the applied model of internal control is focused on:

a) risk management of business entities;

b) compliance with the optimal balance between the profitability of the organization and risks;

c) the effective and cost-effective use of the necessary resources to achieve the main objectives of the organization.

Taking into account the established theoretical concept, the model of risk-based internal control (RBIC) can be applied in the Russian market. The development of this model was started at the beginning of this century, and in 2014 it was approved as mandatory for commercial banks. Unlike the COSO model, according to which management is carried out considering the assessed risk, in the Russian RBIC model, management itself is already considered a risky event. At the same time, risk-based internal control can be interpreted as prevention, assessment and risk control using various management technologies in all areas of activity and business units aimed at the maximum possible reduction of risks. However, the main differences between the use of the COSO and RBIC models are the following significant aspects:

1. Unlike COSO, where the great importance is attached to the internal environment, RBIC is focused on the verification of the activities of the units in the context of business processes from the standpoint of building a risk management system.

2. In COSO, the maximum importance is attached to internal control monitoring as a form of subsequent control, and monitoring is one of the main elements of the COSO model. RBIC is focused on building the internal control system.

3. In COSO, the greatest importance is attached to the operation of the Board of Directors, while in RBIC – to the process of interaction of all management bodies.

4. The current concept of RBIC includes the following elements: compliance control, as legal and regulatory risk monitoring; control of the whole set of potential and actual risks assigned to the internal audit service; monitoring of the compliance with procedures and deviations performed by the internal control service; risk assessment performed by the risk management service, which is an integrated element of any technological business process. Risk assessment includes an assessment of the risk factor of any business model, including the development strategy, the business plan, the concepts for the individual areas and business development, as well as the assessment of risk appetite for all development factors. Moreover, the mechanism for monitoring procedures to combat money laundering and terrorist financing is assigned to the financial monitoring service. Based on the fact that the Russian model is identical in content to compliance control, which is an element of a risk-based model of internal control, the authors believe that this model has lost its purpose. Its existence can be justified only if the risk-based model is ineffective in the economic entity. At the same time, the applied mechanism of the system-oriented approach of internal control is that the main object is the structural units of the economic entity, reproduced as a process, and the economic entity as a whole represents a chain or a network of processes. In a strict understanding, in the authors' opinion, this is not a model, but the basic principles (platform) that underlie the construction of an effective and indicative model of internal control, which allows the assessment of the degree of influence of standardization by the type of costs incurred in an autonomous institution.

4. Results

The normative costs are based on the basic standard of costs for the provision of services (work) related to the state task, which falls into two standards: the basic standard of costs directly related to the provision of services (work), for example, employee salaries, material costs, rental costs, and the basic standard cost of general business needs. Thus, on the basis of the results, it turns out that the first basic standard of costs directly related to the provision of services (works) is related not only to direct but also to overhead costs (depreciation, rent, and other costs) that cannot be allocated for services (work) in accordance

with the standards. As for general business expenses, in the authors' opinion, in this case, the standards for their establishment should not be discussed, because they are not subject to standardization at all. In this regard, it is advisable to establish objective standards for the expenses (or resource consumption) only for variable costs that have a direct relationship with the volume of services rendered or works performed (these include the remuneration of employees, materials consumed in the process of rendering services and performing work, etc.). These standards can be established, for example, as the standard of remuneration of employees per unit of services, the rate of consumption of materials per unit of services, etc. With regard to the definition and distribution of general and overhead (indirect) costs, a slightly different approach should be applied. First of all, it must be noted that for the most part these expenses are not the same. Secondly, it is necessary to single out those expenses that can be predicted, estimated in cost terms and which are regular from month to month. Such expenses include payment for communication services, transportation costs, maintenance of buildings, payment of utilities, rent, etc. and they can be set by extrapolation. As for their distribution by services, for the base it is possible to recommend the remuneration of workers directly related to the provision of public services.

With regard to general business and overhead costs that are carried out irregularly (one-time lump sum costs not related to the development of an autonomous institution), and which cannot be estimated and predicted and the share of which is minimal, the authors support the position of those specialists who believe that depending on the availability of financial resources in the respective budgets, they should be financed outside the framework of financial support for the implementation of state (municipal) tasks. Special instruments can be used to finance these "irregular" costs – long-term and/or departmental target programs or targeted subsidies. Non-recurring costs for the development of an autonomous institution are included in their entire amount in overhead costs and are distributed as noted earlier – in proportion to the wages of employees directly related to the assignment. Therefore, based on the provisions formulated by the authors, it follows that the formation of basic standards for the costs of public services should exist only in relation to direct costs, and the understanding of basic standards should not appear in relation to overheads as part of direct expenses and general business expenses.

General and overhead (indirect) expenses are determined and distributed according to an individual scheme and should be designated as non-standardized general economic and non-standardized overhead costs (expenses). Hence, the authors suppose that the current "definition of standard costs for the provision of public services" should be worded as "the definition of integrated (total) costs for the provision of public services", including the formation of basic standards for the costs and non-standardized overhead costs and the expenses for general business needs. Thus, in contrast to the calculation procedure in force in Russia, the cost determination scheme, proposed by the authors for calculation of the amount of financial support (subsidies) of a state (municipal) task for an autonomous institution, involves the division of the regulatory costs into two groups – the costs of provision of state (municipal) services and performance of work calculated according to the standards, and non-standardized overhead and general business expenses of the institution determined by calculation. This approach to determining the financial support for the fulfillment of state (municipal) tasks by autonomous institutions will not only adequately and objectively determine the amount of subsidies (financial support) to an autonomous institution, but will also provide information on the total cost of public services (work), the share of overhead (permanent) costs in the cost of public services and works, the cost of public services per user of services (works). Such information is the basis for making informed management decisions related to the provision of state and municipal services to consumers and the performance of work. At the same time, the current mechanism of financial support for the fulfillment of state (municipal) tasks presupposes to apply a normative approach in the cases when normative costs are defined as the product of the cost of a cost group unit by the number of cost group units, while the authors offer an integrated method that includes the costs calculated normatively and the costs calculated in other ways, and involves passing through several stages.

Stage 1. The formation of basic regulatory costs. Determination of standardized costs, when for all services rendered and works performed by state (municipal) autonomous institutions in accordance with the tasks of the founder, neat basic standards for the costs of working time and material resources are formed, according to the following main aggregated cost blocks:

a) the cost of working time of the employees directly involved in the process of service (work) rendering [17];

b) raw materials used in the process of service (work) rendering;

c) the cost of purchase of the necessary equipment and the other direct costs [31].

Stage 2. Determination of the overhead costs as part of expenses directly related to the provision of services (works) and expenses for general business needs. As part of the costs of autonomous institutions directly related to the provision of services (performance of work), as already noted, there are overhead costs, indirectly related to the provision of services and performance of work [19]. General business expenses also include overhead costs such as expenses for utilities, communication services, administrative and technical staff remuneration, determined by calculation, since it is impossible to establish correctly the cost standards for them. Moreover, these types of costs include both regular (utilities, rent, communications, etc.) and irregular costs (repairs, etc.), i.e. costs for which there is a clear frequency of their implementation and those for which there is no frequency [20]. It is for the first group of overhead costs that it should be noted that when calculating the financial support for the fulfillment of state (municipal) tasks, such an approach is possible when the costs are related to the cost of services (works) provided as part of the task, in accordance with the established proportion of their distribution among services (works). Accordingly, the proposed changes and improvements in the accounting and determination of overhead costs and, in general, the costs underlying the formation of the amount of budget financing (subsidies) for the provision of state (municipal) services will entail positive changes in the organization of the internal control system.

5. Discussion and Conclusion

The effective model is based on the understanding of internal control as a focus on cost optimization, efficiency improvement of the existing business processes and cost reduction in parallel with the establishment of financial responsibility centers (FRCs) and formation of the financial flows in an economic entity. Therefore, effective internal control can be interpreted as control over business processes and the FRCs in all areas and divisions of the economic entity, aimed at cost optimization as a condition for further development. At the same time, the areas of effective internal control may include:

a) the definition of key indicators of the FRC in the long term, taking into account the analysis and building of a model of business processes operating in an economic entity [6];

b) the creation of an identification card of business processes and financial flows operating in an economic entity;

c) adjustment of the interaction system of various departments with building business process models [15].

Based on the focus, the model of effective internal control as a whole is a technology for building business processes, in particular, adjusting the business model. In this regard, the experience of organizing internal control abroad based on the Turnbull Review Group model developed by the Institute of Chartered Accountants in England and Wales for economic entities represented on the London Stock Exchange [27] is worth noting. At the same time, it is recommended to apply the process-oriented approach, considered as an integral part of management processes [29], and not as a single measure for the implementation of regulatory requirements, in which internal control is included in the organization's business processes. An important role in the English model belongs to the assessment of effectiveness of the functioning of the internal control system, for which management should take into account the influence of the following factors:

a) the contribution of internal control to enhancing the sustainability of the economic entity [1];

b) the nature and extent of the risks and the degree of reality of external threats [28];

d) the cost-benefit ratio of internal control [21].

The formation of the German-Swiss model of internal control was based on KonTraG's increased requirements for the organization of internal control, based on the integration of risk-based internal control with the business processes of the organization and the departure of the internal control system beyond the accounting process, covering all areas of the organization. However, the main goal of KonTraG, according to Ang [2], is:

a) the responsibility of the company's management for risk management and risk management (risk classification and control);

c) the establishment of an early risk warning system [9];

d) the prophylactic monitoring and detection of erroneous designs, such as viruses, illegal content, IT security;

e) transparency of the company for decision-making by the investor [10].

It should be noted that the KonTraG principle is that all business risks are detected, and the company is considered as a system that cannot be compromised by individual risks [31]. In turn, the Russian model on the platform of the system-oriented model is based on the indicative model, which is based on a vision of internal control in the form of an analysis of the dependence of the economic entity, with the identification of business processes, on indicators (factors) of the external and internal environment as the parameters of competitive advantages, in parallel building interaction with indicators (factors) of development in terms of their impact indicators of the environment [12], using various analysis methods, including multivariate analysis and multidimensional scaling in the face of macroeconomic uncertainty [23]. At the same time, in Russian reality, in the effective model (based on the principles of the system-oriented model), the process-oriented model was enriched additionally by including not only business processes in the model. Therefore, indicative internal control can be defined as control over the activity of an economic entity with the identification of business processes and taking into account the influence of indicators (factors) of the internal and external environment on the final result of this business process using information technologies and management technologies.

Based on the study, it seems to the authors that given that the economic entities improve their management by the introduction and replacement of the functional management of the process management with the formation of business processes, and also considering the active creation of financial responsibility centers (FRCs), the authors consider the use of the effective model the most promising internal control model. At the same time, the authors believe that it is impossible to ignore risk management prevailing in economic entities and the analysis of the influence of the external and internal environment factors. In this regard, the authors, by analogy with the German KonTraG model [18], where the risk-oriented and process-oriented models of internal control are synthesized, consider the integrated (complex) model of internal control combining the effective, indicative and risk-oriented models to be the most progressive and efficient one. Therefore, based on the authors' presentation of the integrated internal control model, its main components will be: the systematic approach, risk orientation taking into account the factors of the internal and external environment, embedding the model in business processes and financial responsibility centers [4]. The selection process and the implementation of a rational, economically sound accounting policy based on federal regulations, including federal accounting standards for public sector organizations, make it possible to influence the efficiency of the use of material, labor and financial resources, accelerate the turnover of capital elements, obtain additional internal sources of financing capital investments and current assets, attract external resources to expand activities. Moreover, the conducted scientific research allows formulating the following provisions.

1. Based on the conceptual vision of internal control for an autonomous institution, a comprehensive (integrated) model of internal control is proposed, which includes the individual components of the risk-based, systemic, effective and indicative models. Based on the authors' presentation of the integrated internal control model of an autonomous institution, its main components are: the systematic approach, risk orientation taking into account factors of the internal and external environment, embedding the model in business processes and centers of financial responsibility. The purpose of the model is to increase the efficiency of the existing business processes while reducing the costs and increasing the profits in financial responsibility centers.

2. An algorithm is proposed for application of the model of the institutional environment of the internal control of an autonomous institution, consisting of the levels – the external and internal institutional environment as part of formal and informal institutions (rules), including the institution of internal control, consisting of the principles, methods, objects, basic categories and requirements. At the same time, the procedure is proposed for the interaction of the institutional environments of the autonomous institution

and internal control, where the internal institutional environment of internal control directly interacts with the internal institutional environment of the autonomous institution as a microlevel and mesolevel, and with the external institutional environment as a microlevel and macrolevel. This interaction means the priority of the institutional environment of an autonomous institution.

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Professionally Important Psychophysiological Qualities of Patrol Police Officers

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Abstract

The influence of the authors' teaching method on the dynamics of the professionally important psychophysiological qualities of patrol police officers at the stage of professional development is investigated in the article. The essence of the authors' method is to apply specially developed situational tasks mastering the subjects of vocational practical training in the courses of the primary professional training of police officers. An experimental (EG, n=30) and control (CG, n=31) groups were formed from the listeners of the course of primary police training of the Center for Primary Professional Training of the National Academy of Internal Affairs, called the Police Academy. In order to achieve the goal of the research, a set of modern general scientific methods was used, including theoretical (the method of conceptual comparative analysis, structural and system analysis, synthesis, generalization); empirical (testing, pedagogical observation, pedagogical experiment); the methods of mathematical statistics.

According to the results of the experiment, significantly higher indicators of the attention capacity and distribution of the EG police officers, in comparison to the CG ones, were found; a significant improvement in the attention span and concentration in the EG was defined in comparison to the initial data; the increase of the indicators of neuropsychiatric stability and visual and involuntary memory of the EG police officers was determined. It indicates the positive impact of the authors' method on the dynamics of the professionally important psychophysiological qualities of patrol police officers at the stage of professional formation.
Keywords: psychophysiological qualities, professional training, patrol police, police officer.

Introduction

The mental cognitive processes of a person are one of the factors that determine the success of mastering the knowledge, acquiring special professional skills, the effectiveness of performing a certain activity, and they are a peculiar criterion of mental capacity [4, 5, 9, 10, 24]. The pattern of perception and mastering the information mostly depends on the adaptation of a future police officer to vocational training and specificity of professional activity [1, 3, 6, 17, 19].

An analysis of the characteristics of the patrol police professional activity shows that a police officer stays in the car performing the duties during a significant part of the work time. The qualitative performance of tasks in such conditions requires constant concentration and puts high demands on the neuropsychic stability and mental cognitive processes including attention, the ability to switch it quickly, high sensitivity of visual and auditory analyzers, speed of thinking, memory, etc. The proper functioning of these mental processes helps to keep the necessary service information in the memory, to process the data obtained more quickly that generally contributes to a more efficient performance of the duties.

The analysis of recent research shows that a considerable amount of psychological and pedagogical research is devoted to the study of the improvement of professionally important qualities of police officers [1, 7, 11, 18, 23]. The scientists proved a positive correlation between the development of basic physical and psychological qualities [8, 9, 12, 16, 20, 21], a positive impact of training on the development of professionally important characteristics [14, 17, 22].

2. Literature Review

The scientists in the field of legal psychology emphasize the importance of the development of the police officers' neuropsychic (emotional) stability because official activities are connected with the constant conflict situations that arise during the duties performance. Emotional stability is one of the most important determinants of the success of human life in general, a component of "emotional intelligence" that ensures the maintenance of friendly relationships. This characteristic is considered a manifestation of will. It determines the ability of a worker to regulate one's own emotions and overcome the state of increased emotional arousal during the performance of complex activities. Emotional stability is also interpreted as a feature of a person's temperament which allows performing the tasks reliably due to the optimal use of the reserves of the neuropsychic emotional energy. According to the results of modern research, emotional stability is formed in the process of human adaptation to extreme conditions of activity [2, 4, 9, 11].

One of the qualities that do not have own content but affect the course of a number of mental processes (perception, imagination, thinking, memorizing) is attention. The researchers [14, 15, 22] consider the attention to be the selective orientation of the process of perception on a particular object that is a signal to a worker to reflect it adequately during the time required to perform a particular activity. The attention is a specific psychophysiological phenomenon of a person, it can be considered as a process, state and characteristic of an individual [10, 25]. The scientists determined that attention is closely connected with the individual typological characteristics of the nervous system and is the result of complex integrative activity of the brain [1, 11, 13].

The degree of completeness and quality of reality perception depends on the level of performance of the central nervous system. That is, attention is a dynamic characteristic of any mental activity which influences the distribution of resources of the person's system of processing information and ensures the effectiveness of activity (both educational and professional). The essence of attention is to select significant influences and to extinguish insignificant and indirect ones. This makes the image clearer and the activity is

carried out accurately until the planned act is completed or the goal is reached. The most important functions of attention are the regulation and control of activity. The clarity and completeness of feelings, perceptions, and thoughts depend on what and how a worker focuses. The decrease in the attention intensity leads to a decrease in quality indicators of the work [9, 11, 13].

The special literature [14, 22, 25] mentions that the qualities of attention do not exist in isolation. They are closely interconnected and are the aspects of a single act of attention that does not remain constant but is refined due to human development. If a worker developed the habit of being attentive constantly, then the attention becomes a trait of one's character that is connected with persistent and focus attention, the ability to notice important for understanding characteristics in objects and phenomena. The attentiveness is the basis of sensitivity and tactfulness towards people and should be an integral feature of a patrol officer. The attention characteristics include span, concentration, distribution, switch, and volume. The attention span is a temporal characteristic of attention that is determined by the duration of focused attention on a particular object or activity. This characteristic of attention depends on the activity of the subject which is manifested in one's actions with the object. It is increased when performing practical or mental tasks that require a fuller display of objects [10, 14]. The attention switch is refocusing from one object or activity on another. According to scientists, this kind of attention is conditioned by the mobility of nervous processes. It is possible to improve the indicators of attention switch through training. The focus on the object has a certain intensity that is manifested at the concentration level. That is, the attention concentration is a measure of the person's immersion in a certain type of activity. The more attention is concentrated on the object, the less noticeable third-party influences are, and the more productive the activity is. Accordingly, the volume of attention is the number of objects that a person can simultaneously perceive in a short period of time. An important feature of the attention on which patrol efficiency depends is its distribution. The distribution of attention is the ability of a police officer to hold several objects in the attention, to perform two or even three activities at the same time. While performing the duties, a patrol officer must perform several activities at the same time. A police officer has to distribute attention, that is, to focus it simultaneously on different processes and objects, mostly with varying degrees of expressiveness. While patrolling by car, a worker must simultaneously monitor the traffic situation (state of own car, movement of other vehicles, behavior of pedestrians, road signs, condition of road laneway, etc.), monitor the instrument readings, control the maneuvers of movement of the car, as well as abidance by traffic regulations of other drivers and pedestrians, focusing on suspects, state car license plates, etc.

Concerning the investigations of a number of scientists [9, 13], the expression of attention depends to some extent on the development of the police officers' memory. The memory is the process of memorizing, keeping, reproducing and forgetting the past experience by an individual. The important memory processes for patrol police officers are remembering, keeping and reproducing essential service information. The assessment of neuropsychic stability, attention features, and memory of future patrol police officers will help determine the effectiveness of training methods aimed at the formation of professionally important psychophysiological qualities.

The aim of the study is to investigate the influence of the authors' teaching method on the dynamics of professionally important psychophysiological qualities of patrol police officers at the stage of professional development.

The tasks:

1) to determine the initial level of indicators of neuropsychic stability, attention, and memory of the listeners of the course of primary police training;

2) to investigate the dynamics of the studied indicators mastering the course of primary police training.

3. Method

3.1. Participants

In order to check the impact of the authors' teaching method on the development of professionally important psychophysiological qualities of the listeners of the course of primary professional training of police officers, a pedagogical experiment was conducted during the mastering of the course of primary

professional police officers training and it provided a statement and formative stages. During the statement stage of the experiment, the level of development of the studied indicators was determined to influence the personalities of the listeners of the experimental groups purposefully. The formation phase of the pedagogical experiment involved the creation of experimental (EG, n=30) and control groups (CG, n=31) from the listeners of the course of primary police training of the Center for Primary Professional Training of the National Academy of Internal Affairs, called the Police Academy. The study was conducted among the listeners in 2019 and it lasted for six months (from February to August in 2019).

3.2. Materials

The professionally important psychophysiological qualities of listeners in the process of vocational training were determined using the following methods: the multilevel personal questionnaire "Adaptability" (MPQ-AM), developed by A. G. Maklakov and S. V. Chermianin (to evaluate the indicator "Neuropsychic stability"), the test "Finding numbers" (the indicator "The distribution and volume of attention"), the method of numbers operation (the indicator "Visual and involuntary memory"), Burdon-Anfimov corrective test (the indicator "Attention span and concentration").

Multilevel personality questionnaire "Adaptability" (MPQ-AM) is designed to evaluate the adaptive capacity of an individual taking into account the socio-psychological and some psychophysiological characteristics, reflecting generalized features of neuropsychic and social development [13]. The methodology is based on the interpretation of adaptation as a process of continuous active adaptation of a person to constantly changing conditions of the social environment and professional activity. The questionnaire, designed to assess this indicator, contains 165 questions and the following scales: reliability (R); neuropsychological stability (NPS); communicative abilities (CA); moral normativity (MN); personal adaptive capacity (PAC). Determining the degree of development of the examined indicator, we used the NPS scale, the level of development of which ensures the workers` stress tolerance. The survey was conducted using a special form. Concerning the scale of this method, the growth of the NPS is determined by the decrease in its score. According to the points obtained, the following distribution of developmental levels is provided: a high level – from 0 to 5 points (9-10 sthenes); a sufficient level – 6-21 points (6-8 sthenes); a satisfactory level – 22-37 points (3-5 sthenes); a low level – 38 and more points (1-2 sthenes).

According to the "Finding Numbers" test, one should find the missing numbers on the checklist as soon as possible and cross them out [11, 13]. The level of development of the studied indicator was evaluated by the number of correctly crossed out numbers on the checklist by a 9-point scale. According to the points received, the following distribution of levels is provided: a high level – 8, 9 points; sufficient – 6, 7 points; satisfactory – 5, 4, 3 points; low – 1 and 2 points. The assessment of the indicator "Attention span and concentration" predicted the use of a Burdon-Anfimov corrective test. The levels of development of this indicator were defined in the following way: people with low attention span and concentration had a low and below the middle (up to 84%); people with moderate level of attention span and concentration (85-89%) had a satisfactory level; higher than the middle (90-94%) – a sufficient level; a high level – 95% and more.

The estimation of the indicator "Operational and involuntary memory" was carried out by the method of "Operation with numbers", the essence of which is to manage certain amounts of information in the form of single digits. A poster containing two numbers in each of the seven rows was presented to the listeners for 1 min. They had to summarize the numbers in each row, to compare the amount received with the number 10 and to remember the resulting difference. They also had to memorize the location of this difference on the poster (where the free cell is in this row) and then write it down in the checklist. According to the methodology, the tasks are performed twice using posters with different numbers. The evaluation of this indicator was carried out in points. The correct answer equaled 2 points. If the number was written correctly, but the place in the row was mixed up (or vice versa), it equaled 1 point.

3.3. Procedure

The organization of the pedagogical experiment did not violate the educational regime of the center of primary professional training of police officers and the educational process, the classes were held in accordance with the usual rules. In the EG and CG, the same amount of time was devoted to master certain material – 1102 hours. The standard curriculum provides normative (702 hours), variational (378 hours)

parts of the training program and control measures (24 hours). The normative part of the program consists of subjects of general vocational training (126 hours), professional theoretical (172 hours), and professional practical training (404 hours). The variation part contains training subjects related to the specifics of patrol activity (the organization of patrol police activity; the patrol activity for road safety; the patrol actions during mass events, etc.).

The authors' teaching method provided the introduction of innovations in the subjects of vocational training, including physical, tactical, weapons, first aid training, and externship. The classes of the EG differed from the CG because they provided the implementation of a number of innovations, including the use of advanced situational tasks (while working over the cases); the performance of situational tasks mastering the subjects "Tactical training", "Weapons training", "Physical training"; purposeful development of the necessary physical qualities.

According to the authors' method, working over the cases occurs after mastering the basics of training subjects in tactical and weapons training. In the process of performing the cases, future officers solve new tasks and non-standard professional situations. The use of variational situational tasks in the educational process contributes to the consolidation of the acquired theoretical knowledge, the formation of practical skills and abilities to quickly assess the situation predict the possible consequences, compare the level of threat and type of influence, according to legal grounds while applying the police enforcement measures. The development of professionally important physical qualities was carried out during the classroom (training) and extracurricular activities (morning physical training, classes in sports groups, self-training) according to the developed program which provided the use of a set of exercises aimed at increasing the level of general physical fitness, improving the static endurance of body muscles. The training was carried out taking into account a number of pedagogical conditions and principles.

4. Results and discussion

The study of the specifics of vocational training of patrol police officers provides reasons for a number of interrelated key stages, including the stage of professional self-determination, professional development, and professional growing. The stage of professional self-determination continues till professional education is acquired, it is professionally oriented and designed to encourage individuals to improve themselves that will help to develop the professionally important traits necessary for listeners to adapt to training and further professional activity quickly. The stage of professional development is the main one, during which professional training of future police officers takes place. This stage covers the period of the primary training of police officers and involves the formation of professional readiness for the effective performance of duties as a patrol police inspector. The training system at the stage of professional growing is aimed at updating knowledge and maintaining the achieved level of professional readiness and it provides the strengthening of the role of general physical training and the maximum practical orientation of tactical and weapons training.

As the stage of professional development is crucial in the training of patrol officers, the authors' method was developed for this stage of training and approbated during the primary training of police officers.

The analysis of the "Neuropsychic stability" states its improvement (decrease of indicators) for the EG and CG listeners at the formative stage of the experiment (Table 1).

Table 1. The dynamics of the professionally important psychophysiological qualities of the EG and CG patrol police officers during the pedagogical experiment, points

The statement stage of the experiment				The formative stage of the experiment			
EG (n=31)	CG (n=30)	Significance value		EG (n=31)	CG (n=30)	Significance value	
X±m	X±m	t	p	X±m	X±m	t	p
"Neuropsychic stability"							
19.1±1.62	18.6±1.31	0.240	>0.05	18.0±1.41	17.8±1.14	0.110	>0.05
pEGst–pEGf				p>0.05			
pCGst–pCGf				p>0.05			
"The distribution and volume of attention"							

5.90±0.24	5.57±0.31	0.842	>0.05	6.87±0.21	6.13±0.28	2.114	<0.05
pEGst–pEGf				p<0.05			
pCGst–pCGf				p>0.05			
"Attention span and concentration"							
87.48±0.82	88.63±0.81	0.998	>0.05	90.84±0.66	89.63±0.64	1.316	>0.05
pEGst–pEGf				p<0.05			
pCGst–pCGf				p>0.05			
"Visual and involuntary memory"							
5.48±0.26	5.30±0.28	0.314	>0.05	6.06±0.26	5.67±0.27	1.040	>0.05
pEGst–pEGf				p>0.05			
pCGst–pCGf				p>0.05			

Legend: pEGst–pEGf – significance of difference of EG police officers' indicators at the statement and the formative stages of the pedagogical experiment due to the t-test, pCGst–pCGf – significance of difference of CG police officers' indicators at the statement and the formative stages of the pedagogical experiment due to the t-test

The indicator of the EG listeners was decreased by 1.1 points and accounted for 18.0±1.41 (p>0.05). The indicator of neuropsychic stability of the CG listeners was also decreased: from 18.6±1.31 to 17.8±1.14 points. The analysis of the data from Table 2 indicated a slight change in the levels of development of the studied indicator. The number of listeners with a satisfactory level was 9.6% decreased in the EG. No EG listeners who had a low level at the formative stages of the pedagogical experiment were identified. The number of EG listeners with a sufficient level was increased: 54.8% at the statement stage, 71% at the forming stage. The number of listeners with a high level did not change – 9.7%. The results were similar in the CG: the listeners with a low level were not identified. The number of listeners with a satisfactory level was increased by 3.4% to 26.7%. The number of listeners with a sufficient level of development of this indicator was decreased by 3.4%: it was 66.7% at the statement stage, 63.3% at the formative stage. The number of listeners with a high level of development was increased by 3.3% to 10% (Table 2). Such results show that the neuropsychic stability of the listeners at the stage of professional development is not significantly improved. This problem requires extensive scientific research.

Table 2. The levels of the professionally important psychophysiological qualities development of the EG and CG patrol police officers during the pedagogical experiment, %

The levels	The statement stage of the experiment		The formative stage of the experiment	
	EG (n=31)	CG (n=30)	EG (n=31)	CG (n=30)
"Neuropsychic stability"				
Low	6.5	6.7	0	0
Satisfactory	29.0	23.3	19.4	26.7
Sufficient	54.8	66.7	71.0	63.3
High	9.7	6.7	9.7	10.0
"The distribution and volume of attention"				
Low	3.2	6.7	0	3.3
Satisfactory	38.7	46.7	22.6	43.3
Sufficient	51.6	33.3	51.6	36.7
High	6.5	13.3	25.8	16.7
"Attention span and concentration"				
Low	12.9	10.0	3.2	3.3
Satisfactory	51.6	46.7	29.0	33.3
Sufficient	22.6	26.7	51.6	46.7
High	12.9	16.7	16.1	16.7
"Visual and involuntary memory"				

Low	3.2	6.7	3.2	3.3
Satisfactory	45.2	60.0	32.3	46.7
Sufficient	41.9	23.3	54.8	40.0
High	9.7	10.0	9.7	10.0

The analysis of the results of the study of the attention characteristics of listeners through the test "Finding numbers" showed that the level of the indicator "The distribution and volume of attention" did not differ significantly at the statement stage of the experiment ($p>0.05$). This indicator accounted for 5.90±0.24 points in the EG, and 5.57±0.31 in the CG (Table 1). The analysis of data from Table 2 states that the highest number of listeners with a sufficient level of development of this indicator is 51.6% in the EG, the number of such listeners was slightly lower in the CG – 33.3%. Listeners with a high level of development of the studied indicator accounted for 6.5% in the EG, and 13.3% in the CG. 3.2% listeners with a low level of readiness were found in the EG; and 6.7% in the CG; 38.7% listeners with a satisfactory level were found in the EG; and 46.7% in the CG. The analysis of the indicator "The distribution and volume of attention" states its improvement for the EG and CG listeners at the formative stage of the experiment (Table 1): 5.90±0.24 points at the statement stage in the EG, 6.87±0.21 points at the formative stage ($p<0.05$). This indicator was increased by 0.56 points ($p>0.05$) to 6.13±0.28 points in the CG. The analysis of the data from Table 2 gives reason to note the change in the levels of development of the indicator "The distribution and volume of attention". The number of listeners with a high level of development of this indicator was increased by 19.3% in the EG. The number of listeners with a satisfactory level was decreased by 16.1%. The number of listeners with a low level of readiness was decreased from 6.7% to 3.3% in the CG. The number of listeners with a satisfactory level was decreased by 3.4%; with a high level of professional readiness increased by 3.4% in the CG. In general, the level of the distribution and volume of attention in the EG and CG was rated as sufficient. The conducted analysis proves the positive impact of the proposed author method on improving the distribution and volume of attention of listeners of the primary police training course. The listeners of the EG were observed to have a significant improvement in this indicator.

The indicator "Attention span and concentration" of the EG and CG listeners also did not differ significantly at the statement stage of the experiment ($p>0.05$). This indicator was 87.48±0.82% in the EG, and 88.63±0.81% in the CG (Table 1). The analysis of the levels of development of this indicator states the following distribution: the largest number of listeners in the EG are recorded to have a satisfactory level of professional readiness – 51.6%, in the CG – 46.7%. There were found 12.9% listeners with a low level of professional readiness in the EG, 10% in the CG; with a sufficient level in the EG – 22.6%, in the CG – 26.7% (Table 2). Received results indicate a satisfactory level of attention span concentration that does not contribute to the complete acquisition of the material by the listeners during the course of primary professional training.

The analysis of the indicator "Attention span and concentration" at the formative stage of the experiment showed that the mean values of the EG and CG listeners did not differ significantly ($p>0.05$). On the other hand, the comparison of the indicator of the EG listeners at the formative stage with the results of the statement stage of the experiment showed it was significantly improved ($p<0.05$). The average value of this indicator was increased by 3.36 points to 90.84±0.86 points (Table 1) that indicates the positive impact of the proposed changes in the attention span and concentration of future patrol police officers. This indicator was increased inauthentically to 89.63±0.64 points in the CG during the primary professional training course ($p>0.05$). The improvement of the indicator "Attention span and concentration" during the course of mastering a police officers' primary training course is certainly a positive step toward improving the professional readiness of future patrol officers for effective service. The analysis of the data from Table 2 notes changes in the levels of development of the indicator "Attention span and concentration" at the formative stage of the pedagogical experiment. Both groups showed a decrease in the number of listeners with a low level of development of this indicator from 12.9% at the statement stage to 3.2% at the forming stage in the EG, and from 10% to 3.3% in the CG. The number of listeners with a satisfactory level of development was also decreased by 22.6% in the EG, and by 13.4% in the CG. The number of listeners with a

sufficient level of development of this indicator was increased significantly: they accounted for 51.6% in the EG that was 29% more than at the statement stage of the experiment; and 46.7% in the CG (20% more than at the statement stage). The number of listeners with a high level of development of this indicator in the CG did not change during the experiment and it accounted for 16.7%. The number of such listeners in the EG was increased by 3.2% to 16.1%.

The analysis of the results of the "Visual and involuntary memory" indicator of the EG and CG listeners at the formative stage of the experiment by the method of operation with numbers showed that the average values of the EG and CG listeners did not differ significantly ($p>0.05$). On the other hand, the comparison of the indicators characterizing memory functions of the EG listeners with the results of the statement stage showed that they were 0.58 points better ($p>0.05$) and they accounted for 6.06±0.26 points (Table 1) that indicated the positive impact of the authors' method on the memory functions of future patrol officers. This indicator was increased by 0.37 points ($p>0.05$) in the CG mastering the course of primary professional training and accounted for 5.67±0.27 points. The analysis of the data from Table 2 notes a slight change in the levels of development of the "Visual and involuntary memory" indicator of the listeners. The number of listeners with a sufficient level of development was increased by 12.9% in the EG at the formative stage. The number of listeners with a satisfactory level was decreased by 12.9% in the EG. The trend towards an increase in the number of listeners with a sufficient level of development of the studied indicator from 23.3% to 40% and towards a decrease in the number of listeners with a satisfactory level by 13.3% was defined in the CG. A decrease by 3.4% in listeners with a low level was determined in the CG. The number of listeners with a high level of development of the studied indicator remained unchanged (10%).

5. Conclusions

On the basis of the conducted researches, the efficiency of the influence of the authors/ method on the psychophysiological qualities of patrol police officers during their training at the stage of professional development was proved experimentally.

It is determined that the initial level of the studied attention indicators of the listeners of the primary police training course is evaluated as satisfactory. The positive dynamics of the attention indicators of the EG and CG listeners mastering the course of primary professional training of police officers were stated. The EG listeners were defined to have significantly higher indicators of the attention span and distribution, in comparison with CG listeners at the formative stage of the pedagogical experiment ($p<0.05$). The mean values of the indicator "Attention span and concentration" of the EG and CG listeners did not differ significantly ($p>0.05$). However, the investigated indicator of the EG listeners was significantly improved ($p<0.05$), in comparison with the results of the statement stage. An increase in the number of the EG listeners with high and sufficient levels of attention development and a decrease in the number of t listeners with low and satisfactory levels were noted.

The positive influence of the authors' method on the development of indicators of neuropsychic stability and visual and involuntary memory was determined. However, the results were not significantly improved ($p>0.05$).

Disclosure statement. No author has any financial interest or received any financial benefit from this research.

Conflict of interest. The authors state no conflict of interest.

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Children's Health Maintenance Activities of the State and the Public Organizations in Ukraine at the Beginning of the 20th Century

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Abstract

The problem of development of healthy people requires analyzing and taking into consideration the theory and practice of health maintenance activities, implemented in various countries in different historical time. The article reveals children's health maintenance activities implemented by the Ukrainian state and the public organization during 1900-1917. Based on the archive materials, legislative documents of the studied period, scientific sources of university libraries, information of periodicals and original works of the scientists, memoirs and autobiographical literature, the authors have determined the reasons for children's poor health, named public organizations which were involved in medical and educational activities and specified the directions of their health maintenance activities. The reasons for children's poor health were weaknesses in organization of educational process at school, difficult living conditions in families, children's particular tendency to infectious diseases. The public organizations which provided health maintenance activities were societies of spread of literacy among people, Frebel societies, poor students' assistance societies, societies of care for homeless young orphans, physical education societies, the Society for the Promotion of Primary Education, the Ukrainian Society of School Education and charitable societies. The directions of health maintenance activities were providing hospital care for children, arrangement of children's institutions with educational materials and providing them with rationally-constructed furniture, carrying out children's medical examinations, inspections of classrooms, arrangement of school first-aid kits, conducting talks about health maintenance activities by teachers and doctors, organization of special classes at schools and shelters for shelters for children of refugees during holidays, creation of children's summer colonies. The results and difficulties which the state and public organizations faced with have been revealed.

Keywords: Health, Health Maintenance, State, Public Organization, Children, Activities.

1. Introduction

Nowadays childhood is considered to be an important period in human life, and adults are responsible for good quality of children's life. The status of childhood is going to strengthen, and the acceptance of the documents ("Declaration of the Rights of Children" and "UN Convention on the Rights of the Child") testifies to this. These documents are aimed at the protection and development of children, increased attention to children's subculture and creativity.

The problems of child care, education and upbringing are among priorities in Ukraine, too. They are revealed in Ukrainian regulatory documents (Law of Ukraine "On Education", the concept of "New Ukrainian School", National program "Children of Ukraine" etc.). The state plays the main part in solving educational, cultural and social problems of childhood, ensuring the functioning of the state educational system and the state social protection system. Besides, public and religious organizations and private initiatives complement the activities of the state in the field of socio-cultural support for children.

The main tasks of the corresponding activities of the state are taking steps to reduce child mortality, provide children with necessary medical assistance and health care, fight disease and malnutrition, provide mothers with appropriate health care services, provide all people with information on children's health and nutrition, their hygiene, sanitation of child's environment and accident prevention, ensure access to education and support in using the above-mentioned knowledge, develop educational work and activities on preventive medical care and family planning etc.

However, the situation with children's health maintenance was not the same in different historical periods. For instance, at the beginning of the 20th century the state could not always realize its functions

properly, which caused increasing the importance of the charitable pedagogical movement. As a result, public organizations and private initiatives solved most of the state problems with child care and education. And they did it successfully.

So, it is important to study positive experience in socio-cultural support for children at different stages of historical development of the country, to determine the reasons for the difficulties and the conditions of effective use of this experience under current conditions. The experience of socio-cultural support for children in Ukraine at the beginning of the 20th century is especially valuable, as at that time various steps on health maintenance of children, their education and cultural development were taken.

2. Literature Review

The analysis of publications and researches proves that some aspects of the problem of children's health maintenance activities implemented by the state and public organizations during the 20th century have been studied by the scientists. The issues of the state policy in the field of child protection have been studied by L. Kryvachuk [1], I. Kubai [2], G. Radchenko [3], N. Reznichenko [4] and others. The history of organization of children's protection has been revealed in the works of O. Artiushenko [5], M. Baran [6], A. Ryshkova [7], A. Zinchenko [8] and others. The problems of social services for families and children have become the subjects of research of I. Trubavina [9] and others. The peculiarities of health maintenance activities in retrospective have been analyzed by O. Ionova [10], O. Lukashenko [11], S. Luparenko [12], Yu. Vasylkova and T. Vasylkova [13], Yu. Yaroshevych [14], Ye. Zviagintsev [15] and others. However, the problem of children's health maintenance activities of the state and public organization in Ukraine at the beginning of the 20th century has not been under careful consideration yet.

The aim of the article is to analyze the experience of children's health maintenance activities implemented by the state and the public organizations in Ukraine in 1900-1917.

3. Method

A complex of methods was used to carry out this research. *The general scientific methods* (historical-pedagogical analysis, generalization, retrospective, chronological) were the basis for investigation of the procedural and substantive components of the state reforms in Ukraine at the beginning of the 20th century. *The historical and genetic method* enabled the authors to analyze the genesis of ideas of childhood, attitude to children and their health maintenance at the beginning of the 20th century. *The comparative method* provided the opportunity to compare the scientists' ideas about children and their health maintenance, to distinguish similar and different ideas. *The retro-praximetric method* made it possible to analyze the experience in implementing the health maintenance activities. *The problem-target method* enabled the authors to compare documentary sources and archive materials which revealed the development and implementation of health maintenance activities in Ukraine at the beginning of the 20th century. *The axiological method* contributed to substantiation of value attitude to children and the need for health maintenance activities. The prognostic method enabled the authors to outline the perspectives of creative use of the generalized experience in implementing the health maintenance activities of the past in modern educational practice.

The archive materials, legislative documents of the beginning of the 20th century, scientific and pedagogical sources of the funds of the state and university libraries, information of periodicals of the studied period, original works of the scientists who worked in educational and medical sectors in Ukraine at the beginning of the 20th century, memoirs and autobiographical literature were the main basis for writing this article.

4. Results

State and public organizations in Ukraine in 1900-1917

During the studied period, the state was not always able to implement its social and educational functions, that is why the role of the charitable pedagogical movement among noble people and clergy increased significantly.

During 1900-1917, there was no unified system of bodies and institutions of social protection in Ukraine. For instance, a significant number of socially vulnerable minors lived in institutions which were

mostly run by charities and existed on private charity funds. Due to the expansion of the activities of charitable societies, the net of children's educational and social institutions increased. Children could receive both material and spiritual support in these institutions.

Among all societies which existed in different towns and villages in Ukraine and contributed to solving childhood problems and health maintenance problems, the biggest and the most active societies were societies of spread of literacy among people, Frebel societies, poor students' assistance societies, societies of care for homeless young orphans, physical education societies, the Society for the Promotion of Primary Education, the Ukrainian Society of School Education and charitable societies.

The societies of spread of literacy among people were social and educational organizations which aimed at spread of literacy and general education among people. Kharkiv society of spread of literacy among people was the oldest and the most active society in Ukraine. It existed during 1869-1920 and was the first public organization of cultural-educational nature. The tasks of this society were feasible spread of literacy and useful theoretical and applied knowledge among people, promotion of public education in Kharkiv Region due to establishment of various educational institutions (schools, evening and Sunday classes and schools, museums, libraries, reading rooms etc.), organization of book stores, readings and talks, systematic courses and lectures in various disciplines, exhibitions, plays and concerts, providing students and teachers with different assistance at the schools of the society, promoting physical development and childcare, publication and distribution of useful books, tutorials and catalogues, providing educational institutions with textbooks and training manuals, discussion of pedagogical problems and activities on public education [16]. The statistic data presented in the reports of the society [16; 17] show that the quantity and people involved in the educational and cultural activities of the society increased every year.

Frebel societies had the following tasks: to raise the spiritual and moral level of children who were left unattended (regardless of their faith, nationality and origin), to learn children to work and to give them opportunities to learn crafts, help them to be healthy and beneficial to society, to promote the expansion of children's worldview, their health maintenance and physical development. In order to accomplish these tasks, the societies established nursery schools, literacy schools and work houses [18].

The poor students' assistance societies raised funds to provide all kinds of assistance (food, money, school thing etc.) to poor students. For instance, poor students' assistance society in Kharkiv Region provided various kinds of assistance: it paid tuition fees instead of students, gave them textbooks and tutorials for free or at a reduced price, provided children with medicine and beds in hospitals at the expense of the society, gave money and cheap accommodations to children, arranged canteens etc. [19].

The societies of care for homeless young orphans picked up children from the streets and sent them to shelters and families etc. [20; 21].

The physical education societies arranged children's playgrounds, organized holidays and classes in physical education and handicraft [22; 23].

The Society for the Promotion of Primary Education aimed at ensuring the successful development of primary education and organization of various educational institutions (libraries, reading rooms, Sunday schools etc.). For this purpose, the society held readings for people, repetition classes and evening classes, choral singing classes, concerts, performances which were available for people etc.

The Ukrainian Society of School Education was intended to spread education in the Ukrainian language among people through schools, providing them with methodical and material assistance [24].

The charitable societies were engaged in various types of charitable activities, mainly childcare [25].

The clergy also played a significant role in implementation of health maintenance activities in the studied period. Churches organized and kept hospitals, schools on private donations. The church was one of the social institutions which educated children and took care of them. The Christian education was focused on formation of person's spiritual qualities, moral values, patriotism, aesthetic tastes, love and respect for parents and elders, in general [133].

Moreover, guardianships at public schools were of great importance for child protection and education. The guardianships were created for strengthening the connection between local people and schools represented by selected guardians. The guardianships solved at public schools various problems connected with helping children and organization of their education and free time, namely: providing the

poorest children with warm clothes and food, providing children with hot breakfasts, organization of an overnight stay and transportation of children to school, organization of children's festivals, parties, walks, readings, educational trips and excursions, organization and improvement of activities of school libraries, helping the most capable students to enter other educational institution [15].

The reasons for poor health of children

It should be noted that during the studied period the development of statistics as a science helped to reveal data which showed "imperceptible features of national life" [14, p. 47], for instance, data on children's health and mortality.

The main problem was children's poor health and high incidence among them. In fact, many children suffered form various diseases, so their health maintenance became one of the most important child care directions. For example, according to the data of medical examinations, 91% of students suffered from anemia, 57.4% of students suffered from nervous diseases, 37.9% of children suffered from scrofula, tuberculosis, rheumatism and syphilis, 35.7% of students had physical exhaustion, 33.9% of students suffered from respiratory tract diseases, 23.8% of students suffered from diseases of the digestive system, 17.4% of students suffered from skin diseases, 7.7% of students had eye disorders and 7.4% o students had hearing disorders. Besides, children often suffered from spinal curvature, tonsillitis, rachitis; they had headaches and enlarged lymph glands. Most of children had several mentioned diseases. According to indicators of physical development, 6-14% of children significantly lagged behind the accepted development standards [26].

Children's poor health was caused by a number of reasons. The first reason was weaknesses in organization of educational process at school (children's overload and fatigue because of improper organization of classes). The second reason was difficult living conditions in families (low standard of living, improper organization of child's daily routine, his active work and rest, physical punishments by parents). It caused persistent malnutrition of children (most children seldom had suppers and only sometimes had dinners), insufficient childcare, parents' ignoring the peculiarities of children's development. The third reason was children's particular tendency to infectious diseases (measles, scarlet fever, diphtheria, whooping cough, mumps), which is typical for children age. It led to the fact that children got ill easily (because of the weakened body resistance) and spread these diseases to other children and their families in the process of communication [27].

For example, school doctors affirmed that "many children came to school being weak, ill and having physical disabilities, so they require treatment" [17, p. 39]. At the same time, they noted that school education could worsen children's health: "school and its mode causes children's increased growth with insufficient, delayed development of the chest, which, no doubt, can be considered a very unfavorable moment" [27, p. 12]. Furthermore, school doctors noticed: "Numerous data of the examinations of children and schools show that attending school causes negative changes in schoolchildren's health and physical development, and they suffer from both violation of proper growth and some kinds of diseases called school diseases" [27, p. 12].

School doctors distinguished the following groups of school diseases [27]: 1) dizziness, headaches, convulsive diseases, a general increase in nervousness and nervous fatigue; 2) circulatory disorders in head, chest, stomach, violation of proper emptying of the relevant organs, nosebleeds, eating disorders, anemia; 3) curvature of the spine, wrong shoulder position; 4) eye disorders (short-sightedness etc.); 5) speech disorders (stuttering etc.).

At the same time, family conditions of children were difficult too. It was confirmed by the data of medical-sanitary examinations of schoolchildren and schools. For instance, according to the data of examinations of schools in Kharkiv Region, "…children of public schools, city schools in particular, were children of the underprivileged class, namely: small employees, craftsmen, servants etc., and negative conditions of their life increase the negative impact of school on children's health and development. Small, dark, sometimes damp apartments of lower or basement floors, dirty yards of big streets without green trees are the environment in which they spend time after school. Besides, unfavourable hygienic conditions of children's environments, there were adverse moral defects of the environment. Poverty, quarrels, swearing,

fighting, drunken scenes and other kinds of rude attitude of uncultured people were the specific features of the environment that surrounded children. … The adverse effects of poverty, narrow rooms and low cultural level were replaced by almost the same influence of street and older friends from the same environment" [27, p. 12]. Unfortunately, parents were often not able to care their children, and, in doctors and teachers' opinion, children's diseases severely hampered their progress in learning [17]. All these factors only aggravated the difficult position of children.

In poor families, parents did not often have an opportunity or desire to take into consideration the specific features of child's development. It caused deviations in development and even death of children [14].

Health maintenance activities implemented by the state and the public organization

In order to solve the above-mentioned problems, the state and different public organizations provided various kinds of activities, namely: provision of hospital care for children (free or for a small fee), proper arrangement of children's institutions with educational materials and providing them with rationally-constructed furniture, carrying out medical examinations of children, inspections of classrooms, conducting talks about health maintenance activities by teachers and doctors, arrangement of school first-aid kits, organization of special classes at schools and shelters for shelters for refugee children during summer holidays, creation of children's summer colonies [26; 27; 28; 29; 30; 31; 32; 33; 34].

When carrying out medical examinations of children, doctors examined indicators of children's physical development, for example, height, chest circumference, physical constitution, nutrition features, conditions of eyes, ears, nose, mouth, throat, teeth, skin, glands, heart, lungs, cleanliness of body and clothes. Doctors collected the data about health condition, morbidity and mortality of children [28].

The inspections of classrooms included medical and sanitary supervision of classrooms, construction of schools with sanitary point of view (according to corresponding requirements for floor space, cubic air content per person, the ratio of the glass area to the floor area), room lighting (kerosene, gas or electric lighting), heating (local or central heating), natural ventilation (vents) or artificial ventilation, latrines (warm or cold), quantity of correctly or incorrectly equipped desks, determining the need to redo classrooms in order to adapt them to educational goals, hygiene requirements for classrooms and identifying obstacles which hindered school opening in certain rooms before [28; 29; 30].

Moreover, teachers and doctors conducted talks about health maintenance activities with children, their parents and other teachers. These talks were about the importance to take care of health, the need to maintain health and carry out activities aimed at strengthening children's health, especially in families. It implied strict adherence to the daily routine, regulation of the mode of work, rest and sleep, improvement of children's nutrition. For example, according to the data of inspections of schools in Kharkiv Region, teachers and doctors took various steps for improving schoolchildren's health. They paid much attention to the correct organization of daily classes, their timely beginnings and endings to prevent students from physical fatigue. Also, teachers tried to give students feasible class work in accordance with their mental abilities, focused on students' useful and proper seating in classes, the sufficiency of light and air in order to prevent curvature of the spine, short-eyesight and headaches. For these purpose, teachers were recommended to change places where children sat during the academic year for places which were more comfortable for them. Teachers and doctors sought to provide students with necessary relaxation and enough moving in the open air after each lesson. Moreover, they encouraged various children's games and gymnastic movements, taking into account children's age and health, gave adults various advice about the importance and need to avoid such disciplinary measures as child's long additional staying in the classroom after lessons (for more that one hour) and corporal punishment of children, as it was prohibited under strict liability. In order to prevent various kinds of children's diseases, teachers were recommended to remind children regularly about the necessity to be careful, neat and tidy and teach them basic rules of health maintenance, using available books and pictures [34, p. 16-17].

In special classes at schools and shelters for shelters for refugee children during summer holidays, children had opportunities to use free summer time for strengthening their help and mental development [33].

Children's summer colonies were built on the outskirts of cities, and they were aimed at enabling weak children from poor families to improve their health in rural conditions and to gain strength for further intensive and unobstructed learning. The tasks of the children's summer colonies were children's direct acquaintance with nature, development of skills of observing nature, formation of love for nature and all living things, desire to take care of it, urban children's acquaintances with rural life, agricultural works, peculiarities of native land, expanding children's worldview, formation of children's teamwork skills, active cooperation, mutual assistance and communication and raising children's cultural level [27]. Children's summer colonies worked for free or for a small fee. There were children's summer colonies in Kyiv (from 1896), Zhytomyr, Ielisavetgrad, Kharkiv (from 1897), Sloviansk (from 1900), Katerynislav, Mykolaiv (from 1902), Odesa, Yalta etc. [32]. Children's summer colonies were popular and in great demand. This is confirmed by some facts. Firstly, the quantity of children who attended summer colonies grew every year. Secondly, the quantity of children who needed re-healing after summer colonies decreased every year. Thirdly, the statistic data showed that staying in summer colonies was good for children's health [32], as all children had improvements in their physical health (gain in weight, growth increase and enlargement of the chest circumference)[26] and low incidence.

5. Discussion and Conclusion

So, the problems with maintenance of children's health were among the important directions of child welfare. It was caused by high incidence of children because of difficult living conditions. At the same time, implementation of activities aimed at maintenance and improvement of children's health was mainly the matter of public organizations.

Health maintenance activities included development of a wide network of children's social and educational institutions, healing children, examination of their health and family conditions, inspections of schools and classrooms, organization of children's proper nutrition and medical service, arrangement of shelters for children and refugees, providing them with different things which were needed for living, formation of children's positive personal qualities, organization of children's summer colonies for their health maintenance. The public (clergy, public organizations and societies and a lot of people) tried to solve most problems of childcare and education and carried out this activity along with the state due to initiative and purposeful activity of the public organizations. In spite of all activities, during the studied period the state and public organizations could not provide protection and care to all children who need them, so a lot of children continued to live in poor conditions and difficult situation.

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Native Language in the Process of Foreign Language Studying at the Higher School: Psychological Aspects of Bilingualism

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Abstract

The article deals with the psychological aspects of the bilingualism problem which arises in the process of mastering a foreign language at the higher school. The relevance of the study is caused by the popularity of multicultural bilingual education by means of native and foreign languages studying as an important part of the modernization of the goals and content of national educational systems both in Europe and in Ukraine. The purpose of this study is to determine the place and role of the mother tongue in the process of the foreign language mastering by conducting a psychological research among students who study English at the higher educational establishments.

It has been proved that level of knowledge according to "The Common European Framework of Reference for Languages: Learning, Teaching, Assessment" greatly depends on psychological stability and self-awareness that help to overcome linguistic and psychological barriers. The study has found that influence of the native language on the process of foreign language mastering in general and English in particular leads to student bilingualism, which type depends directly on the level of language skills and abilities (speaking, listening, comprehension, reading, writing and thinking in two languages). Therefore, three types of bilingualism that affect the production and perception of the foreign language have been distinguished and studied. Having done the specific research during the preparation for the writing of this work it has been stated that under the increase of the level of foreign language proficiency, linguistic and psychological barriers disappear and, consequently, the type of bilingualism change into more advanced because of the user's skills improvement.

Keywords: bilingualism, psychological aspects, psychological prerequisite, linguistic and psychological, barriers, speech production and reception.

Introduction

The current stage of development of a society as a whole and education in particular require its members to know two or more languages. The Internet, TV, other media, as well as other forms of communication are getting inside all spheres of life. People travel more often, change their country of residence, and try to adapt to new circumstances, understand the peculiarities of life in other countries etc. European integration, globalization and language policy encourage not only scientists and specialists but also young people to study English at an advanced level. Therefore, multi-lingualism is not only a political goal, but also an urgent need for most of the professional environments.

Foreign languages are included in the educational minimum of school and university curricula in Ukraine, and sometimes the language of education differs from the mother tongue. Nowadays multicultural

bilingual education by means of studying native and foreign languages is an important part of the modernization of the goals and content of national educational systems both in Europe and in Ukraine. One or more foreign languages are indispensable to provide children with good education, skills and self-confidence, which will be so important in future. Foreign languages knowledge allows any person to realize his accumulated potential regardless of time and place, using all possible means, methods and conditions. Second language study is the key to a successful career of a qualified specialist in demanded labour market, who is able to work effectively in a specialty at the level of world standards. The mentioned processes significantly affect the linguistic situation in general, because the development of an open information and communication space creates preconditions and conditions for the spread of bilingualism as a leading trend in the linguistic development of the modern society.

There are many ways of studying bilingualism, namely linguistic, psychological, neuro-linguistic, sociological, pedagogical, literary-artistic, linguocultural, cognitive, etc. The psychological aspect of bilingualism has a wide range of problems in contemporary research: foreign language abilities as a psychological prerequisite for the formation of bilingualism; the connection of psycholinguistic problems of bilingualism with the method of teaching; motivational conditions for the formation of bilingualism; mutual influence of linguistic development of native and foreign languages, etc. One of the psychological aspects of research in the sphere of bilingualism is the determination of the place and role of the native language in the studying non-native one and learning non-native speech. Such a study is particularly relevant since most of the people still learn a foreign language based on the prior knowledge of their mother tongue. It is worth pointing out that the problem of bilingualism in the psychological aspect is considered as a problem of different language codes possession and the interaction of these codes. The assimilation of the second language, in theory, can not be a process of mastering the new system of ideas, but it just concerns mastering the new code, which is projected onto the code of the native language. It has been experimentally established that every person has got a single perception system and two separate production systems of speech in native and foreign languages (Valigura, 2007).

Main text

Considering all the above, the purpose of our work is to determine the place and role of the mother tongue in the process of foreign language studying by conducting a psychological survey among students who master English at the higher schools.

Having undertaken a preliminary review, performed in the framework of this study, we got to realize that in order to achieve the goal being set in the work, it is necessary to solve the following tasks:

1. Theoretically substantiate the basic laws of psychological influence of the native language on foreign one in the process of learning.
2. Experimentally establish students' personal problems under the process of foreign language studying.
3. Identify the main students' psychological barriers of bilingualism in the Ukrainian-speaking environment while mastering English.
4. Establish and systematize the leading and peripheral components of the psychological influence of the bilingual language on the level of foreign language proficiency.

The study required the integrated application of the following *methods*: observation (external free observation; sometimes inside observation was included in particular situations) to clarify the specifics of the implementation of in-language speech structures compared to the native language; methods for assessing the level of foreign language proficiency, as well as problems with its studying and desirable improvement of its level, specified in "The Common European Framework of Reference for Languages: Learning, Teaching, Assessment", (CEFR, 2001); in parallel, to assess foreign language abilities, linguistic and communicative skills and abilities, it was used the method of diagnosing the level of successful foreign language acquisition. The study was conducted on the basis of three higher schools located in the Western Ukraine, it was taken into account the results of the survey among first- and second year students whose major is not a foreign language.

Bilingualism is usually referred to as a situation where a particular ethnic group, in addition to its

native language, widely uses another, often non-related, language, or when the person alternates in two languages for their own purposes.

It is worthwhile to note that, in turn, bilingualism as a modern socio-cultural phenomenon develops under the influence of the following factors:

- strengthening the role of the socio-cultural component - studying the culture of other countries and a deeper understanding of their own culture, participation in the "dialogue of cultures";
- the creation of a single educational space (pan-European educational space, international educational space) and, as a consequence, the desire of people to achieve a pan-European level of foreign language skills; development of academic mobility of students and teachers;
- the need for bilingual education as a means of professional training, enabling future professionals to realize their potential and actively work in the global market, as well as a significant increase in interprofessional exchanges in the 21st century;
- development of the world's information space, the rapid spread of such modern information and communication technologies as television and the Internet, various means of mass communication;
- the use of new information and communication technologies, the development of distance learning, on-line learning, etc.

The significance of bilingualism as a sociocultural phenomenon of contemporary society is indisputable, since the emergence of bilingualism contributes to the convergence of peoples, the peaceful resolution of issues of coexistence, the development of skills of respect for culture and language, traditions and customs of other peoples, the formation of common goals and goals in the process of integration. In this context, bilingualism as the tendency of the linguistic development of modern society gives the person the opportunity to realize their place and their culture in the dialogue of cultures and civilizations in the process of cooperation and cooperation with other people. At present, multicultural bilingual education by means of studying native and foreign languages is an important part of the modernization of the goals and content of national educational systems in European countries (including Ukraine).

Apparently, bilingualism is not ambilinguism, that is, a person for whom two languages are equal at once. An individual can not speak two languages equally well, one of them he puts in the first place, listing the languages in which he speaks: a certain role in this case, obviously, is played by the awareness of belonging to a particular linguistic culture In the narrow sense bilingual can be considered only those who are close to two monolinguers in one, that is, when the degree of knowledge of the second language is almost as high as the degree of knowledge of the first. Bilingualism in the broadest sense is a general ability for all people that allows a person to use more than one language. From this point of view, most of the population of the Earth is bilingual, since bilingualism can be considered both as an elementary knowledge of a particular language and as a free possession of it. It is clear that bilingualism is a phenomenon ambiguous and subject to gradation. It is safe to assert that bilinguals know two languages at a rather high level to use these languages in certain spheres of communication regularly. When classifying types of bilingualism, the following factors are usually taken into account: the degree of real language proficiency; the term of mastering the second language; conditions of possession of the second language in early bilingualism (simultaneous vs sequential); conditions for the emergence of bilingualism; the conditions under which the languages are used, or the principles of the use of languages in this community, as well as sometimes the level of education of bilingual.

In addition to the problem of definition of bilingualism, the great interest is the competent expression of bilingual thoughts, which largely depends on individual characteristics and the manifestation of bilingualism. It has been rightly believed that if a person can speak two or more languages at a high level and uses them frequently, it is necessary to understand if these language systems exist separately in person's mind and is it possible to carry out mental representations and mental processes of those languages similarly at the same time. Modern studies in this field are no longer dictated by the desire to prove the independence or interdependence of representations: it is clear that the proper expression of bilingual thoughts includes both, since bilinguals are basically able to move freely from language to language they possess. In addition, they often observe linguistic interference, which points to the interconnection of the two language systems; on the other hand, many bilingualists are able to use each of their languages without explicit interference,

indicating that each language system can function separately. Thus, bilinguals are capable of competent expression of thoughts in two languages.

It is also essential to understand what a bilingual personality means in terms of psychology. In modern psychological and psycholinguistic sources personality is defined as a set of properties and qualities of a person, unique character, temperament, social cultural experience, knowledge, behavior, his relations to the world, to the to the people themselves. As mental bilingualism is supposed to influence the individual bilingual, due to his social interaction and activity principles, the ways of bilingualism formation, principles of bilingualism and development of mental activity of such personality is also important to research.

Consequently, the phenomenon of bilinguism in psychology is inextricably linked with the problem of forming a bilingual personality who possesses equally good knowledge and enjoys two languages i.e. native and non-native ones. High language proficiency is based on learning the language itself, cultural features of the people speaking this language. The most important for the bilingual personality is mastering speech activity and communicative skills of two languages and develop bilingual consciousness of two pictures of the world that will contribute bilingual entry into a new social and cultural reality. Taking into account the above it is necessary to note that bilingual personality as a psychological phenomenon is a person who owns two language systems and actively use their means for communication as well assimilated culture and national picture. So, bilingual is a person who has passed socialization in the second society, therefore as a member of the second society knows its social and cultural norms. This person is also successfully implemented intercultural communication because knows the ethnic norms of the second cultural community, is oriented in them and form peace in his secondary cognitive context knowledge of their appropriate use.

The psycholinguistic aspect of bilingualism reflects the specifics of speech psycho-physiological mechanisms of a person who uses two language systems. The study of this bilingualism aspect helps to give a "comparative description of the linguistic categories, the concepts that are "deposited" in the linguistic consciousness of the bilingual speakers; peculiarity of some features consolidation in memory, i.e. comprehension, conceptualization, auditory (in oral speech) and visual (in the written form) perception of a bilingual group or an individual. All of them are categories and concepts specific to the second language and absent in the linguistic patterns of the native language. Considerable attention in the psycholinguistic aspect of bilingualism is given to the study of its influence on the process of human way of thinking. Taking into account the relationship between language and thought, there are some reasons to distinguish at least two types of language systems coexistence in human consciousness under bilingual situation: an independent connection in pure bilingualism, when the contacting languages form two separate systems of associations and a dependent connection in the mixed type of bilingualism, when contacting languages form only one system of associations. In general, the psychological typology of bilingualism is based on at least four criteria:

1) types of speech activity;
2) the correlation between the linguistic mechanisms that ensure the possession of different languages;
3) the mode of connection between speech and thought in each language;
4) the way of speaking the language.

Moreover, the psychological aspect of bilingualism involves the study of both the mechanisms of production and the perception of language. For example, there are experimental data that there is a single perception system being possessed by a bilingual person and two separate systems for his/her producing speech in native and non-native languages (Andreyeva, 2009).

An important criterion in the allocation of psycholinguistic types of bilingualism is the level of language skills and abilities applied to speaking, listening, understanding, reading, writing and thinking in two languages. According to this criterion, it is possible to distinguish at least three types of bilingualism:

1) receptive;
2) reproductive;
3) productive.

In case of receptive bilingualism, students partly understand the meaning of the text belonging to the secondary linguistic system, there is practically no knowledge of the second language's phonetic system,

while performing the tasks, these students rely on knowledge of vocabulary and grammar, and therefore, they have only the approximate understanding of the foreign language (English). They usually think only using their native language, and if necessary speak a foreign one, but they try to translate the necessary phrases quickly and replace the ignorance of individual words or speech structures by non-verbal means (gestures, facial expressions, etc).

In case of reproductive bilingualism, there is an active knowledge of two languages: the ability to read, understand the meaning and to write a foreign language is practically free of errors. However, difficulties are found in the ability to speak, reproduce, and transmit the contents of the information being read or heard. It is worthwhile to note that the translation of thoughts from the native language into foreign one is also present in the process of oral speech, but to a lesser extent.

Under productive bilingualism, the above-mentioned actions of understanding the foreign language are added to their reproduction, as well as the active creation of statements (their production), that is, the active use of language. Students have the skills and abilities of automated speech in two languages without any problems and, as a result, rarely use their native language for the production of foreign opinion.

To determine the predominant type of bilingualism among students and, as a consequence, the use of the native language as a basis for a foreign one, we conducted some tests among the students of Ternopil National Economic University, Ternopil State Medical University and Ternopil National Technical University in order to identify the level of abilities in certain types of activities in a foreign language (reading, writing, speaking, listening and the reproduction of the information). It was determined that the individual language skills of the students (total number 950 people) were determined to meet the standards recognized internationally and established in the the Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR, 2001). Based on the result analysis of the students' answers (young people of the 1st and 2nd years of studying at the universities), we have identified levels of language proficiency and obtained generalized quantitative data (Table 1).

Table 1. Average results of language proficiency of the students of TNEU, TSMU and TNTU, obtained by the method of level determination set out in the CEFR language education (2001) (Ternopil, November 2017, sample of 950 people)

Levels of language proficiency in accordance with international standards	**Types of speech activity** (number of people)							
	Reading		Speaking		Writing		Listening	
	1st year of studying	2nd year of studying	1st year of studying	2nd year of studying	1st year of studying	2nd year of studying	1st year of studying	2nd year of studying
A1	160	164	166	162	157	155	165	164
A2	238	186	220	209	244	201	235	217
B1	216	242	217	242	208	238	196	240
B2	161	190	180	181	172	174	168	174
C1	1	2	-	3	-	2	1	1
C2	-	-	-	-	-	-	-	-

Of course, the level of language proficiency varies according to the type of a higher school and its location, but these results are confirmed by data from other studies, as well as by the annual monitoring of students' knowledge and confirming the general tendency to learn English (A2-B1) among foreign language (English) students. The results of the tests demonstrate a qualitative improvement in the level of knowledge during the learning process, as evidenced by the reduction of students with the basic and elementary levels

of knowledge (A1-A2), a significant increase in knowledge among those who speak the language at the intermediate level (B1 and B2), and a slight improvement of speech skills among the students who speak foreign (English) language fluently (C1).

It is worth noting that the descriptors of each of the speech level competences coincide with the signs of a certain type of bilingualism, in particular A1-A2 − receptive bilingualism; B1-B2 − reproductive bilingualism and only C1-C2 − productive bilingualism. By comparing these results with the main features of the bilingualism types, we have obtained the averaged results of the types of bilingualism among student youth, which are summarized in Table 2.

Table 2. Averaged results of bilingualism types of the students in TNEU, TSMU and TNTU (Ternopil, ovember 2017, sample of 950 people)

Year of studying	Types of bilingualism		
	receptive	reproductive	productive
First-year students	55,8%	44%	0,2%
Second-year students	31%	68,4%	0.6%

The results of the calculations show not only the quantitative changes in the accumulation of student knowledge, but also qualitative, which led to appropriate changes in the types of bilingualism among students of the 1st and 2nd courses. Reducing receptive bilingualism among students and increasing the percentage of students with reproductive and productive bilingualism is a consequence of improving the level of the foreign language knowledge (English). The most significant changes were seen among students with receptive and reproductive bilingualism, and minor changes affected only those students who were considered to be productive bilinguals. Among the qualitative changes, the features that were typical of the groups of students with reproductive and productive bilingualism were identified, in particular: ease in communication, the tendency to focus on group forms of work, well-developed cognitive and competitive motives, self-regulation, and others. At the same time, students with receptive bilingualism avoided contact with a teacher or peers, aspiring to individual work with texts and grammatical constructions, did not show cognitive motivation, as well as the motive of the competition or the desire for active work. Accordingly, this caused problems for the teacher in terms of establishing a psychological contact and organization of work in the group.

Research results and discussion

Since the main criterion for determining the psycholinguistic type of bilingualism was the level of foreign language proficiency, it is worthwhile to note that those abilities and skills that are lacking in the use of non-spoken language are borrowed from their native language. Taking into account the fact that the place of interaction of the two languages is a person's mind with its mental, intellectual and linguistic peculiarities, and the language features of a certain type of community (students, in our case), one should expect a large number of implementations of both languages. This is only partly true due to the presence of general stabilizing features that hold the variation of the bilingual language within certain limits. This is due to the presence of a small number of similarities and the prevailing differences between the systems of contacting languages (in our study − Ukrainian and English), which is somehow smoothed by the universal human psychology of the experience transference.

The results of the student survey revealed that most of them (72% of respondents) had to overcome linguistic and psychological barriers. This is due to the fact that studies during foreign language classes are conducted precisely in this language, but some students do not feel free as they have lack of knowledge as their language proficiency level is not high enough. Students can not express their opinion on the proposed topic because of the lack of vocabulary, the complexity of penetration into another national culture, psychology and world perception. It is worth mentioning that similar problems were identified by foreign students who study using their own native language, but communicate in the foreign one outside of university, so they also feel similar difficulties. Bilingualism belongs to the internal psychological barrier, that is, psycho-physiological and linguistic barriers in the study of the second language, inherent for a

certain personality. In addition to the objective circumstances of bilingualism, the emergence of this barrier is also influenced by factors such as young age, the peculiarity of upbringing, the ability to learn foreign languages and belief in their strength, previous learning experience, the negative impact of which prevents the correct assessment of the situation, its style language learning, conflict of communication, internal motivation, memory, updating of cognitive, emotional, semantic and intercultural spheres, awareness of new linguistic reality, etc. (Glebova, 2009). One can not deny the influence of external factors on the emergence of psychological barriers among the learners, namely: obstacles to social order, tension in the human society, intellectual differences between those who study, their belonging to different social groups, problems in establishing psychological contact with a foreign language teacher, etc.

It is clear that native language is a natural main tool not only for communication, but also for a way of reality cognition by any person. Knowledge of a foreign language is also carried out through the use of the native language, which provides the subject with a ready-made system of meanings for understanding the foreign language. This means that in the process of foreign language studying, the student inevitably compares it with his native language, he usually highlights the language and studies what is similar to his native language, but does not notice those phenomena that are specific to the foreign language or are absent in the native one. However, methodologists tend to agree that an adequate understanding of a foreign language is only achieved when the student fully understands its systemic differences from his native language (Raku, 2012).

Students-bilinguals feel the spontaneous influence of their native language. In addition, the idea of bilingual students' speaking is initially made in the native language, and then translated into a foreign one. As a result, a lot of interference mistakes are made. Continuous orientation of students to the Ukrainian language and ignoring of the foreign language during the English lessons can not promote the conscious acquisition of this language. Furthermore, foreign language grammar skills are the least developed of all kinds of abilities. For example, students experience significant difficulties in assimilating the time forms of the English verb based on the Ukrainian language, since most of them simply do not exist in the Ukrainian grammar. This is due to the fact that in Ukrainian language there are no such detailed temporal types of the verb that is adhered to in English. In addition, some students who graduated from schools of national minorities (Russian, Hungarian, Romanian, etc.) even do not speak Ukrainian well enough to understand all the complexities of relationships and ways of expressing temporary relations in English and Ukrainian. So they feel double portion of difficulties if a teacher uses comparisons between English and Ukrainian.

Students-bilinguals must learn not only phonetically correct speech, but also realize the fact that each authentic text has typological common features and nationally-defined differences, identity, uniqueness. When in the text being processed in the class there are words that have etymological correspondences in the language of translation, this correspondence usually appears immediately in the memory of the bilingual students as the predicted equivalent. As practice shows, such an approach is not justified in many cases, since the values, syntactic and semantic interconnectivity, and the stylistic features of etymologically identical words, even in closely related languages, rarely coincide completely. In such cases, occasional mistakes occur due to ignoring the phenomena of lexical attraction ("attraction" similar in form, but different in semantics of words from two languages), which is confirmed not only by the results of our observations, but also the conclusions of other studies (Glebova, 2009).

The absence of complete etymological correspondences in the Ukrainian language simplifies the task of bilingual students, who rely exclusively on the semantic component in their translation. There is a need to consider invariant values of lexemes and transcribed phrases. This allows us to conclude that the priority of such a task in teaching is formation of an adequate image of a foreign language in the consciousness of the learner, which will cover the grammatical and lexical peculiarities of the language being studied. To achieve this goal the teachers during the foreign language classes seek to create a model of another psycho-cultural space that is conducive to learning a foreign language and to motivate "the initiation of a dialogue of cultures in the students' heads" (Vyhel, 2014)

Student surveys conducted in the framework of the research showed that students are aware of their weaknesses and are inclined to overcome them. By setting goals, they indicate that they would like to increase their vocabulary (56% of respondents), practice writing and speech (68% of respondents), learn

more about English culture (37% of respondents), improve their level of grammar in a foreign language (82% of respondents), remove psychological barrier (12% of respondents).

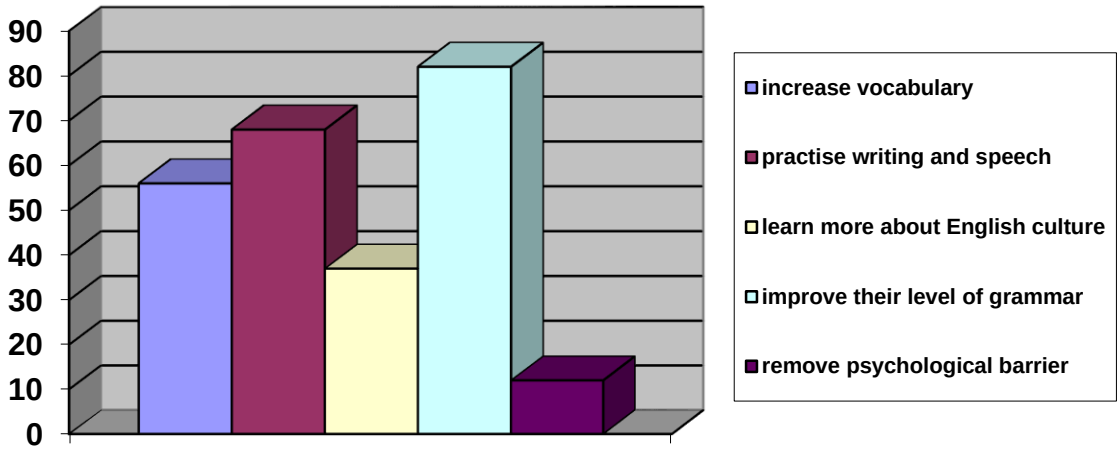

Fig.1. Ways of improving language proficiency according to the students' understanding (percentage of positive answers)

The problem is that students do not see any psychological problems with their studying. Just a few students supposed the ways to overcome the psychological barriers.

A lot of scientists and academic professionals believe that the psychological barrier is a psychological state, represented as inadequate passivity, which prevents the implementation of certain actions. The psychological barrier creates negative experiences in a proper situation. A student at a subconscious level gives himself the installation of the reluctance and uselessness of learning a foreign language. As a result of the analysis of psychological and pedagogical literature it can be distinguished 14 functions of the general psychological barriers, namely:

- creative – aimed at overcoming obstacles, promoting creative activity;
- developmental – contributing to the development and formation of the personality and individuality of a person;
- stimulating – encouraging activity;
- upbringing – a formative system of value orientations, which develops the spiritual, moral, intellectual and physical qualities of a person, the ability to self-organize;
- protective – aimed at stabilizing the personality, shielding consciousness from unpleasant, traumatic experiences associated with internal and external conflicts, anxiety and discomfort;
- training – formative skills to overcome obstacles;
- emotional – forming the ability to realize their mental states and their causes causing;
- mobilization – preparing the internal resources of the body for their actualization, determining the measure and direction of their activity;
- stabilizing – contributing to the stabilization of the emotional and physical states of a person;
- braking function – slowing down thinking, volitional processes, restraining activity;
- regulatory – regulating the development of relations in situations of various kinds;
- adaptation – establishing the correspondence between the needs of the individual and his capabilities, taking into account the specific conditions;
- destructive – shown by dissatisfaction with himself, low self-esteem;
- conservative – associated with the inhibition of the spiritual potential of the individual, leading to the development of isolation, depriving a person of his energy and decisiveness.

In case of foreign language studying we can say about negative influence of the psychological barrier

i.e. slowing down, low self-esteem and restraining communication. It causes much more problems for speaking any languages that students can imagine. A competent teacher who knows psychological barrier functions, can use them for developmental purposes. Often the student does not assume existence of the psychological barrier. It prevent him from developing certain abilities and skills, which a teacher can help him to improve.

Meanwhile, there is another problem in the process of learning. One can not speak of intercultural communication as a communication with a native speaker who carries original linguistic and national culture. In conditions of specially organized education, the teacher of a foreign language is sometimes the only communicative partner of students. However, this does not mean that intercultural knowledge and communication are not present at the foreign language classes. Dialogue of cultures can be carried out when communicating students with teachers, educational materials (printed, audio, visual sources of linguistic information) and in the internal dialogue of students, in the reasoning that there is a process of knowledge and awareness of speech phenomena and the construction of speech in a foreign language for expressing their thoughts.

Conclusion

Therefore, bilingualism is investigated in various sciences, each of which examines bilingualism in its interpretation. Nevertheless, all branches sciences studying bilingualism are based on the existence of a primary language system that is used for communication. What concerns the phenomenon of bilingualism in psychology, then bilingualism is complex a psychological phenomenon characterized by knowledge of a second language, manifesting ability to master the second language able to integrate into the secondary society through the acquisition of social experience by learning culture values culture of another nation, its way of life as a result of mastering two languages. A bilingual can be a person who can use two linguistic and cultural-national systems that own two systems communication.

Thus, the influence of the native language on the process of mastering the foreign one at the higher educational establishments (English, in particular) leads to student bilingualism which type depends directly on the level of language skills and abilities (speaking, listening, comprehension, reading, writing and thinking in two languages). Accordingly, students gain receptive, reproductive or productive bilingualism. The results of the study carried out in the framework of our research showed a significant advantage of receptive bilingualism (and hence a stronger influence of the native language) among the 1st-year students and a growth of the students number with reproductive bilingualism among 2nd-year students. This situation is predictable, as students increase their foreign language skills, reducing the influence of the mother tongue on the formation of the expression and perception of spoken language. Unfortunately, the students do not connect the lack of language proficiency with the psychological barriers and this situation leads to more difficult way of improving it.

A great interest is the competent expression of bilingual thoughts, which largely depends on individual characteristics and the expression of bilingualism. F. Grosjean believes that if a person speaks two languages at a high level and uses them regularly, the question arises whether levels of the two language systems exist separately and to what extent the mental representations and mental processes are carried out on the basis of both languages at the same time. Modern studies in this field are no longer dictated by the desire to prove the independence or interdependence of representations. It is clear that the proper expression of bilingual thoughts includes both, since bilinguals are basically able to move freely from language to language they possess, in addition, in they often observe linguistic interference, which points to the interconnection of the two language systems; on the other hand, many bilingualists are able to use each of their languages without explicit interference, indicating that each language system can function separately. Thus, bilinguals are capable of competent expression of thoughts in two languages.

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Creating Ecological Language Space for the Youngest Computer Users

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Abstract

Forming computer awareness of the junior pupil is a complex and polystructural phenomenon which important component is speech culture. Forming national language young personality is one of the urgent issues of the present; the ecology of the Ukrainian language as a condition of this process is not only a philological, pedagogical, but also a social problem: it is in one way or another connected with the most diverse types of communication, including ICT. As the speech situation in the educational practice largely determines the general state of the Ukrainian literary language, the ecology of the Ukrainian language takes responsibility for the process of forming the national-language personality of the computer user. Therefore, one of the tasks is to preserve the identity of the Ukrainian language, to fight for the standardization of the speech of the junior pupils as computer users, the expediency and correctness of using linguistic means, to protect the Ukrainian language from errors and Russian borrowings, from excessive use of Anglicisms and foreign terms, to free it from the Ukrainian-Russian interferened mixture and excessive linguistic patterns. Observing the linguistic pedagogical environment within a number of Ivano-Frankivs'k and Ternopil schools (2014-2018) gave grounds for concluding that the level of Ukrainian speech (both oral and written) is mostly average, and even low. The analysis of the results of the study showed that a large percentage of errors (89%) was caused by the interference phenomena due to the intensive influence of the Russian language on the Ukrainian language. Adding ecological aspects to the linguistic environment should become one of teachers' priority tasks. Concerning this, the work aimed at forming the culture of Ukrainian primary school pupils' speech gains a special significance. Teachers are called to always take care of the junior pupils' language culture, to motivate them to self-improvement in the area of the normative language proficiency, to work on correcting their mistakes. The suggested forms and methods of work may be an important tool in this activity, aimed at forming an ecologically-linguistic environment, which can provide a computer literacy enhancement to a computer user, in particular his/her linguistic component.

Keywords: computer awarenes, junior pupil, forming national language young,personality, ecology of the Ukrainian language.

1. Introduction

Setting the problem. At present there is a rapid development of the new information technologies penetrating into all spheres of human life, in particular school environment. Since early childhood children are fascinated by computer and everything connected with it while absorbing huge masses of information and during school years this interest only increases. Technologies of organizing educational process with the latest electronic means of training, in particular computers (information and communication technologies (ICT)) is a compulsory component of the educational process at primary school. Necessity of using ICT at primary school is confirmed by laws on education, legal acts and scientific and theoretical works. These testify to the attention of the state, scientists and educators to the problem. Undoubtedly, on the one hand, the use of modern ICT at primary school has significant advantages: the educational process is differentiated; the control over the educational activities of pupils is expanding; the feedback of this process is provided; the level of pupils' interest in learning activities increases; creative abilities of junior pupils are developing, increasing pupils' cognitive activity in the educational process is increasing, etc. [6, p. 9]. On the

other hand, there are great risks entailed by electronic communication for children including the emergence of slang, computer slang, spreading speech rough mistakes etc. Therefore, the task of the primary school teacher is to promote language culture for junior pupils, to monitor the linguistic environment, and to educate a competent user of electronic communications.

There fore a number of problems arise, in particular concerning the process of forming the computer competence of the individual, which we consider to be complex and polystructural, an important component of this concept is the speech culture. Speech culture (both oral and written) is one of the urgent present day issues. It is not only philological, pedagogical, but also a social problem: it is one way or another associated with a wide variety of types of communication, including information technologies. Despite the fact that practically all the junior pupils own computers nowadays, the linguistic aspect of computer competence of the individual is completely neglected; it was confirmed by the results of our study conducted during 2014–2018 in some schools of Ivano-Frankivs'k and Ternopil. Therefore, work aimed at forming the environment of Ukrainian language communication for junior pupils becomes of special significance, since linguistic knowledge and speech skills acquired at primary school age become the basis for the communicative perfection and communication standards of the future active computer user.

Analysis of the latest researches and publications

The issues of the language culture have always been of interest of the Ukrainian scientists (N. Babych, A. Bohush, I. Vykhovanets', S. Yermolenko, M. Pentylyuk, O. Ponomariv, O. Semenoh, O. Serbens'ka, O. Tryfonova, Ye. Chak etc.). The scientists are right to stress that the evolution of forming the linguistic personality is quite lengthy and complicated: it begins with the first months of life of the child and has several stages depending on age periods [8].

In the context of the above mentioned problem the Ukrainian [3; 4] and foreign scientists [10-13] actualize the problem of the language ecology. The results of researchers of O. Potebnya Institute of Linguistics (B. Azhnyuk, L. Azhnyuk, L. Andriyenko, L. Beley, O. Mykhalchuk, O. Skopnenko, O. Taranenko, O. Tyshchenko-Monastyrs'ka etc. [3]), who touch upon the language ecology and language policy in modern society, but the issue of the ecology of the Ukrainian language of computer users was not thoroughly investigated by the scientists.

Despite the fact that investigating the issue of students computer and informational competences was conducted in the works of a number of scholars (A. Bezrukov, N. Besrukova, O. Byesova, M. Byrka, I. Horda, M. Kozyr, N. Samoylenko, L. Semko, A. Syromyatnykov, etc.) the linguistic aspect of the problem of forming junior pupils computer competence was not the subject of a separate study.

The aim of the investigation is to analyze the speech mistakes of junior pupils and primary school teachers as computer users, define the measures for creating the ecological language environment, to develop the methodics of correcting junior pupils' speech.

2. Methodics of the Investigation

The study used a set of methods: theoretical (analysing scientific sources, comparison and classification, synthesis of scientific research results, generalization, and systematization of scientific data; empirical (observing, questioning, interviewing, conversation), etc.

Also descriptive method of the system of work on forming junior pupils speech competence, generalization and systematization of practical experience of primary school teachers of Ivano-Frankivs'k and Ternopil, as well as the author's own experience; with the help of the statistical methods processing the research results was carried out. 20 primary school teachers participated from Ivano-Frankivs'k and 10 beginner teachers from Ternopil participated in the survey; the study covered 180 primary school children.

3. Results of the Investigation

The results of observing the educational environment of the primary education in Ivano-Frankivs'k and Ternopil made it possible to trace a certain contradiction, since, on the one hand, in the context of the national and socio-cultural revival of the Ukrainian education, the development of the Ukrainian language becomes of paramount importance; language and speech culture is an essential means of communication, education and comprehensive personality development. On the other hand, in the practice of the educational institutions of the primary level, the situation is rather complicated: the problem of observing the speech culture and literary standards is especially relevant for junior pupils.

It is logical that due to the high pollution of the linguistic environment one of the new directions of scientific research emerged – the ecology of the language. As the analysis of the results of our research testified, it is just the time of solving the problem of ecology of the Ukrainian language of computer users, which requires special attention from its carriers – all (without any exception) the participants of the educational process: teachers, pupils, parents and students. Ukrainian and foreign scholars point out that, just as environmental problems can undermine the physical health of people, lead to catastrophes of various living organisms, so the problems of the ecology of the language can lead to pollution of the linguistic ecology, deterioration of the purity of the linguistic environment and, consequently, to the loss of language users and language dying.

The ecology (culture) of the Ukrainian language is understood as the perfect level of language and communicative training which presupposes compliance with the norms of the Ukrainian literary language, the ability to express the ideas correctly and clearly, freely to use the normative Ukrainian language in electronic communication, reasonably using various stylistic linguistic means and slang.

The researcher N. Balovsyak states that one of the components of the information competence of the individual is a computer (computer-technological) one which determines the skills and abilities of working with modern computer hardware and software [1].

Computer literacy of a junior pupil involves mastering the minimum set of knowledge and skills for working on a personal computer, but we are convinced that language skills are of the same importance.

Based on the results of the content analysis of educational literature (their digital versions, placed in the Internet) for junior pupils, we can state that almost half of the editions in the content plan are not in Ukrainian, such editions cannot serve the realization of tasks of language education, among which primary place is taken by forming the national language of junior pupils. Thus, according to the results of the analysis of the teaching and methodical support of the course "Computer science" for primary school, we state the insufficient level of language culture of the school textbooks. Creating Ukrainian textbooks is experiencing a complex stage in its development caused by, among other things, the fact that the language of textbooks is not always of highly literary level. The textbooks on computer science are not an exception. Typical mistakes include the use of Russian-language spelling, which are mostly caused by the awkward translation (transliteration from the Russian, not adapted to the Ukrainian language phonetic norms) of the names of fairy-tales and cartoons characters (Masha, Luntik, Fiksik, Elzik, etc.) while the correct variants should be Mariyka, Luntyk, Fiksyk, Elzyk). The tendency towards the use of Ukrainian names and specific Ukrainian diminutive-caressing forms of names of children, people, animals, etc. is obvious, while textbooks, manuals, educational materials use the Russian language variants of names such as Vanya, Masha, Misha, Dasha etc. (instead of the traditional Ukrainian Ivanko, Mariyka, Mykhailyk, Darynka), which is unacceptable, since such forms contradict the word-building norms of the modern Ukrainian literary language, since the organic ones for the Ukrainian literary-linguistic use are diminutive-caressing forms of personal names of people with the Ukrainian suffixes *-к-, -оньк-, -еньк- (-єньк-), -очк-, -ичк-, -ус-, -ик* etc. [2].

Observing the linguistic pedagogical environment within a number of Ivano-Frankivs'k and Ternopil schools (2014-2018) gave grounds for concluding that the level of Ukrainian speech (both oral and written) is mostly average, and even low. The analysis of the results of the study showed that a large percentage of errors (89%) was caused by the interference phenomena due to the intensive influence of the Russian language on the Ukrainian language (in terms of the terminology system, the selection of the necessary terms, the ability to correctly handle them, correctly translate this or that term from Russian or English and finally edit the text). This is due to the fact that junior pupils watch cartoons, Russian-language channels in

YouTube, listen to Russian-language songs, and so on. It is important to note that a large percentage of respondents (62%) consider the language of electronic networks to be perfect in the linguistic sense, 19% of junior pupils do not pay attention to it. And only 5% of pupils are able to see errors in electronic networks.

Questions of the questionnaire were aimed, among the other things, to find out the following: younger pupils awareness of the role of the culture of speech, the possessing perfect speech and personality development; knowledge of the norms of the modern Ukrainian language and the qualities of literary speech; the ability to analyze and evaluate their own speech; younger pupils readiness to raise the level of their speech culture. Answers to the first question of the questionnaire for pupils proved that awareness of the role of perfect speech is characteristic of only 20% of primary school pupils who are able to note mistakes in the speech of their peers while 78% of the interviewed children do not pay attention to them. Almost all the language speakers made mistakes in oral and written speech.

24% of junior pupils demonstrated the superficial understanding of the problem of the speech culture: they assert the importance of perfect speech, without arguing their answer; "yes, a pupil must be able to speak"; "yes, correct speech is important," "to complete the final certification in the 4th form" and so on.

Quite varied were the answers to the question of defining the speech culture and the quality of perfect speech. Most respondents said that the pupil's speech should be: "cultural" (27%); "without local words (dialecticisms)" (46%); without words-repetitions (38%), "correct" (53%); "without obscene words" (26%), "without vulgar words" (15%), "intelligent" (6%); "sophisticated" (4%) and so on. Interestingly, 12% of junior pupils associate the notion of "speech culture" with certain moral norms, emphasizing the culture of human behavior.

So, it can be seen that junior pupils have a general idea and understanding of the essence of "speech culture," they determined the qualities of speech culture, they realize that "vulgar words" and "repetitions" can not be used in "correct" speech, it should be free from "local words" under which the children meant dialecticisms, words from the local dialect. Almost none of the children (5%) mentioned that Russian words, slengizms make the speech polluted. None of the junior pupils was able to give a detailed answer, naming only the list of certain features of the speech culture: correctness, clarity, expressiveness, etc. By "correctness" most of the junior pupils referred to the norm: "it is said so in the rules", "it is necessary", "it is so common to say", "they say it this way, stress this way".

The question "Do you use the literary language at lessons, breaks, at home, in public places, etc.?" was answered "No" by all the respondents. Consequently, we trace the contradiction, on the one hand, between the junior pupils' awareness of the essence of perfect possessing normative speech, and on the other hand, absolute neglecting them in their communicative activity.

As the shortcomings of their own speech the children named "repetitions", "lack of proper words", slang words, dialectal words which testify to pupils' speech difficulties due primarily to their insufficient vocabulary. The question "Do you want to improve your speech?" was positively answered by 72% of respondents while 28% respondents could not answer the question. So, we trace the readiness of junior pupils to work on correcting their speech. Among the ways of improving their own speech the children named such tools as "to read a lot", "to have special classes", "to have classes with tutors", "communication with a teacher speaking perfect Ukrainian"; etc.

As the speech situation in the educational practice largely determines the general state of the Ukrainian literary language, the ecology of the Ukrainian language takes responsibility for the process of forming the national-language personality of the computer user. Therefore, one of the tasks is to preserve the identity of the Ukrainian language, to fight for the standardization of the speech of the junior pupils as computer users, the expediency and correctness of using linguistic means, to protect the Ukrainian language from errors and Russian borrowings, from excessive use of Anglicisms and foreign terms, to free it from the Ukrainian-Russian interferened mixture and excessive linguistic patterns. The ecology of the young computer users speech can be regarded as separate areas of pedagogy and linguistics. We are convinced that this area of scientific knowledge should carry out such an important mission as forming national-linguistic personality which in its turn will serve to raising the level of national consciousness.

In our opinion, the large potential threat to forming the national language personality of junior pupils nowadays is made up by the Internet sites (unfortunately, not an exception in this sense are the educational

and development materials placed there), which are full of linguistic mistakes, meaningful inaccuracies, where for example, the characters of the Ukrainian folk tales are "foreigners". Such information editions distort the moral values of children, do not contribute to upbringing their national feelings at all. And the presence of many errors (grammatical, punctuation, stylistic, etc.) in them naturally turn into language disorders and twists that occur in school textbooks for junior pupils [2]. Thus, Ternopil educators found 153 errors and inaccuracies in 149 pages of the Mathematics textbook for the 1st form. The quality of the textbooks in Mathematics for the second-formers also leaves much to be desired. They contain rough mistakes, mostly using word-for-word translation from Russian, missed commas and dashes, the very mathematical material also leaves much to be desired [5].

Typical mistakes in educational editions (their electronic versions, which are used by junior pupils) include neglecting the Ukrainian letter *r* (the analogue of the Russian letter g), the unmotivated absence of the apostrophe, ignoring the vocative case and so on. Most mistakes are due to the incorrect translation from Russian into Ukrainian and the presence of Russian language in our language; Russian lexemes are automatically translated into Ukrainian editions by the editors [2].

The problem raised in the title of the work is actualized among the other issues, by the situation prevailing in the practice of the schools of Ivano-Frankivs'k and Ternopil. It is a problem of numerous speech disorders not only of young computer users, but also of their teachers. During the computer science lessons at primary school we noticed dozens of lexical errors in the speech of teachers and schoolchildren. The most typical of them can be seen in the Ukrainian variant of the article as it is impossible to give the faithful translation of those mistakes which are obvious only for those speaking Ukrainian and Russian. But the reasons of those mistakes can be easily explained by the low quality word-for-word (lexeme-to-lexeme) way of translation and the language interference in the bilingual environment (Ukrainian and Russian).

Therefore, taking into account all the above mentioned, we highlight the problem of the ecology of the language of junior pupils as computer users as the actual one. That is why the teacher of primary school should have a good command of the normative literary Ukrainian language, as it is a model for imitating by his pupils.

It is also alarming that according to the results of the survey of computer sciences teachers of the Ivano-Frankivs'k and Ternopil schools only 63% of the teachers noted that they paid attention to their pupils' speech and occasional corrective work on correcting speech mistakes.

We are convinced that teachers of computer science, primary school are called to always take care of the language culture of junior pupils, to motivate them to self-improve the culture of pupils speech, to work on correcting mistakes. To complete this, it is necessary to begin the work on developing digital dictionary, where children would include those language expressions, which are most often mistaken by them, as well as the language errors found in the Internet. Various educational games, exercises, tasks, and quizzes aimed at forming the standard of junior pupils speech can be equally effective.

Tasks for speech correcting will be proper; it is expedient to conduct them at the Ukrainian language lessons (for example, minutes of correct using words) or at the computer science lesson, for example, correct using computer terms in the high quality Ukrainian language, but not the low quality word-for-word translation from the Russian language where the Russians lexemes are fused with the Ukrainian ones. One of the reasons for these language problems is Russian-language computer support and using software produced in Russia in the Russian language.

It is also important to create an appropriate informationally rich ecological and linguistic environment which will become an interesting form of innovative teaching junior pupils. As it was shown by our experience gained during the activity of the society "Language Ecologists" showed (this was the experimental group (EG) of our research teaching), organized by the University of Gifted Children, which was created at the Scientific Park "Precarpathian University" ("Vasyl Stefanyk Precarpathian National University"), a very effective form of raising the level of computer awareness of junior pupils in general and linguistic literacy in particular, is the work aimed at identifying the state of language culture of native speakers, mass media, etc., and cleaning the polluted language environment, including the Internet, from Russian borrowings, Anglicisms, Ukrainian and Russian mixture (so called surzhyk) and other language errors. Such centres, according to our convictions, should be created not only in the educational

establishments, but also in the state institutions, public organizations, cultural and educational institutions and other institutions of any city (village) in order to enhance the level of language culture of computer users. The same task is fulfilled by the School of Bloggers at the University of Gifted Children, which serves to form a new virtual personality possessing the standard Ukrainian language and is the linguistic ecologist of social networks.

We also became convinced that master classes for junior pupils organized by teachers and students who co-operate with the University of Gifted Children serve as the effective ecologically-linguistic environment of out-of-school education. For example, the Faculty of Mathematics and Informatics of the PNU conducted a series of educational master classes in the frames of the holiday "Interesting Vacations" at the University of Gifted Children (during the holidays of 2017-2018). Such kind of work caused a great interest in children of the EG, because modern pupils cannot imagine their life without a computer, smartphone and other digital devices. So, taking advantage of such children's interest, the organizers of the master classes decided to combine the passion of children with the study of the educational material, successfully masking educational information for games and quests, during which the children by way of game and search activity could learn the educational material. With the leadership of teachers and students master classes with the use of computer technology were held. In particular, the training quest of the fairy tale character "Speech Cleaner". Speech Cleaner is a literacy expert who always cares about the purity of the language and the correct spelling of words. Schoolchildren fulfilled all quest tasks with curiosity. Since the age category was different, it was interesting to observe how the youngest gifted children were assisted by their relatives – mothers and grandmothers, engaged in the interesting tasks.

Since in primary pupils begin to study the Scratch programming language (this project was developed as a new educational environment for teaching schoolchildren programming and was positioned by the authors as an alternative to the "Photo Shop culture"), Scratch gives the opportunity to create movies, start games, modify the appearance of objects, move them on the screen, establish the forms of interaction between them, etc. Due to the dynamism, it allows you to change the code even duringits realisation. Therefore, it is advisable to use it for the educational purposes in the area of forming the user's linguistic culture while using the computer, because Scratch is a programming environment that allows children to create their own animated and interactive stories, educational games aimed at speech correction. Which is still more important, the programming environment can be downloaded for free and freely used in school and out-of-school education. Taking this into account, students participating in the "Gifted Child University" project began creating such initial games in the *Scratch* program whose purpose is, among other things, learning and fixing computer terms, acquiring new knowledge, developing creative thinking, logics. One of the developments was the project (educational game), whose task is to connect the name of the technical device with its image.

The description of the game "Language and technical researchers". The game consists of 3 levels. At the beginning of the game, a cat is depicted, asking the player to help him to link the name of the technical device to its image. When passed correctly, the player moves to the next level, which is to move the images of the means of outputting and inputting information into the appropriate baskets. For a successful accomplishment of tasks the pupil goes to the last level – guessing riddles. A cat with the proposed puzzle and a field for entering the correct answer appears on the screen. After each successful level, an animation appears (separate elements of the game are shown in Fig. 1).

Figure1. Game "Language and technical researchers"

The purpose of this task is not only to teach children to correctly write computer terms (with highlighted in red letter that pupils usually misuse) and to recognize different technical means, but also to correctly pronounce and stress words, to learn how to use words, to be able to notice and correct the mistakes. These words are found in the texts contained in the pictures.

This project will be further developed and improved. Children will be able to give their suggestions, ideas, participate in the development or create their own projects. We believe that such kind of creative tasks will increase the level of computer competence of junior pupils; in particular, they will serve to forming the national-language personality.

We are convinced now that there is great interest of junior pupils from the EG to presentations in the PowerPoint editor. Rapid checking pupils knowledge is possible while working with texts. To do this, a single text slide shows misspellings, punctuation or some other mistakes. After completing the assignment, the pupils check their work on the next slide and put marks for it. This type of work is convenient because junior pupils immediately see their mistakes, correct them and getmarks. Thus, information technologies help to individualize and differentiate teaching the Ukrainian language at primary school.

In the process of the experimental research introducing the system of game tasks aimed at forming correct speech concerning pronouncing consonant sounds we testified the chances in the indicators of possessing high, middle and low levels of speech culture.

Table 1: Quantitative data of correct sounds pronunciation, normative stresses of words, correct use of words by pupils of EG and CG at the end of experimental research

	Chareacteristics of the speech culture							
Correct pronouncing vowel sounds		**Correct pronouncing consonant sounds**		**Correct stressing the words**		**Correct use of words**	
Forms, quantity of pupils							
EG, 26 учнів	**CG, 27**	**EG, 26**	**CG,27**	**EG, 26**	**CG, 27**	**EG,26**	**CG, 27**
70 %	**55 %**	**66 %**	**47 %**	**54%**	**42%**	**58%**	**44%**

Junior pupils who correctly articulated the consonants of the modern Ukrainian literary language demonstrated the high speech culture level; they adhered to the pronunciation norms in their own speech; understood the types of mistakes, were able to find them not only in someone else's speech, but also in their own speech, electronic media, the Internet, some minor mistakes were made in sound, stresses and use of words. Such pupils in the experimental group turned out to make up 66%, in the control group only 47%. Sufficient and middle levels of the speech culture were common to most junior pupils of the experimental group and to 39% pupils of the CG. Such pupils made up to six mistakes in their pronunciation, stresses or

use of words, did not fully understand the semantics of the word, could find mistakes in someone else's speech, but not in their own speech, they are not able to see and correct them.

Junior pupiuls also demonstrated low level of culture (more than seven mistakes) in their speech (35% in EG and 48% in CG). Such native speakers did not distinguish sounds, syllables; did not quite understand the meaning of the words; did not understand the nature of the mistake and could not fix it; they used slengizms, Russian words, dialecticisms in their speech.

Thus, applying the methodics for forming the language culture of junior pupils showed the positive dynamics of the development of the culture of pupils speech (these indicators are shown in Figure 1). The results are presented in Table 1.

Figure 1: Comparative table of the formed levels of speech culture of pupils from the EG and CG at the end of the experimental research

Forms	Quantity of pupils participating in the experiment	Levels (in %)			
		High	Sufficient	Middle	Low
EG	26	18 %	35 %	32 %	15 %
CG	27	4 %	30 %	33 %	33%

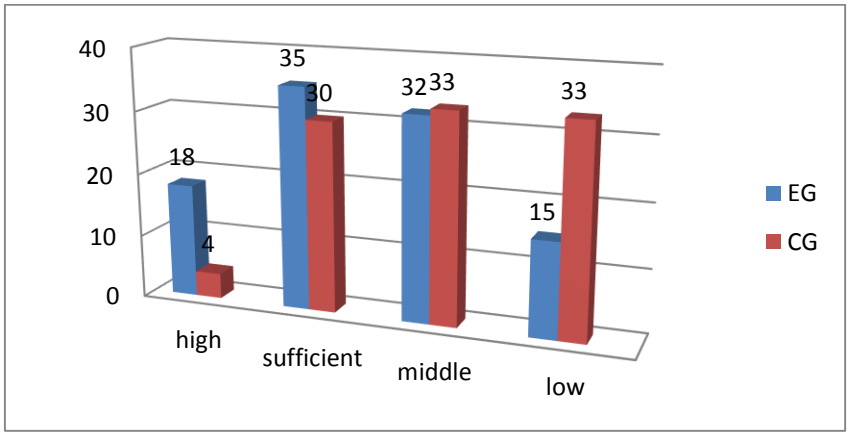

Fig.1. Levels of the formed speech culture of pupils

EG and CG at the end of the experiment

As it can be seen from Table 2, in the EG the level of pupils' knowledge on the culture of speech, the components of culture, norms of the modern Ukrainian language increased by the cognitive criterion: 18% of pupils reached the high level (at the initial level it was 2% before the experimental study), in the control group it grew to only 4%, that is only one pupil reached the high level of language skills; the average level is characteristic of 32% and 33% for junior s pupils from the EG and CG respectively. It actually did not change much compared to the initial data at the beginning of the experiment. It is important to note that there were positive changes in the EG regarding the decrease of the pupils' with the low level of knowledge ofn the culture of speech (at the end of the experiment this percentage was only 15% of children versus 38% at the beginning of the study).

At the same time in the 4th form of the secondary school N4 in Ivano-Frankivs'k where the methodics was not implemented, we noted only minor positive changes. In particular, 33% (vs. 38%) had a low level of speech culture, 35% of junior pupils from EG reached the sufficient level (at the beginning of the experiment it was 28%) and only one pupil from the CG (an indicator at the end of the experiment was 30%) reached the sufficient level of speech skills.

Similar positive changes were demonstrated by junior pupils from the EG by the activity-communicative indicator. Almost half of the pupuls from the CG had a low level of speech skills. This can be explained by the influence of the means of social communication, the Internet, Russian words, slangisms,

local dialects, etc. on forming normative communication of individual pupils, as well as the traditions of parenting in the family, the linguistic environment of the child, low motivation to correct their own speech, etc.

Thus, an important task of the research was the elimination of these shortcomings, that is, complex organizing the process of forming the speech culture of junior pupils as computer users. According to the results of the implementation of the research program aimed at forming the national language personality of the junior pupil, we can state that these forms of work with children are efficient.

Applying ICT makes Ukrainian language lessons and literary reading lessons dynamic, vivid, and more efficient. The interesting experience of applying ICT at primary school can be observed at Ivano-Frankivs'k secondary school N 26 and secondary school N24 in Ternopil. First form pupils at schools of Ivano-Frankivs'k and Ternopil study with notebooks-tablets [7].

In spring 2014 the Ministry of Education introduced the pedagogical experiment "SmartKids" in Ukraine. The Ministry of Education approved the all-Ukrainian experiment "The Technology of Teaching Primary School Pupils (SmartKids)" for 2017-2022 [14].

In the frames of the experiment, in both primary schools, projectors and smart boards where children performed educational tasks in game form were installed; the games are didactic, bright and interesting. It should be stressed that the experiment on applying ICT was carried out with laptops, tablets, children work with them in two subjects – Mathematics and Ukrainian language with literary reading. The exciting learning programmes for junior pupils with interactive exercises, funny animated characters, vivid subjects and soundtrack are of great interest for learning, help the pupils to learn more about new material in basic school subjects, and develop their logic, attention, imagination, creative thinking and memory.

The methodical provision of such innovative training (smartcases) is worth attention. The smartcase of the primary school teacher is a ready-made multimedia of the "SmartKids" Publishing House. There are more than 12,000 interactive tasks in the game form in Math and Ukrainian language based on the curriculum that can be run on any multimedia equipment, smartcases also include the "Teacher's Media Library" which has over 3,000 vibrant pictures of the professional artists and designers as objects for the work of the teacher of primary school, the DVD "Didactic-methodical case of teachers of SmartKids", Methodical recommendations "Use of electronic educational game resources in the educational process of primary school" (S. Lytvynova, O. Melnyk), the subject-thematic electronic catalogue of all the tasks of Pedagogical games, instructions on their installation and use, a label for a class in which children work on innovative technologies SmartKids, etc.

According to the words of teachers Alisa Pavliuk of Ivano-Frankivs'k primary school N26 and Olha Nazar Ternopil primary school N24, participating in the pedagogical experiment "SmartKids" there are obvious advantages of both "Personal teacher's office" (software environment that extends the possibilities of using the SMARTCASE by primary school teacher) and the latest methods of teaching with applying ICT [15]. The above mentioned teachers actively share their experience to their Ivano-Frankivs'k and Ternopil colleagues, present the project SmartKids, demonstrate video tutorials using Edugames at the meetings of the methodical associations of primary school teachers, inform teachers about the benefits of applying electronic resources and share their own experience of work in the project.

On the other hand, applying electronic educational resources reduces the risks of speech errors provided that the language of the curriculum is correct.

According to the results of the survey for teachers involved into the "SmartKids" project, we can state that junior pupils using electronic educational game resources while studying the Ukrainian language, literary reading, mathematics, show higher results in these subjects compared to pupils at regular lessons, since the learning material is trained both at the lessons and in the extracurricular time. Therefore, the use of electronic resources is appreciated as an effective factor/condition for creating an ecologically-friendly medium for young computer users.

4. Conclusions and the Further Research Perspectives

Forming computer awareness of the junior pupil is a complex and polystructural phenomenon which important component is speech culture. Forming national language young personality is one of the urgent

issues of the present; the ecology of the Ukrainian language as a condition of this process is not only a philological, pedagogical, but also a social problem: it is in one way or another connected with the most diverse types of communication, including ICT. Adding ecological aspects to the linguistic environment should become one of teachers' priority tasks. Concerning this, the work aimed at forming the culture of Ukrainian primary school pupils' speech gains a special significance. Teachers are called to always take care of the junior pupils' language culture, to motivate them to self-improvement in the area of the normative language proficiency, to work on correcting their mistakes. The suggested forms and methods of work may be an important tool in this activity, aimed at forming an ecologically-linguistic environment, which can provide a computer literacy enhancement to a computer user, in particular his/her linguistic component.

The further research requires the study of training the future teachers for forming the linguistic competence of the junior pupil, the use of ICT in Ukrainian language lessons and literary reading etc.

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Comparison of Dynamic Balance Test Scores of Young Female Volleyball and Soccer Players

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Abstract

Flexibility and balance are two main fitness components which are commonly prescribed to enhance athletic performance and reduce the risk of injury (1). However it has been not well documented in the literature that how athletes from different sports branches perform on these components. This study proposed to compare the scores of young female soccer and volleyball players in the Star Excursion Balance Test (SEBT) which is designed to measure flexibility and dynamic postural control or balance.

Twenty-one female student-athletes aged 15–17 years participated in the study. The sample included soccer (n=10) and volleyball (n=11) players who attend a sports high school in Turkey and compete at national and international level.

Mean age, height and weight of the participants were 15.9±0.3 years, 161.5±6.1 cm, and 50.8±4.5 kg, respectively, for soccer players, and 16.5±0.7 years, 165.1±7.8 cm, and 55.9±7.7 kg, respectively, for volleyball players. Normalized reach distances (leg length percentages) were compared for anterolateral (AL), anterior (ANT), anteromedial (AM), medial (MD), posteromedial (PM), posterior (PO), posterolateral (PL), and lateral (LAT) directions using the Independent Samples T-TEST. The soccer players reached farther than the volleyball players on the right leg in the PL and LAT directions, and on the left leg in the MD and PO directions ($p<0.05$) while there were no significant differences in forward lunge with right and left leg distances between the groups ($p<0.05$).

We can conclude that volleyball and soccer players may differ in terms of dynamic balance in the SEBT. The findings of this study may also contribute to the literature to reveal to establish reference values for SEBT performance in adolescent population.

Keywords: Proprioception, Postural Control, Dynamic Balance.

1. Introduction

Athletes aim to increase their athletic performance and prevent injuries by developing flexibility and balance (1). These performance components are of particular importance in team sports such as volleyball, basketball, and soccer, where motions such as sudden changes in direction and jumps are frequently observed, which may cause joint injures (2). It is known that the biggest factors in joint injuries are mechanical or functional balance problems (3), and the balance will directly affect athletic performance in these branches (4). Flexibility, like balance, is another important fitness component that may have an influence on injuries and athletic performance (5). However, it is not yet known to what extent these two performance components act on the abovementioned variables and which other variables can affect these components. In previous studies conducted with measurement methods where flexibility and balance were performed together, such as the Star Excursion Balance Test (SEBT), it was observed that different results were reported according to different sports branches apart from factors such as age, gender, and physical characteristics. The fact that each sports branch contains its own motion patterns may cause differences in balance and flexibility performance requirements. For example, there may be differences in the balance factor as a result of load at different intensities on one foot when compared to another (6) due to the fact that soccer players use their dominant legs in each contact with the ball (7). Similarly, basketball players use their postural control mechanisms at different rates according to their motions with the ball. Finally, it is obvious that there may be differences in the performance as a result of the double-foot and single-foot jumps, which volleyball players frequently repeat, and which require dynamic balance performance. Different results have been presented in the literature on how the balance and flexibility will differ according to the branches. In their study, reported (8) that soccer players and basketball players were better at both static and dynamic

balance than gymnasts. In the study (9), which support the findings of this study, it was reported that the balance skills of soccer players exhibiting with single leg were better than of basketball players and swimmers. While creating the research question for this study, it was aimed to examine the balance elements of the volleyball players as well as of the soccer players who are expected to have good single-leg balance performance. It is, albeit, difficult to compare the findings of the present study with of the previous ones because different populations (different age and gender groups, being an athlete or sedentary, sports history, etc.) and methods (static/dynamic balance, postural control, etc.) were used in those studies. Therefore, the aim of this study was to compare the dynamic balance of young female volleyball and soccer players who have similar training routines and attend the same sports high school.

2. Method

2.1. Participants

In this study, a total of 40 young male athletes (10 sprinters, 13 martial arts athletes, 11 soccer players, and 6 handball players) aged 15-17 attending the same sports high school voluntarily participated in our study. The participants were informed about the test procedure one day before the measurements and that the tests administered did not pose any health risks.

2.2. Materials and Procedure

The Star Excursion Balance Test (SEBT) was used to determine the dynamic balance performance of the athletes. The SEBT requires the individual to maintain body stability by standing on the single leg (support leg), to reach the maximum position in different directions with the help of the other leg, and to return to the first position. The participants were asked to reach the lines, the last points they are able to reach, in eight different directions (anterior, posterior, medial, lateral, anterior medial, anterior lateral, posterior medial, and posterior lateral) (Figure 1). During the test, the participants were required to return to the starting position in the center without distorting the support leg when tapping the reach point. The maximum reach distance was determined as the distance reached by the reaching leg at the last point. The test was terminated and re-administered once the participant lifted its support leg, moved it away from the center point, or stepped on the point where it should have tapped. Each participant was given 3 attempts to tap on 8 pre-determined lines with both legs. Each participant started the test with the right leg in the center and took a 5-minute break at the end of 3 attempts. Then, 3 more attempts were done with the other leg (10).

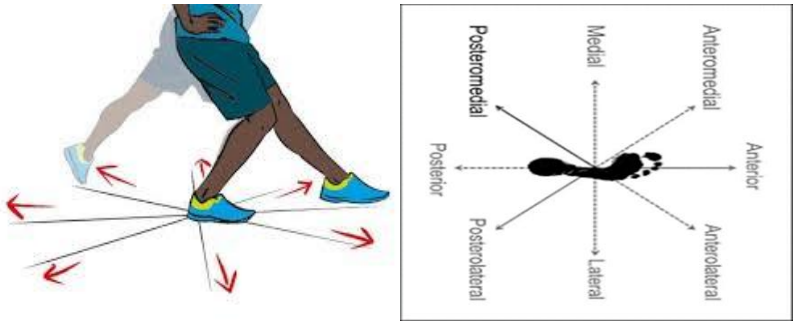

Figure 1: The Star Excursion Balance Test (SEBT)

The best value from the data obtained in the SEBT was recorded in cm. The balance performance values of the participants were normalized according to the leg length of them. Normalization was done by dividing the reach distance to each direction by the leg length of the participant, and then multiplying the outcome by 100. (*Normalized score (cm) = Reach distance (cm) / leg length (cm) x 100)* (10)

2.3. Data Analysis

The data obtained were analyzed with the SPSS for Windows Release 21.0 (Statistical Package for Social Sciences Inc. Chicago, IL, USA). In the analysis of the data, the data set was examined primarily in terms of erroneous value, outlier value, and normality of the distribution. The normality of the distribution

was analyzed by the Shapiro Wilk test and it was concluded that the distribution was normal (p> 0.05). In the present study, the variables determined by measurement were indicated as mean (**X**) and standard deviation (S). Independent Samples T-Test was used to compare the balance performance of young male athletes training in soccer, handball, sprinting, and martial arts. In all statistics, p significance value was taken as n = 0.05.

3. Results

Table 1. Shows that the groups divided into two as soccer and volleyball players are similar in terms of physical characteristics.

	N	*Age (years)*	*Weight (kg)*	*Height (cm)*
Soccer Players	***10***	***15.9±0.3***	***50.8±4.5***	***161.5±6.1***
Volleyball Players	***11***	***16.5±0.7***	***55.9±7.7***	***165.1±7.8***
Total Mean	***21***	***16.2±0.6***	***53.5±6.8***	***163.4±7.1***

It has been previously reported that the leg length may be the determinant factor for the performance variable, and values should be discussed based on the leg length. Therefore, normalized SEBT values are given in Table 2.

Table 1. Normalized SEBT values

	Group	ANT	AM	MD	PM	PO	PL	LAT	AL
RIGHT	VG	86.5±7.8	90.0±5.5	89.7±8.1	89.5±13.4	90.5±11.1	82.5±11.5	76.7±7.4	83.9±6.9
	FG	90.1±5.8	94.1±7.4	93.1±6.0	94.9±9.2	95.1±9.4	91.9±6.6*	83.2±6.0*	85.1±6.6
LEFT	VG	90.0±8.2	90.6±8.3	90.4±9.3	90.2±10.8	89.8±11.8	84.7±16.0	80.2±10.5	83.0±15.3
	FG	93.1±10.9	96.1±7.5	99.1±6.0*	99.2±10.7	102.0±5.4*	92.2±9.8	82.0±8.1	88.6±5.6

VG: Volleyball players, FG: Soccer players, AL: Anterolateral, ANT: Anterior, AM: Anteromedial, MD: Medial, PM: Posteromedial, PO: Posterior, PL: Posterolateral and LAT: Lateral *p<0.05

Table 2 shows that the soccer players have higher values than the volleyball players on the right leg in the PL and LAT directions, and on the left leg in the MD and PO directions (p <0.05). There is no SEBT parameter in which volleyball players have better values than soccer players.

5. Discussion and Conclusion

In this study, it was aimed to analyze the values of volleyball and soccer players in the Star Excursion Balance Test (SEBT) and make a comparison of these values. Previous research has shown that the SEBT may be an indicator of postural deformity as well as flexibility and dynamic balance factors (3, 10, 11) and therefore, the findings of the study are thought to make significant contributions to the relevant literature. The findings of the study revealed that soccer players were better than volleyball players, especially in the parameters of reach to the back and sideways (the posterolateral and lateral directions on the right leg; the medial and posterior directions on the left leg). It was initially predicted that the reach distances could be shorter in the volleyball branch, where single-leg performance is rarely used. In one of the few studies that examined the balance performance of volleyball and soccer players with a larger sample (12) group found similar results in soccer players. In their study, volleyball players had shorter reach distances than soccer players, but better reach distance than cricketers. In parallel with the literature, the findings of the current study indicate that single-leg reach distance of soccer players may be better than volleyball players. It is thought that the main reason for such a difference is the fact that soccer players exhibit a balance performance on the single leg in almost all the motions with the ball and accordingly, it improves their

single-leg postural control skills. In addition, it is thought the fact that soccer players use their body weight centers as a force to compete against their opponents or have to display accelerations and decelerations to get free of the opponent are other factors affecting their dynamic balance performance positively.

It was initially predicted that the height of the volleyball players could be higher than of the soccer players, so the leg lengths in the balance scores were normalized to eliminate such limitation. Although it was observed that there was no statistical difference between these two sports branches in terms of physical characteristics following the anthropometric measurements, normalization was still performed. It is believed that one of the reasons for not obtaining any differences in terms of physical characteristics of the participants may be due to the fact that the physical differences of the players were not taken into consideration in the analyses. It is known that the players in the libero position in volleyball are quite shorter, and defenders and goalkeepers can be taller than others in soccer. Another important issue considered before the study was the decision of whether to make an evaluation as right-left leg or dominant-non-dominant leg. In the light of previous studies and preliminary data of this study, it was decided that the evaluations should be performed as right-left leg instead of dominant-non-dominant leg, since it is deemed that athletes can perform better in any of their dominant or non-dominant legs.

Conclusion

As a result of this study, it can be asserted that young female soccer players exhibited better dynamic balance performance than volleyball players. However, it should be noted that there is no statistically significant difference in the reach distances other than 2 directions for each leg. Also, although the participants were selected from the same sports high school and they were relatively at similar levels, their sports histories or training situations were not taken into consideration. Especially considering that soccer players' balance skills may differ depending on their match histories or training situations (9, 13), future studies are recommended to consider this issue. The gender variable (14), another factor that may affect balance performance, was taken into consideration in this study, so only female athletes were measured. Subsequent studies on males are also thought to contribute significantly to the literature.

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Representation of Cultural Experience: Conditions of Opportunity, Methods of Implementation

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Abstract

The article presents the option of considering the process of forming the individual experience of a person as a representation in his consciousness of cultural achievements. Perception is considered as a method of its implementation. Being a holistic process, perception contributes to the transfer to the inner world of a person of his impressions about the world and their transformation into experience. The latter accumulates the results of multi-level (physical, biological, social) human interaction with the world. It is shown that the representation is carried out both at the reflexive and pre-reflexive levels of consciousness. It is emphasized that the representation by a person of cultural experience, ensuring the representation of forms of culture, knowledge in the human mind, causes the emergence of a person's ability to produce new knowledge. The approach proposed in the article allows one to expand the notion that considering only the mechanisms of perception, explaining its particulars, understanding only what is already perceived, it is impossible to equip a person with recipes for achieving personal growth, enrich with recommendations that can protect him from the aggressive impact of standards, cliches, stereotypes mass culture, strengthening the clip consciousness.

Keywords: person, cultural experience, individual experience, representation, appropriation, consciousness, perception.

Introduction

The relevance of the article is determined by the continuing need in the research community to continue to understand the mechanisms of human interaction with the outside world. The increasing importance of this problem can be traced in conditions when the existence of a person is determined by factors that block the formation of his full experience. Among them – mass culture, the dominance of standardized influences, stamps, stereotypes, academic doping, etc. the so-called spread. academic doping is associated with the use of pharmacological agents in the hope of improving the cognitive abilities of a person, to strengthen the mental (primarily cognitive) abilities of a person through the use of specially developed technologies, including biomedical. The latter are ahead of the possibilities of previously known methods of cognitive improvement-pedagogical technologies, tea, coffee, sleep, hypnosis, self-hypnosis, meditation. Biomedical technology, cognitive enhancement, activate the illusion, especially among the youth, regarding the possibility in the shortest terms without a serious effort on the part of the individual to achieve cognitive goals, improve the ability of only using pills, medications, ultrasound, magnetic pulses, etc (Popova et al., 2018). The role of individual experience is minimized, and sometimes excluded in this situation, or it is identified with the development of a set of techniques for remembering specific information. In this regard, the solution to the problems associated with the identification of the features of the emergence of such a reality as the inner world of man, his experience, comes to the fore. The study of the specifics of the formation of human experience, the features of accumulation in the conditions of modern culture involves the consideration of its essential characteristics. As you know, experience is constituted by knowledge, skills, abilities, experiences, feelings, will of people, imprinting in their minds the laws of the objective world and social practice. Experience in this case is understood in the broadest sense as a holistic process of human activity, the results of which provide social, historical and cultural inheritance (Nesmeyanov, Filatova, 2013).

Features of crystallization of the experience of a genetically determined process multidimensional

creative interaction of man and the world in the course of overcoming people the hard part of the realm of necessity, which is the natural world. Interest in the processes characterizing human interaction with the surrounding world, as a result of which experience is formed, has been studied by such authors as Epicurus, Empedocles, Democritus, Aristotle, Euclid, etc., who emphasized the presence of human activity or passivity in interaction with the surrounding world. Creating a "theory" of the expiration of «atoms» and their subsequent return to the senses, ancient thinkers stated the presence of not only the ability of a person to feel, but recognized the fact of the impact on a person sensually perceived objects (Yaroshevsky, 1976).

Thinkers of the middle ages, the Renaissance also noted the presence of a person's ability to be active or passive in its interaction with the outside world, contributing to the acquisition of knowledge. In Modern times, trying to solve the problem of human activity and passivity in the process of gaining experience, they have taken the differentiation of sensations and perceptions, proving the possibility of cognition of the world through sensations (D. Locke).

As the activation of psychophysical research in the nineteenth century appeared the possibility to measure the sensations, to explore human interaction with the environment at the level of peripheral receptors, to establish the thresholds of sensitivity of the person. Thus, another step was taken to broaden the understanding of the ways of experience formation. The ability to link its accumulation in detail not only with sensory processes, but also with thought processes was established by Ananiev (Ananiev, 1960).

However, in the research literature of recent years, the need to continue to study the problem of «man – world» in terms of the individual characteristics of the process of transition of impressions of the outside world in the possession of the inner world of man. The problem of formation of his experience as conditioned not only by reflexive, but also by pre-reflexive levels of consciousness remains relevant. Today, further in-depth study is required on the extent to which experience is a genetically determined process, how it is related to non-institutionalized levels of human-world interaction, whether experience depends on human activity or passivity, what processes are associated with the appropriation of human cultural achievements. The questions posed determined the purpose of the article – the study of the conditions of the possibility of human representation of the experience of culture, the identification of ways of its implementation.

Research methodology

The historical and philosophical approach helped to identify the dynamics in the approaches to understanding the interaction of man and the world, to understand the conditions of the possibility of the emergence in scientific practice of the concept of representation, to emphasize the difference between modern interpretations of the term representation from the classical (Cartesian). Within the framework of the latter, the representation was understood as what is in the human mind, covered by internal vision, through which the degree of its reliability is determined. Representation in its classical version opened for a person an opportunity to put a real world in front of him, to state the intersection of two processes – the world of objects and the world of a person capable of reproducing the meeting of these worlds, guided by certain ideological positions (Mikeshina, 2005). The limitations of the classical version of the representation were identified thanks to modern theories, in particular, M. Vartofsky (Vartofsky, 1988).

Methodologically significant principles of enactivism contributed to the understanding of representation as a process due to the activity and interactivity of consciousness. The principles of enactivism aim at the non-traditional solution of the problem of consciousness and body, knowledge and action, which contributes to the definition of representation as a process in which the subject and object affect each other. Enactivism, guided by the idea of conditionality of the mind by physicality, allows to overcome the rigid distinction between external and internal, to emphasize that the human body is inscribed in the world that is created by the same person in accordance with his needs Sensory-motor enactivism (one of the varieties of enactivism) – the approach developed by Professor of the University of California Alva Noe – allowed to link the representation and perception of man (Knyazeva, 2013).

The methodology of phenomenological philosophy aims to consider perception as a process, ontologically rooted, possessing an intentionality – orientation to the subject. The main methodological principle of phenomenology leads to the conclusion that representation determines the mental state of a

person, they are intentional, always directed in a certain way to an object, and therefore filled with content. Representation associated with such a key moment as perception forms the experience of consciousness. Perception in this case is the original form of consciousness, is considered as the basis of all its other forms, i.e. all other forms of consciousness – only a modification of perception. (Kharlamova, 2016).

The activity approach developed by domestic researchers gives grounds to interpret representation as human activity, in which perception mediates its connection with the subject world and generates images. Approaches to historical epistemology is allowed to link the representation and perception as historically conditioned processes (Vartofsky, 1988).

The methodology of evolutionary epistemology, based on the idea of the continuity of man with the lower animals, makes it possible to interpret perception as one of the historical stages of formation of the apparatus of knowledge and, consequently, to clarify its role in the implementation of representation, the formation of experience at the early stages of human development. Reliability of experience, criteria of its truth were determined by the extent to which such experience provides adaptation of each organism. It was possible to get the experience due to the coincidence (or deviation) of perception and action, which was already imprinted on the pre-reflexive level of consciousness (Piaget, 1969; Follmer, 1998).

Results

To achieve the goals outlined in this article – understanding the conditions of the possibility of accumulation of experience, understanding the mechanisms that generate it – the term representation (from FR. representation). According to modern dictionaries, it refers to the consideration of reality, the process of assimilation of the original, through which images of the surrounding world (the original, reality) are created. In the human psyche reproduces what is endowed with values (objects, objects, etc.). Representation-in the broadest sense of the word is associated with the presentation as the presence, presence of something, representation of one in the other, through the other with the use of signs. Representation is also interpreted as a way of representing an object in everyday and scientific knowledge, contributing to a more objective recreation of reality (Newest philosophical dictionary, 1998). Noting the complementarity of the concepts of reflection, representation, representation, we emphasize that the use of the concept of representation, understood by us as the representation of culture, knowledge in the consciousness of the individual, allows us to take into account the inclusion in the process of assigning experience reflexive and pre-reflexive layers of consciousness. This implies such characteristics as multi-level representation processes. Its analysis involves the study of the perceiving ability of a creative person. Thus, psychologists, based on the achievements of physiologists, showed that at the level of the sensory act, the energy of external irritation turns into a fact of consciousness. The existence of both sensory and logical levels of information processing (Ananiev, 1960). makes it possible to clarify the processes of the emergence of prerequisites of mental processes, to determine the ways of intellectual improvement of a person (Zinchenko, 1997). The understanding of the role of perception in the processes of representation of cultural experience and its appropriation is facilitated by the methods of perceptive activity established by researchers (Zinchenko, (1997). Thus, if the transition to directly Executive actions is not connected with the construction of the model, the execution speed increases. The variant, in which there is such a link as a system of detailed actions for the construction of conceptual models, preceding directly the Executive actions, reduces the speed of execution. Perceptual action is a kind of self-regulating action that has a feedback mechanism and adapts to the characteristics of the object under study. The system of perceptual actions carried out by the subject in the process of practical activity contributes to the orientation of the subject in the surrounding reality, to the understanding of its properties, which are necessary for adaptation to it, for solving life problems facing it, for the implementation of an act of behavior (Zinchenko, 1997).

Perception, understood as a mode of consciousness, ontologically rooted, associated with the physicality of man, inscribed in his cognitive activity, which is carried out as an impact on the environment and cognizable environment — by enactivating the environment. In other words, the perception accompanies the representation, performing the function of the method of its implementation. In fact, representation appears as a process in which perception is a form of human activity, due to the presence of a system of opportunities, including practical knowledge, possession of bodily, sensory-motor skills, the

ability to self-movement. Perception, understood as the first initial experience, as a mode of consciousness, contributes to the awareness and detection of things as such, what they are in reality.

In this consideration of perception performs the function not only of the method of the representation, but also the conditions of its possibility. Thanks to the representative processes accompanied by perception, the foundations of human behavior in the world are formed, including its theoretical attitude to the world (in fact, different types of experience are formed). Interpretation of perception as a way of representation and conditions of its possibility allowed to put forward the thesis that representation is a process, not a frozen snapshot of reality. It is associated with the involvement of pre-reflexive and reflexive levels of consciousness, due to the ability of human movement, and is based on his bodily knowledge. The concept of sensory-motor enactivism A. Noe, closely associated with the ideas of John. Gibson made it possible to clarify the concept of experience and to interpret it (experience) as the ability of a person to perceive the possibilities for action in the conditions provided by the objects of the environment. In other words, a person is in a circle of meanings and meanings that are «... external to the observer» and give him situations of choice (Gibson, 1988). Decision-making and further-the representation of the experience of culture is associated with the motives and attitudes of man, his activity of correlating the information with his existing knowledge, past experience, ie activities that bring together feelings, perception and thinking (Ananiev, 1960). The specificity of the representation of cultural experience is determined by the context, the situation in which a person is. It is also influenced by his needs, emotional preferences, system of values. Representation is due to the presence in the human consciousness of preliminary structures that are transformed in the process of human development from primitive to more complex. The function of the mechanism here can perform assimilation-assimilation, assimilation on the basis of sensorimotor or perceptual schemes, which causes the appearance of logical categories and classes (Piaget, 1969). As a condition of possibility of representation is the interdependence of cognitive and practical activities of man. The latter contributes to the emergence of images caused by the work of the senses, under the influence of objects of the outside world. Thus, it is possible to consider the representation carried out through the perception as a process that accompanies the first action external, practical. Because of internalization, they are imprinted in our inner world, crystallizes like experience. The peculiarity of the representation process is its ability to be carried out as a socio-cultural activity, the leading role in which the perception, in fact, is also an activity due to social development, technological practice (Vartofsky, 1988).

Discussion

Research of conditions of possibility of representation of experience of culture by the person, identification of ways of its implementation assumes definition of constructive potential of concept of representation. Used in Russian epistemology, it is aimed at the development of the fundamental thesis of knowledge as a reflection, direct receipt of the "copy", the image of the real world

Fixing to a greater extent the end result, the concept of reflection does not cover the operational side of cognitive activity, which is more fully revealed by the concept of representation. With its help it is possible to speak about the embodiment in cognitive activity of creative potential of the person, including his ability to see problems, to build hypotheses, to take into account social and cultural preconditions, to be based on individual and collective experience.

Understanding the theory of knowledge as a reflection is burdened with the interpretation of reflection in the meaning of specularity, which provokes and strengthens the mechanistic vision of the world, the identification of man with the machine-animal-mirror. The problem of obtaining a comprehensive knowledge of reality within the framework of traditional epistemology was realized by Descartes, who prepared a turn for the introduction of the concept of representation into scientific use. With it, came to denote what is in the mind of man, and that it is possible to capture an inner vision, thus to ascertain the reliability of the content of consciousness. Representation in the classical interpretation is a procedure of consciousness that allows you to put in front of a cash being, to include it in a relationship with yourself as an object. Man does not so much look at the being as he imagines the picture of the being, and it becomes a researched, interpreted representation of this being.

Revitalization in the twentieth century research in the field of linguistics, developing the ideas of

Polanyi tacit knowledge contributed to the understanding of representation as a process emerging in the deep layers of human consciousness that determines the patterns of human understanding of the external world and himself. The understanding of the conditions of the possibility of representation influencing the formation of experience was expanded. The ability of a person to capture in various forms of culture, and then use implicit information, "folded" knowledge, hidden meanings is noted. The last person masters in practical actions, in joint scientific work. Implicit-personal knowledge-is woven into people's activities, is not fully explicated, but can be appropriated by a person in direct communication, personal contacts.

The introduction of new results in other scientific areas allowed, in particular, to systematize the achievements of psychological science in order to philosophical understanding of the features of the formation of human experience, assignment at the individual level of cultural achievements, their inheritance. At the same time, consideration of representation processes in their connection with perception opens up a number of problems that need to be addressed in order to continue to identify the reasons that prevent the appropriation of cultural experience at the individual level.

1.In developed forms of perception there is no one-to-one correspondence between perceptive and performing action performed on its basis. The same perceptual actions can serve different forms of behavior, i.e. different tasks are solved with their help. In this regard, the completeness of the representation of cultural experience can be achieved depending on the nature of the goals set by the person, the stage of his personal growth.

2.Finding out the nature of perception, representation and experience acquired with their help requires the involvement of genetic and functional research methods, phylogenesis data in order to determine the actual structure of perceptual actions, their role in the reproduction of reality. For example, in developed forms of perception it is difficult to draw clear lines between the actions of detection, distinction and identification, in genetic research it is possible. The question of the differences between these actions is problematic, since different levels of perception are not only the property of a person of a certain age, not only the stages in the development of perception. The solution to the problem can be achieved in the light of the idea that each subsequent step does not cancel the previous one by its appearance. In other words, in the structure of developed perception there is a place for each of the actions that develop in the process of development. However, they may differ significantly from their original form. In this case, the representation of cultural experience, which is a process due to the age characteristics of a person, is prepared by the experience acquired in the early stages of human development, and is contained in the adult experience. The lack of experience of early human development determines the degree of completeness of the experience of adults.

3. Perceptual actions are multi-component, that is, include in its composition, for example, the movement of receptor apparatus, which also play a role in the formation of the image of perception, which indicates the existence of the necessary connection of movement and action. The latter, in its original form — in the form of external material action, necessarily includes motor components. Problems in the implementation of the representation of cultural experience and its understanding arise in the identification of movement and action. In order to understand the nature of identity and the differences between these two processes, it is necessary to take into account the main qualities of action, which consist in focus and objectivity (Leontiev, 2004). Action always entails a certain reasonable conversion (real or imaginary) outside the subject of the situation. Obstacles to representation may arise due to the lack of necessary conditions – focus, objectivity, human activity.

4. Representation associated with the representation in the human consciousness of the features of forms of culture, objects, things, due to personal characteristics, individual experience, tasks. The way an object appears in consciousness is also determined by the environmental conditions in which a person is located, the peculiarities of his life and activity, his needs and the degree of importance of the object for him, the choice of ways of interaction with him.

Research on the identified range of problems will contribute to the further identification of the specifics of representation, perception processes, factors that contribute to or hinder the individual assignment of cultural experience.

Conclusion

Representation is studied as a process that determines the formation of human experience. As a way to carry it examines the perception is ontologically rooted human trait inherent in him, is integrally linked with the being. Characterized as a form of connection of a person with the surrounding world, perception is a holistic process that contributes to the transfer to the inner world of a person of his impressions of the world and their transformation into experience. On the other hand, using the available experience, revealing his essential powers, a person embodies them in the created subject forms, images of reality, reflecting also the relations with other people.

Perception appears as a way of integral manifestation of human capabilities at different levels of relations with the world – physical, biological, social, using sign systems, mastering semantic contexts. Such processes, directed from a person to the outside world, allow to interpret perception as a condition for the possibility of representation.

Representation of cultural experience by a person, ensuring representation of cultural forms, knowledge in the human consciousness, involves the use of assigned knowledge in cognitive activity, existing in the form of science, art, beliefs of people, etc.the Essential characteristic of representation is the emergence of a person (on the basis of the acquired complex of knowledge, skills, skills, all imprinted in the consciousness) the ability to generate new knowledge. Representation is determined by several levels of human interaction with the world (natural and cultural) – both reflexive and pre-reflexive. This circumstance gives rise to a variety of ways of representation used by man, the transfer of cultural data into the inner world, turning them into the heritage of the human world, his experience.

The approach proposed in the article allows us to expand the idea that considering only the mechanisms of perception, explaining its particular, understanding only what is already perceived, it is impossible to equip a person with recipes for achieving personal growth, to enrich with recommendations that can protect him from the aggressive impact of standards, clichés, stereotypes of mass culture, strengthening clip consciousness.

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Forming Self-Development Competences in Engineering Students During Physical Culture Lessons

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Abstract

This topic is believed to be important as an adequate arrangement of the younger generation's physical education can surely help to implement healthy lifestyle habits, develop certain personal traits that can ensure their competitiveness in the career market as well as to form personalities capable of adapting and developing in the modern world. Physical culture in universities is considered to be one of the most crucial basic elements necessary for the formation, development and self-development of a student's personality that is defined as a socially determined area of humans' general culture, while paying special attention to some of its elements can ensure development and self-development. The purpose of the given research is to analyze scientific and methodological literature on the reformation of education in higher education institutions involving competence-based approach in student's physical education, to define key competences of an engineering institution specialists, and, taking all if it into consideration, to work out a module-based Physical Culture syllabus. The leading research method for this topic is to analyze the available literature dealing with the concept of the key competences and self-development competences and, based on the federal learning standard for higher education FGOS VO, to work out a module syllabus that includes the development of such competences as they are necessary for the fulfillment of a specialist's professional objectives. The article analyzes philosophical and psychological and pedagogical literature on a person's self-knowledge and self-development during the education process organization. The article also considers the variety and stages of the development of professional competences during the education process as well as provides a short summary of a module-based Physical Culture syllabus for engineering students. The findings can be implemented by university teachers in order to ensure students' professional self-development or as a scientific and methodological basis for the elaboration of the physical culture learning process for engineering students.

Keywords: physical culture, engineering university students, competence approach, key competences, self-development, module approach to education.

Introduction

The problem discussed in the article is recognized as being important due to the fact that the leading objective of a higher education institution is to provide favorable conditions that will boost the development of the students' healthy lifestyle, personal traits necessary for the competitiveness in the career market, and to be able to adapt and develop in the modern context (Batenko, 2017; Lopatina, 2017).

Many authors (Boldysheva, Tryamkina & Salnikova, 2015; Gubanishcheva, 2014; Mokeyev, Mokeyeva & Shestakov, 2018) believe that knowledge and intellectual skills define a person's horizon, evaluation gradation, values, and the outcomes of their activities. What is more, Physical Culture and its specific methods stimulate students to show their individuality and, thus, help to achieve the main purpose which is the integral and balanced development of a modern specialist.

The major characteristics of a self-developing person are outlined in the works written by both Russian and foreign psychologists and pedagogues such as B.S. Gershunskiy, V.P. Zinchenko, I.S. Kon, A. Maslow, C. Rogers, K. Horney, etc. The problems of a person's creative self-development got a profound analysis in the works by V.I. Andreyev, L.N. Kulikova (Mokeyev, Mokeyeva & Shestakov, 2018).

Recent studies highlight the problem of activating students' self-processes in various higher education institutions. L.V. Bykova and E.N. Kochneva considered the theory and practice of a pedagogical support of students' adaptability self-development (2010); M.P. Prokhorova and A.A. Semchenko (2018) focused on how to make creative self-actualization in pedagogy a part of a teacher's value system; V.Yu. Lebedinskiy (2018), discussed pedagogical conditions of the development of a university student's self-actualization skill (based on learning of foreign languages), the achievement of a technical university student's preparedness for professional self-development; S.S. Ivanova (2017) studied the development of creative self-actualization skill, etc.

However, as the review of psychological and pedagogical studies on this topic shows, despite the fact that a wide range of scientists and pedagogues demonstrate stable interest in the issue discussed, there is no sound research yet on the theory and practice of the process of forming self-development skill in students of pedagogical universities during Physical Education lessons, although the existing works constitute a serious scientific basis for such research.

The problem of competence approach is one of the biggest ones in the preparation of higher education specialists as it contains the ideas of the emerging education system. The competences defining the structure of specialists' professional preparation include special, or professional, competences and key, or super-professional, ones that imply the development of skills which allow the maximum of one's self-actualization in profession, society, modern world.

Nowadays, due to the fast development of production and technology, the contents of professional preparation that a student undergoes at university turn out to be insufficient when a student's professional career begins. And that is why the actual goals of education need to be changed, as there should be a switch from the subject-oriented approach typical of the Russian school to developing some universal skills and abilities required by the market as well as self-development competences aimed at a specialist's social and professional adaptation. The problem of training self-development skills in engineering students during PE lessons has been scarcely studied and is an acute issue characterized by huge potential and demand.

Methodological Framework

Theoretical and practical basis of the present research includes fundamental provisions of the systemic approach to the study of pedagogical process; the ideas of competence, personal activity and axiological approaches to education; studies of higher education issues, the theory of the integrity of pedagogical process, the theory and methodology of pedagogical studies, the scientific bases of a specialist's preparedness for profession (Mukhametzyanova & Shaykhutdinova, 2012; Perevoshchikova, 2016; Bystritskaya, 2018; Chelnokova, Agayev & Tyumaseva, 2018; Mingaleyeva, 2011).

To achieve the set purposes, a theoretical analysis of psychological and methodological literature was performed as well as the analysis of the FGOS VO learning standard, course books and recommendations on the development of professional competences in engineering students.

The results of the study allow to review and give more details to the modern ideas of a person's self-development and the mechanisms of forming a competence that will help develop pedagogical students' preparedness to pay enough attention to the technical students' physical preparation during PE lessons as to ensure their successful social and professional activity; make certain contribution to the development of an integral concept of the competence approach implementation at Physical Education lessons in higher education institutions.

Results and Discussion

The analysis of philosophical and pedagogical literature dealing with a person's self-knowledge and self-development during the organization of learning process has shown that this problem has always been a focus of attention for many great thinkers. The major advance in the study and implementation of self-development was made in the Renaissance as various scientists of the period (J.-J. Rousseau, C.A. Helvétius, etc.) helped to establish the idea of consciousness as an expression of self-education. I. Kant elaborated the concept of a complex 'Self' of a person: objective and subjective, sensational and intellectual, inner (reflective self) and outer; he singled out the Self of inner sensory experience and the Self of a thinking subject. At the

turn of the 20th century the ideas of the European humanism receive further development, each scientist brings their own contribution into the study of self-development (Wilhelm Dilthey, Herbert Spencer, Johann Gottlieb Fichte, Eduard Spranger, Karl Jaspers, etc.). Wide cultural and moral implication of a person's self-development determined the area of further research in the philosophy of education as well.

The problem of a person's self-development and self-awareness has overstepped the boundaries of philosophy and features a lot of aspects studied in psychology. Russian scientists consider the problem of self-development as a personal opportunity for self-improvement. This vector of a person's self-development is the most crucial one if it has to do with ethics and will.

Since person-oriented educational paradigm has gained the leading role nowadays, the problem of self-development has become one of the central ones in pedagogy. We have found out that psychology and pedagogy suggest various approaches to the understanding of self-development: it can be understood as self-education (Kourov, 2013.), an important personal characteristic (Leontyev, 1983), evolution of a person's formation (Kapterev, 1982), an evolutionary process of one's self-determination (Abulkhanova-Slavskaya, 1980), an active positions in the realization of a person's need in development (Kharlamov, 2003), etc.

Despite a large amount and diversity of the existing research dealing with the problem of self-development, the bases and mechanisms of self-development are not so widely reflected. A burst of interest to this problem has been seen only since the end of the 20th century.

And nowadays Russian philosophers again discuss the problem of a person's free self-development trying to reflect it as a clear way to the revival of education diversity and high quality. The thing is modern society needs a person with proper self-esteem, self-consciousness, the one that seeks self-expression, self-affirmation, self-improvement, self-actualization, self-realization, self-development; humanitarian orientation of the self-processes plays the determining role.

A person's inner self, their natural needs, social goals, the right to be oneself – something that has not been a part of traditional pedagogical values and used to develop sporadically - have got in the limelight. A student's personality in this case is considered as a subject of its own development and not as a means of realization of syllabi and curricula.

Self-development may be seen as an equivalent to a student's integral personality as it is an integrative characteristic and cover all the components of the personality structure. That said, several components of self-development characterized by certain parameters and indexes can be singled out: motivational-value-based (this self-development element is defined by the system of predominant motives that reflect a person's conscious attitude to goals and values of activity, their own development during its realization), operational-activity-based, reflexive.

Thus, the essence of the process of students' self-development can be interpreted as a qualitative self-change of a person being a subject of education, that has to do with the fulfillment of one's inner demand in self-improvement and is aimed at one's self-preparation for efficient self-expression.

Speaking about a student's personal development, we should underline the special importance of a teacher that is developing together with them in the single educational space. The teacher shall prevent all possible deviations and complications. There is the principle of switching from help and support to using the mechanisms of self-regulation and self-development of all the participants of the educational process. Based on the assertions put forward by V.G. Maralov (2004), we can state that one's support shall not diminish the role of a person's active attitude but "create favorable conditions for a person's self-knowledge and self-development while it is not bound to deny support and help when they are required."

However, despite the wide interest in the problem of psychological and psychological support and the accumulated theoretical and empirical materials, we shall point out insufficiency of the contents and organization of pedagogical support of a student's personal self-development.

One of the important types of support is learning and pedagogical interaction during the learning process based on teacher-students scientific research activities and targeted pedagogical help and support.

Generalized concepts of personal development support are as follows:

– A person shall not become but be a subject of cognitive and creative activity from the very beginning, that is why the priorities are individuality, self-value, originality of a student having subjective experience accumulated long before the influence of the organized learning process in a higher education

institution.

– The design of learning process presupposes an opportunity to actualize a person's pursuit of individual activity and reformation of all aspects of life. While elaborating and implementing learning process, subjective experience of each participant shall be deduced, and the methods of learning and creative activity shall be recorded.

– Cooperation between a teacher and the students aimed at the exchange of professional experiences shall be performed during specially organized teacher-students shared activities.

– The result of the learning process shall be students' formation as personalities.

That is to say, the main purpose of pedagogical support shall not be to give external expert assessment but to make a student reflect on their problems. It is the supported who are responsible for their own self-knowledge, self-improvement and self-actualization. Support is, first of all, an integral and complex system of help and support, secondly, it is an integrated technology the core of which is to create conditions for the recovery of a person's development and self-development potential and, as the result, to fulfill efficiently one's own functions, and finally, a special type of relationship between a supporter and the one who needs to be supported.

Conclusion

The problem of competence approach is one of the biggest ones in the preparation of higher education specialists as it contains the ideas of the emerging education system. The competences defining the structure of specialists' professional preparation include special, or professional, competences and key, or super-professional, ones that imply the development of skills which allow the maximum of one's self-actualization in profession, society, modern world.

Nowadays, due to the fast development of production and technology, the contents of professional preparation that a student undergoes at university, turn out to be insufficient when a student begins their professional career. And that is why actual goals of education need to be changed, as there should be a switch from the subject-oriented approach typical of the Russian pedagogical school to developing some universal skills and abilities required by the market. And, actually, the competence-based approach turned out to be rather productive.

Engineering specialists' preparation includes three stages:

1. General (key) competences that are typical of all kinds of professions and imply developing skills and organizer abilities in a group, as well as during the implementation of general humanity studies (the FGOS learning standard); and also professional self-development skills.

2. Professional competences included in the special subjects and directly related to engineering.

3. New basic competences based on the formation of innovational approaches and requiring IT support.

That is to say, the reformation of a specialist's preparation based on competences consists in the assimilation and usage of knowledge, skills, labor processes required for certain kinds of jobs. The key principle of education based on competences is result orientation (Perevoshchikova et al., 2016).

The key Physical Culture competences for engineering students are an integral characteristic of a specialist's personality that does not only include one's degree of assimilation of knowledge, abilities and skills but also one's personal traits reflecting their ability to adapt in society, the level of physical preparation e.g. power, stamina, back strength, coordination skills (Prokhorova & Semchenko, 2018; Yadryshnikov, 2018).

The key competences are as follows:

a) health-improving and rehabilitation competence aimed at increasing and maintaining health of a trainee specialist.

b) motor competence aimed at increasing students' physical stamina and developing physical abilities.

c) social competence including society's requirements to a person in charge of physical education in a company, in the Russian armed forces.

Based on the analysis of scientific and methodological literature on the reformation of education in higher education institutions involving competence-based approach, we have tried to define the key

competences of an engineering institution specialist, and, taking all if it into consideration, to work out a module-based Physical Culture syllabus, as well as to organize the Physical Culture process.

The model of PE learning process that we suggest shall improve students' physical state, the effectiveness of their preparation, and make them want to maintain certain level of physical preparation by themselves to ensure adequate social and professional activity (UK-7, FGOS 3++).

The module-based PE syllabus for engineering students included five blocks. That is the PE process is divided into five blocks and twenty modules that are logically and thematically complete.

The first year consisted of two blocks aimed at developing physical qualities based on the use of explanatory and training modules. At the beginning and at the end of each block a testing took place to assess students' physical preparation.

The second year also consisted of two blocks aimed at developing technical competences and the referee skills in basketball based on the use of explanatory and training modules.

The third year of study consisted of one block aimed at the development of social competences that should ensure students' improving their physical qualities based on the use of methodological and practical modules. In the modern context that includes the reformation of education and the market demand in preparation of higher education students, a university graduate shall have knowledge and skills that ensure their competitiveness in profession and be competent and independent in the realization and actualization of their knowledge in accordance with the ever-growing dynamics of the job market (Nesterov & Zhmykhova, 2018, Opletin, 2013).

The present study suggests a module syllabus in conformity with the FGOS VO learning standard which is aimed at developing the key competences and shall result in the increase of a student's general and applied physical preparation.

Recommendations

The design of physical culture educational processes in universities must help to implement healthy lifestyle habits, develop certain personal traits that can ensure their competitiveness in the career market as well as to form personalities capable of adapting and developing in the modern context.

The key Physical Culture competences for pedagogical students shall become an integral characteristic of a specialist's personality that does not only include one's degree of assimilation of knowledge, abilities and skills but also one's personal traits reflecting their ability to adapt in society, perseverance, will, decision-making skills, self-analysis and self-assessment skills.

The elaboration of the contents of physical education studies shall be based on the module approach that includes the systemic and individual character of work, logical completeness, and orientation towards professional competences. The model being suggested has the following structure. The first year includes two blocks aimed at the development of physical qualities based on explanatory and training modules while at the beginning and at the end of each block there is an assessment to check students' physical preparation. The second year will also consist of two blocks aimed at the development of technical competences and referee skills in basketball based on explanatory and training modules. The third year of study will only have one block aimed at the development of a social competence that shall ensure the improvement of their physical qualities based on the methodological and practical modules.

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Technological Support of Professional Self-Development of Teachers in the System of Lifelong Learning

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Abstract

The article is devoted to usage of the principles of ontodidactics and anthropic educational technologies in the professional self-development of teachers. The use of ontodidactic methods is considered a condition for effective professional self-education of teachers. Meta-educational design, which forms the meta-subject competence of teachers, is technological support for the implementation of ontodidactics in professional pedagogical education. In the article the meta-subject competence of the teacher is considered as a personal construct of self-education for the formation of which the dialogue interaction of all the participants in the educational process is necessary. The features of application of the ontodidactics principles and technological support of the educational process of teachers during the implementation of meta-educational projecting are revealed in the paper, when, through the resolution of personally significant problems, teachers undergo a transformation in the system of self-identification-self-actualization-self-realization. The aim of the study is to identify and theoretically substantiate the potential for the anthropic technologies application in relation to the formation of the meta-subject competence of a professional, as the basis for his self-development. The leading method of research on this topic is the analysis of the available literature on the concepts of meta-subject competence, ontodidactics and self-development, as well as a method of modeling the professional self-development process in the context of lifelong education. The article reveals the distinctive features of ontodidactics in comparison with traditional didactics. These peculiarities make meta-educational design of the professional self-development process possible. The model of professional self-development of a teacher is determined and the technological aspects of this process are identified in the paper. These materials can be used by teachers of various specialties for the successful implementation of the professional self-development process, scientific and methodological basis for designing the process of professional self-development.

Keywords: lifelong learning of a teacher,ontodidactics, meta-subject competence, meta-educational design, anthropic educational technologies,aporetics methods.

Introduction

The change in the educational paradigm of professional education that has taken place in our country is aimed, first of all, at making the final results of training and upbringing meet the actual needs of the state, society and the individual needs. In this context, there is a rethinking of ideas about quality of education at every level, determining which individually acquired and collectively distributed knowledge, competencies, attitudes are important for personal and professional success of a man, socio-cultural and economic modernization of the country (Stafeeva et al., 2019; Prokhorova & Semchenko, 2018).

Today, the job market demands not only professional knowledge and skills of specialists, but also teachers must be aware of lifelong professional growth and development for self-identification, self-actualization and self-realization in the profession and in life (Lubysheva, 2004; Neverkovich, 2014; Dmitriev et al., 2014).

However, at the present stage of the pedagogical science development the problems of the methodological and didactic foundations of personal education, self-education and professional self-development as a special subject area and methodological content of this education among teachers remain unsolved (Bystritskaya & Burkhanova, 2015; Prokhorova & Vaganova, 2019).

Classical didactics has always dealt with subject areas (Gromyko, 2000). Now subject areas are becoming vague, the content of education is redrawing. Nowadays didactics itself is becoming not institutionalized formation, it begins to mix with other areas. In order to understand the issue in detail, a master-degree stedent is forced to take different positions, look from different angles, apply multi-positioning and use not only professional, but also life experience to solve professional problems. If a teacher possesses some positional vision, it is easier for him to see the essence of the problem and find a solution.

The term "ondidactics" was introduced into scientific vocabuary by A.A. Lyapunov (1998). The author refers the fact that a person, by his nature, through his whole life has to solve countless various problems, integrating himself into the world around him. Therefore, he considered the task way of life as education and, more broadly, as an ontological property of man. This is where his "ontodidactics" comes from.

The modern world is constantly being developed, supplemented, new technologies are being introduced, all this requires a person to acquire new knowledge and skills, to increase his competence in a particular issue. A teacher is not an exception, because he is a culture bearer, and this fact implies continuous personal and professional self-improvement (Burkhanova et al., 2017; Shaidullina & Ramazanov, 2011; Konkina & Egorova, 2017). The teacher, like any other subject of social activity, should systematically develop professionally and personally.

The main condition for the professional development of a teacher is the awareness of the need to increase their own competence (Vorobyov et al., 2018). This implies updating theoretical and practical knowledge, improving the skills of specialists because of constantly increasing requirements for their competence.

Self-development is a person's own activity in changing himself, in discovering, enriching his spiritual needs, creativity, all personal potential, in realizing the belief in the possibility of self-education - in the process of natural physiological, mental, social development (Neverkovich, Dmitriev & Bystritskaya, 2012). Conscious self-development is considered as self-education and self-improvement.

A modern teacher must constantly develop, because experience, not enriched by fresh knowledge, is not longer a source of movement. The level of education is determined not only by the ability of a specialist to possess a set of technological skills, but also by the ability to think professionally at the level of modern and future technologies, and the ability to constantly improve himself (Bystritskaya et al., 2018). All the features of the pedagogical mind appear on the basis of comprehension of science, art and reality.

Methodological Framework

Purpose - the purpose of the study is to identify and theoretically prove the potential for the application of anthropic technologies in relation to the formation of meta-subject competence of a professional, as the basis for his self-development.

The leading method of research on this topic is the analysis of the available literature on the concepts of meta-subject competence, ontodidactics and self-development, as well as a method for modeling the process of professional self-development in the context of lifelong education.

Results

Ontological didactics (from the Greek. -On, -ontis - being, beingness) is didactics that deals with all human manifestations, all forms of human being. V.B. Novichkov (2010) points out that ontodidactics should have as their starting point not only the subject of study, but also anthropological, sociological, cultural, ideal, dialogical foundations, i.e. the well-known system of expression of human (personal, personalistic) nature.

The founders of the School of Anthropic Educational Technologies S.V. Dmitriev and E.V. Bystritskaya are working on the problem of ontodidactics. They identify as ontodidactic principles: scientific principle, the principle of humanization and advanced education, and define "ontodidactics" as "a branch of

pedagogical science that studies the inclusion of a person in research and design of the process of self-education and self-improvement" (Dmitriev, 2016; Dmitriev, 2017; Bystritskaya, Neverkovich & Voronin, 2017).

The principles and features of ontodidactics formulated by the authors make it possible to reveal its nature that is distinctive from traditional didactic theory. Table 1 presents the comparative features of traditional didactics and ontodidactics.

Table 1. The main peculiarities of traditional didactics and ontodidactics.

	Traditional didactics	**Ontodidactics**
Philosophical base	Epistemology	Ontology
The main problems to solve	What to teach? How to teach?	Why to study? What to study? How to study?
A kind of knowledge	Subject knowledge.	Meta-subject knowledge (knowledge about knowledge, its structure and features, methods of getting knowledge) as a basis of a comprehensive view of the world.
The main purpose	To teach, learn standard methods.	To awaken consciousness and thinking, learn meta-methods - methods by which a person opens up new methods of activity.
The role of a teacher	The main in all the aspects of education.	Tutor, mentor who guides the process of self-identification-self-actualization-self-realization of a person.
The task of a teacher	To give knowledge	"Identify" trigger points in the student's mind which start the process of self-identification-self-actualization-self-realization
The task of a student	Knowledge reproduction	Knowledge is formed, rediscovered, creation of new knowledge.
Teaching methods	Reproductive, productively practical, partially searching, searching methods (set by the teacher)	Intensive teaching methods
Technologies	Classic technologies for transferring knowledge and skills	Anthropic educational technologies

Based on the data given in the table, it becomes obvious that the construction of the educational process based on ontodidactic principles contributes to the fact that the teacher gives way to the learner, which is justified by the tasks of lifelong professional pedagogical education.

In the context of ontodidactic technologies in the practice of their professional modeling, the student does not absorb the educational standards given by the teacher, but operates with information. Moreover, he finds information for comparison in other sources in his own education and personal mentality. This creates new opportunities for cognition and transformation of reality. Such mechanisms are implemented on the basis of binarity – the materiality and non-materiality of the world order in interdisciplinary educational relay races, that materialize the thoughts and thinking of a researcher, technologist, and teacher in their specific actions and activities (Burkhanova et al., 2018).

In the ontodidactics methodology of physical culture, a transition from non-subjective kinesiology to purposefully organized actions of the personality is outlined (Dmitriev, Bystritskaya & Neverkovich, 2013). The main goal of the research conducted by the authors is the dialogue between the natural sciences and the humanities in lifelong professional education.

As modern research shows, it is a person who is the main subject of their education (Zimnyaya, 2003; Khutorskoy, 2012). And the meaning of professional education is to identify and realize the person's internal potential in relation to themselves, the outside world, and professional activity. The connection between internal and external in a person is ensured through activities related to the fundamental nodal foundations of the world and man. The meta-subject nature of education lies on these foundations.

Ontodidactics becomes the basis for the formation of meta-subject competence of a professional teacher (as the competence that controls the teacher's professional self-development), a new scientific thesaurus and a new educational paradigm in the framework of understanding the value foundations of the modern system of lifelong professional teacher education (Burkhanova, 2016).

The meta-subject competency formed on an ondodactic basis, which is an integrative totality of personally-meaningful knowledge, skills, and values, allows educators to effectively carry out self-directed activities to solve educational and cognitive problems, self-development, and professional development.

Meta-subject competence "turns" a person on themselves, on the development of methods of self-education and self-development, including the so-called "mode of development of an individual-personal thesaurus" (Dmitriev, 2011).

The formation of meta-subject competence is possible only in the course of professional activity when the teacher independently identifies the problem and realizes its personal and social significance and considers self-educational activity as an integral part of his professional activity, and professional activity as a component of the educational process. Here, support is needed on the "principles of growth" of the educational system associated with its non-linearity and openness (Dmitriev, 2014).

The use of anthropic educational technologies in the process of formation and development of meta-subject competence of teachers provide rethinking of the content of personal experience and individual style of activity through strengthening the practical orientation of teacher education, the active development of its content. In anthropic educational technologies the main thing is not a "tool" (method or method of action), but who possesses it and what it is turned to – body, mind, soul, spirit.

The implementation of the ontodidactic approach into practice of postgraduate education is the technology of meta-educational design, organized as part of additional education at the Kozma Minin State Pedagogical University in order to form meta-subject competence of teachers and increase the effectiveness of their professional development.

Discussion

Teacher's work is creative, this means that in their professional activity there are few standard and conservative provisions. He often acts in non-standard situations, which require skillful operating with means and methods in accordance with general principles, goals and specific tasks. He must be able to correlate all this with the unequal degree of preparedness of their students, with their age, skills and capabilities. Creative nature of his work lies in the fact that he must be ready to find a solution of any prevailing situation, be able to make non-standard decisions, find original and witty arguments, be able to organize students and manage them in difficult situations.

Considering features of the teacher's work named above and teacher`s professional competence, we proposed a model of the teacher's professional self-development in lifelong education (Table 2). The presented model is implemented in the form of meta-educational design, which allows to develop the personality of the teacher through a change in his professional activity.

Table 2. The model of professional self-development of a teacher

The object of development	The personality of the teacher that determines their professional development	1 step
	Professional competence of a teacher	
Main conditions	Transition to a higher level of professional development	2 step
Driving force	Activity to resolve a personally significant professional problem in professional activity	3 step
Psychological mechanism	The transition of external motivation to internal one, creation of a sense of the internal necessity of action	4 step
Result	The teacher's awareness of the need for self-realization in professional activity, self-improvement, the systematic nature of professional self-development. An ability to anticipate and design professional self-development	5 step

To activate professional self-development, the teacher needs special methods. Consider the main ones.

1. A special place in the process of lifelong self-education of a teacher is occupied by aporetic methods. The methods of aporetics in the ontodidactics of professional education are presented in the form of some paradoxes that diverge from the tradition of approval in the form of conflicting postulates. The authors of the article have developed methods of reflective aporetics for the subject area of knowledge and educational technologies under discussion, which contribute to the understanding of the process and results of education by students, and increasing the efficiency of their professional development. The methods are developed in accordance with the modern methodology for optimizing professional education, as it is currently recognized that for any personalized educational task, there is not one, but a whole field of possible alternative solutions. The authors point out the idea that "these methods should be designed and implemented on the basis of a number of principles: the principle of design methodology; constructivism principle; the principle of nonlinear determinism; the principle of consciousness problematization and de-problematization of activity".

2. Self-control of competence. Self-control of competence is a procedure that is desirable if not constantly, then at least periodically, not only through self-monitoring, but also through diagnostic tools. Based on the results obtained, it is important to draw the correct conclusion about the nature of changes in one's professional competence over the last period of time.

Evaluation of your personal professionally important qualities, for example, such as criticality — self-criticism, confidence — self-confidence, dependence — independence. These qualities can also be evaluated in oneself with the help of special personality tests, questionnaires, introspection of one's own behavior in significant professional situations. It is also important here not just to measure some qualities, but to determine in what progress is observed (positive dynamics), and in which it is absent. Determining the reasons for both the positive dynamics of competence and its absence will clarify and concretize plans for working on yourself for the next stage of career growth.

3. An inventory of changes in work and in oneself. The procedure that must be performed once a quarter or at least once every six months. Its essence is to take into account, analyze and systematize all changes in the tasks, content, requirements of the work performed, on the one hand, and on the other, those changes that have occurred in the self and professional competence during this period. Such evaluation makes it possible to determine how much they correspond to each other. The goal of this procedure is to stay

constantly ahead of the level of changing requirements for the tasks being solved with their professional readiness.

4. The ability to learn from others. It is necessary to create an installation for searching and mastering new in various situations where there may be interesting information, useful knowledge and new experience. Managing your motivational attitudes you can provide a high development effect even in work at traditional meetings, seminars and in specially organized forms of training and development. An example of such an attitude toward self-development with the help of others is the following statement of one of the ancient doctrine of Indian philosophy: "Every other person is a guru (teacher) from whom one can learn something useful."

5. Table of life and professional goals. Compilation and from time to time correction of the table of life and professional goals. The main tasks of the methodology are: to realize as many real motives and relevant goals of behavior as possible; differentiate their motives and goals into personal (related to life in general) and professional; match one's life and professional motives, and then carry out their conscious correction.

6. Diary of achievements and failures. A detailed or generalized description of situations with an analysis of the causes and factors of positive and negative results of one's own activity. It helps to avoid repeated mistakes, allows to better understand and critically evaluate and systematize one`s own experience, making practical and correct conclusions.

7. Drawing your professional portrait. The process of compiling your professional psychological characteristics in the form of the most striking features, both positive and negative, that have been demonstrated over some period (for example, the last week) or when solving some important task. It is best to use graphical modeling tools. In this case, a professional portrait will look like a schematized drawing with brief verbal notations. This procedure should be carried out periodically, while it is advisable to alternate the successful and unsuccessful stages of work in which the manager looks different and, accordingly, his professional portrait will differ significantly.

After drawing up the model, you need to work with it. It is useful to compare the last portrait with the previous ones, you can plan “cosmetic” changes, make refinements, highlight random and permanent features. Visualization of your professional qualities and competencies allows you to recognize them more clearly, better use and control them.

8. The use of reflection. Reflection is one of the universal internal mechanisms for increasing the effectiveness of a teacher and their decisions, team behavior, work in the organization as a whole, as well as their own development. Reflection is a process of self-discovery and self-regulation by a person of his desires, goals, mental actions, self-image, experiences and senses. The main function of reflection is to provide a more complete and clear awareness of a person’s activities performed by them in its individual elements (factors, goals, means) and as a whole (activity as a whole is a functional part of all life). The results of reflection allow you to more accurately evaluate your behavior and make better decisions.

Conclusion

Meta-educational design using anthropic educational technologies based on the principles of ontodidactics is aimed at solving the teacher’s personally significant professional problem, which they work on in the process of their own professional activity. This technology is implemented in the process of the teacher’s work and is aimed at the full formation of all components of the meta-subject competence. Professional activity is a transversal program for the development of the personality and activity of the teacher, the purpose of which is to solve their personally significant professional problem, which makes it possible to give vectoriality to their self-development.

Anthropic educational technologies are used to increase the efficiency of self-development of teachers implementing meta-educational design on the basis of a productive dialogue. The applied methods of reflective aporetics make it possible not only to identify the object of perception and its assessment based on the cognitive installation, but also to see the object in order to follow it in its actions, presenting this vision in the form of a technological setting. Reflective aporetics methods help to build the learner’s actions and at the same time expand their individually-semantic thesaurus. The arsenal of technological support presented in

the article allows to change qualitatively and give meaning to the process of professional self-development of teachers.

Recommendations

To sum everything up, we can state that for the field of lifelong professional pedagogical education ontodidactics which is used to form the meta-subject competence of teachers, allows to develop such a way of thinking in which the teacher comprehends and creates his own technologies and techniques for acquiring knowledge, expanding consciousness and professional and pedagogical thinking. This approach can be used to enrich the knowledge and forecast the perspectives of individual educational trajectories of teachers in the system of lifelong professional education. In order to develop effective professional development skills for teachers a transition from a one-dimensional vision of reality from the perspective of an absolute observer, aspiring to the only and final truth, to a vision of the whole diversity and completeness of the world from different project, program, design positions and in different research positions is necessary.

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The Effectiveness of Anthropic Educational Technologies as a Means to Develop Master's Students' Meta-Subject Competence

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Abstract

The issue discussed in the article is believed to be important nowadays because purposes, contents and technological bases for master's students' preparation have not been sufficiently studied and require learning technologies designed for the development of the students' professional and research competences. Such competences are crucial for individualizing the pedagogue's work and developing their professional qualities. In the course of their master's studies, students should have an opportunity to study and practice a wide range of pedagogical technologies that can be assimilated better if a student is interested. In this case, the solution of a personally important professional task can become the core of the master's degree preparation. The leading research method is the analysis of the existing literature on the meta-subject competence concept as well as the analysis and the implementation of the model of the meta-subject competence development in master's students during their on-the-job practice. The authors of the article suggest their interpretation of meta-subject competence. Its components and functions have been investigated, a model of the meta-subject competence development in master's students during their on-the-job practice has been designed and its effectiveness proved. The materials can be used by university teachers to improve the quality of master's degree professional studies and also as a basis for the on-the-job practice syllabus for master's students majoring in various subjects.

Keywords: anthropic educational technologies, master's students, on-the-job practice, meta-subject competence, meta-subject competence development model.

Introduction

Nowadays the mission of professional education has been widely discussed in the scientific and pedagogical circles as a mission that can be comprehended only if the learning process is organized within the meta-subject context as meta-subject activity allows students involved in it to resolve unusual tasks, see professional issues (Khutorskoy, 2012; Prokhorova & Semchenko, 2018). The meta-subject character of the learning process ensuring continuity of all the stages of learning consists in the development of a student's integral world view, their systemic development and self-development, as well as the systemic development of their professional competences (Dmitriev, 2017).

At the current stage of the implementation of the new generation FGOS VO federal learning standard, competence shall be studied based on the meta-subject approach that is considered to be the core of the Russian education system allowing to preserve and defend the culture of thinking and the development of the integral worldview; and to follow the best didactic and methodical examples of the development of the subject-based knowledge (Stafeeva et al., 2019; Novichkov, 2010; Dmitriev, 2007; Dmitriev, 2014).

The implementation of the meta-subject approach in the higher education system ensures the graduate's competitiveness according to the strategic vectors of the education development stipulated in *The European Higher Education Area Declaration (Bologna process)* and *The Concept of the Federal Targeted Program for the 2016-2019 Education Development.*

That is why higher and vocational education experts show huge interest in the meta-subject competence development (Rozin, 2000; Dmitriev, 2011a; Dmitriev, 2011b; Dmitriev, 2011c).

Agreeing on a special place that activity possesses in what has to do with the development of competences in the professional education structure, the scientists used the activity-based approach to understanding pedagogical processes and phenomena in different ways. Yu.V. Gromyko (2000) pointed out that the formation of scientific concepts can only take place in the context of an activity organized in both mental and practical ways (the organizational basis and the executive basis). S.V. Dmitriev, E.V. Bystritskaya, S.D. Neverkovich (2013) believed that the contents of the course should depend on the students' organized practical activities. That is to say, the current pedagogical tendencies are such that, instead of assimilating knowledge, today's learning process is aimed at developing competences (Zimnyaya, 2003; Dmitriev et al., 2014; Vorobyov et al., 2018).

The problems of the organization of practice for master's students have not received enough attention. There is no effective model of the meta-subject competence development in master's students in the context of on-the-job practice yet, and the possibilities of the technological support of the process have not been sufficiently studied either.

Methodological Framework

Methodological framework of the study includes the main provisions of the meta-subject approach, the competence-based approach in professional education, the activity-based approach.

The hypothesis of the study consists in the assumption that the process of the meta-subject competence development can become more effective if:

1) the essence, structure and function of the meta-subject competence have been defined;
2) the possibility and the necessity of the master's students' meta-subject competence development during on-the-job practice have been substantiated;
3) the model of the master's students' meta-subject competence development during on-the-job practice has been designed.

The purpose of the study is to provide scientific bases for, design and implement a model of the master's degree students' meta-subject competence development during on-the-job practice.

To resolve the issues, the following complex of methods is used:

– theoretical methods – analyzing scientific and methodological literature, normative documents, systematizing, classifying and summarizing theoretical and practical data, modeling;

– empirical – the collection and analysis of empirical data, assessment methods (tests, analysis of the process and results of the study), pedagogical experiment, pedagogical observation, questionnaires, face-to-face conversation;

– mathematical – mathematical statistics methods (scaling, variability index calculation, check of the veracity of various indexes), and graphical interpretation of the results of the study.

The study was performed between 2010 and 2017 in the Minin University of Nizhny Novgorod (NGPU) and the N.I. Lobachevsky State University of Nizhny Novgorod (NNGU). The participants of the experiment include 83 master's students specializing in Pedagogy, Psychology and pedagogy, Physical Culture; 40 Physical Culture teachers from secondary education institutions as well as 19 Physical Culture teachers from higher education institutions.

Results

The first part of the study had to do with the elaboration of theoretical bases of the master's degree professional preparation. In particular, the purpose and meaning-related bases in the master's degree Pedagogy course were revised, the structure, essence and functions of the master's meta-subject competences were revealed.

Meta-subject competence of a master's student is a person's universal ability, being a means of their professional and personal self-actualization, self-education and self-realization. It is a person-based construct that includes methods of the familiar activities realization, mastering new activities, reflexive assessment of the activity and themselves in that activity, and that is based on one's personal characteristics and worldview (Burkhanova et al., 2017).

Meta-subject competence includes the following elements:

– value and meaning (understanding and acceptance of the value of culture, science, activity; comprehension of the social importance of the chosen profession, the system of professional activity intentions);

– professional activity (mastering universal learning skills, project culture is developed, ready for creative professional activity, ready to analyze critically one's experience, change professional specialization if necessary;

– reflective (developed skills in self-actualization, self-attribution, self-identification, self-knowledge, self-regulation, self-improvement, self-education, and self-realization).

Taking into account all the scientific aspects, the functions of meta-subject competence (as the key competence controlling the development of all the other competences) were determined. These are the worldview development function, the regulatory function, the function of personal meaning-building.

Each element of the meta-subject competence can take on the leading role at one or another stage of a professional's development, it can also become a source of other elements or the subject-based competences development.

The criteria of a well-developed meta-subject competence of a master's student are awareness and comprehension of one's professional activity and oneself as a the subject of the said activity.

When developing one's meta-subject competence, on-the-job practice has a special role as it is an inseparable part of each stage of professional education so it is specified in the FGOS VO learning standard as a separate block (Bystritskaya et al., 2018). master's practice meets all the requirements necessary for the development of a master's degree student's meta-subject competence. However, there is no systemic work in that area. During practice, developing the professional activity element of meta-subject competence ends up the priority while the value and meaning element does not get enough attention so that the development of the meta-subject competence proves less effective.

The study also provides some foundation for the possibility and necessity to develop meta-subject competence in master's students. The purpose of the experiment done was to implement a model of the master's degree students' meta-subject competence development during on-the-job practice.

A distinctive feature of the meta-education design implemented by master's students during practice in order to develop meta-subject competence, are meta-subject tasks aimed at the development of meta-subject competence of a master's student and able to complement specialized tasks on various subjects related to all kinds of professional activity.

To optimize the organization of meta-education design, its stages are subdivided into technological steps. Technological support of the meta-subject competence development of a group of master's students at different stages of meta-education design during practice can be found in Table 1.

Table 1. Technological support of the meta-subject competence development of a master's degree student during practice

A stage of meta-education design and technological steps	Activity technologies of a master's student's during pratcice	
	Anthropic technologies	Inceptive methods
Problem-oriented (step 1)	Swat-analysis with the dialogue – based discussion	Aporias, dialogue with a primary source, self-report, professional trials method, apology of a draft, reflective mirror method, self-report (researcher's portfolio)
Purpose and meaning (steps 2,3)	Reflective technology	
Programme of action (steps 4,5)	Case study, dialogue-based learning situations	
Iteration (steps 6,7)	Games teaching organizational skills	
Reflection and interpretation (step 8)	Reflective mirror	

The contents of the subject-related tasks were selected according to the anthropic educational technologies based on dialogue (Neverkovich, Dmitriev & Bystritskaya, 2012; Dmitriev, 2014; Bystritskaya & Burkhanova, 2015). The abovementioned anthropic educational technologies were used at the introductory, interim and concluding conferences organized for each professional practice. Interim conferences used educational events as a form of activity (Prokhorova & Vaganova, 2019). Introductory and concluding conferences always had a form of a physical meeting.

The results of the experiment were assessed against the results of the master's students' second participation in testing based on the designed diagnosis complex.

Determining the levels (critical, acceptable, and optimal) of the meta-subject competence development of the experimental (EG) and control (CG) groups consisting of master's students allowed to obtain the results shown in picture 1 (the results are compared to the results of the initial testing).

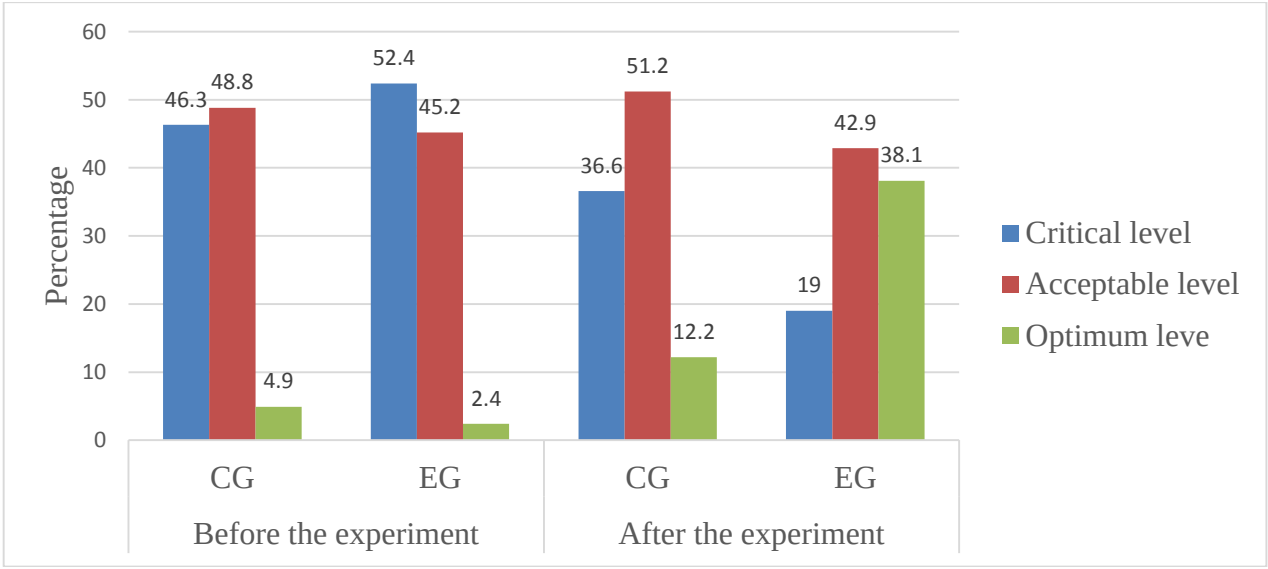

Figure 1. The final results demonstrating the levels of the meta-subject competence development of the master's students from the experimental and control groups

After the implementation of the model of the master's degree students' meta-subject competence development during on-the-job practice into the learning process of the experimental group, the control group assessment revealed that 12,2% of the students have the optimal level of the meta-subject competence, 51,2% are at an acceptable level while 36,6% showed a critical level of competence. The situation in the experimental group was totally different: 38,1% had their meta-subject competence at an optimal level, 42,9% had it at an acceptable level while 19% had it at a critical level. Mathematical treatment with the use of the $\chi 2$ criterion demonstrated that there is a reliable difference between the two groups after the experiment that shows the effectiveness of the meta-subject competence development model for master's degree Pedagogy students during on-the-job practice.

Upon implementing the meta-subject competence development model for master's degree students during on-the-job practice, a clear and significant improvement can be seen in the experimental group that proves the model effective in what has to do with the increase in the development level of meta-subject competence in master's students.

Discussions

The meta-subject competence development model for master's degree students during on-the-job practice has been elaborated based on the meta-subject, competence and personal activity approaches and

the interconnection between the following blocks: purpose and meaning, theory and methodology, content, procedure (including technological and organizational elements), and results and assessment.

The purpose and meaning block of the model includes some objective purposes of a master's degree student's preparation during on-the-job practice as well as some subjective meanings of their educational and professional activity.

The purpose is to develop a master's student's meta-subject competence and to make them reflect on their work and experience based on the meta-subject, competence and personal activity approaches as well as the following ideas and principles: the theory of developing education, the idea of a transition from an educated specialist to a self-educating professional and practice-oriented professional education, the principles of person-oriented education, personal and professional self-determination, and the design of an individual learning trajectory.

The content-related block of the model consists in meta-educational design that is performed by a master's student during on-the-job practice and is aimed at the development of all the elements of meta-subject competence (Burkhanova, 2016). On-the-job practice as a meta-educational project is a transversal programme the purpose of which is to resolve a professional issue, allowing to individualize education as much as possible.

The fundamental educational objects of the design determined on the basis of the meta-subject approach are as follows: purpose, meaning, problem, activity, reflection. Fulfilling practical tasks with meta-subject content allows to determine purposes, to reflect, to find problems, to reflect on the professional activity at a more fundamental level.

The stages of meta-educational process are as follows: problem-oriented, purpose and meaning, professional activity, iteration, and reflection and interpretation. The model contains the content of a master's student's activity divided into stages.

The procedural block consists of two elements: a technological one and an organizational one. The technological component of the procedural block includes project technology (as a form of research-based education and a form of students' activities during practice), anthropic educational technologies (focused on the development of a student's personality and individuality being their socio-spiritual essence), inceptive methods (initiated by master's students themselves based on their personal peculiarities and needs) (Bystritskaya, Neverkovich & Voronin, 2017; Dmitriev, 2016; Burkhanova et al., 2018).

The organizational component has to do with determining the conditions for the learning process that will help to develop students' meta-subject competence during practice.

The result and assessment block. The result of the implementation of the experimental model is supposed to be a student's meta-subject competence fully developed in terms of all its components. That is why the designed diagnostic block includes component and complex diagnoses.

Conclusion

As the result of the research done, the hypothesis has been proved and the problems set have been resolved. The process of developing students' meta-subject competence can and shall be personalized based on the design and implementation of a personalized educational trajectory that takes into account their individual psychological and professional peculiarities and abilities allowing to work effectively. The theoretical analysis of the issue constituting the basis of the research, as well as the empirical study allowed to prove the vast importance of the meta-subject competence development process in professional and educational activities. The model of the development of meta-subject competence during practice ensuring a pedagogue's readiness for self-development and self-improvement, has been empirically proved effective.

The theoretical and experimental research done leads to the following conclusions.

The meta-subject competence concept is defined as a universal ability serving as a means of professional and personal self-actualization, self-education and self-realization of a subject. The structural and functional basis of meta-subject competence consists of the following elements and their functions: value and meaning (the worldview development function), professional activity (the activity regulation function), personal reflection (the function of personal meaning-building).

The model of the meta-subject competence development in students during practice based on the meta-subject, competence, and personal activity approaches includes the following interconnected blocks: purpose and meaning, theory and methodology, content, procedure (including technological and organizational elements), and result and assessment. The model has been implemented in the framework of the meta-educational design during practice.

Recommendations

The development of master's students' meta-subject competence can be more effective if the following technologies are used:

– meta-educational design as a form of a student's activity during practice;

– anthropic educational technologies (focused on the development of a student's personality and individuality) being a means of determining their socio-spiritual essence and developing their personal and professional individuality;

– inceptive methods as a means of feedback initiated by master's students themselves based on their personal peculiarities and needs.

– The effectiveness of the development of students' meta-subject competence can be increased thanks to the use of some fundamental factors of anthropic educational technologies of higher education setting the following priorities of a person's educational development:

– orientation to personal self-improvement and self-determination including one's system of values, subsystems of self-control and self-regulation, mechanisms of free choice, determination in achieving self-development goals;

– self-realization as a targeted basis of the educational development of a person being result-oriented and prioritizing future over past.

– the priority of meta-systemic education in a person's educational system, based on the principle of the syllabi and technologies heterarchy.

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Features of Forming Minors' Law-Abiding Behavior: A Socio-Psychological Aspect

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Abstract

The article gives a brief overview of methodological recommendations for improving the activities of educational institutions in the formation of minors' law-abiding behavior. The methodological recommendations have been made to the executive authorities of the constituent entities of the Russian Federation that carry out state administration in the field of education. The methodological recommendations are aimed at improving and developing the system to prevent juvenile delinquency in educational institutions and are intended to enhance the effectiveness of preventive work with minors. They can be the foundation for the development and improvement of programs and techniques directed towards the formation of law-abiding behavior among minors. They can serve as the basis for building systematic educational activity with the goal of forming a comprehensively developed, harmonious, independent, mature and law-abiding person. The methodological recommendations provide the content of systematic work to form law-abiding behavior of minors in educational institutions. The author has substantiated the use of a system-activity approach when organizing preventive work with minors in organizations that carry out educational activities. The features of the formation of minors' legal culture in educational organizations have been disclosed. The necessity to bring up and train children and teenagers in the unity of two educational spaces has been determined: the normative legal space and the space of formation and development of minors' personality.

Keywords: methodological recommendations, minors, law-abiding behavior, regulatory legal space, the space of minors' personality formation and development.

Introduction

In accordance with Article 28 of the Federal Law of December 29, 2012 No. 273-FL (Federal law) "On education in the Russian Federation" [1], an educational institution is obliged to carry out its activities in accordance with the legislation on education. It is also supposed to create safe conditions for learning, upbringing students, looking after and caring for students, their content in accordance with established standards that ensure life and health of students, staff of the educational organization.

In accordance with Article 14, Section 1, Clause 5 of the Federal Law of June 24, 1999 No. 120-FL "On the Basics of the System for the Prevention of Child Neglect and Juvenile Delinquency" [2], the agencies that carry out administration in the field of education develop and implement programs and methods in the work of educational institutions aimed at forming law-abiding behavior among minors. In accordance with Article 14, Section 2 p of the Federal Law dated June 24, 1999 No. 120-FL "On the Basics of the System for the Prevention of Neglect and Juvenile Delinquency" [2], organizations that provide educational activities carry

out measures to implement programs and methods directed to forming law-abiding behavior among minors.

Thus, the formation of minors' law-abiding behavior, the identification and elimination of the causes and conditions conducive to the development of deviant behavior is one of the priority areas of activity of all subjects of the prevention system, including agencies that provide administration in education, and organizations that carry out educational activities.

Theoretical review

Law-abiding behavior is a person's stable behavior, in which he follows the most important social norms, strives to maintain public order and balance, while preserving his own individuality. Law-abiding behavior "works" owing to self-control of a person. Therefore, the concept of "law-abiding behavior" contains a balance between the adoption of social norms, adherence to them and maintaining an internal balance between a sense of duty and responsibility and the individual's real behavior.

It is important to understand that any behavior is based on observed patterns. The first step in forming a pattern of behavior is imitation. The system of education is the main institution for minors' socialization, where the development of a person' personality takes place as well as the formation of values and attitudes, rules of conduct, legal competence in children and teenagers in accordance with generally accepted standards of morality, the current conditions of social development. In this regard, institutions providing educational activities ensure the formation of law-abiding behavior of minors from the stage of imitation of normative behavior to the stage of formation of a law-abiding person [3-6].

Society makes high demands on education, morality, individual responsibility, its ability to cooperate and compete, and the ability to make decisions independently in choosing various behavioral strategies. The legal and civil competence of an individual is an essential component of a person's general culture, which his social and legal activity depends on, his willingness to participate in strengthening the rule of law and order.

Statistics of juvenile delinquency and crime, child abuse and domestic violence, failure to perform parental duties in recent years show a steady downward trend. However, the nature of offences, lower age boundaries of offenders, the increase in the proportion of juvenile delinquency does not remove the topicality of the activities of social institutions to prevent negative social phenomena. The improvement and development of the system to prevent juvenile delinquency should begin precisely with the system of education, as the most important institution for socialization of children and teenagers' personality [7-11].

To solve this problem, it is necessary to develop and implement programs and methods aimed at forming law-abiding behavior of minors in educational institutions (hereinafter referred to as the Program and Methodology). This kind of programs and methodology should be comprehensive and systemic in nature, ensure the implementation of psychological and pedagogical technologies directed to developing minors' personality, the formation of a self-reflection attitude, legal consciousness, prerequisites for self-actualization, etc. Besides, the system of forming law-abiding behavior of minors in educational institutions should take into account the content of the processes of the mental development norm at each age stage. The age-psychological approach, along with the system-activity approach, should take its rightful place in the methodological basis of psychological and pedagogical work with minors in organizations that provide educational activities [12-15].

The development and implementation of programs and methods to form law-abiding behavior of minors in organizations that provide educational activities will ensure the formation and development of value orientations, personal meanings, spiritual and moral values of children and teenagers on the basis of the norms of morality. Legal education and legal enlightenment of minors in educational institutions, implemented from the early stages of the development of a child's personality, will ensure that minors develop legal knowledge, legal behavior skills, respect for law, development and support of positive activity in the field of law. Systematic, purposeful, comprehensive work on legal education and upbringing of minors in institutions that provide educational activities is a prerequisite for legal socialization of a person, from the stage of social adaptation to internalization of legal norms and values [16-20].

Thus, when developing programs and methods to form law-abiding behavior of minors in educational organizations, one should take into account that psychological and pedagogical work must comprise:

• legal socialization of minors - from the stage of social adaptation to internalization of legal norms and values;

• the formation of harmoniously developed personality (intellectual, spiritual and moral development).

Discussion of Results

Law and morality are the most important elements of human culture, which always go in close interaction and are determined by the concrete historical conditions of the development of society, as well as its social and class structure. Legal culture determines responsible law-abiding behavior of a person, characterized by conscious submission to the requirements of the law, compliance with social and moral norms and rules of behavior. In the formed legal culture, the individual uses the lawful precepts voluntarily, on the basis of individual legal consciousness. Law-abiding behavior is behavior determined by law, consistent with its goals, principles, and regulations. By its properties, this is normative legal behavior, manifested in various forms of social and legal activity (activity, individual actions, legitimate inaction, verbal activity, which has legal significance). The normative social and legal activity of an individual dominates if a legal identity is formed that includes a set of values, norms and rules that are performed on a voluntary basis and on the basis of which a really existing rule of law is built. It is important to form a positive attitude of minors to the law, to familiarize children and teenagers with specific features of the legal system, to form their legal competence and legal consciousness in general.

However, the assimilation of legal information cannot be considered as the major objective of upbringing and developing legal consciousness of minors. In addition, minors do not need legal knowledge on their own, but as a basis for behavior in various social situations. The system of legal education should be oriented to the formation of social attitudes that do not contradict the requirements of social and legal norms. The key objective of legal education is to achieve a condition where respect for the law becomes the direct, personal persuasion of minors.

It is important that students should be competent in matters of legality, oriented in matters of law-abiding behavior, be aware of the essence of offences and accept responsibility that is provided for them. It is necessary to pay special attention to such concepts as “kindness”, “decency”, morality, moral character, code of honor. The uniqueness of forming a moral and legal culture, legal consciousness of minors lies in it.

However, moral and legal education of minors should be carried out in close interconnection with the development of minors’ personality. The system of personal values is the most important psychological mechanism of self-development, while simultaneously determining its direction and methods of its implementation. The regulatory function of personal values embraces all levels of the system of incentives for human activity. The specificity of the action of personal values is that they function not only as ways of rationalizing behavior, their action extends not only to higher structures of consciousness, but also to those that are usually designated as subconscious structures. They determine the direction of the will, attention and intelligence, human behavior as a whole.

Personal values make up the basic component of the personality, determine its orientation, which is embodied in beliefs, moral positions and manifests itself in social relations, activities, communication.

Thus, activities aimed at forming law-abiding behavior of minors’ personality should incorporate the unity of two components: the regulatory legal space and the space of formation and development of minors’ personality (intellectual, cognitive, emotional-volitional components).

The unity of the two components will provide the formation of minors’ legal culture strategically oriented towards the implementation of a personal, subjective, active, individually-creative educational paradigm. The organization and planning of preventive psychological and pedagogical activity in an educational institution based on the unity of the formation of legal consciousness and the development of minors’ personality will create favorable conditions for the use of qualitatively more effective means of legal education and upbringing, primarily related to the organic unity of educational activity with the goals of

civic formation of children and adolescents, optimal use of the educational material base and teaching potential of the institution, greater opportunities to create a holistic all-round development of the situation of a minor's personality.

In addition, cooperation and equality in partnership, which create favorable conditions for the effectiveness of the educational process, should become the foundation in organizing activities to form law-abiding behavior of minors.

Raising a law-abiding person requires conscious and responsible observance and implementation of life rules, norms and laws of society. The higher the level of such development, the more effectively the individual is able to defend his constitutional rights and responsibly fulfill his rights and obligations. The main goal of such upbringing is the purposeful formation of a civic moral position of a person who is able to bear moral responsibility for his decisions made taking account of the existing system of values in this society and knowledge of laws. The purposeful adoption of moral standards and values by the younger generation, which are the basis for the formation of a conscious member of society, will create the required conditions for the development of forms of law-abiding behavior. In the process of specially organized work, the society will get a morally stable person, socially active, a competent and law-abiding citizen of the state in the legal and general cultural aspect. At the same time, a high level of moral development helps the child to orient himself in complex social and economic problems, to understand the socio-political life of the country, having his own opinion and defending his own position, focusing on the internal moral values, according to which a person lives.

Based on the foregoing, the organization of systematic work to form law-abiding behavior of minors in organizations that provide in educational activities should comprise:

- purposeful work to form legal competence, legal consciousness and legal culture among minors;
- the intellectual, spiritual and moral development of children and teenagers, fostering a sense of patriotism, citizenship and responsibility;
- enhancing legal culture and legal literacy of parents (legal representatives) of minors;
- individual preventive work with minors in socially dangerous situations;
- identification of families in socially dangerous situations and assisting them in upbringing and education of minors.

In addition, the organization of systematic work on the formation of law-abiding behavior among minors in educational organizations should bear an interdepartmental character, that is, include the subjects of prevention (staff of law enforcement bodies, commissions on minors' affairs and protection of their rights, PPMS centers, medical workers, etc.). P.). The unity of the activities of all participants in the educational process with the activities of the subjects of prevention will ensure interprofessional interaction and raise the formation effectiveness of law-abiding behavior among minors in educational institutions.

Conclusions

The main target groups when organizing the activity to form law-abiding behavior of minors in institutions providing educational activities should be:

1) minors;

2) participants of the educational process (administration, class masters, teachers, social educators, educators, tutors);

3) parents of minors (legal representatives).

1. The purpose of work with minors should be the formation of their stable behavior to resist the violation of social norms and rules of behavior based on their own personal position and individuality. Work with children and teenagers should be built in view of the age-psychological approach (taking into account age and individual characteristics).

The formation of law-abiding behavior among minors should be revealed through five main functions: value-normative (the formation of important legal norms and values), cognitive-transformative (the formation of legal knowledge to prevent possible errors and assess social situations), and legal socialization (the formation of a system of legal relations, legal competence, legal consciousness),

communicative (creation of conditions for the exchange of legal values and meanings), regulatory (regulating the formation of legal guidelines, legal competence of activities).

The structure of the formation of minors' law-abiding behavior:

- the axiological component (the formation of a person's value attitude to moral and legal norms, an objective legal assessment of one's own actions and the activity of others);
- the cognitive component (the formation of ideas and knowledge about the norms of morality and law, legal phenomena, legal knowledge, legal thinking);
- the behavioral component (compliance of the legal system of values and attitudes of an individual with moral and legitimate norms accepted in society, an attitude toward legal behavior in society).

The formation of law-abiding behavior among minors is manifested through three levels:

- the initial level (the presence of basic legal consciousness developed in the family, basic attitudes);
- the orientation level (fluency in the basics of legal knowledge, legal competence of the individual);
- the adaptive level (compliance of legal values and personal attitudes with moral and legitimate norms accepted in society).

The process to form law-abiding behavior among minors includes three successive stages, at each of which one of the components complements the other and ultimately forms legal consciousness of the individual. At the orientation stage, the axiological component takes priority, the cognitive component takes priority at the informative stage, and the behavioral component takes priority at the motivational-activity stage. For each of the stages, technologies of psychological and pedagogical activity are determined that correspond to the age and individual characteristics of the person, as well as the formation level of legal culture.

Specific features of the organization of the formation process of law-abiding behavior among minors lie in its purposeful and systematic nature, orienting the educational process in educational organizations to the formation of a humanistically oriented, active and responsible person. A person who is aware of his rights and respects the freedom of others, has legal competence and legal consciousness based on individual values, meanings and attitudes.

2. Raising the effectiveness of the organization of work to form law-abiding behavior of minors in educational institutions should incorporate the activity with all participants in the educational process: administration, class masters, teachers, social educators, educators, tutors, parents (legal representatives). This work should be directed to improving the professional competence of all participants in the educational process: familiarizing the teaching staff with new programs, methods and technologies to form normative behavior of children and teenagers, preventing the manifestations of various deviant forms of behavior in minors, teaching technologies for preventive programs taking account of features of educational organizations.

3. Improving the psychological and pedagogical competence of parents (and legal representatives) also provides for their training and education within the framework of legal culture and legal literacy, training parents (and legal representatives) in knowledge and skills that contribute to effective and developing interaction in the family.

To increase the effectiveness of the organization of work to form law-abiding behavior of minors in institutions that provide educational activities, it is necessary to:

- carry out systemic and differentiated psychological and pedagogical preventive activities;
- use the system-activity approach in organizing the entire educational process;
- ensure the unity of the normative legal space and the space of formation and development of the personal sphere (spiritual, moral, intellectual, emotional-volitional) of minors in educational organizations;
- implement interdepartmental and interprofessional interaction;
- monitor the effectiveness of the activities of preventive work in institutions that provide educational activities.

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Specific Features of Forming the Teacher's Professional Competences for Inclusive Education

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Abstract

The paper presents an analysis of the scientific literature, research and development, describing the competences of the teacher of inclusive education. The authors have given the analysis of the state educational standard of higher professional education (bachelor) in the program "Adaptive physical culture" and professional standard for teachers (educators, teachers) in the field of preschool, general, basic general and secondary general education. The authors have outlined the major difficulties in the enhancement of professional competences that are required for the successful activity of a teacher working with students with limited abilities. The "problem field" of physical culture and sports for children with limited abilities has been shown. The specificity of the process of forming competences in physical training teachers in the field of socialization of students with limited abilities by means of adaptive-sport activity has been determined and described. The authors have proposed the options for the formation of competences among teachers in the field of socialization of children with limited abilities throughout the entire educational activity. In addition, the paper presents a structural-functional model of psychological and pedagogical follow-up for the professional competence formation of an inclusive education teacher, that comprises: horizontal follow-up (follow-up modules), vertical follow-up (development stages of a professional), "diagonal" follow-up in the framework of the formation of corresponding structural components of professional competency.

Keywords: professional competences of ateacher, professional qualificationsenhancement, schoolchildren with limited abilities, adaptive-sports activities, socialization.

Introduction

In the conditions of the contemporary educational environment that is dynamically changing and striving to become more and more humane, we need a teacher with such professional qualifications that allow restructuring pedagogical activity in view of socially significant goals and limitations. Today's education is "education not for life, but through one's whole life" [1].

In the new conditions, it becomes necessary for a teacher to learn constant interaction, new approaches and technologies, especially in the field of socialization of schoolchildren with limited abilities (further in the text - LA) [2].

There is a high demand for professional competences of a teacher in the field of socialization of children with LA in a contemporary humanistic society, since the result of his activity is each student's achievements in public life. It is important that the teacher understand the goals and objectives of his own pedagogical activity, know how to implement them, and the student with special needs understand what to learn, how to overcome the limitations associated with pathology. In this connection, a significant focus should be on the formation of the value-meaning sphere of personality of a teenager with LA, which translates the effects of socialization factors into a personal plan in the form of transformation of social

values into a ready-made system of personality values. In the conditions of effective innovation, the focus of teachers will be on the future destiny of a student, the search for various effective ways to prepare him for an independent solution to the problems of physical education [3-4].

In this regard, it is necessary to pose a question: which constituent elements of professional competence are the most important for the success of the pedagogical assistance in the socialization process of students with LA? First of all, we believe that these are the competences that are associated with socialization of a school student with LA. One should understand the importance of a chance for a student with LA to get out of isolation through adaptive sports activities, new opportunities that are opened up before him, to be a full-fledged member of society, and be useful to it. Specific features of professional activity suggest that teachers should have a set of humanistic qualities: tolerance, willpower, ability to react quickly in extreme situations. It is necessary to have self-reflection, quick orientation in the circumstances as a condition for the correct assessment of situations and their own actions. The teacher's attitude to cooperation with the student, his psychological readiness for this, allows the teacher to more fully accept children with LA as subjects of communication and create interpersonal contacts. It is important for a teacher who encounters children with various limitations in his work not to confine himself to solving narrowly applied, private problems, but to go to the level of joint business and game activities with students in which life situations would be simulated; operate with the content that carries a certain pedagogical load. This would help to naturally connect the educational content with life activity of students and allow them to master the ways of cognitive activity and social interaction in society. The specific features of a PT teacher's pedagogical work, the specific tasks of work dictated by the medical and psychological characteristics of children with LA, determine the specific set of constituent elements of the profession of this specialist, basic, professionally required knowledge. We need a PT teacher who will have experience in organizing activities and professionally significant qualities aimed at socializing students with LA. Teachers should combine the ability to provide individuals with LA with the possibility of physical rehabilitation and social adaptation to the living environment, to certain types of practical activities. This also comprises the teacher's ability to create an atmosphere for the restoration of social and communicative opportunities and ties, the integration of people with limited abilities into the modern social and cultural space [3-7].

An important circumstance that further enhances the significance of this aspect of the problem in the case when we address the problem of developing physical culture, is the possibility of developing such a special space by means of adaptive sports activities in which children with LA are introduced to social and cultural values various in forms and character. Therefore, the teacher, a PT teacher should have a certain supply of competencies, knowledge and skills in the field of socialization of children with limited abilities in adaptive sports. PT teachers working with children with limited abilities note a persistent lag in the field of physical education from other educational areas and identify a number of reasons that reduce the possibilities of adaptation and socialization of these children, and therefore, their integration into society [3-4].

Theoretical review

The "problem field" of physical education and sports for children with LA in PT teachers' assessments are as follows:

1. The sports life of children with LA does not have socially significant incentives for development. It takes place mainly according to a simplified organizational scheme within the school. There are no conditions for the development of sports motivational and targeted space for students.

2. The intuitive nature of innovations in physical education of children with LA does not contribute to its effective renewal.

3. There are no organizational opportunities for unification and partnership with sports organizations and institutions for healthy children and children with LA. There is no single coordination center for children's sports, including sports for children with LA.

4. The traditional system of teacher training does not provide for the practical development of new modern technologies of children's sports for children with LA and social partnership in this field [5].

When studying the scientific literature on the problem, we could not find any scientific developments or studies that describe the competences of a PT teacher and aimed at socializing children with LA.

The analysis of the state standard of higher professional education of 2000 (the qualification - teacher in physical culture and sports (in accordance with an additional course)) showed that various subjects are included in the requirements for the graduate's level of training, knowledge about socialization of students and they are not considered in individual issues. The concepts of "socialization" and "social adaptation through physical culture" are not given in the subject-oriented disciplines. The analysis of the State educational standard of higher professional education (bachelor) on the course of training 034400 Physical education for people with health impairments (adaptive physical education) (2010), new course code 49.03.02 Physical education for people with health impairments (adaptive physical culture) (2015), showed that pedagogical activity is aimed at optimizing the health status of students and contributes to the formation of ways that ensure self-realization, self-determination, self-improvement and self-actualization [5, 11-12].

The main goal of the Federal Program for the Development of Education for 2011-2015 is to develop the system of education for the purpose of forming a harmoniously developed, socially active, creative person and which will serve as one of the factors of the economic and social progress of society based on the priority of education proclaimed in the Russian Federation. Special attention should be paid to the situation associated with successful socialization of children with limited abilities, children with disabilities, children without parental care, as well as children in difficult life situations. On the other hand, the objective has been set to reduce the costs of implementing the mechanisms of social adaptation for socially disadvantaged groups by 8-12% [5, 13]. Thus, the state program guides the schoolteacher of physical culture on physical education and sports activities aimed at developing a socially active person.

The professional standard for teachers (tutors, instructors) in the field of primary general, basic general and secondary general education (order of the Ministry of Labor of Russia dated 10.10.2013 No. 544) compels all the workers of education to possess competences in the field of inclusive education for children with LA [6, 14]. As we can see, the standard outlines the requirements for training a specialist in an inclusive space, but the issues of socialization of students with LA by means of the subject are not considered. The teacher cannot be expected to do what nobody has taught him. The introduction of a new professional standard for a teacher should inevitably entail a change in the standards of his training in higher education and in centers of professional development [5].

The main guidelines of a teacher's training how to teach children with LA are given in the activities of the "Comprehensive program for improving the professional level of teachers of educational institutions". However, extracurricular physical education work for schoolchildren with LA is understood as passive-illustrative teaching at school. Fulfilling the requirements for learning educational material, participation at in-school sporting events are perceived as the social activity of the student. At this stage of school development, standard physical education curricula are used, which implement only the informational principle of instruction, and regulate thematic content. The creative, anticipatory orientation of physical culture remains unrealized. The use of means of physical culture in socialization and social adaptation of children with LA is not provided. Therefore, today a special role is given to the system of advanced training programs at the federal, regional and municipal levels for the teacher to gain the above-mentioned professional competences. The topical question is how to ensure the formation of competences among PT teachers in the field of socialization of children with LA throughout their educational activities. Today, the need for teaching staff has increased significantly. Schools need knowledgeable and qualified teachers in the field of students' socialization. The specialist's readiness for professional activity consists in mastering the full range of special competences, in the formation and maturity of professionally significant personality traits for the implementation of socialization of students with LA through adaptive-sports extracurricular activities [5-6, 15-19].

It seems important to develop a new, personality-oriented content for professional development courses of teachers, as well as the introduction of effective pedagogical technologies that contribute to the development of new pedagogical thinking, the growth of professional and pedagogical culture in the field of socialization of children with LA through adaptive sports. The formation of teachers' competences in the

field of socialization of students with LA is a specific process. The specificity of the competence formation process in PT teachers in the field of socialization of students with LA through adaptive sports activities is as follows:

1) to receive a request of society that matches the problem under study;

2) to determine the essential content of competences in the field of socialization of students with LA through adaptive-sports extracurricular activities;

3) to identify the specificity of the educational process in the system of teachers' professional development [6].

It should be noted that pedagogical activity is constructive, productive, creative. The requirements for the character of a PT teacher's competences are multifaceted and multidimensional. They are determined not only by the needs of a growing person, a child with limited abilities, but also by the features of the socialization process of a person in adaptive sports activities and, of course, by the functional content of the activities of a PT teacher in this process. One of the problems of teachers' professional development is insufficiently developed training programs. Educational programs are necessary because they allow one to master the models of socialization of students with LA in adaptive sports activities. Taking account of the peculiarities of the process of forming the above-mentioned competences among PT teachers, we have identified the following forms of work that are important from our point of view, which should be developed and recommended in the professional development system:

1) experience sharing seminars, the participants of which are teachers, coaches, methodologists in physical culture and sports, as well as specialists from various social services;

2) joint social and research projects devoted to the development of new technologies in the field of socialization of students with LA in adaptive sports activities;

3) visiting sports schools, etc. [6].

The selected forms are based on the principle of cooperation and interaction. Further professional development of PT teachers implies such an organization that promotes the formation of a professionally significant level of competences in the field of socialization of students with disabilities through adaptive sports activities [20-24].

The main competences of the teacher are:

1) a system of knowledge about social adaptation, integration, inclusion and socialization of children with LA, which forms a new style of thinking and is formed on the basis of information knowledge;

2) a system of competences in the field of socialization of students with LA through adaptive-sports activities, which is formed in the process of practical activity.

In conditions of the national education system modernization, the teacher is the key figure that creates psychological and pedagogical conditions for the integration of the child with special needs in the educational space. At the same time, the teacher often encounters problems in the process of solving professional issues, that he cannot solve on his own: difficulties in building rapport and trusting relationships with children, managing the educational situation, increased mental stress, and emotional burnout. All this requires the creation of the system of psychological follow-up and support for the teaching staff in an educational institution [25].

Counseling and awareness activities of the psychologist in work with the teaching staff.

Psychology awareness and counseling for teachers is one of the traditional components of school psychological practice. Counseling and psychology awareness activities for teachers can be carried out both at the request of teachers themselves, and at a psychologist's suggestion. Counseling for teachers (individual and group) is provided on changes in the strategy of pedagogical assistance and training; difficulties in work with children to develop a joint problem-solving program; creation and implementation of a program of individual follow-up for a child; analysis of the results of a psychologist's work with a child, etc.

The problems that teachers and administration usually tackle are the difficulties of children's adaptation to the learning environment, the shortcomings in behavior of specific children, the interaction difficulties in the teacher-child dyad, the problems of a child's interpersonal communication in a peer team. In psychological practice, there are several methods to construct a counseling conversation:

1. In the first phase, the psychologist organizes the conversation space, establishes contact with the client, makes acquaintance, gives a guarantee of anonymity, invites to a conversation, overcomes resistance to counseling.

2. In the second phase of the conversation, the psychologist supports, stimulates the client's story, conducting an empathic hearing, contributes to the targeted development of the conversation, comprehends what the client has said. The second phase clarifies the hypothesis of the psychologist.

3. In the third phase, the psychologist provides corrective help, avoiding direct advice and recommendations. If the psychologist's hypothesis and the proposed interpretation of the client's situation are accepted, it is necessary to help the client formulate as many behaviors as possible.

4. The fourth phase - summarizing the counseling conversation; clarification of further relations between the psychologist and the client, as well as a ritual act of saying goodbye to the client.

At the final stage, the psychologist reflects on professional activities, draws up the protocol (card) of the consultation and, if necessary, outlines measures of influence on the socio-psychological environment in the interests of the client [25].

Psychological testing of the teaching staff

Psychological testing of professional and personal characteristics of teachers, identification of psychoemotional problems serve as a starting point in work with the teaching staff. The psychological study of the teaching staff is a very time-consuming procedure that requires professional skills, compliance with certain moral and ethical norms and standards. It is important to understand that any psychological testing and assessment is not an end in itself, it is subordinate to the main task - the development of recommendations. Testing and assessment of the teaching staff of an educational institution that implements inclusive practice includes the determination of the individual pedagogical style of a teacher. It also makes sense to conduct a structured questionnaire survey to determine the basic ideas and meanings that teachers "fit" into their vision of inclusion. At present, the issue of a psychologist's participation as an expert to assess the professional competency of teachers in their educational institution is a highly debatable topic. The most desirable is the involvement of an independent psychologist in the expert assessment. At the same time, the mass character of performance evaluation of teachers and often the absence of professional psychologists-experts determine the participation of a teacher-psychologist at an educational institution in assessing the professional competence of teachers. In this case, the psychologist participates in the expert assessment throughout its duration:

- studies the teacher's personality in the aspect of its influence on the personal formation and development of a child;
- gives an assessment of the professional activity of a teacher in terms of the outcome and personal aspect (especially pedagogical communication, behavioral reactions, personal qualities, level of organizational, communicative and other abilities);
- carries out a psychological analysis of specific forms of work with children (lesson, class, extra-curricular activities);
- makes a psychological analysis of the relationship "teacher – child" through the eyes of the child [25].

Psychocorrective activity of the psychologist in the teaching staff contributes greatly to the psychological problem solution in teachers involved in the educational process for children with limited abilities. In this case, psycho-correction is thought of as a system of measures aimed at correcting the faults of the psyche or human behavior with the help of special means of psychological influence. In practice of psychological follow-up for teachers involved in the educational process for children with limited abilities, psychocorrective work is aimed at solving the following problems:

– reduction of negative experiences of teachers and their transformation into positive emotional states;

– the formation of the need for self-control and self-regulation of their emotional states;

– training in techniques for self-regulation of the emotional state, prevention and overcoming of emotional tension;

– developing those qualities of a teacher that help them adapt to stressful factors of professional activity: psychological culture (empathy, expressive skills, culture of pedagogical communication), the formation of professional self-consciousness;

– the formation of stress tolerance, prevention of the syndrome of "emotional burnout" [25].

For the process of psychocorrection of a teacher, modern psychological science offers many methods that can be classified into two groups: specific and non-specific. Specific methods are expressed in the development of those qualities of the teacher that help them adapt to the stressful factors of professional activity. Non-specific methods are characterized by the use of means and methods of self-regulation of the emotional state, methods of preventing and overcoming emotional tension (training in relaxation methods, special physical and breathing exercises, self-monitoring of emotional states, etc.). Forms of psychocorrective work can be different: individual and group ones. Group developmental classes are aimed at developing professional competences. Trainings can also be aimed at developing communication skills, conflict resolution, development of health-saving behavior, and prevention of professional burnout [8-10].

The formation of the teacher's professional competences for inclusive education

The formation of the teacher's professional competency for inclusive education involves the implementation of systemic measures for psychological and pedagogical follow-up and support of this process. Psychological and pedagogical follow-up is thought of as a result and a process directed towards the formation of professional competency of teachers for inclusive education. The content of psychological and pedagogical follow-up consists of guidelines, methods, forms and conditions of psychological and pedagogical follow-up. The areas of psychological and pedagogical follow-up to form professional competency of an inclusive education teacher comprise: horizontal follow-up (follow-up modules), vertical follow-up (development stages of a professional), "diagonal" follow-up in the framework of forming the corresponding structural components of professional competency. The horizontal direction of psychological and pedagogical follow-up is carried out at each stage of forming a professional. The horizontal direction of psychological and pedagogical follow-up includes the following modules: psychological testing, design, implementation and self-analysis. Psychological testing involves the study of readiness (the level of competency) of future teachers and educators to carry out professional activity of an inclusive education teacher. Design involves the development of a follow-up program. Implementation involves the realization of the developed follow-up program; self-analysis – the study of the outcome follow-up. The formation of the value-motivational component assumes increasing the activity of a specialist in inclusive education, updating the need for work, the need for self-knowledge and self-development. Work with the cognitive component is designed to increase self-esteem, correct the views of a specialist in inclusive education about himself, the world, and the formation of positive thinking [25].

The methods of psychological and pedagogical follow-up are psycho-counseling, psychocorrection, psychotherapy, psychological training, psychological and pedagogical practical training. The forms of providing psychological and pedagogical follow-up can be individual, subgroup and group ones. Individual forms involve the procedure of psychological counseling, as well as holding psychotherapy sessions. The following points serve as the conditions for psychological and pedagogical follow-up: a competency-based approach, module training, an individual-oriented approach, an activity-based approach, etc.

Discussion of Results

We conducted an empirical study of teachers' behavior strategy who work with students with limited abilities (hereinafter - LA). One hundred and twenty teachers of educational organizations in Moscow, Ulyanovsk and Tver participated in the study. The purpose of the study consisted in determining the strategies of teachers' behavior under conditions of inclusive education. In our study, inclusive education is viewed as a difficult situation for teachers.

At the first stage of the study, we conducted an expert assessment of attractiveness of teachers' behavior in the educational process for students with LA. We asked students to evaluate the behavior of teachers on a 5-point scale:

- 1-2 points - ways to overcome difficulties are very unattractive for me (1 point) / not attractive (2 points);

- 3-4 points - some methods can be used to overcome difficulties (3 points) / I would like to adopt some methods of overcoming difficulties from a teacher (4 points);

- 5 points – a teacher applies constructive ways to overcome difficulties that I would like to adopt.

On the basis of the expert assessment results all teachers were divided into two groups: those who constructively overcome difficulties (the average score of expert assessment is more than 2 points) and the ones who overcome difficulties not quite constructively (the average score of expert assessment is up to 2 points).

To study teachers' behavior strategies, we used a questionnaire on behavior strategies in significant life situations designed by E.Yu. Korzhova (Korzhova E.Yu., 2016). E.Yu. Korzhova has identified six main types of behavior strategies in significant life situations [26]:

1. somatically oriented;
2. professionally oriented;
3. unprofessionally oriented;
4. socially oriented;
5. direct response;
6. indirect response.

After comparing the results of applying behavior strategies in groups of teachers who overcome difficulties constructively and not in a constructive way, the following results were obtained (Fig. 1).

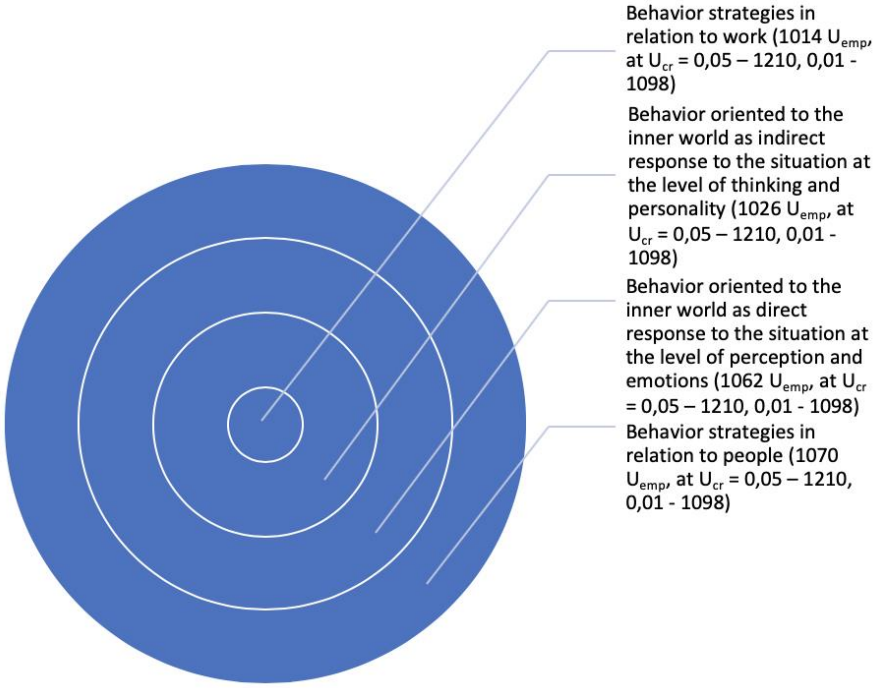

Fig. 1. Significant differences in teachers' behavior strategies

Significant differences were obtained in the following behavior strategies:

- behavior strategies that characterize a person's attitude to professional activity: high or low motivational activity, cognitive interest in professional activity, emotional job satisfaction. Adaptive strategies of behavior in relation to work significantly predominate in teachers who are a good example to students in overcoming difficulties. It is through the choice of adaptive behavior strategies in relation to work that such teachers prove to be more effective in their profession and less exposed to emotional burnout when experiencing difficult situations.
- behavior strategies that characterize interaction with social reality. Teachers who are characterized by

high rates of coping with difficult life situations prefer to turn to friends (relatives, friends, colleagues) around them for help when solving complicated problems.

• behavior strategies that characterize the emotional sphere of response to a situation: denying or accepting actual experiences. Teachers whose behavior is not desirable to follow from students' point of view often choose maladaptive strategies (anger, anxiety, sadness). Teachers, whose behavior students evaluated as desirable for learning, demonstrate high rates on the scale of accepting the situation and its adequate assessment.

• behavior that characterizes the intellectual and personal sphere of teachers in responding to a situation: attribution errors, attribution, conformism, the prevalence of logical judgments and conclusions, constructive analysis and evaluation. Rationality is considered as an indicator of an adaptive strategy of behavior which is also more often chosen by teachers whose behavior students are willing to adopt.

At the next stage of our study, we studied personality factors that contribute to the development of constructive strategies for teachers' behavior in an inclusive environment as a required competency when working with students with LA. We have put forward a hypothesis that such a factor can be a person's integrative quality as a person's social competence. Based on theoretical and methodological justifications of the concept of personal potential in overcoming difficult life situations (Leontiev D.A., 2002, Maklakov A.G., 2001, Shakurov R.Kh., 2003), we identified 7 basic personality characteristics that contribute to the development of constructive behavior strategies of a teacher in an inclusive environment [27-29]. These factors are the following:

1) restructuring of behavior patterns;
2) orientation to one's own attitudes;
3) giving up an authoritative way of behavior;
4) striving for personal development through changes;
5) mobility of activity;
6) rationality;
7) tolerance.

As a result of the study aimed at studying the identified factors, the following results were obtained.

• Thirty-one per cent of teachers demonstrated the factor "Restructuring of behavior patterns" at a high level; 48% of teachers at an average level; 17% are below average and 4% of teachers are at a low level. The results obtained allow us to state that generally accepted rules and norms of behavior are typical for teachers, but they are also capable of changing and being flexible in relation to established forms of behavior.

• The factor "Orientation to one's own attitudes" according to the results of the study at a high level was demonstrated by 35% of teachers; 44% - at an average level; 18% - at the level below average; 3% at a low level. The results obtained suggest that most teachers are free and able to react sensitively to the requirements of the situation, 21%, as a rule, strive to meet the expectations of significant people around.

• The factor "Giving up an authoritative way of behavior" according to the results of the study was demonstrated by 12% of teachers at a high level; 34% - at an average level; 42% were below average and 12% of teachers at a low level. These indicators show that teachers in their behavior are guided by the principles of dominance and prefer to use a behavior strategy based on self-confidence.

• The factor "Striving for personal development through changes" according to the results of the study is developed in 10% of teachers at a high level; in 30% of teachers, the factor is developed at an average level; 55% have a level below the average and 5% have a low level. The obtained indicators show that 90% of teachers have skills to cope with difficult situations and have high adaptive abilities. However, 5% of the teachers in the sample are characterized by low adaptive abilities to changing situations and experience a sense of anxiety and fear of difficulties.

• The factor "Mobility of activity" according to the study results is developed in 17% of teachers at a high level; in 39% of teachers at an average level; 44% of teachers have a level below the average. A low level of development of the factor of behavioral mobility among teachers was not found. The results of the study indicate that 61% of teachers have difficulty in exhibiting behavioral mobility. Teachers have a poorly developed ability to quickly and flexibly adapt to changing social conditions and shape new forms of

behavior.

• The "Rationality" factor, according to the study results, is developed in 22% of teachers at a high level; in 47% of teachers at an average level; in 16% of teachers at a level below the average; 15% of teachers have a low level. The results obtained indicate that 47% of teachers have the ability to rationally and constructively perceive and evaluate changes in social reality, make decisions based on logic and common sense. Fifty-three per cent of teachers tend to evaluate and perceive reality through the prism of their own experience and established views and judgments and are not capable of non-standard solutions to difficult problems in life.

• The factor "Tolerance" according to the study results is developed in 21% of teachers at a high level; in 38% of teachers at an average level; 36% of teachers have a level below the average; 5% of teachers have a low level. The results obtained indicate that 41% of teachers in their behavior tend to show a lack of tolerance, intolerance of points of view and opinions different from their own, a lack of independence in the choice of decisions and responsibility for these decisions.

The results of the study allowed us to draw the following conclusions. In teachers' behavior in difficult life situations (situations of inclusive education), there is a tendency to use patterns of behavior that have developed in the process of professional activity, which are very difficult to change. When solving complicated problems, they rely on established views and principles, proven rules and norms of behavior, and deny creative and non-standard ways of responding to changing social conditions. Teachers also demonstrate a low level of tolerance, flexibility and the ability to adapt to new changing conditions. These conclusions suggest that due to the high emotional tension of pedagogical activity and the risk of emotional burnout, teachers need to develop social competency as a factor that contributes to the development of constructive strategies of teachers' behavior in an inclusive environment. For the purpose of developing the social competency of the teacher's personality in an inclusive educational environment, we have developed the programs "Educational training session for teachers to form coping behavior in an educational inclusive environment".

The goal of the training is to educate teachers on how to work with children with LA. The training offers exercises on the formation of skills to cope with life difficulties, the development of stress tolerance, tolerance, self-analysis, empathy, the ability to quickly adapt to changing social conditions that must be used when working with students with LA.

Training objectives are the following:

• to create favorable conditions for establishing trusting and friendly relations in a group;

• to form and develop the ability to preserve the resource state of the psyche;

• to form and develop the motivation of achievement (the desire for self-realization and development in the professional sphere).

The training program is designed for 36 hours and consists of three modules. The first module - the introduction - is aimed at introducing and uniting the group. The second module,

the main one - comprises psychotherapeutic exercises. The third module - the conclusion - is directed towards the feedback and self-analysis from the training process.

Module 1: art-therapeutic exercises aimed at creating group cohesion, building trust, emotional contacts.

Module 2 includes the information-analytical block and the block of socio-psychological techniques and exercises aimed at forming and developing teachers' social competency (Table 1).

Table 1. The main part of the training program

Information-analytical block
The information-analytical block is a course of lectures (18 hours) devoted to the problem of modernization of education which provide conditions for the development of a child's personality; the problem of organizing and implementing pedagogical support for students with LA and fulfilling the norms and rules of pedagogical interaction.
Block of socio-psychological techniques and exercises

The system of psychological studies which comprises three sections: the legal section (increasing social and legal literacy), the personality section (increasing the level of knowledge about the individual psychological characteristics of the development of students with LA), the professional section (the formation and development of knowledge, skills and work with students with LA).

Techniques and technologies:

- mini-lectures;
- brainstorming;
- role-playing games;
- business games;
- interactive training;
- active learning;
- case methods, etc.

Module 3: self-analysis and feedback, creating a resume of a "new teacher". The objective of the module is to summarize the results of the training process and to recognize the experience gained for professional activities.

This program was tested on teachers who participated in an empirical study of the first and second stages. The results obtained show that:

• The factor "Restructuring of behavior patterns" was demonstrated at a high level in 64% of teachers. The results obtained allow us to state that teachers began to show more change and flexibility in relation to established forms of behavior.

• The factor "Orientation towards one's own attitudes" according to the results of the study was demonstrated at a level below the average in 10% of teachers, in 2% at a low level. The results obtained allow us to state that only 12% of 21% tend to meet the expectations of a significant milieu.

• • The factor "Giving up an authoritative way of behavior" according to the results of the study is demonstrated at a high level in 51% of teachers. These indicators show that teachers, in their behavior, tend not to use an authoritarian style and prefer to use a behavior strategy based on mutual respect and care.

The factor "Striving for personal development through changes" according to the results of the study remained at a low level only in 2% of teachers.

• The factor "Mobility of activity" according to the research results is developed at an average level in 19% of teachers; in 28% of teachers this indicator is below the average. The results of the study indicate that 47% of teachers have difficulty in exhibiting behavioral mobility (whereas before the implementation of the training program, the percentage of such teachers was equal to 61%).

• The factor "Rationality", according to the results, is developed in 62% of teachers at an average level. The results indicate that 62% of teachers have the ability to rationally and constructively perceive and evaluate changes in social reality, make decisions based on logic and common sense (at the first stage of the study, the percentage is 47%).

• The factor "Tolerance" according to the study results is developed in 10% of teachers at a level below the average; in 5% of teachers it is low. The results obtained show that 15% (compared with 41% of the first stage) of teachers in their behavior tend to show a lack of tolerance, intolerance to views and opinions different from their own, a lack of independence in solving difficult problems.

Conclusions

The results obtained indicate that the developed program has a positive impact on the development of teachers' social competency in the situation of inclusive education. The strategies of behavior chosen by teachers after the training activity started to have an adaptive character, teachers demonstrate constructive and effective ways of coping with difficulties in professional activities. In addition, teachers in their behavior began to show more tolerance, orientation to the opinions and views of others, striving for innovative and creative ways to solve difficult problems, the flexibility of choosing ways of behavior in changing social conditions. They have become more open to change and innovation.

The designed program can be used in the training of highly qualified personnel: giving courses of continuing education for psychologists-practitioners, social educators, teachers, additional education teachers working both in general educational institutions and in special (correctional) educational institutions for students with health problems.

Thus, we analyzed the problems in the continuing education system and determined the main professional competences of PT teachers that are significant for the success of pedagogical assistance in socialization of students with LA through adaptive –sports activities.

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Nobility of a Researcher and Notionalist and Tragedy of Revolutionist and Marxist: G. V. Plekhanov

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Abstract

Theoretical views of G. V. Plekhanov on the future of the mankind still raise undoubted interest, which determines the relevance of this study. Being an encyclopedic personality, he brought up a galaxy of talents who successfully represented Russia in various fields of knowledge: economics, philosophy, literature and art. Nowadays, his ideas do not lose their relevance. The purpose of this study is to analyze the life of this great person, his views, doubts, striving, as well as his standpoints.

The main research methods used are the method of scientific abstraction, system analysis, deduction, the method of information structuring, and analysis of archive recordings.

The authors present the genealogy of the Plekhanovs, trace the three stages of Plekhanov's political life, consider his views on the development of social and political thought.

Both works and deeds of Plekhanov have always deserved heated discussion. At first he was fond of the Narodnik ideas, but they got split. Later, after reading the Communist Manifesto, Plekhanov was carried away by Marxism and abandoned Narodnik ideas. Then he started his cooperation with Lenin, but disagreements between them led Plekhanov to the Mensheviks. Even now Plekhanov's position can not be clearly determined.

Plekhanov's works undoubtedly have this valuable and durable content, as well as views on the future of a wise, highly educated and just man.

Keywords: Ideologist, notionalist, Narodnik movement, Marxism, ideology.

Introduction

modern level of education sets special requirements for the development of intellectual and creative activity of students - future specialists of highest qualification. In turn, this fact calls for the use both world and Russian scientific thought and experience, for the Russian philosophy is a significant contribution to the treasury of knowledge. It is impossible not to mention the important role of G. V. Plekhanov in the formation of cultural heritage of Russian philosophy. His works are remarkable for the exceptional depth and seriousness of his mentality and the scope of his encyclopedic knowledge.

Materials and Methods

The main research methods used are the method of scientific abstraction, system analysis, deduction, the method of information structuring, and analysis of archive recordings. The authors also used historical-genetic and historical-typological methods.

Analysis of the sources

This study considered Plekhanov's correspondence with his friends (V.I. Zasulich, L.G. Deych, P.B. Aksel'rod), relatives (N.A. Semashko, Claude Bato), comrades (Paul Lafargue, V.I. Lenin) and contemporary scientists (Sh. M. Munchaev, G. Kh. Popov, G. Zhuravleva, etc.).

Problem statement

A vast number of studies deal with analyzing G.V. Plekhanov's works, but his private life is understudied. This is of great importance for understanding why people's attitudes to same Plekhanov's ideas, words, works and deeds are so controversial.

Plekhanov believed that the people's life paths and activities are determined by their main goals, as well as their natural and acquired personal traits. The main task and goal of the notionalist himself was the successful development of Russia for the sake of society, and the first means to achieve this goal was

establishing socialism by overthrowing the autocracy. [7] Plekhanov'a own inherited and acquired personal traits come from the history of his family:

"G.V. Plekhanov was born in the village Gudalovka of the Lipetsk district of the Tambov region on December 11, 1856 N.S. in the large (14 sisters and brothers) family of a small nobleman, staff captain Plekhanov Valentin Petrovich (1810–1873).

His mother was Maria Feodorovna Belinskaya (1832–1881), grand-niece of V.G. Belinsky, an orphan who graduated from the Tambov Institute of Noble Maidens and worked as a governess in the families of local landowners.

Plekhanov got firmness, determination, honor, duty, diligence and passion from his father, while his mother gave him kindness, tolerance, justice, intelligence, modesty and even shyness.

От матери Плеханов унаследовал доброту, терпимость, чувство справедливости, интеллигентность, скромность и даже застенчивость.

Plekhanov's family had a huge influence on the formation of his personality. The complexity and inconsistency of notionalist's nature showed in sharpness in arguments. Plekhanov was aware of his character, and respected his opponents, never going as low as swearing while criticizing not the opponents themselves, but their points of view. That is how he justified the sharpness of his criticism and hoped for tolerance". [7]

The family of Valentin Petrovich, Plekhanov's father, was a large one. He had seven children from Pozdnyakova Vera Ivanovna (died 1855) (Plekhanov's four stepbrothers and three sisters), and seven children from Belinskaya Maria Fedorovna (died 1891) (Plekhanov's three sisters and three brothers). There is very little information about Plekhanov's family because the notionalist was either in illegal status or in exile since 1876. Of all the relatives of this notable man, the nephew Nikolay Aleksandrovich was the most famous. He was an outstanding revolutionary, a doctor, and the first Minister of Health of Russia for the October Revolution.

G. V. Plekhanov was married twice, same as his father. His first wife, Smirnova Natal'ya Aleksandrovna, wasone of the first female doctors in Russia. She started working in the Min'yar City Hospital of the Chelyabinsk region, then moved to Petersburg where she met her future husband. They had two children - daughter Nadezhda (1877) and son Nikolay (born 1878, died in his infancy).

Plekhanov's second marriage was lifelong and happy. The couple has four daughters. Two of them (Vera and Mariya) died, but other two girls got married and moved to France. There is no information on other relatives of the notionalist.

Development of G.V. Plekhanov as an outstanding Russian philosopher of his time is described by the complexity and variety of his ideas, statements, contradictions, even mistakes, but also by the recognition of universal humane values in social development. The overall entanglement of Plekhanov's philosophy, the authors distinguish the following three stages of his "evolution":

Stage I: 1873–1883

Stage II: 1883–1903

Stage III: 1903–1918.

Stage I shows Plekhanov's break from the aristocratic environment, refusal of military career. In fall of 1974 he entered the Petersburg Mining Institute, where he met the Narodniks and started active revolutionary struggle. Being in the revolutionary movement, Plekhanov "met the people" by participating in demonstrations and strikes. Then was the first legal demonstration of the Narodniks (the Kazan demonstration on December 6, 1876) who gathered on the excuse the prayer service to St. Nicholas the Wonderworker. The date coincided with the birthday of the grandson of Alexander II (the future Emperor Nicholas II. During this demonstration, Plekhanov delivered an accusatory speech against the Tsarist autocracy and in defense of Nikolai Chernyshevsky, who was exiled in Siberia at that time. For his passionate speech, Plekhanov was put n the police wanted list, though his comrades appreciated his performance. From that day on, the ideologist becomes a professional revolutionary, becomes an illegal person, and is forced to emigrate twice: to Berlin and Paris in 1877, and to Geneva in 1880. [7].

V.I. Lenin described Narodniks in the following words: "this is an integrated worldview", "an enormous patch of social ides", "the ideology and movement of the heterogeneous intellectual class", "its

basic ideas are a non-capitalist path of development; transition to socialism through the preservation, use and transformation of the collectivist principles of the rural community. Peasantry was declared the driving force of social development: the peasants were regarded as "born socialists".

However, there were no unity among the Narodniks. In the late 60-70s. P.L. Lavrov and N.K. Mikhailovsky considered the "critical thinking individuals, the intellectual class as the bearers of enlightenment, moral consciousness, and ideals of a just social community" to be a progressiv, driving force of history. P. Lavrov declared the need for the organization of lasting propaganda among the masses and the extensive theoretical and moral preparation of the revolutionists for the future uprising. G.V. Plekhanov shared these ideas. [7] Once he was very keen on M.A. Bakunin's views that appealed young people to immediately prepare a popular revolt against the three main enemies: private property, state and church.

In 1879, Land and Liberty (found in 1862 under the ideology and with the direct participation of A.I. Herzen and N.G. Chernyshevsky) "split into two independent organizations. The first was Narodnaya Volya, headed by Zhelyabov A., who preferred terrorist methods of fighting the autocracy. The second was Black Repartition" headed by Plekhanov. Plekhanov was adamantly opposed to terror, for he believed that the tsar slaughter would not destroy the autocracy, for another monarch would come to replace the former one. As a result of murder, revolutionary movement would suffer from arrests, exile, hard labor and even executions of the best people who participated in it.

The first serious Plekhanov's fascination with Marxism ended with translating the Communist Manifesto into Russian. The philosopher learned German within a short time in 1882. After that he finally abandoned the ideas of the Narodniks.

The second stage of G.V. Plekhanov's development as a Russian philosopher is described by a final break with Narodniks and a full switch to the Marxist principles. Plekhanov treated Marx with great respect: he mentioned that he was more a Marxist than a German thinker; that he would think a hundred times before he disagreed with Marx.

Such a revolution in Plekhanov's views was caused by the rapid development of capitalism, the strengthening of the working-class movement in Russia and Europe, personal experience of activities among the workers, and especially the profound study of the works by K. Marx and F. Engels. Plekhanov becomes a propagandist, ideologist and a brilliant popularizer of Marxism in Russia. [7]

It is he who creates the first Russian Marxist group Emancipation of Labor, along with his comrades and friends P.B. Aksel'rod, V.I. Zasulich, L.G. Deych and V.N. Ignatov in 1883 in Geneva. The group's main purpose is distribution of Marxism in Russia and a convinced criticism of the Narodniks ideology. The most important works of G.V. Plekhanov in this period are translations of the works "Ludwig Feuerbach and the End of Classical German Philosophy", "Theses on Feuerbach", parts of the book "Sacred Family", author's pamphlets and articles "Socialism and Political Struggle" (October 1883).), "Our Differences" (1885), "The Social Democrat Collected Articles" (1888), "Anarchism and Socialism" (1894), "The Materialist Conception of History" (1897), "The Development of the Monist View of History" (under the name of Beltov, 1895) and many others. [6, 7]

With his works Plekhanov slogged the Narodniks ideology and acquired sufficiently strong critics and enemies among former like-minded people. He showed that Russia invesitably followed the path of capitalism and that the task of the Social Democrats was to use the processes generated by capitalism for the sake of the revolution. Plekhanov also claims that the emerging proletariat (according to P. Aksel'rod, the "hegemon of the liberation movement" [2]), which is called upon to fight for the creation of a socialist workers' party, becomes the main revolutionary force in the struggle against autocracy and capitalism.

In this period, the formation of his Marxist viewpoint is influenced by the follwoing events: Plekhanov's work in the congresses of the Second International, meetings with F. Engels, cooperation with V.I. Lenin after 1835, the organization of the first all-Russian newspaper "Iskra", the "Zarya" journal, elaboration of the RSDLP Program and its publication (1902), acceptance of the program and charter at the Second Congress of the RSDLP, the split of the Bolshevik-Menshevik party, Lenin's support for Plekhanov and departure from the congress along with the Bolsheviks. [11]

Together with Russian Marxists, Plekhanov joined the struggle against liberal Narodniks, "legal Marxism", economism, and the apostasy of E. Bernstein from Marxism. All above mentioned is significant in the struggle against modern opportunism. [3, 7]

The last stage III is the most complex and tragic one. It is full of forecasts and doubts of GV. Plekhanov that are crucial for understanding the present and future of modern Russia.

This period of the rapid increase in the disagreements between Plekhanov and Lenin, the philosopher's ambivalence from the Mensheviks to the Bolsheviks and back could not but took its toll not only on creativity, but also on the revolutionist's private life. At this stage (as the Bolsheviks justified) Plekhanov became obsessed with the unattainable goal of achieving the "unity in the Party" at all costs. Lenin shared his ideas, but proposed his own leadership, goals and slogans, which Plekhanov could not agree with. Therefore, soon after the Second Congress of the RSDLP, Plekhanov took the side of the Mensheviks and became one of their leaders. His worldview had a significant contradiction: on the one hand, he acts like a Menshevik against V.I. Lenin, especially in terms of the strategy and tactics of the Bolsheviks, and against the Leninist concept of "forced seizure of power". On the other hand, Plekhanov's philosophy remains a militant materialist, a Marxist, fighting against bourgeois idealistic philosophy. [7]

Results

Plekhanov's activities, personal behavior, and his works may not be considered regardless of the environment that existed in Europe and Russia at that time. The economic structure of Russia was characterized as "the system of eastern despotism". [19] XIX century from Belinsky to Plekhanov was an era of the thinking intellectual class that did everything for the sake of its people. Various solutions, different tactics and methods of activity were selected to resolve existing tasks. Last names of Belisky and Plekhanov are not mentioned together by accident. On Plekhanov's repeated las will, his ashes were transported from Moscow to St. Petersburg and buried next to Belinsky's ashes, thereby symbolizing the continuing ideas of revolutionary ideology.

Plekhanov "was a man of inner democratic convictions". [11.] He was an irreconcilable enemy of autocracy and tsarism, showed firmness in his positions of choosing tactics and strategy, and often was ready to end up all relations (even personal ones) with his opponents, defended his principles, especially, the policy of terror. Those who about him consider this to be a part of betrayal [1]. Or maybe he just dipped into the future? Taking into account theglobal search for consent and compromise, harmonization of interests is wisdom which unfortunately is not expressed directly in Plekhanov's words.

Discussion

During the revolution of 1905-1907, Georii Plekhanov criticized the policy of armed revolt, saying that it was not necessary to take up arms. In 1908–1912, according to Lenin's viewpoint, Plekhanov praised the underground and successfully revealed its enemies and opponents, acting as an opponent of liquidationism, God-seeking and Machism.

In the First World War (1914), G.V. Plekhanov fiercely defends his point of view on the need to continue the war with Germany "till final victory" [13] on the grounds that otherwise the defeated Russians would become slaves to the victors. If Russia concludes peace with Germany, Germany would eventually grow stronger and unleash a new war with Russia again. Thus, Plekhanov predicted the birth of fascism in Germany, the Second World War, and the Great Patriotic War (1941–1945).

The revolutionist was a unique hardworker. Both in Russia and abroad he was recognized as a bright and profound Russian scientist, philosopher, leader of the Russian Social-Democratic movement, which was covered in press, meetings and meetings of associates. Plekhanov's return to Russia from the 37-year-old emigration in 1917 after the February Revolution was greeted at the Finlyandsky Railway Station of Saint Petersburg very solemnly, with an orchestra, welcoming speeches, and a crowd of thousands. However, he was not invited to join Petrograd Soviet. It is known that Prince L'vov offered Plekhanov the post of Minister of Labor, but the Mensheviks voted for Skobelev. When A. Kerensky from the Provisional Government invited Plekhanov to the post of Minister of Industry and Trade, Plekhanov recommended him to talk with the Mensheviks and remained silent. Socialist-revolutionary B. Savinkov suggested G.V. Plekhanov to head

a new counter-revolutionary government after the overthrow of the Bolsheviks. Plekhanov refused, saying that he would not kill the workers, even if they were misguided. [7]

Plekhanov only had work in the newspaper "Edinstvo", where he publishes his new articles. There he insistently expresses his disagreement with Lenin and the Bolsheviks. Suffice it to recall his comments on Lenin's "April Theses", published under the title "On the theses of Lenin and on why absurd may be interesting" (1917).

Throughout this whole stage, Plekhanov openly defends his position on the need for the unity of all forces that contribute to the approximation of socialism, including the bourgeoisie. In his opinion, Russia had already stepped on the track of the objective law of social development [12], which required: firstly, to go the path of developing capitalism, for no one can voluntarily stop this process; secondly, socialism is a higher stage of social development than capitalism, and needs a higher level of production forces development, in which the bourgeoisie could help the working class. Therefore, it is logical to stay "friends" with the bourgeoisie.

Во-первых, пройти весь путь развития капитализма и никто по своей воле не может остановить этот процесс;

Во-вторых, социализм - более высокая ступень развития общества по сравнению с капитализмом и нуждается в более высоком уровне развития производительных сил, в чем могла бы помочь рабочему классу буржуазия, то логично с буржуазией дружить…

That is why Plekhanov called for supporting the provisional government, "not to shape the bourgeoisie as an absolutely obsolete social class capable of harming the progress". Later in the 1920s, V.I. Lenin heeded Plekhanov's recommendations and repeatedly invited "elements of bourgeoisie" to serve in the Red Army, to join the creation of the GOELRO plan, and so on.

Before the October Revolution, G.V. Plekhanov warned that "early and premature socialist experiments are a dangerous adventurism that may discredit the very idea of socialism and lead to the establishment of barracks communist systems, the substitution of the power of the people by the power of a new bureaucratic elite" and even the national degradation. The seizure of power by the Bolsheviks would lead not to the proletarian dictatorshipt, but to the dictatorship of the Bolsheviks, of one party, of one individual, to stagnation and the death of the country. Plekhanov calles this system "political deformity", a renewed tsarist despotism with a communist lining". [6, 7]

That is why he did not approve of the Great October Socialist Revolution and openly admitted this fact. In his "Open Letter to the Workers of St. Petersburg" he tried to be understood: "Dear comrades! Recent events make me upset, but not happy. I repeat.

They upset me not because I do not want the triumph of the working class, but on the contrary, because I call upon it with all the strength of my soul, and at the same time I see how far these events are being postponed. They will be incomparably sadder if the conscious elements of the working class do not express themselves firmly and decisively against the policy of seizing power by one class, or, even worse, by one party. The power should rely on a unity of all the living forces of the country". [12].

Conclusion Unfortunately, Plekhanov did not see the unity of all the forces of the countries while alive. The truth of his words is justified by the existence of this unity. The Mensheviks, the Socialist-Revolutionaries, the Cadets, monarchists, students and workers came to pay last respects to Plekhanov. One flower tribute said: "To the political enemy - the great Russian patriot - socialist Plekhanov from the monarchist V. Purishkevich".

Plekhanov's constant and everyday criticism of Bolshevik course in 1917 led to an open antagonistic confrontation between Plekhanov and Lenin, which culminated in July 1917. Plekhanov openly advocates the arrest of Lenin, allowing the possibility of his political cooperation with Germany. As we know from his letters, Lenin received no answer from Plekhanov for his invitation to speak at a meeting of the Bolsheviks devoted to the fifteenth anniversary of the existence of the party. Then, Lenin mockingly called Plekhanov a "cheat", Ignatius Loyola, "general of influence". In his letter to Plekhanov Lenin says that "as for personal relations, their restoration is impossible". Plekhanov was invited to emigrate, but he refused.

Rejected by the new authorities, the philosopher is left on the sidelines. His diseases had progressed, and on May 30, 1918, he passed away. Plekhanov's closest friend L. Deych, visiting him at the grave, said

that Christ had only one Judas, while Plekhanov had plenty among his followers. Anyway, it is for history that would show the right side. G.V. Plekhanov in buried at the Volkov cemetery, next to the grave of V.G. Belinsky. Plekhanov's coffin was carried along the Nevsky Prospekt to the cemetery. The Bolsheviks, headed by G. Zinoviev, openly refused to participate in the funeral ceremony. Lenin too wasn't seen at the funeral. However, taking into account all disagreements with Plekhanov, in 1921 Lenin recognized that everything written by Plekhanov on philosophy is the best in all the international Marxist literature. In 1922 Lenin told N. Bukharin: "I re-read Plekhanov's articles written during the war. Interesting! They were not so stupid as we thought they were".

*** Studying the creative heritage of Plekhanov, it is important to remember that it is not a matter of quotations (they can be found in his works on many issues) but in his aspirations for the sake of Russia and its people and his methodological approach to the analysis of socio-economic, political and other problems of social development.

Plekhanov's works are still relevant for solving current problems

For example, in Plekhanov's warning that the socialist revolution is premature in an agrarian country and that it is necessary to prepare for it, to form and create a different level of development of the productive forces, to go through the path of capitalist development is very wise. One may ask themselves, was perestroyka an intrinsic capitalist development path of Russia that we refused by mistake or untimely, but return to it after 70 years.

Another question is how perestroyka should be described: as the reform of socialism, an upheaval (a change of power while maintaining the economic system), a revolution (a steep leap in social development), the change of one production mode to another (for example, capitalism to socialism in 1917) or counter-revolution. These issues are still being discussed.

Modern Russia is not an agrarian country. Its raw material orientation does not allow raising the productive forces to the level necessary, if not for socialism, then for another option. The question is, what this option is. After all, the USSR didn't establish socialism, but, according to Plekhanov, "political deformity". Development of Russia is required for its future, though it does not have a distinct name yet. Currently, a new model of socio-economic development and the need to reform the model of capitalism and not only in Russia, but also abroad is under discussion.

Вопросов много. Их нужно решить современникам. Но и Г.В. Плеханова забывать нельзя.

Georgii Valentinovich Plekhanov remains in our memory a real scientist, a deeply intelligent person, a strong one, worthy of respect. Apart from the wrong and obsolete information, his works will be valuable and eternal for mankind, the ideals of enlightenment, humanism, freedom and justice.

The materials of this paper are of practical value for economists, philosophers, scientific and pedagogical staff, postgraduate students and students, as well as for the lecture courses in economics, history, philosophy, aesthetics and psychology.

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Sobornost as a Specific Phenomenon of Russian Culture

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Abstract

The article is dedicated to sobornost as a specific phenomenon of the Russian religious consciousness and Russian mentality. The issues addressed in the article are of particular relevance due to the current situation in the Russian society and state structures. In the conditions of the global geopolitical confrontation, "many scholars and public figures today view sobornost as a resource mobilization mechanism for the future social and political development of Russia. Sobornost is regarded as an energy resource for the Russian culture and a foothold for raising the people's spirit and ensuring further development and prosperity of the country. Therefore, the aim of the article is to study the phenomenon of sobornost as a socio-cultural value of the Russian civilisation. The methodological framework for the research complies with the principles of historicism and systemic and comparative analysis. The performed analysis of historical facts is based on the historical-cultural approach. The main results of the study: the depth of the changes taking place in the contemporary Russian society provides adequate grounds for the conclusion that the much needed unity of the Russian citizens cannot be achieved without relying on the civilizational heritage of Russia and the principles of social justice and national equality. The authors communicate their understanding of sobornost as a significant phenomenon of the Russian culture, in contrast to the traditional consideration of only religious, theological and philosophical aspects of sobornost.
Keywords: sobornost, Russian mentality, Orthodoxy, sobornostic consciousness,civilizational legacy of Russia

Introduction

The period of social stagnation and uncertainty has a disastrous effect on the Russian people. They are disoriented and become inept and passive. It is difficult to say what can today become a cathartic idea that will unite and raise the people to creative work. An idea cannot be constructed or invented to order. But it is possible, and today it is really necessary for the Russian people, to understand their true nature and thereby to preserve their identity. So many times in our history the periods of confusion and uncertainty were followed by the emergence of a clear goal that united the people for its achieving, as it was in the 15th century, with the mission to preserve Orthodox Rus – the heir of Byzantium, or at the beginning of the XX century, with the aspiration to create a state of universal equality and justice.

Research problem

One of the characteristic features of Russian culture, being its leitmotif for more than a thousand years of its history since the times of Ancient Russia, is its universality and all-inclusiveness, reflected in such phenomenon as Russian sobornost.

Outstanding Russian philosopher N. Berdyaev wrote in his book "The Origin and Meaning of Russian Communism", "Russians in their spiritual make-up are an Eastern people. Russia is the Christian East, which for centuries has been subject to the powerful Western influence (in the 18-20th centuries) and whose higher cultured classes have assimilated all Western ideas. The historical fate of the Russian people has been unhappy and full of suffering, as it has developed at a catastrophic tempo through interruption and change in its type of civilization. It is impossible to find organic unity in the Russian history." (Berdyaev 1990, 7).

The entire history of Russia confirms the opinion of the great philosopher. We know that the main quality of the Russian culture – discreteness – is constantly present in the process of socio-cultural

development. The Russian culture demonstrates a number of antinomies, which are inherent, to a varying degree, to every culture and create a variety of national life: collectivism/individualism, natural spontaneity/humility, asceticism/hedonism, cruelty/softness, selflessness/selfishness, common/elite, low/high, etc. At the same time, it is always characterised by stable features and phenomena (Bagnovskaya 2004, 5).

"Caught between two cultures – Western and Eastern – and absorbing them, Russia combined the Eastern subjection of an individual to the clan (community) and the Western individualism and respect for personality. These two cultural principles were synthesized in the idea of sobornost." (Bagnovskaya 2004, 6)

In the 19th century the idea of sobornost became one of the important themes of Russian philosophical and social thought. It is well known that in the 19th century the problem of choosing the path of development and determining the future of Russia was as acute as at the turn of the 21st century. Being a vital issue for the Decembrist ideology, it was later transformed to generate two major trends in the Russian social thought – Westernism and Slavophilism, splitting the emerging intelligentsia between the corresponding schools of thought. Both Slavophiles and Westernizers criticized and rejected the existing regime of autocracy and serfdom but had different views of Russia's future and ways to shape it.

Slavophiles Konstantin and Ivan Aksakov, Ivan and Pyot Kireevsky, Aleksey Khomiakov and other adepts of this movement (Khomyakov 2005) were committed to the ideas of cultural relativism and Orthodoxy and disapproved the radical transformations under Peter the Great, which, in their opinion, violated the natural evolutionary development of Russia. They did not accept the West-European path of development and gave reasons for the possibility of Russia's own path, in any and every way emphasizing the religious, historical, cultural and national originality of Russia.

At the same time, they strongly supported the development of a modern economic and financial system in the country, based on the established traditional forms of spiritual life and economy, the most important of which, in their opinion, were the Orthodoxy and sobornost ("organic togetherness"), as well as obshchina ("village community") and artel ("cooperative association").

"Slavophiles laid the foundation for the development of the original Russian philosophy based on Orthodox religiosity rather than Western rationalism. As opposed to Western individualism and disunity, they propagated the idea of sobornost as a value belonging not to an individual but to a collective of people united by one love, from which the sobornostic consciousness is born. Considering the concept of freedom, Slavophiles emphasized its conditionality on inner motives and intentions and denied its dependence on external circumstances. People should be guided in their actions and deeds by their conscience and spiritual rather than material interests. The Slavophile ideas were further developed in the ideology of Pochvennichestvo, one of the leading representatives of which was F.M. Dostoevsky." (Bagnovskaya 2004, 34-35). Similar views and ideas were laid in the basis of the culturologic concept of local civilizations and types of cultures developed by eminent Russian sociologist N.Ya. Danilevsky (Danilevsky 2003). Of course, considering the Orthodox sobornost as the core of the national spiritual life, one should not narrow the scope of this phenomenon only to Slavophile conceptions. Sobornost is a global phenomenon of the Russian life, reflecting the genetic mentality of the Russian people.

Methodological framework

The methodological framework for this article is based on the principles of historicism and systemic and comparative analysis. The historical and systemic approach, providing for a comprehensive study of phenomena in their development, was applied to the retrospective and comparative historical research into such phenomenon of the Russian socio-cultural life as sobornost.

Other methods used in the study: the genetic method, used to determine the essence of the studied phenomenon; and the typological method, allowing us to consider sobornost as a socio-cultural phenomenon with its specific typological features.

Overview of recent research and publications

In the conditions of the global geopolitical confrontation, "many scholars and public figures today view sobornost as a resource- mobilization mechanism for the future social and political development of

Russia. It is considered to be 'a genetic code of the Russian society' and foundation for the new Russian statehood" (Likhachev 2004). Sobornost is regarded to be an energy resource for the Russian culture and a foothold for raising the people's spirit and ensuring further development of the country. Such ideas were expressed in works by S.S. Averintsev (2003), A.F. Zamaleev (2015), A.L. Kazin (1998), N.N. Moiseev (1997; 2000), A.S. Panarin (2002), V.N. Sagatovsky (1994), E.S. Troitsky (2010), L.E. Shaposhnikov (2016), and S.S. Khoruzhy (2005).

Main results

One of the main virtues of any nation is the ability to carry through the ages and preserve important socio-cultural traditions and spiritual bonds, especially significant for this particular nation. One of such bonds uniting the Russian people is sobornost, which we regard as a socio-cultural phenomenon of the Russian life, manifesting itself in various spheres: spiritual, religious, political and economic.

We consider sobornost, born as a philosophical and theological category related to the religious doctrines of the Orthodox Church, as an axiological resource for uniting the nation in the current situation in the Russian society and state structures, as one of the foundations for the revival of a number of moral values of the Russian society, such as patriotism, solidarity, optimism, diligence, social justice and decency, and as a significant phenomenon of the Russian culture.

Discussion

In the 20th century one of the concepts of sobornost in a broad sense was studied by a famous scientist, RAS academician N.N. Moiseev. In his works, N.N. Moiseev gave careful though to the main idea of sobornost as the unity of free people. Treating the freedom in the pragmatic sense, the scientist wrote, "We need collectivism – otherwise we would not survive in our harsh conditions, with a short growing season (a hundred days shorter than in France). Our vast plains gave birth to a different worldview. But the Russian people have never lacked energy and entrepreneurial spirit" (Moiseev 2000, 8).

Indeed, the traditional system of values of the Russian people included the perception of diligence as a virtue and mutual assistance and collectivism – as natural and integral features of the social organization characterised by the production processes taking place mainly in the rural community or industrial cooperative (artel). At the same time, following the high moral and ethical principles of Christianity, the social morality put such personal qualities as honesty, decency, asceticism, courage and valour, as well as initiative and enterprise, on a pedestal as high virtues.

It should be emphasized that the Orthodox culture in the 14th-16th centuries was greatly influenced by the ideology of hesychasm, which laid the basis for the Orthodox asceticism but was also following principles of the comprehensive (spiritual, mental and physical) human perfection.

One of the most significant and striking features of the Russian culture is the selfless devotion to Motherland. Throughout its centuries-old history, Russia has multiplied glory and strengthened the state power through supporting the cultural value of a sovereign powerful state. This glorious tradition must be preserved and developed in every way in today's Russia.

In the contemporary Russian social and philosophical thought, the tradition of providing a rationale for our national mentality and our own path of development was continued by E.S. Troitsky, who paid a special attention to social and cultural roots of sobornost rather than its religious origin, indicating that this phenomenon existed in the rural community, Russian artel and the entire family and economic lifestyle of the Russian people (Troitsky 2010). The conception developed by E.S. Troitsky is criticized by I.S. Kolesova, who considers that "the thinker actually identifies sobornost with collectivism", but "a person in a collective is losing uniqueness and, entering into agreement with others, accepts certain rules that are essentially coercive. As a result, the personality becomes a means to realize the goals of the collective." (Kolesova 2014).

Undoubtedly, the essential meanings of sobornost and collectivism do not coincide, but they are not completely opposite. The sobornostic interaction of people does not imply confrontation, but it is not a primitive unanimity, as it promotes free discussion and exchange of thoughts and ideas. In the life based on sobornost, the personality is elevated to the highest sobornostic unity without losing individuality. It is not accidental that His Holiness Patriarch Kirill of Moscow and All Russia, during his enthronement at the

Cathedral of Christ the Saviour, emphasized the importance of dialogue. Disclosing the meaning of sobornost, His Holiness said, "A strong personality, a close-knit family with many children and the united society – these are the consequences of the way of thinking and the way of life that stem from a sincere and deep faith" (Yakovleva 2009).

The Orthodox faith and Orthodox traditions played¬ an extremely important role in our country's history. They united the Russian people in the struggle for liberation from the Golden Horde dependence. Protection of "holy¬ Russia" from "filthy" pagans was a matter of honour and glory for the population of Russian principalities.

The period of the Tsardom of Muscovy (16th-17th cent.) was the time of strengthening and flourishing of Orthodoxy, which became the spiritual core of the state and the rising nation. The Orthodoxy symbolised the spiritual¬ identity of the Russian people and was regarded as an inexhaustible source of strength, power and unity for the state.

At some point, Byzantium and Rome deviated from the spirit of true Christianity (Orthodoxy) and were defeated. Moscow's steadfast commitment to Orthodoxy was a guarantee of its political greatness and strength, and the philosophy of "Moscow the Third Rome", formulated by the monk Filofei of Pskov in his address to Vasily III, served as the ideological foundation for the Tsardom of Muscovy.

Orthodoxy is characterized by considerable tolerance for other faiths. As early as the beginning of the 16the century, the Boyar Duma permitted to¬ construct a Protestant church in Moscow. Later, also under the permit of the Boyar Duma, a Catholic church was built near the tsar's palace. In the 19th century there were Protestant, Catholic¬ and Armenian churches in Saint Petersburg, which was the capital of the Russian Empire. In the beginning of the 20th century, a Buddhist temple and a Moslem mosque were also built in the northern capital of Russia.

It is undoubtedly the idea of sobornost that underlies such a religious tolerance of Orthodoxy. N.O. Lossky wrote, "The sobornostic unity of the different peoples implies the possibility of interpenetration of national cultures¬. Just as the fragrance of the lily of the valley, the blue light and harmonious sounds fill the same space and blend together without losing their distinctness, so the creations of various national cultures can interpenetrate and form a higher unity" (Lossky 1957).

Russia has been a multi-ethnic country since its inception. The adjoining territories have also been multi-ethnic. It is not a mere coincidence that "The Tale of Bygone Years – the first great historical work dating back to the 11th century – begins the story of Rus with a description of its neighbours and the river courses with indication of the peoples that can be reached by the waterways" (Likhachev 2004). The Russian culture ¬developed in the conditions of this multi-ethnicity. "Russia served as a giant bridge between the peoples. And it was primarily a bridge connecting cultures" (Lossky 1957). However, we should understand that this bridge, facilitating communication, at the same time also facilitates enmity, shaping some specific features of the national character.

Therefore, the contemporary Russian society, solving many complex issues of development, should pay a special attention to the unity of the nation and strengthening the systemic role of the Russian people in the state, preservation of national autonomies and the equality of rights of all citizens, regardless of their ethnicity. Only this approach would allow preserving the lasting peace and mutually beneficial agreement between different ethnic groups. We should also advocate for the Slavic unity and urge not to forget about our compatriots living today outside Russia.

The theme of sobornost becomes particularly relevant nowadays, when Russia faces sanctions and is under unprecedented pressure from the Western world. Globalization is a combination of three processes: technology, economics and politics. It has been a flourishing field of research in recent years, with a lot of publications. There are different opinions regarding this phenomenon, but we should view it from a quite different perspective. The most important is the key idea that should be steadily implemented, without losing sight of the complicated, sometimes contradictory, interaction of the globalization issues and the interests of our country.

In our opinion, at the current stage of Russia's development the idea of sobornost should express itself in the desire to organise our country in such a way that it would not only be powerful politico-military entity, which is undoubtedly the foundation for the true sovereignty, but would also be comfortable for the

majority of citizens and attractive for our distant and close neighbours. Moreover, the care of Russian national interests should become the main content and meaning of all activities of governmental structures and the main idea of public life.

Disregard of the national interests by the authorities, pursuit of illusory goals, reforms after the projects of "experts", who, as a rule, do not act in the interests of Russia, – these are the steps on the false path to the collapse of a truly national idea of development and prosperity.

During the difficult period of crisis, we all should seek to find a way out and give adequate response to the challenges of our time, following the behests of the ideologists of Russian sobornost. President of the Russian Federation V.V. Putin in his Address to the Federal Assembly of April 26, 2007, stated that "[t]he spiritual unity of the people and the moral values that unite us are just as important a factor for development as political and economic stability" and that "a society can set and achieve ambitious national goals only if it has a common system of moral guidelines[,] <...> if we maintain respect <...> for our unique cultural values, for the memory of our forebears and for each page of our country's history" (Putin 2007).

In fact, the much needed unity of the Russian citizens cannot be achieved without relying on the civilizational heritage of Russia and the principles of social justice and national equality.

Conclusion

As a conclusion, we can state that sobornost, as a significant phenomenon of the Russian thought and the Russian life, is a religious, theological and philosophical concept, meaning the common activity and consolidation of free citizens on the basis of Christian love and patriotism. Sobornost has deep Orthodox, as well as social and cultural roots, based on communal mutual assistance and unity, especially in the period of external threats and dangers, which have been abound in our history.

This is good news that now, when Russia faces sanctions, our authorities have begun making the long-awaited effort to stimulate the development of domestic industry and agriculture, so there is hope that we can finally limit our dependence on the oil pipe and the export of non-renewable natural resources and can carry out technological modernization. The ordeals endured by our country should unite the nation on the path of modernization and development. This is a true national idea of our time. No wonder the Russian proverb says: Soborom i cherta poborem! ("Together we'll overcome even the devil").

Recommendations Materials of this article can be of particular interest for those who study or just would like to know more about the Russian culture, the specific features of its formation and development, including the phenomenon of sobornost, and their manifestations at different stages of the development of Russia.

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The Phenomenon of Higher Education in Russia: History and Modernity

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Abstract

the article deals with the historical processes of preparing students in high school. The actuality of the research stems from the need to form a new structure of educational activity of HEIs on the basis of historical experience and based on modern teaching methods. In this regard, the purpose of this work is the study of historical processes, the application of new teaching methods, the identification of possible ways of modernization of the educational process, the involvement of students in active learning process. The main research methods are the method of scientific abstraction method of formalization and structural-functional method, development of innovative thinking and action. A brief analysis of the domestic and foreign literature. The main results of the study: new approaches in the educational process of preparation of bachelors. Define "jedjutejnment" and its place in the domestic and foreign educational systems.

The materials of the article are of practical value for the organization of educational and methodological work in the university, faculty, researchers, graduate students and students.

Keywords: historical experience,education, game, edutainment, training.

Introduction

The current state and development of higher education and, in particular, university education in the Russian Federation characterize rather serious and complex stage of its further development and improvement. In this regard, it is necessary to know and take into account the historical experience of Russian higher education that has accumulated over its long history of formation and development in the current context.

Next critical stage in the history of Russia requires significant efforts and investments in the modernization of modern Russian higher education. At the same time, these expenses can be significantly reduced both in time and in financial costs, if we take advantage of the positive experience that has determined the development of higher education in Russia in the latter half of the XIX century. The creative use of this historical experience in the current context is very important for the further transformations of higher education in modern Russia.

Interconnection of two stages in the development and improvement of higher education in Russia can be traced in the books of famous Russian scientist V. I. Zhukova [6,7] and others who pointed out that the system of higher education in Russia in the latter half of the XIX century had a set of features, which can be realized in modern Russia in one form or another.

First, the system of higher educational institutions was influenced by all the contradictions that had accumulated in this period in Russia. First of all, new economic and social relations, formed in the conditions of rapid industrial growth and capitalization of the economy, underwent a conservative influence of the state structure, i.e. class division and aristocratic privileges. This is largely responsible for the fact that the higher school of Russia helped to strengthen the autocratic power and class privileges on the one hand, and contributed to strengthening of the monarchy, forming educated specialists, devoting themselves to the new opportunities that appeared after the abolition of serfdom. Second, by the end of the XIX century, the need for a more flexible response of the higher school not only to the political needs of the monarchy, but also to

the emerging needs of the economy that was overcoming the feudal system and required the recruitment of specialists of a different level of professional qualifications was realized at the societal and ministerial levels.

Thus, in the era of Peter and Catherine, as well as in the XIX century, there is a clear influence of the national and state idea on education, its goals, content and the type of specialists in Russian history.

This example gives sufficiently detailed description of the characteristic features of all the contradictions of that period. Many great people of the Russian Empire well realized and understood it. In the early 70-ies of the XIX century, the great Russian writer I.A. Goncharov wrote: "At the present time, the university issue has become a priority along with the crucial issues of Russian life. This is our global issue in terms of the importance of university education for us" [4].

Almost a hundred and fifty years have passed since then, and the university issue remains the most important problem in the life of developed countries, which are striving for leadership, accumulating their knowledge. Science and education create national wealth of the country and act as one of the values without which it is impossible to develop modern society and form a fully rounded person.

In other words, "everything useful, progressive and interesting that was accumulated by the Russian higher school in the XIX century should be used properly today in the process of reforming the national higher school" [24], especially since these periods in the history of Russia are similar in many socio-economic situations.

Material and methods

The article presents a brief analysis of domestic and foreign literature. The method of scientific abstraction, the method of formalization and the structural-functional method of innovative thinking and activity method development have been applied.

The theoretical and methodological background to writing the article has been the principles of historicism, system and comparative analysis. The principle of historicism, the systemic approach, involving the consideration of phenomena in their development in a complex manner, have been applied taking into account the retrospective, comparative historical approaches to such phenomenon as the phenomenon of higher education in Russia. The historical-genetic method on the basis of which the essential content of the studied phenomenon is determined; historical-typological method that allows considering education as a socio-cultural phenomenon, which has its own typological features have also been used.

Actual scientific researches and issues analysis

The article gives a historical survey of Russian education, studies the works by Gusev A. [5], Rozhdestvensky S. [19], Tolstoy D. [23] Goncharov I. [4], Nekrasov P. [18], the materials of the Ministry of Education over the period of 1898 -1901 [11], uses the materials of the dissertation of Kharlamova T. [24], as well as the articles of Belyaeva O., [1] Zelenova A., [8] Kopytina T., and Rusinova T. [10] and a number of other authors.

Target Setting

Before starting to analyze specific actions for the development and improvement of higher education in Russia in the latter half of the XIX century, the authors have decided to refer to the report "It's not too late", presented by the special commission to the US government, knowing that many, on whom the future of education in Russia depends, like to refer to foreign experience, as "no man is prophet in his own country" [20].

Despite the fact that the report is addressed to the government and people of the United States, it clearly goes beyond the framework of one state, even such powerful state as the United States. This document is very interesting for any country whose self-assessment and the idea of its niche on the world stage are quite high. Interest is subject not only to the content of the report, by the way, it is extremely deep and versatile, but also to fertile source that it gives when reading it, including ideas for reflection on the state of things in the sphere of education in modern Russia, providing a very humbling experience of decision-making, which our specialists should look closer even after a decade.

But let's return to the events of the latter half of the XIX century in Russia. The starting or turning point of the beginning of the Russian higher school reform is May 13, 1866, "The Day of the publication of the highest rescript of the emperor addressed to the Chairman of the Government of Knyaz Gagarin" [24].

In fact, in this document Alexander II refused "many ideas of the university reform of the 60s, which seemed to him an encroachment" upon "everything that is sacred to us, upon religious beliefs, upon the foundations of family life, upon property rights, upon law obedience and respect for the constituted authorities" [19, 24]. Everything indicated the growing role of the state in the implementation of education reforms and the strengthening of educational policy. These plans were implemented by Tolstoy D., who headed the Ministry of Education from 1866 to 1880. Count Dmitriy Aleksandrovich Tolstoy is a Russian historian and statesman. During Tolstoy's day several higher educational institutions were opened: the University of Warsaw, Historical and Philological Institute in St. Petersburg, Moscow Higher Women's Courses, Tomsk University and several others. He conducted the reform of secondary education by introducing extended hours of mathematics teaching in the curriculum, as well as strengthening the teaching of Latin and Greek languages. Only pupils of classical gymnasiums had the right to enter the university. Former non-classical gymnasiums were transformed into non-classical secondary schools. The famous professor and publicist of the Imperial Moscow University Katkov M. contributed significantly to the preparation of this reform [9]. The main goal of the reform was the development of students' ability to think thoroughly, create a Russian tradition in the teaching of mathematics, classical philology and linguistics. The role of this reform has remained underestimated.

During Tolstoy's day, universities financing increased significantly, but certain studies assess his work negatively. However, there are other opinions, and they are very important, as they belong to contemporaries, who wrote: "... he gave Russia a school, completely adapted to the modern requirements of science and life. All the schools of his time were opened for the rich and for the poor, for noble and common men ... "[23]

DA Tolstoy adhered to strong convictions, was a consistent statesman, highly educated and undoubtedly highly cultured man, qualified scientist who made a well-known contribution to the study of the history of Russian education. His "acting can be traced along the principal directions, as they were set by the minister:

- Electivity of supervisor functions in universities;
- Electivity of pedagogic staff;
- Organization. Discipline of the students and so on". [23]

As it seemed to us, these three directions could contribute to the reform of higher education in modern conditions. Because they involve the foundations of the entire educational system, which has relied and will rely on three "whales": the electivity of management and teaching staff and the organization of the educational process, where the main consumers are the students.

Another Minister of Education, Nikolai Pavlovich Bogolepov (1898-1901), according to the words of Professor Nekrasov P., "was the most consistent, passionate and true progressist, not only according to his aspirations, but also according to his actions..." [18]. As the main task of his activity, Bogolepov considered not the reorganization and creation of new posts, but the improvement of teaching. "The task of the university is to teach those knowledge and techniques through which a student can later become a scientist, judge, lawyer, administrator, etc., and develop intellectual power, i.e. to teach, so that the student is not afraid to work intellectually (thought boldness)" [2].

In our opinion, the success of reforms to improve higher education, regardless of the time and place of their implementation, depends primarily on the following three components: the electivity of management and teaching staff, as well as order and discipline of the students. In the 90-s of the XX century, all three directions were forgotten under the guise of reforms. In practice, the state abandoned the management of higher education. Many universities announced a free attendance of classes, etc. Without taking into account the real needs of the state, commercial universities began to be created, hundreds of non-profile departments appeared in educational institutions, which focused on training lawyers, economists, political scientists, etc. Certainly, the need for this category of specialists is necessary, but the quantity and quality of training of this category of specialists has been spontaneous, caused by the absence of state regulation.

It is known that universities have always been the centers of initiation in Russia. Public lectures of outstanding professors have been held here, which have been attended by hundreds of people of various occupations. Unfortunately, we have to state that there is no such practice to date. There are no new names, no new ideas. And endless scientific conferences are held as a carbon copy regardless of the place and time of their carrying. We have seen and heard these "men of science" for decades. In this regard, we can recall the galaxy of outstanding Russian scientists who taught at universities in the latter half of the XIX century, among them are A.M. Butlerov, D.I. Mendeleev, K.N. Bestuzhev-Ryumin, N.V. Sklifosofsky, F.F. Petrushevsky, S.M. Soloviev, A.D. Granovsky, A.O. Kovalevsky, I.M. Sechenov, F.F. Fortunatov, A.N. Veselovsky, P.N. Yablochkov, N.E. Zhukovsky, S.A. Chaplygin and hundreds of other world scientists.

It is also necessary to refer to the experience of educational work in universities with first-year students, which are now being recollected only after some unpleasant events.

There is almost no systematic educational work among young people. Especially this situation causes anxiety in large cities, where thousands of boys and girls come to study and work every year from all over Russia.

In this context, the approach of the Ministry of Education of Russia, which held an enlarged meeting with the participation of trustees of educational districts and rectors of higher educational institutions in June 1899, is interesting. Formally, it was intended to promote "the establishment of the correct course of studies and improving the life of students". In this case, according to the authors, "life" means educational process.

Here is how it is described in the official source [11]. "Among the most desirable measures to improve higher education institutions in general, and universities in particular, the meeting included the arrangement of student hostels and the broad introduction of practical classes with students: with proper formulation of the problem, both the first and the second should promote the philanthropic convergence of students with their professors and teachers on the basis of scientific studies and contribute to the successful development of the latter. Regardless of this, the arrangement of hostels, which are mainly for nonresident students, is of special importance for newly entering young people, without mentioning the normal living conditions that preserve health, the hostel save these young men from obstinate loneliness and complete abandonment of their stay in a strange and big city, where they usually do not have any relatives or acquaintances, and they protect them from the demoralizing external influences of that unhealthy and multicultural environment in which otherwise they typically get.

It is known that the process of education in higher school is aimed at training personnel for a market economy. This involves providing students with a certain range of knowledge, skills and abilities related to their specialization. Today for the full development of the student's personality, an innovative approach should be provided that includes the ability to work in a team, the development of alternate thinking abilities, and a high level of creativity. At the present time, in the system of higher education, one of the elements that improves its effectiveness should be a training game. Its appeal to the student lies in the gaming experience itself. Its effectiveness also consists in it. The training game involves the fusion of play activity and training. It can be assessed as a complex system of activities that arises during the fusion of the game and training. An integral part of this system is the educational process, during which students acquire knowledge, skills and abilities, as well as professional strength. Therefore, the game performs educational, learning, communicative and entertainment functions. [1] In substance, game is a multidimensional and complex phenomenon. Today there is no uniform classification of games. According to the analysis, they are divided into spatiotemporal and emotionally-experienced, business, role, training games, creative games. A fairly extensive group of methods and technology for organizing the educational process in the form of various games is combined into the concept of "gaming technologies".

Game technologies are necessary for the development of creative abilities, the formation of skills, the assimilation of the new and the reinforcement of the material learnt. "Business games" are used s developing gaming technologies. [21] Simulation, role, business, training, creative games, etc. are used in the educational process. [22] The distinctive feature of the educational game is a clearly stated goal with an educational and cognitive focus. The essential condition is that the game should be incentive. In the absence of an incentive, the efficiency and effectiveness of the game are significantly reduced [8].

Specifically, the educational games, which are used in the pedagogical practice of Higher Educational Institutions, refers to the active methods of teaching. This is due to the fact that, as a rule, the productive-transformational activity of students predominates in them.

Relation of theoretical knowledge with practical activities, acquisition of work skills in the specialty;

- many modalities of games that differ from the standard, the occurrence of which is possible in the future practice specialist;
- the need to make decisions in a conditional situation;
- a large number of options and alternative solutions, of which the student can choose the most rational;
- visibility of the consequences of decisions;
- compressed time frame, the possibility of repeated occurrence of situations;
- ample opportunities for individual learning.

The game develops the creative search thinking of students in relation to the performance of their future duties and functions. During the game, it is possible to cancel the decision, which was unsuccessful, go back and make another decision to define its pros and cons in comparison with the already tried out. In this case, the same game situation can be played several times, in order to enable students to try different roles and offer their solutions as such. [13]

Educational games develop and consolidate the students' skills of independent work, the ability to think professionally, solve problems and manage the team, make decisions and organize their implementation. During the game, the students develop the following skills and abilities:

- collect and analyze information necessary for decision-making;
- decision-making in conditions of incomplete or insufficiently reliable information, evaluation of the effectiveness of decisions made;
- analysis of a certain type of tasks;
- establishing links between various spheres of future professional activities;
- work in a team, the development of collegial solutions using the methods of group thinking;
- abstract and figurative thinking as the basis for effective creative use of the system approach to the study of processes and phenomena. [12]

Like any other method, the game as a learning task is multifunctional and can be used to form and develop various characteristics and qualities of a person: professional orientation, mental independence, knowledge and skills in one or another field of activities, making creative solutions of cognitive and professional tasks, organizational and communicative qualities, evaluation and self-esteem, etc. Among the functions of gaming learning can be distinguished: the formation of skills, knowledge and thinking; communicative qualities of the student. Also, the diagnostic, motivational, modeling, organizational and creative functions are implemented.

By taking part in the games, the students are trained to solve professional problems in difficult, close to real conditions, undergo a kind of psychological hardening.

Currently, a significant arsenal of various game teaching methods has been accumulated in higher education. The game as a method of teaching differs not only in the activity of the participants, but also in the intellectual and mental stress of students, in comparison with traditional methods. When developing, planning and conducting the game sessions, it is necessary to clearly understand and take into account their features.

The expediency of game development must be aligned with the scope of discipline, the objectives and problems to be solved when studying it, and contribution to the professional training of students.

When evaluating games as a method of teaching, one should keep in mind a number of circumstances:

- games in comparison to other teaching methods have one huge advantage: possibility to integrate the acquired knowledge with respect to the chosen profession.
- Once developed a good game can be used for many years as an effective learning tool for several generations of students. Of course, the game content to be updated in accordance with changes in the content of science itself.

- game teaching methods, by which students master the professional activities and acquire knowledge without any direct intervention or assistance of the teacher (the latter remains as if behind the scenes), are the powerful means of awakening interest in the content of this activities. In terms of increasing the share of student's independent work, the games are an effective form of its implementation.

- it is difficult to overestimate the feasibility of acquiring skills to make responsible decisions in an atmosphere of conditional practice. Training in the game can prevent the real errors that arise in future professionals, when moving into the independent professional activities.

- in the game, the learning process can be successfully combined with the research objectives, thus visually demonstrating the research method in action to the learners. Therefore, when developing the game plan, a number of issues (problems) to be studied shall be taken into account, as well as you should separate a group of game players, whose responsibility includes timing and recording of individual results.

- the acquisition of experience in the complex formulation of the problem, the harmonization of individual priorities in the group selection of solutions and its implementation is invaluable to the future specialist

- the game promotes the development of group thinking, the ability to act as part of the team, seeking to develop a sound common solution.

- the games allow you to try out new forms and rules, management structures, standards and technology, checking them as on a test stand, the role of which is acted by the game itself. [15]

The games can generate a wide range of skills, experience and professional qualities of the person. The high efficiency of gaming learning methods is due to significant advantages over traditional ones. Some of them we would like to highlight separately:

- variable time scale: the game allows you to "live faster" or "slower", speed up and slow down the course of events;

- repetition of experience with changing settings (accumulation of skills during training): in the game, one and the same situation can be played several times, approaching its solution each time in a new way;

- possibility to change the scope of coverage, which can significantly reduce the timeframe to search for the fundamental solutions in different conditions. [16]

The decision to include games in the curriculum shall be made at the stage of general schedule development for the training in the specialty. At the final stage of training, it is desirable to conduct the complex business games covering a number of disciplines taught by several departments, and involving, if possible, students of different specialties.

Information support for educational games includes a number of items:

- description of a situation laid in the gaming activity;

- rules of games and criteria for evaluating the results of game session, taking into account their complexity and significance;

- documents for planning and organizing a game session;

- regulatory and reference data.

Game situations are the basis of the game session program and usually include its detailed description.

An important component of the information support for the game is the documentation, which includes the initial and planned documents issued to the participants for working out and reflecting the decisions made by them; finally, the report documents that set out the results of these decisions. Such results in games are most often identified by expert assessments, which are provided by a group of the best trained students or teachers who conduct such sessions.

Regulatory and reference data are usually presented by a special set of documents, which are used by participants in the game sessions. The regulations may be permanent, i.e. unchanged for the duration of the game or constant only during a particular stage, or may take a certain value (with regard to the established probabilities) of the range of possible values. The values of some regulations may vary depending on the decisions made by participants in the session.

The advanced information support allows you to create a game model, which is the basis of the game session.

The success of games as a teaching method depends much more than traditional on the logistic support, which includes the audiences specially equipped for the games, information display tools, controls, simulators, computers, and so on. Of course, the composition of material and technical support and its placement depend in a decisive degree on the type of game session, the number of participants and many other factors.

The experience of the leading universities of our country shows that the success of game sessions more depends on stimulating and evaluating the students' activities.

Evaluation of the participants' activities always consists of an assessment of the situation analysis, the developed and made decision, as well as its implementation in terms prescribed by regulations.

The analysis of each individual situation is a training not so much in the choice of decisions, as sometimes it is considered, as in the analysis, which is the threshold of their adoption. In some cases, the analysis is more important than the decision itself, but for many students the latter is the most difficult. [16]

The pedagogical practice of using gaming methods of teaching in high schools testifies to the expediency of constructing an incentive system on the basis of arbitration.

Arbitration of a business game is a complex of continuous control measures carried out by several permanent arbitration groups. The rating system of different types of audience activity during the game is developed in advance and issued to the arbitration group for guidance.

The final score of each game player in points is determined as the sum of individual ratings (including penalty points). An approximate system of assessing the various students' activities during the game.

Restrictions and controlled time, which is given to the game players to solve the tasks, mobilize everyone, thereby increasing the effectiveness of training. The experience of applying arbitration shows that this method successfully manages a number of important didactic and educational tasks, including: an operative and justified assessment of all types of practical activities for the individual groups and each participant in the game, as well as the degree of their preparedness for the performance of corresponding functional duties;

An important issue is the objective assessment of the individual performance of each player. After all, in a number of cases the game's result is not related to the activities of a particular student. This problem can only be solved through active participation of teacher-leaders, who can in this case get a better idea of the students' abilities and use these conclusions to evaluate the results.

An essential role in increasing the effectiveness of the game process has the final stage of the game, especially the discussion of its results. The experience of several universities shows that, if after the game the discussion was not conducted, the skills acquired during the game are quickly lost. Therefore, after the result discussion in the form of game, revealing the reasons for obtaining one or another result, is just as important as the game itself.

Discussion of the results is most expediently conducted by the conference method, so that everyone has the opportunity to express their opinion on the methodological necessity and results of such an activity.

The conference ends with the speech of the leader, who not only sums up the overall results, but also assesses the performance of each participant in the game. [3]

Today, in a series of educational games there has appeared a new direction - edutainment (*derived from the English "education" and "entertainment"*). For the sphere of higher education, edutainment is a new round of searching for ways to get more information in the learning process, the means of increasing the cognitive activities of students (learning through entertainment).

In the domestic literature, the term "edutainment" is defined as "a digital content that connects educational and entertainment elements" and at the same time ensures that the audience is informed in "the most facilitated analysis of events". [14] The concept of "learning as entertainment" is an effective way of understanding the World in a playful form, because through entertainment, not only the awareness is generated about a particular subject, but also an emotional connection is established between the learner and the subject being studied. Edutainment - a learning process in the format of entertainment, cognitive events in an informal atmosphere - is a product of technology synthesis, when there is a "consistent sequential mastering of transferred methodologies and experience of creative activities by the student, and on this basis the formation of his own creative experience: knowledge, skills and abilities". This approach contributes to

the active involvement of students in the educational process, the formation and development of creative personality.

The main thing in the edutainment is that it helps diversify the acquiring of knowledge by entertainment, that is, the theory is mixed with educational goals and means and vital values, and enables "the representation of experience and entertainment through creation". [1] However, it covers only a small part of the educational process, and only helps to diversify training without requiring transformation of the traditional learning model. Edutainment is an effective way to obtain more information by a large number of people in a short period of time, at what the presentation of potentially "terrible" topics occurs in the frivolous manner.

The basic communicative theories, on which the edutainment is built up, may include:

• Petty's theory of persuasion, since the psychological components (improvisation, living, relaxation, reflection) affect the person's response to the message, and the persuasiveness degree of this message depends on the number and quality of arguments and the form of their reporting [26].

• Rogers' diffusion theory, according to which any new idea never covers the entire group of people for a single period of time, but gradually seeps through the various communication channels, passing through certain stages (attention, interest, evaluation, acceptance, confirmation);

Edutainment is also based on such pedagogical principles as:

• principle of the connection between theory and practice, since properly delivered instruction and education follows from the life itself and is inseparably associated with it both through the source of knowledge and the result itself;

• principle of consistency, since a person only has information and knowledge when he has a system of clearly interrelated concepts, the sequence of which has been determined by the internal logic of educational content and the cognitive abilities of students themselves;

• principle of accessibility, since the accessibility of training is determined by the educational process organization, the training methods used, etc.

To remove the learning difficulties, the teacher must be an expert in his field, masterfully possess the modern technologies in teaching and attract non-traditional teaching technology, such as a game, relying on positive personal experience - living the certain life situations [10]. However, in order to successfully transfer, receive and assimilate information, it is necessary: to encourage students to pay their attention to the phenomenon under study; to cause their interest; to encourage them to participate actively in the process of acquiring knowledge; during the actual process of acquiring knowledge, it is necessary to give students pleasure, to completely capture their minds, and to distract them from outside thoughts or experiences; to make the strongly interested students to give themselves up entirely to the activity or idea. [14]

And still, the edutainment is not able to solve all the issues of fundamental education, and this is an opportunity to widen the student's horizons, satisfy his curiosity and interest by his attracting, training, entertainment and enthusiasm through a variety of means of instruction and taking into account the specific psychological needs of students.

Results

The relevance of the ideas expressed more than one hundred years ago raise no doubt, for it is only in the qualitative teaching and educational work the system can get highly skilled and cultural professionals who are appreciated all over the world.

The authors believe that the above suggestions and ideas are not indisputable, especially at the beginning of the XXI century, when globalization issues, including in the system of higher education, prevail in the world community. However, we are sure that in the historical conditions of modern Russia, the experience of the development and establishment of a national higher school can and should be in demand. Therefore, for the full and comprehensive development of student's personality, the article provides the innovative approach to the proposed tasks implementation. A new direction in a series of educational games is announced - Edutainment, where the game performs the training, educational, communicative, and entertainment functions. Edutainment This is a modern pedagogical innovation that is based on visual material, narration, modern psychological technology, game format, modern information and

communication technologies, more informative and less didactic teaching methods, and the purpose of which is to facilitate the analysis of events as much as possible, to maintain an emotional connection with the educand, and to attract and hold the attention of students for a long term. It turns out that the main purpose of edutainment is the transfer of knowledge, attitudes, experience or skills.

Discussion

The study is a continuation of the work of Russian scientists who conducted an analysis of historical facts on the development, modification, transformation, and improvement of higher education in Russia [6,7] Many articles, monographs, textbooks on the history of public education and the creation of a modern system of higher education are published in the central and regional magazines, press and foreign publications [17, 25]. At all times, the quality education has received a lot of attention, and since 2009 it has been increased both in Russia and all over the world. This article contributes to the discussion of innovative ideas in the field of education.

Conclusion

The materials of this scientific article are of practical value for the world scientific community, recommended for use in the educational process, by the multi-skilled pedagogical workers, as well as doctoral candidates, and students.

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Modification of the Ensemble Method for Generalising IPCC Forecasts to Bring Them Into Probabilistic Representation

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Abstract

A method has been developed for forming the information base of agroclimatic risk management based on the global climate change forecasts, published and recommended by the Intergovernmental Panel on Climate Change (IPCC). A possibility has been shown of applying mathematics of fuzzy sets for transforming deterministic IPCC forecasts to probability representation. Statistical characteristics have been presented of densities of the forecasted air temperatures and precipitation distributions, calculated using an ensemble method, modified by the authors. A description is given of the results of utilising fuzzy sets to find distributions of the transformed deterministic IPCC forecasts in one of the agricultural territories of Russia.
Keywords: agroclimatic risk, management, temperature and precipitation forecasts, fuzzy sets, statistical characteristics, information base.

Introduction

In conditions of the observed climate changes, to have a sustainable and competitive production of the primary agricultural product, to earn income and reduce potential losses, business structures are forced to make strategic and tactical decisions in view of unstable agricultural production (Zhukovskiy et. al, 1984; Zhukovskiy, Uskov, 1984; Adapting to Climate Change, 1996). Studying the essence and subject matter of agroclimatic risk is therefore of particular relevance. There are multiple interpretations and definitions of the "risk" category (Zhuchenko, 1983; Kobysheva, 2015; Plyuschikov, 2010; J.T. Houghton et al., 1995), with several common distinguishing attributes therein: risk is directly related to the decision-making process; decisions are chosen in conditions of uncertainty; each alternative solution has a certain probability; risk is linked to the possibility of incurring losses or damages. The main types of risks in agriculture are: natural risks (variability of weather and climatic conditions and hazardous agrometeorological phenomena); environmental risks (the conditions, critical for the growth and development of plants in their habitats); agroecological risks; agronomic risks (technology-related, attributable to completeness and timeliness of performing technological operations in the fields and crops); economic risks; no authentic information about risk factors and current state of the management object (Kayumov, 1973).

The category of risk constitutes a theoretical basis for assessing climate changes effects for agriculture. Agroclimatic risk for agriculture implies, first, probability of seasonal (over the period of vegetation) lack or excess number of climatic factors of heat and water availability of agricultural plants, and, second, making agronomic decisions, which do not guarantee achievement of stated objectives in conditions of unstable local agro-climates. There are extremely low or, vice versa, high values of agroclimatic indicators of agricultural crop productivity factors that accompany the observed growing instability of global and local climates (Kasimov, Kislov, 2011; Kislov, 2011; Sirotenko, 2003).

Effective risk management involves anticipation (forecasting) of potential adverse effects and planning measures to mitigate them (Trenbat, 1974; Uskov, Zhukovskiy, 1985). A possibility of managing agroclimatic risks exists since there is both subjective, and objective component, namely, factors of occurrence of risky situations (Ivanov, 2009). The adequacy (completeness) of information support principally specifies the degree, to which risk management is successful.

When forming the information base to assess agroclimatic risks based on the data of model forecasts of changes in air temperature and precipitation parameters, recommended and published by IPCC, two

problems arise: selection of a model with the maximum degree of forecast correctness (adequacy), and bringing deterministic data of temperature and precipitation forecasts into probabilistic representation.

The first problem shall be solved by retrospective calculations on all the available models of global atmosphere and ocean circulation and comparison between the calculation data and the formerly observed temperatures and precipitation, and through comparing and ranking the respective deviations (Menzhulin, 2011; Menzhulin, Peterson, Shamshurina, 2009). To evaluate the possibilities and limitations of the utilised models, the degrees of uncertainty and adequacy of climate models have been verified by historical data (Kiktev, 2011). Adequacies of forecasts have been estimated by the accuracy of the models' reproducing global climate variations in history. The assessments made based on forecasts by the regression models of the observed trends of changes in precipitation and temperatures may also be placed in this category of studies (Kislov, 2011; Moran G.M., Moran M.D., 1997), likewise the works, where spatial-temporal analogues of paleoclimatic reconstructions of the past warm epochs are utilised (Sirotenko, Pavlova, 2003).

The data of ensemble forecasts have a certain degree of adequacy (Assessment Report, 2008; Kasimov, Kislov, 2011; Climate Change 2001. The Scientific Basis, 2001; Lamb H.H., 1996; Kubasch, 2001). Concurrent computations using several models with identical external effect are commonly referred to as the ensemble ones. Ensembles composed of computations using one and the same model, however, with various initial conditions, characterise the uncertainty associated with the climatic variability inherent in this model (Bondarenko, et. al., 1982). Multi-model ensembles compiled from calculations that involved independent models, characterise uncertainty, attributable to inter-model differences.

To date, ensembles, including multi-model ones, have a wide application in forecasting. It has been shown (Kiktev, 2011), that the methodology for assessing uncertainty in the climate change tendencies using bootstrap technique can be generalised in case of co-ensembles. The results of the conducted analyses have demonstrated (Meleshko, et. al., 2004) in a generalised sense that: multi-model ensemble averaging of annual extreme indices, reproduced by the individual models of climatology fields, contributed to improvement of the results; ensemble averaging reduces the influence of climatic noise and allows to obtain more efficient assessments of long-period climate changes; when temporal trend fields are reproduced in temperature indices, all the examined models demonstrate to one extent or another only the desired signal, however, for the indices that characterise precipitation extremes, no significant similarity between reproduced and actual trend fields has been found; when reproducing global fields of multiyear average and historical trends in extremum characteristics for temperature and precipitation, neither of the examined models is the "best". Multi-model ensemble average trend fields need not be characterised as more successful than the fields of trends reproduced by individual ensemble members. Creation of technologies (Zhukov, 2000; Kiryushin, 2000; Fedoseev, 1979) that anticipate the forecasted effects of air temperature and precipitation change based on the locally observed trends of agrometeorological indicators, enables no sustainable agriculture and overcoming negative consequences of hazardous agrometeorological phenomena. Furthermore, the complexity of this methodology lies, first of all, in the necessity to have the information on statistical characteristics of the local trends' series, approximated by some function, and it is impossible to accurately and promptly assess the potential extrapolation of data using this information.

The result of multi-model ensemble averaging is usually the most successful when compared to the observation data. This is due to the fact that systematic errors, inherent in each particular model, are often accidental with respect to the ensemble of models and cancel each other out in the course of averaging.

A super-ensemble implies an ensemble of various models (or an ensemble of versions of one model, which correspond to the various realistic parametrisations of physical processes (Yakushev, et al., 2001)), with each of which ensemble calculations are performed based on different initial states. Such an approach, successfully implemented in the weather forecasts, allows to estimate changes in the functions of probability distribution for various climate parameters, i.e. to obtain much more comprehensive and reliable picture of climate changes as compared to a single computation.

Quantification of uncertainty in assessments of climate changes is so far an area of active research. In the climate simulation literature (Pon'ko, 2006; Budyko, et al., 1991), there are few formalised quantity-related assessments of possibilities of the ensemble approach beyond the limits of seasonal time scales. The present article proposes a new modification of the ensemble method.

The solution to the *second problem* is complicated by the fact that IPCC forecasts are issued to a user in the deterministic form and cannot be directly used for probabilistic computations. A hypothesis is therefore formulated about possible representation of the data of multiple forecasts of air temperature and precipitation parameters as non-correlating with each other opinions of individual independent experts. Nonclassical probabilities of two types appear in the nature of such probabilities: valence and axiological. *Valence probability* expresses the expectancy taking into consideration the availability of actual evidences about the research object, and, if sampling of forecasts is representative in terms of homogeneity of data of the forecasted parameters, the probability is statistical. *Axiological probability* expresses the expectancy of implementation of the forecasted meteorological characteristics considering the context of subjective assessments, computed using each model of atmosphere-ocean circulation in conditions of objective uncertainty, including the choice of greenhouse gas emissions revision. In this case, a concept of randomness is replaced by a concept of expectancy.

The availability of forecast is an indispensable prerequisite for making management decisions. Risk is, by definition, a probabilistic category. The forecast revision should be presented in a probabilistic form and contain characteristics of density of the forecasted agrometeorological parameters probability.

Information base of agroclimatic risk management may be formed based on the model forecasts of global climate change, published and recommended by the Intergovernmental Panel on Climate Change (IPCC). The effectiveness of adaptation measures, developed based on the data from the IPCC forecasts, cannot be defined since their forecast success rate is low when the data are highly scattered (Menzhulin et al., 2011).

Moreover, these forecasts are issued to users only in the deterministic form and need to be brought into probabilistic representation with computations of statistical characteristics of densities of the forecasted agrometeorological parameters' distribution.

Materials and methods

Since the onset of the problem of global climate changes, three directions of climate change assessments have been considered perspective: assessments by the trends of series of actual observations, assessments by the method of paleoclimate analogues, atmosphere-ocean general circulation models (AOGCM) assessments. To date, the first direction is used mostly to monitor the climate changes in progress, the second has remained in a low demand, and climate models have come to the forefront in assessments of forthcoming climate changes.

In terms of management stages, the following stages of management are distinguished: forecasting, preliminary, anticipatory; planned goal-oriented; operational; procedures for developing management decisions: measurement and monitoring of the object state parameters; analysis and diagnostics of the system state; forecast of the probable development of situation in cases of passive and active environmental impact and direct impact on the object of management. During the procedures for diagnosing the state of the managed object, the structure and dynamics of statistical characteristics of probabilistic distributions, indicators of agroclimatic productivity factors are analysed. Here, a stochastic nature of the occurrence of a situation or risk factors, which motivate management, is taken into account.

Problems of management are generally either functional in the existing stable system, or situational, arising due to deteriorating the relationship between environment and adaptive capabilities of biological component in the controllable agroecological system. From the management object position, there are following distinguishing functions: functions reflecting the structure of agroecological system; functions reflecting the place of the object in the management system hierarchy; functions reflecting the composite elements, through which the object can be managed. In terms of management stages, there are following distinguishing agricultural measures: preliminary, goal-oriented, anticipatory, forecasting, planned, operational considering probabilistic nature of occurrence of a risky situation, which motivates management; ultimately, the final management procedures (accounting, analysis, control). Such a classification enables formulation of functional management tasks through combining different functions. Combinations can be of various degrees, up to n-combinations of the object and subject functions. Classification of situational management problems is more complex, since the occurring situations are the result of interactions inside

the object itself (in soil-crop-atmosphere system), when each of the system chains is in the state of constant variability, including soil-formation processes, at all temporal levels of crop growth, development and ripening (Poluektov, 1991, Bondarenko et al., 1992)

A potential source of management situations when managing agro-biological risks is at the interface of climatic factors, specifying the risk, and physiological factors, specifying adaptive capabilities of agro-biological system. Climatic factors and meteorological parameters that define productivity, growth, and development of plant communities, are of probabilistic nature (Zhukovskiy et al., 1984; Zhukovskiy, Uskov, 1984) and with a certain probability density are distributed across different time intervals of vegetation period.

By definition, risk is a probabilistic category. Selecting management decisions, which do not guarantee achievement of the stated objectives, can be called a risk in making management decisions. The degree, to which management of agroclimatic risks is successful, is first defined by the adequacy (completeness) of information meteorological support. The availability of climate forecast is an indispensable prerequisite for developing a decision tree. Management procedures specify that it is imperative to have a forecast. Risk can be assessed only if the forecast data are presented in a probabilistic form, i.e. there are densities of distributions of the forecasted meteorological value and statistical characteristics of these distributions (stochastic averages, mean square deviations, asymmetry, kurtosis, different quartiles).

Here, a probabilistic nature is taken into consideration of the occurrence of meteorological situation or agroclimatic risk factors, which motivate management.

Revisions of forecasts of the two types form the basis of management decisions: forecasts, produced using the models of general atmosphere-ocean circulation; forecasts of changes in meteorological parameters based on the assessments of potential extrapolation of characteristics of the observed trends in these parameters.

Model climate forecasts, published by the Intergovernmental Panel on Climate Change (IPCC), are issued to users only in the form of deterministic data. Agroclimatic risks constitute a probabilistic category, therefore, when utilising them a problem arises of transforming the IPCC forecasts' data into probabilistic representation in the form of density of probabilities' distributions with the computed statistical characteristics of these distributions.

Formation of agroclimatic component of the information base

The information base of developing solutions to manage agroclimatic risks is localised and formed being distributed in space and time. Unstable agrometeorological conditions are a statistical phenomenon. The observed minor local changes in the average values of agrometeorological parameters in conditions of climate change do not considerably alter a climatological potential of cultural cenoses' productivity. At the same time, analysing the statistical structure of probabilistic yield distributions and productivity factors (temperatures and precipitation) is indicative of the observed raised risks of foregone production (Uskov, Uskov, 2014).

A set of methods for calculating risks in a differentiated manner by various agroclimatic factors and complexes of factors is the methodological basis for such assessment.

According to studies (Zhukovskiy et al., 1984), the risks of extreme values of random variable are more exposed to changes than the average values. Hence, for random value with normal pattern of distribution, a change in the average value by 10% may lead to more than twofold changes in the risk of the extreme deviations. In this case, the risk shall not be defined only by dispersion, and not always raises when it increases; thereby its independent value is proved.

The authors find it possible to involve the fuzzy logic methodology and the respective mathematics of fuzzy sets in assessing agroclimatic risks by the factors of heat and water availability of crops. The methodology based on computing the values of the reduced comparison indices allowed (Menzhulin, 2011) to obtain the assessments of accuracy of the reproduction, performed using modern models of the global atmosphere and the world ocean general circulation, of the changes in climatic parameters, which took place during the XXth century in different climatic regions, and to provide ratings of the models according to the forecasted agroclimatic parameters: air temperature, atmospheric precipitation. It has been shown that the

data, obtained for each of the models, do not correlate with each other, what constitutes one of the criteria of the possibility for using fuzzy logic rules and mathematics (Uskov, Uskov, 2015). Coefficient of "autonomy" of each model can be assessed by the results of computing pair correlations of the deterministic forecast data.

Fundamentals of the theory of fuzzy sets (Konysheva, Nazarov, 2011; Levner, 1998; Zadeh L.A., 1965) define the criteria of admissibility for using fuzzy logic. First, the data should be accessible in a structured form, and this is the case herein: they are published by IPCC in table form and related to geographical coordinates of the nodes of grids, which cover the examined territory. Second, there is no way of constructing a mathematical model of relationship between the personalised expert data, since each expert (model) has its own solution to the problem in question. Third, there are no precise data about the forecasted climatic situations.

The main requirements of fuzzy logic: the initial point is the existence of each expert's own solution to the problem in question; intellectual method of contemplations of individual "experts" cannot be described in the framework of unified mathematical formulas; expert methods for drawing conclusions and making decisions based thereupon are considered approximate. Mathematics of fuzzy sets is a possible synthesis of probabilistic methods for analysing statistical processes and it fits into the classic probabilistic analysis methods (Ronald R. Yager, 1986; Zadeh L.A., 1965).

A modification is suggested of the ensemble method for processing deterministic data of the IPCC forecasts, which solves the problem of bringing an ensemble of such forecasts into probabilistic form.

In terms of methodology, the problem is solved through sequentially performing a set of procedures for finding characteristic membership functions of the forecast ensemble sampling data to this set. At the first preparatory stage, the following procedures shall be consecutively performed:

- an ensemble of the models of atmosphere-ocean global circulation is formed;
- a database is created of the forecasted climate parameters, contained in the nodes of coordinate grids of each model;
- sampling is distributed across the clusters of data, homogeneous by each agroclimatic parameter;
- no data correlation in each homogeneous sampling is checked;
- potential attribution of the sampling data array to the set category is estimated;
- finding characteristic membership function of sampling data by each cluster to some multitude, based on a set of rules and procedures.

Out of 20 models, presented in the 4th IPCC Report, ten are involved in the ensemble in the current study (Table 1): sampling comprises the data that implement the four potential scenarios (Commit, SRA1B, SRA2, SRB1):

Commit - An idealised scenario in which the atmospheric burdens of long-lived greenhouse gasses are held fixed at AD2000 levels.

SRA1B - Emissions Scenarios. *Key Assumptions* A future world of very rapid economic growth, low population growth and rapid introduction of new and more efficient technology. Major underlying themes are economic and cultural convergence and capacity building, with a substantial reduction in regional differences in per capita income. In this world, people pursue personal wealth rather than environmental quality. Global population that peaks in mid-century and declines thereafter, and rapid introduction of new and more efficient technologies, with the development balanced across energy sources.

SRA2 - Emissions Scenarios. *Key Assumptions* A very heterogeneous world. The underlying theme is that of strengthening regional cultural identities, with an emphasis on family values and local traditions, high population growth, and less concern for rapid economic development. Continuously increasing global population and regionally oriented economic growth that is more fragmented and slower than in other storylines

SRB1 - A convergent world with the same global population as in the A1 storyline but with rapid changes in economic structures toward a service and information economy, with reductions in material intensity, and the introduction of clean and resource-efficient technologies.

Scenario line A1 contains a description of the future world, characterised by the very fast economic growth, global population growth, the rates of which achieve their peak values in the middle of the XXIst century with the subsequent decrease. A trajectory of the population number rise: to 9bln. people by 2050;

and decline to 7bln. people by 2100. Introduction of new and more effective technologies. Convergent world: income and standards of living are similar in its regions. Significant social and cultural interactions throughout the world. The scenario is divided into three groups, providing a description of the alternative options for technological change in the energy system: A1F1 – fossil fuels are mostly used; A1T –non-fossil energy sources are mostly used; A1B – equilibrium between all the sources, specified by a minor dependence on one specific energy source. The scenario is characterised by high-rate technological changes and economic development; the widest range of CO_2 emissions, due to changes in land use.

Scenario line A2 contains a description of the very non-uniform world with the retained self-sustainment and local cultural integrity. Considerable population growth to the level of 15bln. people by 2100. Economic development is underway mostly in the regions; technological changes are more non-systematic and slower as compared to the other scenarios. Trend of indicators of all-anthropogenic CO_2 emissions due to changed land use remains positive over the period up to 2100.

Scenario line B1 contains a description of the world moving in one direction with the same global population, which reaches the maximum number by the middle of the XX1st century, as in scenario A1. A trajectory of the population number rise: to 9bln. people by 2050; and stepwise decline to 7bln. people by 2100. An intensity of using materials decreases, clean and resource-efficient technologies are introduced. The main attention is paid to the global solutions to the problems of economic, social, and environmental sustainability.

Scenario line B2 contains a description of the world, where a major attention is given to the local solutions to the problems of economic, social, and environmental sustainability. This is the world with constantly rising global population at the paces lower than in A2. According to the long-term evaluation, the population size will amount to 10.4 bln. people by 2100. The average levels of economic development are slower and technological changes are more diverse as compared to scenario lines B1 and A1.

Accessibility of scenarios for sampling a forecasted meteorological parameter shall be assessed by the possibility of performing model calculations for all the four emission scenarios (Table 1)

Table 1: Accessibility of scenarios for sampling the forecasted data on temperatures and precipitation

Model	Step of the model coordinate grid (degr.)		Accessibility of scenario			
	latitude	*longitude*	Commit	SRA1B	SRA2	SRB1
UKMO-HanCM3	2.5	3.75				
NPIM – Echam	1.86-1.87	1.87-1.88				
GFDL-CM-2.1	2.01	2.05				
CSIRO-MK3	1.86-1.87	1.87-1.88				
ECHO-G	3.7-3.71	3.75				
CCSM3-NCAR	1.4-1.41	1.4-1.41				
NIES-miroc3.2-med	2.78-2.79	2.81-2.82				
CGCM3(T47)	3.7-3.71	3.75				
NIES-MIROC-3.2-h	1.12-1.13	1.12-1.13				
MRI-CGCM-2.3.2	2.78-2.79	2.81-2.82				
UKMO-HADGEM1	1.25	1.87-1.88				
GFDL-CM2	2	2.5				
INM-CM3	4	5				
BCCR-BCM20	2.78-2.79	2.81-2.82				
PCM-NCAR	2.78-2.79	2.81-2.82				
IPSL-CM4	2.53-2.54	3.75				
GISS-EH	3.95-3.96	5				
FGOALS-g1	3.05	2.81-2.82				
GISS-ER	3.95-3.96	5				
GISS-AOM	3	4				

Note: the models, the forecasts' data for which were not included in sampling, are highlighted in colour.

Thus, sampling in the examined option may be formed based on calculations results for 10 models: UKMO-HanCM3; NPIM – Echam; GFDL-CM-2.1; CSIRO-MK3; CCSM3-NCAR; NIES-miroc3.2-med; MRI-CGCM-2.3.2; GFDL-CM2; INM-CM3; BCCR-BCM20; IPSL-CM4; GISS-ER when using the initial data of emissions scenarios: Commit, SRA1B, SRA2, SRB1. Sampling is a multitude of homogenous data.

Theory of sets is based on the applicability to the analysed sampling of the fuzzy logic principles. Here, any aggregate of objects, defined and distinguishable between themselves, however, implied to be as a whole, is considered a set. An analysis is therefore needed of the potential attribution of sampling from the entire database of the forecasted meteorological data to the set.

Analysing the potential attribution of the forecasted meteorological data sampling to the set comprises the following procedures:

- verification of sampled data for homogeneity using one of the known criteria;
- verification that the data do not correlate with each other using one of the criteria.

Attribution of a set to a fuzzy set is possible only in case, when the transition from the set membership to the set non-membership occurs stepwise. This problem is solved by bringing the data of each homogeneous cluster of sampling into non-dimensional form through normalisation according to the parameter maximum value in the analysed series. The series is formed in each node of coordinate grid of each model. As a result, normalised data within each cluster fit into the range between 1 and 0, i.e. a smooth transition from the set membership (normalised value is equal to or less than 1) to the set non-membership (normalised value is 0) is enabled.

The density of distributing normalised data across each cluster is approximated by the selected function, which is a membership function in terms of mathematics of fuzzy sets. Approximation of membership function of the normalised sampling data is performed according to the degree of membership in the form of distribution density. The method of approximating the set of one of the possible characteristic functions depends on the model of the membership function found.

The identified characteristic membership function represents the function of density of the forecasted parameter distribution probability, its statistical characteristics for which are computed. The proposed hypothesis suggests, that the computed statistical characteristics of the sampling series are identical to the statistical characteristics of densities of the forecasted meteorological parameter distribution probability.

Results

Below is a description of the method by the example of generalising model IPCC forecasts for the 2011-2030 period in the nodes of model grids, covering the territory of Russia. Sampled forecasted meteorological parameters involve the data on temperatures during the warmest month of vegetation period (July) and the amount of precipitation by the months of vegetation period for all the available model forecasts. To relate the data to the coordinates of the representative meteorological stations in the agricultural territory of Russia, a plane interpolation has been performed by the data, initially fixed to the coordinates of grid nodes of the selected climate models.

To illustrate and assess the performance of the suggested methodology, the graphs have been drawn of densities of the forecasted air temperatures distributions over the 2011-2030 period for July in the territory with 52°-56°N and 75°-80°E geographical coordinates (Fig. 1). The data of 48 "experts" were involved in the analysis, computed using 12 models and 4 scenario implementations in the nodes of 48 coordinate grids, and brought by the method of plane interpolation to coordinate location points of 17 representative (according to the World Meteorological Organisation) area-based RF hydrometeorological stations (HMS).

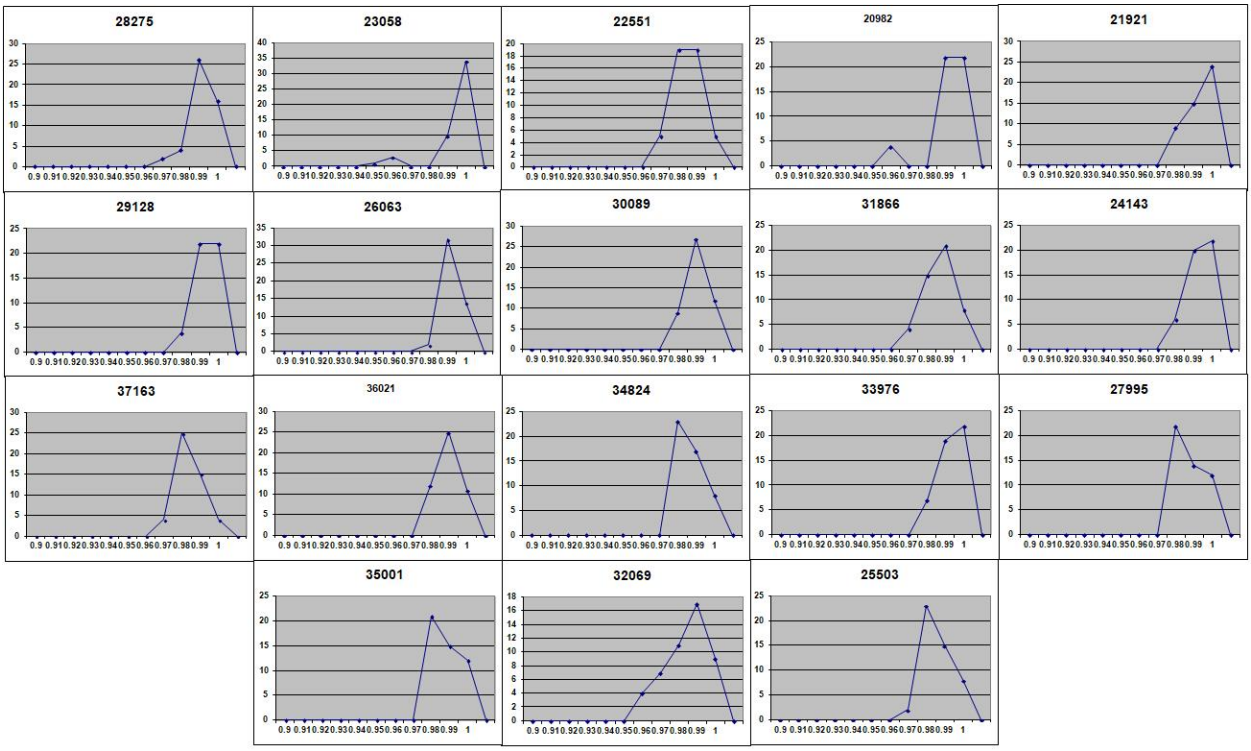

Fig 1. Densities of distributions of normalised temperatures by hydrometeorological stations in the Russian Federation territory

The analysis of the presented distribution has shown that it is possible to approximate membership functions by the laws of single- and bimodal continuous distribution densities and define statistical characteristics of these distributions in a differentiated way by HMSs in the agricultural territory of Russia. When there is such a relation to a specific "object", it is obvious that fuzziness indices of the sets need not be calculated, because in the case in question, the fuzzy set covers the entire range of changes in a normalised parameter within membership function with smooth transitions from 1 to 0.

Statistical characteristics of these distribution densities are computed (Table 2). It is further assumed that, in the coordinates of the specified meteorological stations, the density of the forecasted temperature and precipitation distribution probability is defined by the same values of statistical characteristics.

Table 2: Statistical characteristics of densities of the normalised temperatures distributions in July

No. of station	Average	Median	Mode	Mode frequency	Minimum	Maximum	Geom. average	Harm. average	Average deviation	Variance	Average deviation	Range	Asymmetry coefficient	Coefficient of kurtosis	Total
20982	0.750739	0.783688	multiple		0.049645	1.000000	0.641220	0.360588	0.238829	0.057039	0.154280	0.950355	-2.02921	4.113942	36.03546
21921	0.757584	0.801137	0.917780	5	0.479452	1.000000	0.741782	0.725124	0.152885	0.023237	0.138859	0.520254	-0.266952	-1.38651	36.37767

	8	0	8				4			4		8			1
22551	0.686004	0.676796	0.41989	3	0.364641	1.000000	0.670424	0.653567	0.142759	0.020380	0.112147	0.635359	-0.098730	0.004332	32.928188
23058	0.766253	0.829787	multiple		0.00	1.000000			0.248311	0.061658	0.155585	1.000000	-2.41498	5.280244	36.780144
24143	0.800630	0.811047	0.633721	3	0.540698	1.000000	0.793264	0.785620	0.107726	0.011605	0.089945	0.459302	-0.228736	-0.602265	38.430233
25503	0.707558	0.683511	0.659575	3	0.489362	1.000000	0.697781	0.688260	0.120341	0.014482	0.097869	0.510638	0.468835	-0.340430	33.962777
26063	0.830793	0.804878	0.804878	4	0.707317	1.000000	0.827333	0.823980	0.077751	0.006045	0.064101	0.292683	0.606250	-0.614241	39.878805
27995	0.813170	0.801786	multiple		0.685714	1.000000	0.807284	0.801567	0.100028	0.010006	0.085742	0.314286	0.408458	-1.15585	39.032144
28275	0.816685	0.805804	0.892857	4	0.584821	1.000000	0.810637	0.804329	0.098574	0.009717	0.078381	0.415179	-0.244737	0.034909	39.200889
29128	0.852535	0.850230	0.829493	3	0.603687	1.000000	0.847011	0.841054	0.094690	0.008966	0.070853	0.396313	-0.707465	0.792202	40.921666
30089	0.811599	0.822115	0.846154	4	0.591346	1.000000	0.806003	0.800247	0.095041	0.009033	0.073893	0.408654	-0.147937	-0.189075	38.956673
31866	0.741987	0.746606	0.746606	4	0.520362	1.000000	0.732022	0.722207	0.123970	0.015369	0.089854	0.479638	0.433297	-0.157128	35.615538
32069	0.686421	0.709845	multiple		0.264249	1.000000	0.656425	0.620528	0.188248	0.035437	0.151784	0.735751	-0.413557	-0.374196	32.948819
33976	0.877557	0.877256	multiple		0.700361	1.000000	0.874013	0.870284	0.077692	0.006036	0.060933	0.299639	-0.748145	-0.036773	42,122744
3482	0.8	0.8	0.7	4	0.7	1.0	0.8	0.810	0.0812	0.0	0.0704	0.2	0.42454	-	39.

4	18548	11290	51613		09677	00000	14679	899	55	06602	97	90323	4	0.916581	29032
35001	0.822334	0.811189	multiple		0.685315	1.000000	0.816691	0.811189	0.098328	0.009668	0.084162	0.314685	0.371440	-1.16103	39.472033
36021	0.833408	0.817204	multiple		0.684588	1.000000	0.829887	0.826435	0.078202	0.006116	0.061097	0.315412	0.475518	-0.306952	40.003358
37163	0.800556	0.788274	multiple		0.674267	1.000000	0.797195	0.793970	0.075787	0.005744	0.056101	0.325733	0.931579	1.130688	38.426671

The rules for operations with the values, which constitute a multitude of data on temperatures for the entire vegetation period, make it possible to distinguish subsets for the other time intervals from calendar to seasonal, inter-seasonal, and vegetation periods by individual phases of development. Here, there is no need for seeking other different in form membership functions, likewise, no combining such subsets into a set with their inherent particular statistical characteristics is required.

Discussion

The method performance and effectiveness have been assessed through comparison between the statistical characteristics of data on the amount of monthly precipitation, occurred in the agricultural territory of Russia and in the vicinity of the specified meteorological stations over the 1961-1990 period, computed by IPCC models using the suggested modification of the ensemble method and mathematics of fuzzy sets, and the same computed statistical characteristics of density of probability distributions of the observed actual meteorological data over the same period. The results are given in Table 3.

Table 3: Statistical characteristics of data on daily precipitation over a period from 1961 to 1990

	Valid N	% Valid Obs	Average	Confidence interval 95%	Confidence interval 95%	Geometrical average	Geometrical average
Actual	30	100.0000	0.989690	0.987237	0.992144	0.989669	0.989648
Forecast	10	33.3333	0.995696	0.992814	0.998578	0.995689	0.995681

	Median	Mode	Mode frequency	Total	Minimum	Maximum	Lower quartile
Actual	0.989990	0.9910252	3	29.69071	0.976873	1.000000	0.985847
Forecast	0.996876	Multiple	2	9.95696	0.987851	1.000000	0.991670

	Upper quartile	Percentile 10 %	Percentile 90 %	Range	Quartile range	Variance of random variable	Standard deviation
Actual	0.994822	0.980152	0.998964	0.023127	0.008975	0.000043	0.006571
Forecast	0.998612	0.989760	1.000000	0.012149	0.006942	0.000016	0.004029

	Confidence interval CO -95%	Confidence interval CO +95%	Variation coefficient	Asymmetry coefficient	Coefficient of kurtosis

Actual	0.005233	0.008834	0.663962	-0.242823	-0.599586
Forecast	0.002771	0.007355	0.404605	-0.888526	-0.122520

Comparison between actual and calculated data indicates that the obtained statistical characteristics of probability distribution of the average daily precipitation can be used to make probabilistic risk assessments by water availability of field crops in the territory of Russia, represented by a set of the specific observation points.

Conclusion

A new modification of the ensemble method for generalising IPCC forecasts has been created, and a methodology of bringing deterministic model IPCC forecasts into probabilistic representation has been developed. The methodology has been shown to be efficient.

The authors find it possible to use the values of statistical characteristics of the probability density of the forecasted temperatures and precipitation distribution, thus calculated in the coordinates of the specified meteorological stations, to forecast and assess agroclimatic risks and other agrometeorological indices and factors of field crop productivity in conditions of global climate changes.

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Educational Quest as an Innovative form of Professional Self-Determination of the Youth*

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** The study was carried out within the framework of the project 18-1-00573 "Educational quest as an innovative form of professional self-determination of the youth"*

Abstract

Professional self-determination of the youth in modern conditions involves responsible participation and interaction of various actors: teenagers, teachers, parents, social structures and organizations. Based on the analysis of the modern theory and practice of education, the authors emphasize the lack of innovative approaches and forms of career guidance among the youth, contributing to the conscious choice of future profession. Modern socio-cultural conditions determine the development of educational technologies that include quest technology. The paper reveals the development features of educational quests of professional focus, the types of quests that can be efficient in forming the ideas about popular professions, and on the expansion of personal opportunities in professional interests. The authors developed a flow diagram to design educational quests of professional focus. The experimental activities on the basis of the regional children's public organization 'Republic of young transbaikalians', with more than 3,000 students participating, it was proved that educational quests efficiently influence professional self-determination, help young people to focus on professions that are in demand in the modern Russian labor market. This paper is for the heads and employees of education management bodies, public organizations, and also for all professionals and citizens interested in the development of the Russian education system.

Keywords: professional self-determination, educational standard, quest technologies, flow diagram, information technologies.

Introduction

The problem of professional self-determination of young people is due to the introduction of Federal State Educational Standards, which set a benchmark for the formation of personal characteristics of young people aimed at "conscious choice of future profession and opportunities to implement their own life plans; attitude to professional activity as an opportunity to participate in solving personal, social, state, and national problems" [21]. The choice of profession is the most difficult problem facing every graduate of a modern school. That is why the educational standard aims teachers to support and help to the younger generation in achieving personal results in a conscious choice of profession. Even in a stable economic situation and the relative availability of information about the labor market, a significant number of graduates are not ready for independent determination of their future profession. According to the RAO Institute for Education Development, confirmed by other sources (the Ministry of Health and Social Development of the Russian Federation, the Center for Labor Research of the Higher School of Economics, etc.), 50% of students do not correlate the choice of professional future with their real opportunities and needs of the labor market; 46% of respondents are focused on the support deom the adults (parents, relatives, acquaintances); 67% have no idea about the scientific basis of choosing the profession; 44% have no information about training opportunities in the field of labor, which is interesting for them [23]. The reasons of the current situation academician S. N. Chistyakova sees "the declared and practical absence of the state status of vocational guidance of the youth in Russia; the episodic nature of its implementation; the

unpreparedness of teachers and other practitioners to its implementation; the lack of communication and continuity of schools, parents, the system of vocational education, production, employment services and other social institutions, the duplication of functions by various entities responsible for employment and general destiny of the younger generation" [17].

Professional self-determination of students in Russian [1; 2; 22] and foreign [30; 31; 32] psychological and pedagogical literature is considered as a process of education, development and formation of personal maturity, manifested in the independent process of planning their professional future. The study of A. I. Popovich defines the conditions that ensure the optimal level of professional self-determination of students. They are "personal maturity, adequate self-assessment of abilities for mastering the future profession, the degree of completeness of ideas about the content of future professional activity, and the efficiency of psychological and pedagogical support of their professional self-determination" [16]. The key point of professional self-determination of high school students is the willingness to choose a profession that specifies the interests and preferences, being a solution focused on the nearest future.

The formation of this willingness requires expansion and inreoduction of new approaches to career guidance in educational institutions, taking into account the peculiarities of the labor market and the educational and professional interests of the youth. The authors think that it is the form of work that meets the challenges of today's youth, its needs and demands, that should be improved. Formation of personal characteristics in young people set by educational standards may be productive in case of using the system of educational career-oriented quests. Participation in the educational quest is not only of interest to modern teenagers, but also contributes to the further building of their individual educational trajectory, the perception of themselves as a subject of professional self-determination, is a "dress rehearsal" of their subsequent serious and responsible choice. This assumption leads to the formulation of the key question of this study: how to develop and implement educational quests of professional orientation that can affect the professional self-determination of adolescents and the formation of their willingness to choose a future profession in the process of professional orientation.

Materials and methods

The purpose of this study is to understand and substantiate the educational practice of introducing quest technologies of professional orientation in the system of work aimed at professional self-determination of students.

The study was carried out with the financial support of the grant of the President of the Russian Federation for the development of civil society, provided by the presidential grants Fund.

2.1. Research problems

The authors identified the following research problems: providing assistance to young people in professional self-determination through quest technologies; formation motivated professional intentions and readiness to choose a profession in the youth; finding out professional inclinations and ideas about the professional abilities of the youth of Chita; studying the dynamics of the formed willingness to choose a profession.

2.2. Theoretical and empirical methods

The study used the following theoretical methods: analysis of literature and practice of using quest technologies in educational activities. The empirical methods were experimental work, expert methods, methods of mathematical statistics, Internet monitoring, content analysis, and design.

2.3 Research stages

The study was conducted in three stages. The first stage considers the theoretical approaches and experience in using quest technologies in foreign and domestic educational practice. The quests for students of educational organizations aimed at the orientation of students in the world of professions in demand in the Transbaikal region were theoretically substantiated and developed. At the second stage, researchers

organized the experiment to test quest technologies in working with high school students. The third stage monitored the efficiency of the carried out activities.

2.4 Research basis

Experimental work was carried out in the period from 2017 to 2019 on the basis of the Regional children's public organization 'Republic of young transbaikalians' (Chita) with the participation of more than 3,000 teenagers.

2.5. Proceedings and description of the experiment

The first stage studied the specialized literature and experience of educational quests in Russian and foreign practices.

The concept of quest ('quest' means search) in the pedagogical literature is defined as a specially organized type of research activity, inwhich the student searches for information at the specified addresses (in reality), including the search for these addresses or other objects, people or tasks [5]. The quest is based on a long-term purposeful search related to adventure or game [9; 10; 11; 13; 14].

Based on the analysis and study of the specifics of different types of quests in the activities of professional orientation of students, it was decided to use:

- educational quests;
- adventure or game quests;
- 'live' quests.

The origins of the development are the creation an by, etc. B. Dodge and T. March (USA, 1995). The term WebQuest was introduced by B. Dodge, professor of educational technology at the University of San Diego, who developed a methodology for using Internet for integration into the educational process [27]. The word 'quest' comes from the English ('the search, the item to be found, the search for adventure') i.e. it means a deliberate search; it also is the meaning used to denote a particular type of computer and real games [4]. The word 'web' (network) means the Internet space. That is, WebQuest can be translated as searching the Internet [3].

For more than twenty years, B. Dodge presented 30,000 Internet developments of the web quest in his personal website 'QuestGarden'. This resource is translated into 10 languages (Spanish, Portuguese, Catalan, French, German, Italian, Dutch, Greek, Arabic, and Indonesian) [24].

In August 2007, MERLOT the resourse was awarded the MerlotClassics prize by the State University of California program. The jury noted that "... the use of WebQuests is a strong support for scientific research in educational activities. The problem has always been technical: how to make web development easy enough so that all teachers can create web quests when needed. B. Dodge solves this problem by providing a tool that is used by teachers and provides them with pedagogical support in their professional activities. This tool is used by educators around the world to organize structured activities that students can use to solve real problems" [29].

So, B. Dodge describes web-quest a model (technical resource or Internet application) of involving the Internet sources in the educational process for the solution of educational problems (1995).

The concept of the web quest was further developed by T. March (USA) in the aspect of cognitive psychology. He defined web quest as a learning structure that uses links to important resources on the Internet and an authentic task in order to motivate students to explore any problem with an ambiguous solution in order to develop students ' ability to work both individually and in a group in the search for information and its transformation. T. March, following on from the works of L. S. Vygotsky on interiorization and the "zone of proximal development", concludes that this type of search activity needs "support", which should provide the teacher (tutor). Support (more figuratively it looks like "scaffolding erected around a building during renovation or construction") is helping students work outside their real skills area. Support or scaffolds March defines as "temporary framework designed to help learners to operate beyond their capabilities" [28]. Examples of support can be the activities that help students to build a research plan, involve them in solving the problem, and draw their attention to the most important aspects

of the study. As students progress toward achieving their goals, the level of "support" decreases, since their skills undergo a process of interiorization.

B. Dodge identifies three principles of classificating web quest [6; 25]:

– by duration: short term and long term;

– by content: single project and interdisciplinary web quests;

– by type of tasks: retelling tasks, compilation tasks, mystery tasks, journalistic tasks, design tasks, creative product tasks, consensus building tasks, persuasion tasks, self-knowledge, analytical tasks, judgment tasks, and scientific tasks.

Currently, the information space of the Internet and in educational practice has two main types of quests: Web-Quest – virtual quest, which is a problem task with elements of role-playing game, which requires resources of the Internet (puzzle quests, graphic quests, etc.); and Real-Quest - live quest, performed by participants in real mode − in the classroom, museum, outdoors, in the city (geocaching, room quests, volunteer quests, quests with elements of orientation, etc.). The authors highlight the following characteristic features of the quest: the main idea (the main task); the presence of the plot and progress on it; problem task; certain rules of the quest; the role of the quest hero; the organization of targeted search; reference signals, tags or navigators; a specific result.

In the last decade, the quest technology is being actively studied. Scientists and teachers are trying to adapt it to their needs and, accordingly, they classily it according to the educational goals and objectives.

The core of any educational quest can be the main task of various types. Based on the web quest classification by the type of learning tasks made by J. E. Ferreni [26], the authros use the following types of basic tasks of the educational quest.

1. *Compilation* is a task performed in the form of a story, its own conclusion based on other's research and writings, and requires the study of several sources. It is the basis of the simplest type of quest, focused not on the development of students' knowledge, but on general acquaintance with the topic, using various sources of information, understanding and processing of the information received in the form of a story, own conclusion, presentation, drawing up a herbarium, recipe books, etc.
2. *Reconsideration* is a task aimed at finding information on a given problem, presented in the form of a presentation, booklet or brochure, and taking into account the personal perception of information. For example, in the quest 'Meet the Transbaikalia!", students are invited to study the information on this topic and develop a presentation or advertising booklet about the Transbaikal region. It is proposed to work in teams in various areas to achieve a full understanding of the given topic: Thus, the "geographers" are responsible for collecting data on the geographical features of the Transbaikal territory; "historians" study historical events and the contribution of scientists, politicians, and athletes in the development of the region; "tourists" are looking for information on the organization of the trip to create a virtual trip across the region, etc.
3. *Persuasion*. The task is aimed at gathering information in order to convince the opponent in his point of view. Students are offered different versions of the points of view of a particular situation. Their task is to develop a strategy to persuade the students speaking from the opposite point of view (for example, lesson–'courtyard', confirmation of the hypothesis, etc.).
4. *Journalistic investigation*. The task is aimed at the collection, systematization, description of information in the form of an article of a magazine or newspaper, made according to the laws of the journalistic genre. Taking on the role of journalists, students gather information, systematize and describe the example of the selected publication, which can be regional or central magazines and newspapers.
5. *The analytical study* is aimed at identifying relations. This may include assessing the health effects of certain impacts, establishing causal relationships, similarities and differences, etc. For example, students are encouraged to study the situation on the appeal of more than 30 people to hospitals in Chita on 20 April with complaints of exacerbation of allergy, asthma, swelling of conjunctiva, etc. A group of "doctors" is studying the situation on its part, offers ways to provide first aid. A group of "ecologists" assesses the environmental situation in the Transbaikal region in a given period of time. A group of "foresters" studies fires and their breadth, etc.
6. *Solving the mystery*. The task has the form of problems or puzzles compiling surprising and interesting

facts from any scientific field that need to be disclosed or solved, for example: "The mystery of the Yablonovy ridge", "Where did the palms disappear from Transbaikalia?", "In search of treasures of Genghis Khan", etc. In order to solve a puzzle or a problem, students work in groups, performing different roles, and conduct a thorough investigation in order to get an answer to the problem or mystery.

7. *Creative research.* The task is aimed at creative or non-conventional presentation of information collected on a given topic using various sources. The presentation can be a painting, a radio play, the team, etc. Students explore a specific topic and collect information that is converted into a creative product.
8. *Search for truth.* The task is aimed at finding information on a particular topic, comparing different points of view on a given topic, making an agreed final decision or a compromise result for each participant of the search. Working in different role teams, each of them moving in its own direction, analyzing different points of view, the teams should come to only one, common, agreed decision.
9. *Scientific research.* This task is aimed at the formation of students' ability to use methods and methodology of research activities. Students are offered a scientific problem. It involves skills of creating a hypothesis, testing the hypothesis, and comparing the result with the initial prediction.

Proposed options of the main task of the educational quest can be used separately and together in a single quest.

Table 1. Some variants of combining different types of the main task [19]

Main task type	compilation	reconsideration	persuasion	journalistic investigation	analytical study	solving the mystery	creative research	search for truth	scientific research
Compilation		+	+						
Reconsideration	+		+				+		
Persuasion	+	+		+	+	+		+	+
Journalistic investigation			+			+		+	
Analytical study			+						
solving the mystery			+	+			+	+	
Creative research		+				+			
Search for truth			+	+		+			+
Scientific research			+					+	

Along with the importance of understanding and comprehension of the possibilities of the educational quest technology, the practice and conditions of its application are of particular interest, taking into account the specifics of the children's public organizations.

The feature of the **game quests** is that they are organized by means of information technologies type of Word and Excel text processor, spreadsheets, andPowerPoint multimedia presentations. Examples of such a quest design can be:

– creating a database on the problem, all sections of which are prepared by students;

– create a microcosm in which students can move around using hyperlinks to model the physical space;

– writing an interactive story (students continue their work just as in Russian folk tales, the heroes at the crossroads chose the road for further adventures);

– creating a document that contains an analysis of a complex problem, which is accompanied by the student's comments (agreeing or disagreeing with the author's opinion);

– on-lineinterview with a virtual character whose answers and questions are developed by students. A

character can be a well-studied personality, such as a literary character, a politician, etc.

In career guidance activities, 'live quests' have become particularly efficient and popular for teenagers. According to O. O. Zhebrovskaya, **'live quest'** is a quest project that involves accomplishing a certain problem task, implementing educational goals, with elements of the plot, role-playing game associated with the search for places, objects, people, and information [7]. To achieve the goal, the players use the resources of any territory, where there are movements or other actions of the participants, or information resources. Here are examples of such quests.

1. *Questorias,* which are plot games, organized in a cafe or a classroom. Undoubtedly, questoria as one of the varieties of 'live quests', provides the player a great opportunity to try on a new image: it can be a daring pirate, an experienced detective or a Hollywood diva; in accordance with it, they realize the unique goals.

Thus, the members of the Transbaikal regional organization 'Republic of young transbaikalians' were offered a quest, in which the children participated enthusiastically. The participants had to determine the purpose of the mission of the aliens on the planet Earth and to complete this mission during the quest with professional focus 'Space Odyssey' in a specially equipped room. According to the route list, the participants were divided into three teams to pass the locations, 20 minutes for each. On the locations, the teams showedd the skills that an astronaut should have: physical training, special theoretical knowledge, ability to make responsible decisions in non-standard situation, and ability to adapt quickly to environmental conditions.

Quest locations: Asteroid belt. Space and archaeology. Solar battery repair. Holographic projection of light. Solar system. At the final stage, the participants conducted a virtual tour to space using the program '360° Panorama', demonstrated their understanding of the profession 'Manager of space tourism' in creative, gaming, presentation, interactive, and other forms.

2. *Guided tour quest* to get acquainted with the professions in demand in the city greatly impress and contribute to revealing the professional interests, inclinations, and real opportunities in mastering any profession.

Here are examples of quest tours of professional orientation, used in this work, which have helped teenagers to realize their potential and opportunities, to become motivated for further development and realization of their abilities in a certain direction.

Thus, the guided tour quests of professional orientation in the workshops of Transbaikal craftsmen, contributed to the acquaintance with the regional labor market. Art crafts – creative activity of the artisans, aimed to create unique and distinctive items that are typical of the Baikal region, using their hand-held equipment, skills, ingenuity, and the inner sense of beauty. In the 'Studio of handmade gifts', the quest participants not only learned about some types of painting, but also showed creativity in ornamenting their own souvenir spoon. During the quest marathon, each child was a designer and a creator of an individual print on a t-shirt, getting acquainted with the profession of a fashion designer. Participation in the quest tour 'Masters of window affairs' at the plant of plastic windows 'KBE-GARANTIYA' allowed visiting the modern enterprise of the city of Chita, its production shops equipped with the high-tech equipment, offices and warehouses, the fleet of the plant. Thanks to the engineers and masters of the plant who aises passing the quest tour locations, all participants could feel like window masters. Children got acquainted with the physical properties of glass and its characteristics. On location 'Modeling the window profiles', there was a unique opportunity to determine future windows characteristics – dimensions, materials of construction, etc. using the modern equipment. At the location 'Installation of reinforcing profile', the participants were entrusted with the simplest operations for the installation of the reinforcing element. The quest allowed bringing the specificity of the profession in easy-to-understand form.

Quest tour 'Detective science' was organized with the help of Forensic center of the Ministry of Internal Affairs of Russia in the Transbaikal region. Each department of the forensic center turned into a separate location with a specific problem task or question, which was answered using the material heard or presented during the tour. Children and teenagers saw how the method of thin-layer ascending chromatography is used and visited the laboratory for the study of almost all organic and inorganic compounds: drugs, psychotropic toxic substances, explosives, alcoholic products, coloring materials, shot

residues, metals and alloys, glass and ceramics, combustion products. The participants of the tour were astonished by the size of a room-sized molecular-atomic spectrometer. It decomposes any substance and its trace elements and helps to find traces of various chemicals. The participants got acquainted with the professions in demand in this center.

Let us turn to another kind of quest.

3. *In-situ quests* involves city racing or search for caches (geocaching) with elements of orientation and local history. In such quest, players move through the 'points' with tasks within a common plot. The game is a route based on puzzles and riddles. The goal is to get to the finish line by guessing the password and phone number with the help of intermediate tasks-tips, using their knowledge, intelligence and wit. Tasks are selected so that they do not require special knowledge or skills, but at the same time to be the most original and interesting. The solution of each task has an encrypted figure indicating the number of the next task. The winner is the player who calls the phone number and says the password first. These quests can be carried out not only in the city, but also in other areas. The most remembering quest during the activity of the Transbaikal public organization 'Republic of young transbaikalians' was the guided tour quest to the ecosystem of lake Halanda. This quest engaged children in studying native nature and observation of the interactions of living organisms with each other and with other environmental components. While performing the tasks, it was necessary to record, photograph and sketch various objects of wildlife. The quest process included the office processing of the information received during observations; the participants defined objects of wildlife, plants and animals living here with use of the reference literature and atlases. The result of this tour was a scientific report. At the evening event, the participants presented their ecosystem and answered the key question of the day: 'Why 'We be one blood, thou and I'?'.

Despite the variety of quests, they all have a clear structure. [8]:

1. Introduction, involving a description of the main roles of the participants, the script of the quest, the work plan or an overview of the entire quest.
2. The central task, which is to determine the final result of the independent work of each student in the form of solving a number of questions, collecting information for the transition to the next level, as well as the presentation of the results of the collection of information.
3. A list of information resources required to perform the task, presented in electronic or paper form, on CDs, video and audio media, as a link to resources on the Internet or web sites.
4. Description of the work provided for each student for independent performance of the task.
5. Guidance on how to organize and present the information collected.
6. Conclusion, which is supposed to analyze the experience gained by students during the independent work.

This gives grounds to design a quest as a technology and to use a standard technological map for the development of career-oriented quests [12; 15; 20]. The example is the quest 'Gorgorod'. The authors provide the flow diagram (Table 1)

Table 1. Flow diagram of the educational quest 'Gorgorod'

Structural elements	*Quest development requirements*
Name	Gorgorod: virtual city of professions of the future
Aim and objectives	Promoting the formation of personal characteristics of young people on the basis of the acquiring initial experience in the process of professional orientation in the world of new professions aimed at – formation of the target audience understanding of the Atlas of new professions; – assistance to young people in professional self-determination; – professional education, taking into account trends in the labor

	market; – formation of motivated professional intentions among the youth; – 'formation of the ability to express and defend their public position, critically evaluate their own intentions, thoughts and actions'.
Target audience	Schoolstudents of 7 - 11 grades of schools №3, №30, №49 in the city of Chita (pilot sited of Transbaikal regional branch of all-Russian public youth organization Russian Movement of Schooltudents (RMS))
Duration of the quest	3 days, taking into account the time for organizational matters (including lunch)
Focus of the quest	Vocational guidance. Educational quest 'Gorgorod' is implemented in the Transbaikal regional branch of the RMS within the direction of 'Personal development'.
Legend	Participants of the quest become guests of the Gorgorod. On the main square of the city with a welcoming speech they are met by the city manager. To become a full-fledged resident of the city, each participant should prove their social significance by passing all locations and determining the future profession.
Main task	As a result, students prove their social usefulness and find a job. Professionally-focused educational quest 'Gorgorod' sticks to the following logic: **Stage I (2 days)** - collecting quest participants, explaining the rules, getting acquainted with the professions of the future, the passage of seven locations, filling the workbook-itinerary; **Stage II** – quest participants select the profession of the future, 'employment', the team performance of the selected profession; **Stage III** - summing up the quest results: rewarding and reflection. A necessary condition for participation in the career-oriented educational quest is the presence of a gadget with an installed program for reading QR-codes.
Plot	Participants of the quest are divided into seven teams according to the itinerary and pass the I stage, with each participant receiving points in the individual trial. Each location is to be passed in 35 minutes. Quest locations: 1. Manager of crowdfunding and crowdinvesting platforms (MCCP). 2. Personal security designer (PCD). 3. Specialist in migrant adaptation (SMA). 4. Moderator of the platform of communication with government agencies (MPCGA). 5. Foreman-supervisor (FS). 6. Wearable energy devices designer (WEDD). 7. City farmer (SF). Quest can take place outdoors (park, playground, grassy clearing, etc.).

Tasks	To advance through the story, there are the main tasks of the stage I of the quest and the main task of the stage II, presented in didactic material.
Quest-heroes	***'City Manager'*** - the head of the city, the coordinator of the game, he or she greets guests on the main square and introduces them to the rules, traditions and laws of the city; ***'Location moderators'*** – responsible for a central location, they organize the work of the quest participants on their location. ***'Personal safety designer'*** is a specialist who assesses and designs a person's life from the point of view of all possible risks (from genetic predisposition to certain diseases to the probability of accidents and the fact that a person would become a victim of a crime) and their prevention. ***'City-farmer"'*** is a specialist in arrangement and maintenance of agro-industrial farms on the roofs of buildings and skyscrapers of large cities. ***'Manager of crowdfunding and crowdfunding platforms'*** is a person who organizes the work of crowdfunding platforms, conducts a preliminary assessment of projects to obtain crowdfunding financing, examines conflicts between depositors and project holders. ***'Foreman-supervisor'*** is a specialist in construction with the use of digital construction projects. This person can use the construction process evaluation system and adjust it based on the results of the data analysis. ***'Wearable energy devices designer'*** is engaged in creating the goods for individual use (including clothing and footwear) able of micro-energy generation. ***'Moderator of the platform of communication with government agencies'*** is a specialist who organizes online and offline dialog between public activists and officials responsible for specific areas (for example, education, housing, construction, pensions, etc.) to develop joint solutions. ***'Migrant adaptation specialist*** is a professional who teaches migrants the national language and culture, including through online platforms.
Resources	1. Luksha, P., Luksha, K., Varlamova, D., Sudakov, D., Peskov, D., Korichin, D. (2015). Atlas of new professions [Atlas novykh professiy]. Agentstvo strategicheskikh initsiativ. Moscow, Skolkovo. 2nd ed. URL: http://atlas100.ru/. 2. Laptop, projector screen, projector, A4 paper, pens, personal electronic gadgets with installed software for reading QR codes
Evaluation criteria	Location moderator scores from 1 – 10 in "work book" of the quest participant.

Results

In the process of experimental work on the formation of adolescents' willingness for professional self-determination, there have been changes and increments in their minds, due to the development of skills of self-analysis of their interests in the professional sphere, the ability to analyze educational and professional activities; the accumulation of pre-professional, in some cases, and professional experience acquired in the

process of participation in the quest tasks. As a result, the ability of the individual to choose the educational and professional fields corresponding to their interests, opportunities, inclinations and demands of the modern labor market has been formed. This ability is considered as a dynamic characteristic of professional self-determination, and its measurement allows predicting the success of adaptation in the profession. The atudents now can identify the adequacy of their own capabilities to the characteristics of professional activity. Thus, the participants of the experimental groups expanded their understanding of popular profession and made an objective idea about their opportunities in the field of professional interests. The motives of conscious choice of future profession were formed.

The use of quest technologies has enriched the experience of professional choice, broadened the horizons, and contributed to the development of personality as a whole. Participation in career-oriented quests allows participants to develop competencies such as self-learning and self-organization; the ability to find several ways to solve the problem situation, to determine the most rational option, to justify their choice; teamwork (planning, distribution of functions, mutual assistance, mutual control); public speaking skills; communicative competence, functional competence (possession of specific skills).

Discussion

The authors consider the following approaches to the development and use of quest technologies to be important:

– educational quest is an integrated technology that combines the ideas of the project method, problem and game training, teamwork and ICT; it combines targeted search in the performance of the main problem task and a series of auxiliary tasks with adventures and (or) a game on a specific plot. Web quest can be considered as one of the types of quest technology;

– the quest algorithm is based on the logic of the technology of problem-based learning - from problem statement to the ways of its solution, presentation of the result and reflection, which is aimed at the development of the student as an active subject of life;

– educational 'products', performed individually or in a group as a result of the quest, can be different: from solving the problem in the form of an answer to the question to creating multimedia presentations, videos, websites, booklets, etc. In this sense, educational quests are interconnected with the ideas of "instrumental" pedagogy and the method of projects of D. Dewey (USA) of the late XIX century;

– the conflict and story are introduced in this technology, are elements of game-based learning – role-playing or adventure games, which in essence is teamwork;

– the use of special computer programs, information capabilities of the Internet, both during the execution and in the presentation of the quest results and exchange of views describe this technology as informational and communicational one [18].

Conclusion

Professional self-determination of schoolchildren and the formation of their willingness to choose a future profession should be carried out in accordance with the challenges of the socio-economic situation and personal needs of students, which involves the choice of innovative forms of organizing this work, corresponding to the challenges and interests of modern youth. Modern socio-cultural conditions determine the development of educational technologies, the update of which is carried out via the Internet and technical means of education, including electronic gadgets, which contributes to high personal involvement in learning, interactive interaction of students, quick access to information and increase their cognitive motivation. Educational technologies that meet modern requirements include quest technology of professional focus, contributing to the development of creative abilities, improvement of intellectual abilities of adolescents, and their involvement in new social relationships that affect the choice of future profession.

Acknowledgments

The study was supported by the grant 18-1-00573 "Educational quest as an innovative form of professional self-determination of the youth" of the President of the Russian Federation for the development of civil society, provided by the Presidential Grants Fund.

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Geochemical Indices of Weathering and Elementary Processes in Mountain Soils in the Middle Urals

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Abstract

Post-lithogenic soil formation occurs due to weathering and hypergenesis of rocks. The products of physical and chemical weathering make the mineral base of the soil. The study aims to determine the evolutionary-genetic features of the total composition of mountain soils using geochemical indication of weathering and elementary processes of soil formation. The studied mountain soils were sampled on the Basegi Ridge located in the Basegi Natural Reserve, the Middle Urals (Perm Territory, Russia). Profiles were made in the most typical biogeocenoses. Geochemical indices, reflecting the processes of weathering and soil formation, were calculated based on the data on the content of elements. The following soils were identified within the experimental plot by their morphological description: Alfehumus, Structural-Metamorphic, Organic Matter Accumulative, Lithozem, Gley. The evolutionary-genetic features of the distribution of the TiO2/Al2O3 index confirm that the soils developed in different directions: upward due to aerial transport of fine earth, denudation on the slope, and thickening of the organogenic horizons; down due to the transformation of rubble and eluvium of rocks during weathering and primary soil formation into fine earth in the mineral soil horizons. The joint manifestation and combination of these directions was observed in the soil profile. CIA indicated the degree of chemical weathering of the mineral mass in the soils from moderate (60–80 units) in the transition zones of ecotones to active (more than 80 units) in the soils of the subgoltsy and mountain forest belts. The soil types were arranged by their chemical transformation and weathering as follows: Litho-Podzol < Gray-Humus < Clay-Illuvial Burozem < Eluviated Burozem < Peat Gleyzem < Gleyic Burozem < Sod Podbur < Raw Humus Burozem < Ferrous Burozem. The study established the evolutionary-genetic features of the total composition of mountain soils and the geochemical heterogeneity of the soil cover of high-altitude landscapes in the Middle Urals.

Keywords: geochemical index, orogenic soil, diagnostics, disaggregation, soil formation, polygenesis.

1. Introduction

Mountain systems differ in geological age, height, structure, lithology, and geographical location. The soil cover in mountain systems varies accordingly, although it has common features associated with mountain soil formation (Rozanov, 1977; Urushadze, 1979; Vladychenskii, 1998; Vladychenskii et al., 2004; Dymov, Zhangurov, 2011; Borisova, 2012; Karpachevsky 2012; Samofalova et al., 2012; Zhangurov et al., 2012; Samofalova, Luzyanina, 2013; Samofalova et al., 2014; Samofalova, 2017). The diversity of natural conditions in highlands preconditions the directions of weathering processes and the soil formation, which is why the soil cover is variegated (Urushadze, 1979; Karpachevsky, Shevchenko, 1997; Vladychenskii, 1998; Molchanov, 2008; Karpachevsky et al., 2009; Luzyanina, Samofalova, 2013; Samofalova, Kondrateva, 2016). In each high-altitude landscape, the processes of weathering and soil formation proceed with different intensity (Karpachevsky, Shevchenko, 1997; Samofalova, 2014; Dymov et al., 2015; Samofalova et al., 2016). Often, the morphological diagnostics of soil is not enough to describe changes in local soil-forming processes in highlands. The final diagnostics should be based on the chemical composition of the genetic horizons in the profile (Karpachevsky, Shevchenko, 1997; Kalinin, 2009; Kulizhskiy, Rodikova, 2009; Samofalova, 2014; Martynov, 2015; Samofalova et al., 2016).

The geochemical description of the soil and the soil cover is the first link in epy biogeochemical chains in any region, especially in mountain conditions. An important indicator of the soil cover development is the profile and spatial change in the content of chemical elements. Standard models of soil formation are rare in nature, and soil profiles are often polygenetic (Kulizhskiy, Rodikova, 2009) and manifest properties (a

combination of inherited and modern features) that cannot always be explained by the factors and phenomena observed at present.

The geochemical indices characterize the peculiarities of soil formation, help to study and understand the geochemistry of mountain soil composition, provide additional information on the soil formation processes, and allow diagnosing soils in accordance with modern approaches to soil classification (Kulizhskiy, Rodikova, 2009; Samofalova, 2014). The change in altitude conditions is accompanied by the redistribution and the change of ratios of various elements in the soil profiles and diagnoses the physical weathering and the soil formation processes.

It is known that geochemical indicators are determined by the position in the relief, but the contribution of the relief factor is much less significant than the contribution of the climate factor (atmospheric moisture) (Alekseev et al., 2016). Thus, it is possible to use geochemical indices for a comparative study of complex polygenetic soil profiles located both in watersheds and in subordinate landscapes.

Soil formation is accompanied by reactions that rarely reach chemical equilibrium. The most important reaction in soil is hydrolysis: minerals dissolve to form clays and carry alkaline and alkaline-earth cations to the soil solution. An informative indicator of this reaction path is the molar ratio of aluminum oxide to the total of calcium, magnesium, sodium and potassium (Alekseev, Alekseeva, 2012; Spiridonova et al., 2016). The final solid products of chemical weathering are SiO_2 and aluminum silicates (clay minerals). The reaction of CO_2 with silicate rocks is the main mechanism for removing carbon dioxide from the atmosphere. The kinetics of this process largely depended on the hydrothermal conditions, especially at the early stages of the Earth's history (Schwartzman et al., 1995). Weathering depends on climate. This is a constantly ongoing monotonous process, and catastrophic tectonic phenomena can dramatically affect its rate.

Under the post-lithogenic conditions, soil formation occurs due to weathering and hypergenesis of rocks. Products of physical and chemical weathering of rocks make the mineral basis of soils and determine their elementary composition. Soils largely inherit the composition of parent rocks of the geological base, including in the zones of geochemical anomalies (Kulizhskiy, Rodikova, 2009; Rusanova, Shakhtarova, 2012; Samofalova et al., 2014; Martynov, 2015; Asylbaev, Khabirov, 2016).

The soil profile can be formed both by transformation of the rock (down) and by the aerial material reaching the surface of the earth (up) (Ilyina et al., 1993; Karpachevsky et al., 2009; Samofalova, 2018; Samofalova, Kucheva, 2018). A complex profile, which consists of several superimposed sub-profiles, each having organogenic horizons and underlying bands of fine earth, affects the transformation of the soil elementary composition.

In recent years, lithochemical indices and geochemical indices have been used more often in genetic soil studies (Bowen, 1979; Nesbitt, Young, 1982; Nesbitt, Young, 1989; Retallack, 2001; Determination of soil ..., 2009; Kalinin, 2009; Druzhinina, 2012; Rodionova, 2012; Ryabogina et al., 2013; Kalinin, 2014; Samofalova et al., 2014; Lisetskii, Marinina, 2015; Maslennikova, Dergyagin, 2016; Kalinin et al., 2016). Such lithochemical indices and geochemical indices have been calculated on the basis of data on the gross content of macro- and microelements. Studying soil geochemistry using geochemical parameters minimizes the influence of soil heterogeneity and variegation, as well as diagenetic changes (Dyakonova, 2009; Kalinin, 2014; Kalinin et al., 2016, Tunçay, Dengiz, 2016; Senol, Tunçay, Dengiz, 2018).

The mountain soils of the Urals have been studied less than the soils of other highlands. A unique feature of the Ural Range, stretching meridionally from north to south of Eurasia, is that it redistributes the air masses of the western and eastern transport, being a climate divide of the continent. Hence studying the conditions and characteristics of the soil cover formation in the Urals is important. Undisturbed mountain soils retain information about the climate change and the evolution of landscapes in their properties. This regional 'archive' of paleoclimatic information can be tapped into to predict future climate changes. It appears necessary to determine the geochemical structure of the soil cover of the Middle Urals, zone the soils of this unique territory and conduct its integrated environmental assessment and background monitoring.

The purpose of this study is to determine the evolutionary-genetic features of the gross composition of the mountain soils, using the geochemical indication of weathering and elementary processes of soil formation.

2. Materials and Methods

2.1 . Geographical location

The study of the chemical composition of soils were carried out on the Severny Baseg Mountain, which is part of the Basegi Ridge. The ridge is fully incorporated into the Basegi Natural Reserve (Fig. 1) that is located on the western slope of the Ural highland and represents an exemplar of West Ural mountain taiga. The total area of the reserve is 37,957 ha; the protective zone surrounding the reserve is 21,345 ha; forested area is 36,000 ha; and non-forested area (meadows, mountain tundra, etc.) is about 2,000 ha.

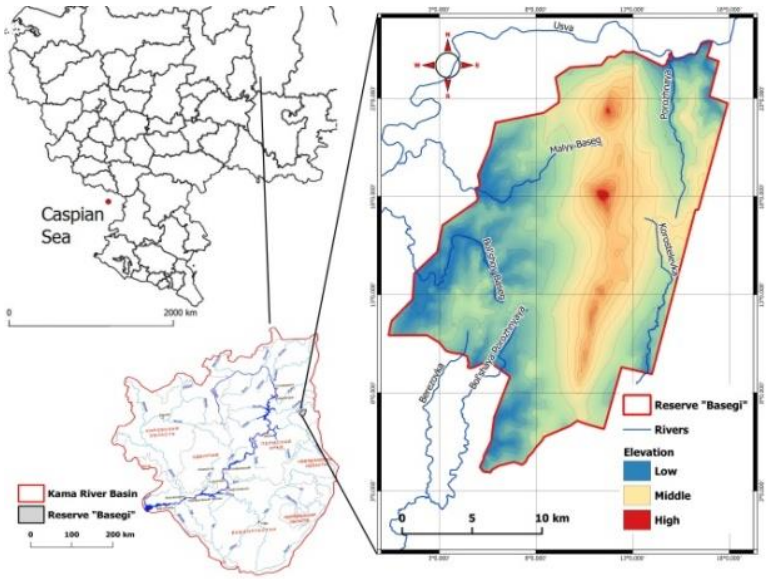

Fig. 1. Location of the Basegi Narural Reserve (Volga-Kama basin)

Administratively, the reserve belongs to the Perm Territory. The reserve lies between the rivers Usva and Vilva (58°45'–59°00' N, 58°15'–58°38' E) within the Volga-Kama basin, which is a part of the Caspian Sea basin. The territory is remote from the industrial centers. However, the Kizelovsk-Gubakha and Lysva-Chusovskoy industrial hubs with developed mining, chemical and metallurgical industries are located within 42–73 km to the west of the ridge. They can be sources of technogenic pollution of the reserve.

2.2 . Natural conditions

Geological framework. Sedimentary cover, mainly consisting of Permian sandstones, clays, marls, limestones, dolomites, and anhydrites stretches along the eastern margin of the East European Craton. In the piedmont and partly in the mountain belt of the Urals, there is a strip of Carboniferous and Devonian sediments, comprising various limestones in the upper horizons. The geological framework of the Basegi reserve comprises Upper Proterozoic rocks, which are subdivided into two series: Basegy and Serebraynsky (Chronicle of Nature Reserve "Basegi", 1997). The territory of the reserve is composed of metamorphic rocks, such as chlorites, chlorite-sericites, mica schists, and quartzites. The bedrock is covered with Quaternary deposits. Thus, the Basegi Ridge is confined to a strip of weathering-resistant quartzite sandstones of the Oslyansk Formation – the oldest rocks in the reserve (quartz, mica-quartz, feldspathic-quartz species).

Geochemically, the territory of the Basegi Reserve is a province enriched by such elements as nickel, chromium, cadmium, and molybdenum in comparison with the Ural regional background (Larionova, 2004).

Relief. The Basegi Ridge belongs to the Vishera-Chusovskoy regional uplift in the low-mountain region of the Middle Urals. The Basegi Ridge that shapes the reserve's orographic plan extends meridionally

in accordance with the tectonic structure. The ridge is a chain of three peaks, Sredny Baseg in the middle reaching 994.7 m (Fig. 2). To the north of it is Severny Baseg (951.9 m); to the south, Yuzhny Baseg. The peaks are separated by saddles with absolute heights of about 650 m.

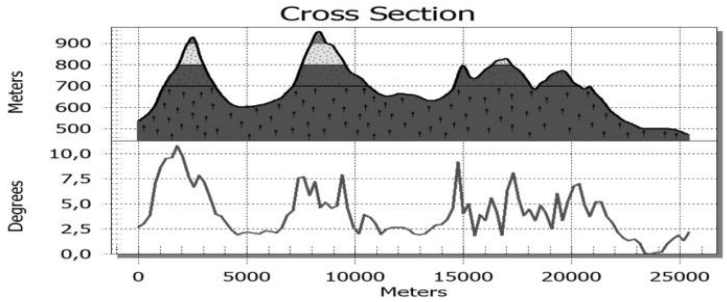

Fig. 2. Geomorphological profile of the Basegi Ridge (Samofalova, Shutov, 2017)

The asymmetrical profile is typical of all the Basegi peaks. The gentler eastern slope is replaced by a steeper western slope, which is associated with the tectonic structure of the territory. In the plan, each of the peaks extends from north to south in accordance with the course of the whole ridge. The glacier had not reached the Basegi Ridge, and due to this, the processes of goltsy denudation prevailed there, having fractured the massif into isolated peaks. At present, the main relief-forming processes are the activity of flowing waters and the gravitational movement of weathering products. The river valleys are poorly developed due to the hardness of the underlying rocks, but the depressions between the watersheds are rather wide. The watersheds are also wide and strongly and deeply dissected by a dense network of narrow river valleys.

The prevailing modern processes of relief formation are weathering, denudation, and slope, fluvial and biogenic processes. Aeolian transportation is observed on the tops. The peculiar mountainous terrain of the reserve acts as a distributor of heat and moisture and has a notable impact on the landscape structure of the territory: it determines the high intensity of runoff and erosion, increases the mechanical migration of chemical elements, and conditions altitudinal zonality.

Climate. The Basegi reserve is located in a temperate climate zone. The climate is continental and characterized by sharp fluctuations in average annual air temperature. In summer, fluctuations in day and night temperatures reach 15–29°. The average annual air temperature is below 0 °C. Winter is long and harsh, with an average air temperature of –18 °C and below in January. Such temperatures provide a steady 1.5–2.0 m snow cover. Summer is moderately warm, with the average air temperature of 15–17 °C in July. The short, frost-free summer period lasts 70–80 days on average (Leushina, 2012). The temperature regime is also determined by the altitude above sea level, and every 100 m the temperature decreases by 0.5 °C. In winter, the opposite is observed: the temperature rises by 1–3 °C at higher altitudes while cold air stays in the depressions. The amount of precipitation (800 mm) is the largest for the Perm Territory. The warm period accounts for 60 % of the annual precipitation.

A large amount of precipitation and dissected relief enhance the migration of substances with surface waters. The climatic conditions provide leaching moisture regime, low microbiological activity due to the lack of soil heat, constant leaching of elements from the soil profile and low-active decomposition of organic residues.

The reserve climate is typically mountainous, causing vertical zonality of vegetation and soil cover. The zonality is often disturbed due to differences in the steepness and exposure of the slopes forming different water and thermal regimes.

Altitude zoning. According to the geobotanical zoning of the Perm Territory, the Basegi Ridge belongs to a sub-district of spruce, fir and birch forests in the mountain-taiga fir forest district. According to the vegetation cover zoning, the studied territory is located in the middle taiga subzone of the boreal forest zone within the western spurs of the Ural highland. In the Middle Urals the mountain forest, sub-goltsy (subalpine), mountain tundra (alpine) belts are clearly expressed. In addition, there are three expressed sub-

belts in the sub-goltsy (subalpine) belt (sparse park-like forests, elfin forests, subalpine meadows) (Gorchakovsky, 1975, Balandin, Ladygin, 2002).

2.3 . Objects of study

The object of study was the soil cover of the Basegi Reserve. The studies were conducted in an experimental plot in the Maly Baseg river basin in 2010–2014. To study the soil cover on various relief features in the most typical biogeocenoses, soil profiles were made starting from the altitude of 315 m.a.s.l. (mountain forest belt) to 950 m.a.s.l. (goltsy belt) on Severny Baseg. Twelve spots were selected for making the soil profiles. The morphological profile of the soil was described, and samples were taken from the genetic horizons. The profiles were cut according to the standard technique. We used the substantive-profile soil classification according to the Field Guide to Soils (2008). Soil categories according to World Reference Base for Soil Resources (2014) are indicated in parentheses.

2.4 . Research Methods

The distribution of elements in the soil cover was comprehensively studied using the methodological instruments of landscape-geochemical studies, physico-chemical, physical and chemical analysis of soils, and statistics. The samples were analyzed at the Department of Soil Science of the Perm State Agro-Technological University (Perm, Russia) using generally accepted methods. The following indicators were determined: pH of salt extract and aqueous extract potentiometrically; organic carbon content in mineral soils by the Tyurin method modified by Antonova et al. (1984); hydrolytic acidity; total absorbed bases; degree of soil saturation with bases. The content of macro- and microelements was analyzed using the ReSPECT energy dispersive X-ray fluorescence spectrometer and the Agilent AES-4100 atomic emission spectrometer (25 elements) in the laboratory of soil physics and chemistry at the Dokuchaev Soil Science Institute (Moscow, Russia).

The obtained data was statistically processed in the Data Analysis software using Microsoft Excel and STATISTICA 6.0. The information-logical analysis was performed in the ALI software developed L.M. Burlakova and D.I. Ivanichkin of the Altai State Agrarian University. The significance level of statistical data processing results was considered reliable at $p < 0.95$.

2.5 . Geochemical parameters

Based on the data on the content of macro- and microelements, geochemical indices that reflect certain soil processes were calculated:

1.Subsoil Weathering Indices A and B (Kronberg, Nesbitt, 1981):

$A=(CaO+Na_2O+K_2O)/(Fe_2O_3+CaO+Na_2O+K_2O)$;

$B=(SiO_2+CaO+Na_2O+K_2O)/(Al_2O_3+SiO_2+CaO+Na_2O+K_2O)$;

2.Chemical Index of Alteration ($Al_2O_3/(Al_2O_3+CaO+Na_2O+K_2O)100$) (Nesbitt et al., 1982; Rusanova, Shakhtarova, 2012; Ryabogina, 2013, Kalinin, Alekseev et al., 2016; Tunçay, Dengiz, 2016; Senol, Tunçay, Dengiz, 2018). CIA indicates the degree of weathering and transformation of the mineral mass in soil formation, which reflects the ratio of primary and secondary minerals. It can act as an indicator of climate dynamics. Increasing CIA values point to increasing activity of soil formation and, therefore, to an optimization of natural conditions.

3.Weathering Index $Al_2O_3/(MgO+CaO+Na_2O+K_2O)$. This is an indicator of the hydrolysis of minerals (Vlag et al., 2004; Alekseev, Alekseeva, 2012, Ryabogina, 2013). The index determines the intensity of soil material weathering in different periods. Increasing Weathering Index values point to strengthening continentality of the climate and increasing values of both extreme temperatures.

4.Homogeneity Index TiO_2/Al_2O_3. This index helps estimate the degree of homogeneity of the composing material and identify the periods of intake of foreign soil with different properties (Alekseev, Alekseeva, 2012, Ryabogina et al., 2013, Tunçay, Dengiz, 2016; Senol, Tunçay, Dengiz, 2018). A sharp change in the index value indicates periods of increasing erosion activity and introduction of erosion material.

5.As a result of chemical weathering, there occur the processes of loss of bases and desilication with a relative residual accumulation of aluminum and iron oxides. Several special indices can be used to assess the

degree of weathering, (Lisetskii, Marinina, 2015), such as total content of Mg, Ca, K_2 (%), molecular ratio CaO:MgO; Na:K; (K+Na)/Al; total content of Si and Al (%); and molecular ratio (Al+Si)/Fe; $(CaO+MgO+10*P_2O_5)/SiO_2$.

3. Results

The soils of the following divisions were identified within the experimental plot according to the morphological description: *Alfehumus soils, Structural Metamorphic Soil, Organic Matter Accumulative Soil, Lithozem Soil, Gley Soil* (Table 1).

The following vertical order of soil zones on the slopes of Severny Baseg was established: (1) *Brown Forest Soil* at 315–655 m.a.s.l. (*Cambisols*); (2) *Gray-Humus*, *Organic Matter Accumulative Soil* at 570–760 m.a.s.l. (*Subalpine Mountain Meadow Soils, Umbrisols*), confined mainly to the slopes of the southern and eastern exposures; (3) *Lithozem* at 755–930 m.a.s.l. (*Leptosoils*); (4) *Podbur* at 930-950 m.a.s.l. (*Umbrisol*). The chemical composition was determined for twelve profiles, which were made in different vegetation conditions and at different altitudes.

The morphology and the physicochemical properties of the soils have been earlier described in a number of works (Samofalova, 2012; Samofalova, Luzyanina, 2014a; Samofalova, Luzyanina, 2014b; Samofalova, 2015; Samofalova et al., 2015; Samofalova et al., 2016; Samofalova, 2017).

Table 1. Classification of soils

Profile altitude (m.a.s.l)	Profile formula	Soil type	
		Field Guide to Soils (2008)	WRB (2015)
18, 930	O-ao-AY-BF-C	Sod Al-Fe-Humus soil (Sod-Podbur)	Enti Umbric Podzol
30, 794	Ad-AYao-AY-BM-C	Raw Humus Burozem	Distric Cambisol
31, 743	O-ao-E-BF	Dry Peat Litho-Podzol	Leptic Histic Podzol
32, 691	Ad-ay-AY-AYf-BM-C	Ferrous Illuvial Burozem	Ferric Cambisol
29, 613	Ad-ay-AY-BMf-Cf	Ferrous Illuvial Burozem	Ferric Cambisol
28, 609	Ad-AY-aym-AYm-C	Metamorphic Grey-Humic (sod) Soil	Cambic Umbrisol
27, 595	O-AYf-AYg-BMg-Cf,g	Gleyic Ferrous Iluvial Burozem	Ferric Gleyic Cambisol
17, 590	O-AY-AYf-BMf-BM-C	Ferrous Illuvial Burozem	Ferric Cambisol
15, 577	O-AYao-AY-BMg-Cg	Gleyic Burozem	Gleyic Cambisol
19, 565	O-AY-BMel-BM-C	Eluviated Burozem	Fulvic Cambisol
24, 518	O-Oao-G-GC-Cg	Peat Gleyzem	Histic Gleysols
26, 315	O-AY-AYi-BM-C	Clay-Illuvial Burozem	Luvic Cambisol

In the organic-mineral horizons, Organic Matter (OM) were represented by detritus, and fine humus is represented by dark brown or brownish clots. The OM content in soils varied widely from 1.2 to 21.4 %. In depth, the amount of OM gradually decreased. The soils were very strongly acidic (pH_{KCl}) regardless of the altitude and the growing vegetation (3.01–3.97 units). Hydrolytic Acidity (Hg) was fairly high; in the upper horizons, it ranged from 8.8 to 25.2 cmolc·kg^{-1}. The highest Hg values were observed in the organogenic-accumulative horizon. Down the profile, the Hg value decreased. There was a clearly defined spatial pattern in the distribution of the potential acidity value: the highest values were noted in the soils of the northern, north-western and western slopes, as well as at the top of Severny Baseg. As for the altitude belts, no patterns were found in the change in acidity (Samofalova, Luzyanina, 2014a; Samofalova, Luzyanina, 2014b; Samofalova, Luzyanina, 2013). It was established that the soils were depleted in exchange bases (from 1–2 to 22.3 cmolc·$kg^{-1}$of soil). The Cation Exchange Capacity (CEC) varied considerably from 8.8 to 42.3 cmolc·kg^{-1}, while remaining moderately low on average. Down the profile, the CEC value gradually decreased. In some cases, the content of exchangeable cations increased in the rock and the transition horizon. The physico-chemical properties are indicators of the manifestation of geochemical barriers for heavy metals.

The composition and the geochemical features of the mountain soils of the Middle Urals have been considered in previously published works (Samofalova, Luzyanina, 2014a; Samofalova et al., 2014; Samofalova et al., 2015; Samofalova et al., 2016; Samofalova, 2014; Samofalova et al., 2016). It was established that the soil formation processes do not produce a distinct differentiation in macroelements content of the profiles, and the determining factors of differentiation are the litho-petrographic and climatic conditions, the geochemical structure of the landscape and the evolution of landscapes in the Holocene. The cluster analysis showed that Al, Fe, K, Ca, Mg, Mn accumulate in the soils of the mountain forest belt. It was confirmed that the climate change in the Late Holocene had a decisive influence on the formation of the soil cover.

The studied soils were grouped based on the conditions of soil formation and physicochemical properties for the statistical processing of analytical data: Group 1 (profiles 18, 28, 29, 30, 31, 32) – goltsy-subgoltsy belt (elfin forest, subalpine meadows); Group 2 (profiles 15, 17, 19, 24, 26, 27) – mountain forest belt and sparse park-like forest; Group 3 – no division into belts and sub-belts (all soils). The elementary composition of the soils was identified within these groups.

4. Discussion

The total content of Si and Al in soils varies from 33 to 43%. More than 40% of silica and alumina are found in the *Litho-Podzol* horizons (profiles 31). This indicator changes along the soil profile and gradually increases towards the rock.

The total content of Si and Al soils also varies depending on the altitude. Thus, in the goltsy-subgoltsy belt this relationship is strong for both the upper and the lower horizons (r = 0.70 and 0.85, respectively). In the sparse park-like forest belt and the mountain forest belt, this relationship is medium and inverse to the total Si + Al content in the rock and the altitude (r = -0.60). For the upper humus horizons, this relationship is very weak. Therefore, in the course of their development the soil profiles of the sparse park-like forest and mountain forest belts transformed most of all as compared to the rocks (r = 0.41) and the soils at higher altitudes, where the upper and lower horizons of the profile are more alike in the Si + Al content (r = 0.78).

The ratio of the total silica and alumina content to iron (Si + Al)/Fe varies depending on the soil formation conditions. Thus, at 700 m.a.s.l. and higher the ratio is the broadest (over 21.0); at 590–690 m.a.s.l. the ratio narrows to 12.5–15.0; and in the sparse park-like forest and mountain forest belts at 315–590 m.a.s.l. the ratio expands to 16.2–19.5. Such variability points to a complex of profile-forming processes that are characteristic of certain geomorphological and climatogenic conditions. The narrowest ratio is characteristic of soils forming in meadows under high-grass vegetation (profiles 28, 29, 32), and it points to the maximum manifestation of the sod-meadow process. A downward change in the (Si+Al)/Fe ratio within the soil profile signifies the overlapping horizon-forming processes, such as gleying, ironification, while an upward change points to eluviation and podzolization. The broadest ratio is typical of *Litho-Podzol* soils (profile 31, Table 2).

The information-logical analysis of changes in the (Si+Al)/Fe ratio in different diagnostic horizons (AY, BM, E, G, BHF, C) revealed their specific state. Thus, the humus horizons of the mountain taiga and park forest soils have the narrowest ratio of less than 16 units; the structural-metamorphic horizons BM and horizon C (eluvium of rocks) are characterized by a specific state of the ratio within 16-20 units; the illuvial-humus-ferruginous horizons of BHF show the (Si+Al)/Fe ratio of more than 20 units; and the gley horizons have the (Si+Al)/Fe ratio of less than 16 units. The overall explanatory value of the ratio can be assessed as high. Therefore, the ratio of rock-forming elements in soils can be used to identify the direction and the type of soil formation.

The total content of potassium and alkaline earth metals calcium and magnesium in the soils of the goltsy-subgoltsy belt shows no loss of bases in the *Sod-Podbur Soil* (profile 18) at 930 m.a.s.l. and in the soils formed under meadow vegetation (profiles 29, 28) at 590–613 m.a.s.l. (Table 2). A clearly pronounced loss of bases can be observed in *Burozems* and *Litho-Podzol*. In the sparse park-like forest and mountain forest belts, as well as in *Gley* (profile 24), the profile splits into two parts according to the total content of K, Ca and Mg: the humus horizons are depleted in the elements while the structural-metamorphic horizons are enriched (Table 3). Perhaps, there is a geochemical barrier for these elements at the interface.

The content of calcium and magnesium in the soil composition controls the degree of weathering of the soil-forming material. The molecular ratio of oxides signifies the biological accumulation of calcium in

the upper part of the *Burozem* profile and in the *Gray-Humus Soils*. Oxidation ratios regularly decrease from top to bottom of the profile. This pattern does not manifest itself in *Sod-Podbur* (profile 18 at 930 m.a.s.l.), *Litho-Podzol* (profile 31 at 743 m.a.s.l.) and *Gleyzem* (profile 24 at 518 m.a.s.l.). The narrowest ratio, sharply differing from the upper and lower horizon, is observed in the podzolic horizon in *Litho-Podzol*.

Alkaline elements Na and K can, to some extent, signify accumulation or destruction (weathering) of in various minerals. The soil mass of mountain soils includes a large amount of sand and dust particles, mainly quartz (SiO_2) and feldspars (carriers of CaO and Na_2O). Minerals of the micas and illite group act as K_2O carriers in the clay fraction of soil and, therefore, analysis of the K_2O distribution in the chemical composition along the profile can point to the distribution of these minerals over the horizons (Sokolova et al., 2005). The molecular rations of Na and K signify the variation of the mineralogical composition of the soil profile and, accordingly, the degree of weathering and the presence of mineral carriers of these elements. Feldspars predominate in broader ratios, while micas and illites, in narrower ratios.

Thus, five types of distribution in the soil profiles can be distinguished according by the change in the Na:K ratio. First, uniformly eluvial distribution signifies the elementary soil-forming processes of mineral substance metamorphism in *Sod-Podbur* (profile 18) and *Burozem* (profile 29) on the southern slope of Severny Baseg.

Second, evenly accumulative distribution is observed in soils below 600 m.a.s.l., namely, in raw humus *Gleyic Burozem* (profile 15, 577 m.a.s.l., eastern exposure) and *Raw Humus Gleyzem* (profile 24, 518 m.a.s.l., western exposure). A similar type of distribution of the Na:K ratio is typical of *Ferrous Gleyic Burozem* (profile 27 at 577 m.a.s.l., southern exposure) for the humus (4-26 cm) and middle (26–67 cm) profile parts. A polygenetic profile is distinctly different in mineralogy: micas and illites dominate in the humus part of the profile, and a wider ratio is noted in the lower, more gleyic part (twice as much as in humus), which indicates the predominance of feldspars in the lower horizons. Therefore evenly accumulative distribution of the Na:K ratio points to the gleic process and, accordingly, the gley content of the profile.

Table 2. Geochemical indicators for the soils in the goltsy and sub-goltsy belts

Profile, altitude (m.a.s.l)	Horizon (cm)	Ca+Mg+K (%)	CaO/MgO	Na/K	TiO_2/Al_2O_3	(K+Na)/Al	Si+Al (%)	(Si+Al)/Fe	(CaO+MgO+10*P_2O_5)/SiO_2	CIA	Al_2O_3/(CaO+MgO+Na_2O+K_2O)
Sod Al-Fe-Humus Soil (Enti Umbric Podzol)											
18, 930	AY, 6-24	2.80	0.14	0.61	0.088	0.24	39.17	23.95	0.042	89	1.87
	BF, 24-41	2.82	0.17	0.76	0.079	0.25	39.20	24.87	0.043	87	1.81
Raw Humus Burozem (Distric Cambisol)											
30, 794	AYao, 13-23	1.82	0.32	0.54	0.129	0.25	38.13	32.10	0.021	89	2.68
	AY, 23-32	2.12	0.25	0.43	0.107	0.23	37.47	21.09	0.027	90	2.44
	BM, 32-50	2.46	0.16	0.58	0.090	0.23	39.57	27.59	0.036	89	1.94
	C, 50-	2.60	0.15	0.94	0.085	0.28	41.90	31.26	0.036	85	1.70

	75										
Dry Peat Litho-Podzol (Leptic Histic Podzol)											
31, 743	ao, 6-9	1.10	0.45	2.36	0.229	0.54	41.05	125.99	0.012	70	1.46
	E, 9-22	1.26	0.14	2.82	0.180	0.53	43.46	52.93	0.009	71	1.54
	BF, 22-33	1.55	0.91	0.82	0.142	0.28	42.22	35.64	0.007	87	3.10
Ferrous Illuvial Burozem (Ferric Cambisol)											
32, 691	ay, 5-9	2.91	0.12	0.34	0.146	0.26	36.40	13.02	0.047	92	2.23
	AY, 9-22	2.82	0.15	0.22	0.129	0.23	36.84	12.85	0.038	94	2.61
	AYf, 22-37	3.07	0.11	0.19	0.120	0.21	37.40	12.59	0.044	95	2.41
	BM, 37-58	3.02	0.11	0.36	0.119	0.24	38.17	13.38	0.042	92	2.22
	C, 58-68	3.29	0.11	0.37	0.112	0.24	39.31	14.09	0.046	92	2.06
Ferrous Illuvial Burozem (Ferric Cambisol)											
29, 613	ay, 3-8	3.91	0.26	0.56	0.144	0.28	35.21	14.15	0.090	83	1.30
	AY, 8-18	3.96	0.26	0.75	0.139	0.33	36.47	14.24	0.092	81	1.29
	BMf, 18-74	3.92	0.21	1.09	0.130	0.36	37.26	13.85	0.089	79	1.23
Metamorphic Grey-Humic (sod) Soil (Cambic Umbrisol)											
28, 609	AY, 4-13	4.03	0.51	0.60	0.159	0.32	33.18	15.03	0.100	76	1.08
	aym, 13-18	3.98	0.31	0.61	0.155	0.30	35.06	13.66	0.095	80	1.18
	AYm, 18-35	4.50	0.23	1.01	0.136	0.34	37.52	13.10	0.099	78	1.10
	C, 33-43	4.54	0.25	0.71	0.136	0.30	38.11	13.73	0.092	80	1.10

Table 3. Geochemical coefficients for the soils in the mountain forest belt

Profile, altitude (m.a.s.l)	Horizon (cm)	Ca+Mg+K (%)	CaO/MgO	Na/K	TiO_2/Al_2O_3	(K+Na)/Al	Si+Al (%)	(Si+Al)/Fe	(CaO+MgO+10*P_2O_5)/SiO_2	CIA	Al_2O_3/(CaO+MgO+Na_2O+K_2O)
Gleyic Ferrous Iluvial Burozem (Ferric Gleyic Cambisol)											
27, 595	AYf, 4-12	3.89	0.40	0.76	0.106	0.27	37.99	17.76	0.083	81	1.41
	AYg, 12-26	3.91	0.36	0.52	0.123	0.26	39.05	16.26	0.071	83	1.44
	BMg, 26-57	4.34	0.32	1.63	0.142	0.47	38.56	14.83	0.083	69	0.91
	Cf,g, 57-67	4.41	0.34	1.10	0.117	0.37	38.97	14.15	0.080	75	1.07
Ferrous Illuvial Burozem (Ferric Cambisol)											
17, 590	AY, 4-13	2.67	0.23	0.12	0.101	0.18	34.72	18.09	0.061	94	2.27
	AYf, 13-23	2.90	0.15	0.32	0.096	0.22	35.33	16.61	0.060	92	1.96
	BMf, 23-32	3.13	0.17	0.49	0.092	0.25	39.48	18.84	0.046	89	1.78
	BM, 32-46	3.16	0.18	0.13	0.088	0.19	40.19	19.71	0.043	93	1.91
	C, 46-56	3.40	0.15	0.54	0.115	0.26	40.25	19.25	0.050	88	1.65
Gleyic Burozem (Gleyic Cambisol)											
15, 577	AYao, 10-14	2.70	0.35	0.75	0.099	0.31	39.98	20.60	0.034	83	1.68
	AY, 14-21	3.10	0.18	0.75	0.090	0.27	40.20	17.82	0.046	85	1.58
	BMg, 21-43	3.31	0.15	0.69	0.095	0.25	39.79	16.94	0.053	87	1.58
	Cg, 43-70	3.05	0.19	0.55	0.176	0.25	40.14	17.32	0.041	87	1.70
Eluviated Burozem (Fulvic Cambisol)											
19, 565	AY, 6-15	1.80	0.26	1.29	0.134	0.41	25.79	12.31	0.042	77	1.34
	BMel, 15-30	3.58	0.19	0.70	0.130	0.26	38.49	14.19	0.069	85	1.47
	BM, 30-72	3.82	0.19	0.90	0.120	0.31	38.69	14.65	0.071	82	1.24
	C, 72-82	4.42	0.35	0.99	0.102	0.35	38.65	14.17	0.084	76	1.09
Peat Gleyzem (Histic Gleysols)											
24, 518	G, 16-36	2.86	0.22	0.81	0.086	0.28	40.85	29.79	0.040	84	1.66
	GC, 35-58	3.22	0.17	0.77	0.079	0.26	40.19	15.91	0.052	86	1.59
	Cg, 58-	3.46	0.22	0.5	0.089	0.22	39.	16.22	0.058	87	1.61

	70			2			07				
Clay-Illuvial Burozem (Luvic Cambisol)											
26, 315	AY, 5-22	3.10	0.18	0.76	0.089	0.28	38.40	19.07	0.050	85	1.61
	AYi, 22-33	2.86	0.19	0.47	0.084	0.21	38.86	18.49	0.042	90	2.11
	BM, 33-57	3.04	0.17	0.58	0.095	0.25	40.10	19.00	0.043	87	1.68
	C, 57-67	3.10	0.20	0.66	0.094	0.28	41.01	19.55	0.039	86	1.67

Third, accumulative-eluvial-illuvial distribution occurs in Burozems and points to illuvial-accumulative processes, namely, ferruginization (profiles 30 and 32, 794 and 691 m.a.s.l., southern exposure; profile 17, 590 m.a.s.l., eastern exposure slope) in the subgoltsy belt and clayey illuviation (profile 26, 315 m.a.s.l., north-western exposure) in the lower part of the mountain forest belt; eluvial processes, namely, leaching, illimerization and acid hydrolysis of clays (profile 19, 565 m.a.s.l., western exposure). At a depth of 20–30 cm, these soils are characterized by narrower Na:K ratios, which indicates illitization and formation of secondary minerals *in situ*. In addition, the Na:K ratio can indicate polygeneticity in the profile development in *Ferrous Burozem* (profile 17) on the steeper northern slope of Severny Baseg, since ratio Na:K = 0.13 at a depth of 32–46 cm is approximately equal to that of humus horizon at a depth of 4–13 cm (Na:K = 0.12).

Fourth, eluvial-illuvial distribution is observed in *Gray-Humus Soil* at 590 m.a.s.l., where there is a sharp increase in the ratio value at a depth of 18 cm followed by a decrease along the profile.

Fifth, progressively accumulative distribution can be found only in *Litho-Podzol* (profile 31), where the upper horizons have the widest possible ratio of alkaline elements (2.36–2.82). It indicates the destruction of semi-stable minerals and the accumulation of acidic source minerals (spar) enriched with sodium (albite and oligoclase).

The ratio of alkaline metals to aluminum (K+Na)/Al characterizes the degree of leaching and eluviality within the profile. *Litho-podzol* in profile 31 showed the maximum degree of eluviality (0.53). In the soil horizons with the narrowest (K+Na)/Al ratio, the ferruginization processes are morphologically expressed (0.21–0.28).

Geochemical ratio $(CaO+MgO+10*P_2O_5)/SiO_2$ characterizes the biological activity of the soil through the ratio of biophiles (ash elements) to a more stable oxide in the soil profile. The highest index is typical of meadow soils formed under high-grass vegetation (profiles 28, 29). In *Burozems*, regardless of the altitude, the molecular ratios of oxides have narrower ratios (2–3 times less than in the organic matter accumulative soils). The lowest ratios of the index are observed in *Litho-Podzol*, varying from 0.012 in raw humus litter to 0.007 in soil-eluvium. Therefore, the geochemical ratio $(CaO+MgO+10*P_2O_5)/SiO_2$ can be a criterion that points to the soil type.

Homogeneity Index TiO_2/Al_2O_3 makes it possible to assess the homogeneity of the soil-forming rocks and determine the presence of secondary material (Alekseev, Alekseeva, 2012). The index varies widely in the upper (0.086-0.229) and lower (0.079–0.176) horizons. In the soils of the goltsy-subgoltsy belt, the ratios in the upper horizons are wider than in the soils of the eluvium, which indicates inwash of secondary material. A direct linear relationship was established between the ratios of the elements in the horizons in the upper and lower parts of the profile (r = 0.82). In addition, a negative relationship was established between the TiO_2/Al_2O_3 index and the terrain elevation for the upper horizons (r = -0.48) and soil-eluvium (r = -0.86). Therefore, the heterogeneity of the chemical composition of soil-eluvium and its changes are presumably associated with the terrain elevation.

In the soils of the sparse park-like forest and the mountain forest belts, the TiO_2/Al_2O_3 ratios in the upper horizons are, on the contrary, narrower than those in soil-eluvium and rather alike (see Table 3). It should be noted that on the slopes of the western (profiles 19, 24, 26) and eastern (profiles 15, 17), southern (profile 27) expositions of Severny Baseg, the ratios are different, which is probably due to the heterogeneity

of rocks by chemical composition on different slopes, which is due to the development of the territory. There is no connection between the rations of the elements in the upper and lower horizons of the profile, which may indicate a lithological heterogeneity of the profile horizons. In the sparse park-like forest and the mountain forest belts, the relationship between the TiO_2/Al_2O_3 index and the terrain elevation is positive and average for both the upper horizons and soil-eluvium (r = 0.45–0.46).

The distribution of the TiO_2/Al_2O_3 index over the soil profiles can be different. Thus, the soils of the goltsy-subgoltsy belt have evenly accumulative distribution of the index. Therefore, the soils of the goltsy-subgoltsy belt are distinguished by the lithological heterogeneity of the soil-forming rock and the soil profile due to the inwash of secondary material and its participation in weathering and soil formation. The accumulative-eluvial-illuvial distribution of the indices is noted in the soils of the sparse park-like forest and the mountain forest belts. This points to the lithological heterogeneity of the rock and the soil and also to the heterogeneity of the mineral material of the horizons in the profile. The reasons for the heterogeneity of the soil profile can be multiple and are associated with changes in soil formation conditions, mineral matter migration, processes of illimerization and partluvation, lateral subsurface runoff, and blowdown phenomena. Thus, the change in the TiO_2/Al_2O_3 index along the profile indicates the polymorphism and polygenetic character of the soils forming in the sparse park-like forest and the mountain forest belts.

The Nesbitt-Yang index is widely used to evaluate chemical weathering: $100xAl_2O_3/(Al_2O_3+CaO+Na_2O+K_2O)$ (Nesbitt et al., 1982). CIA indicates the influence of the moisture content on the weathering of minerals (Ryabogina et al., 2013, Alekseev. Alekseeva, 2012; Vodyanitskii et al., 2015; Senol, Tunçay, Dengiz, 2018; Tunçay, Dengiz, 2018). This index reflects the ratio of primary and secondary minerals in a total matter sample. It is also referred to as the chemical weathering coefficient and indicates climate dynamics and the degree of rock transformation (Nesbitt et al., 1982, Kalinin, 2009; Alekseev 2012; Kalinin et al., 2016; Ryabogina and et al., 2013; Dyakonova 2009; Druzhinina, 2012). High CIA values indicate profound changes in sediments and hence longer distance to the source of drift. For unweathered igneous rocks the CIA value does not exceed 50 units; for moderately weathered rocks, it varies from 60 to 80 (for clay shales from 70 to 75); and for the rocks that have undergone intensive chemical weathering (which indicates soil formation activity) it exceeds 80 units (McLennan et al. 1993; Tkachenko et al., 2009). CIA is used to assess paleoclimatic environments of fine-grained sediments formation. The threshold CIA value for sediments formed in cold climates is 70 units. Above this value the climate is considered humid; in the range of 60-70 units, transitional; less than 60 units, relatively arid.

The CIA value of the Basegi Ridge soils varies from 70 to 95 units, which indicates that the conditions of soil formation in the Middle Urals were humid and wet and that the mineral part of the soils has undergone profound transformation.

The peculiarities of CIA variation in the space and along the soil profile were determined, depending on the soil type and geobioclimatogenic conditions of soil formation. Thus, the weathering index in humus horizons varies depending on the exposure of the slopes (from top to bottom) of Severny Baseg mountain as follows: on the northern slope it varies from 89 to 85 units; on the southern slope, 89–70–92–83–76–81 units; on the eastern slope, from 94 to 83 units; and on the western slope, from 77 to 84 units. Thus, the conditions of weathering and soil formation differ depending on the exposure and the terrain elevation.

The next feature is that the CIA values may be different within one profile, especially in *Burozems*. In the middle part of the *Burozem* profile, the values are higher (87–95 units), which indicates claying. In some soils (profiles 28, 27, 17) there is a bimodal distribution of the CIA index that can signify the change in the ecological conditions of soil formation associated with hydrothermal factors, which, in turn, points to the polygenetic character of the soil.

Since soil types are confined to certain geobioclimatogenous formation conditions (Samofalova, Shutov, 2017), their CIA is different. In this regard, soil types can be arranged by the chemical transformation and the degree of weathering as follows: *Litho-Podzol* < *Gray-Humus* < *Clay-Illuvial Burozem* < *Eluviated Burozem* < *Peat Gleyzem* < *Gleyic Burozem* < *Sod Podbur* < *Raw Humus Burozem* < *Ferrous Burozem*. Therefore, physical weathering of the mineral part of the soil is more pronounced in *Litho-Podzol* than chemical weathering, while the opposite is observed in *Ferrous Burozem*.

The intensity of soil material weathering on Severny Baseg varies widely from 0.91 to 3.10. The minimum of weathering development with respect to $Al_2O_3/(CaO+MgO+Na_2O+K_2O)$ is observed in organic matter accumulative soils (1.08–1.30) that are formed under meadow grasses, *Eluviated Burozem* (1.09–1.47), *Gleyic Ferrous Burozem* (1.07–1.44), and *Litho-Podzol* (1.46–1.54). The maximum of weathering development (interestingly, along the entire profile) is noted in *Burozem* and *Sod-Podbur*, which are formed in more severe conditions at 650 m.a.s.l., with the index varying from 1.80 to 2.68. The intensity of weathering is somewhat lower in *Burozem*s of the sparse park-like forest and mountain forest belts; it varies in the range of 1.65–2.27.

Kalinin (2009), Alekseev and Alekseeva (2012), Ryabogina et al. (2013), and Kalinin et al. (2016) found that increased values of the Weathering Index point to strengthening continentality of the climate and increasing values of both extreme temperatures. This explains the higher intensity of weathering in soils above 650 m.a.s.l. More ancient sediments are characterized by a higher degree of transformation under the influence of weathering and soil formation processes (Kalinin et al., 2016). A jump in the Weathering Index values within one profile can identify ancient and young sediments.

Comparing the ratio $Al_2O_3/(CaO+MgO+Na_2O+K_2O)$ in soils above and below 650 m.a.s.l., it can be concluded that the transformation of the mineral part of the soils was more profound at higher altitudes of the ridge. The most differentiated profile was noted in *Litho-Podzol* (profile 31), where the Weathering Index reached maximum (3.10) at a depth of 22–33 cm. Accordingly, it can be assumed that this layer of soil-eluvium is more ancient than the overlying horizons.

The soils of the sparse park-like forest and mountain forest belts (Table 3), enduring the simultaneous development of two overlapping and interdependent geosystems (vertical zonation and basin formation), are differentiated by the intensity of weathering $Al_2O_3/(CaO+MgO+Na_2O+K_2O)$. This means that the chemical composition of soil horizons was forming in different hydrothermal conditions.

Subsoil Weathering Index A values distributed as follows: the highest values were onserved in the soils at 700–900 m.a.s.l. with a maximum intensity of weathering in *Litho-Podzol* (profile 31); the lowest values, below 700 m.a.s.l. Index A shows that the intensity of weathering varies by to the genetic horizons of the soil, depending on the mineralogical composition. Three types of profile variation were identified for Index A: gradually decreasing (profiles 31, 28, 15, 24), gradually increasing (profiles 18, 29, 17, 19), and differentiated (profiles 30, 32, 27, 26). Subsoil Weathering Index B varies slightly in the studied soils, but four types of profile variation can be identified for Index B: uniform (profiles 18, 30, 32), gradually decreasing (profiles 31, 28, 29, 24), gradually increasing (profile 27), and having a minimum in the middle part of the profile (profiles 26, 19, 15, 17).

The degree of weathering intensity of the upper horizons for Indices *A* and *B* is presented in Figure 3. The soils can be interestingly grouped by the intensity of weathering. Profile 31 stands out with the maximum intensity of weathering (*Litho-Podzol*). It is believed that high values of Index *A* indicate a greater water saturation of the soil (Kronberg, Nesbitt, 1981).

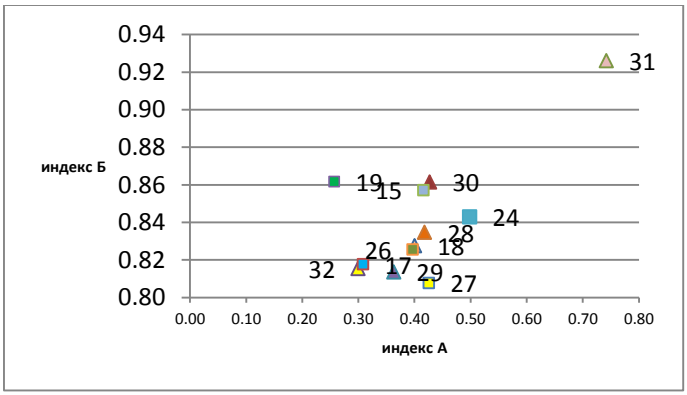

Fig. 3. Intensity of weathering by Indices *A* and *B* (profiles 15, 17, 18, 19, 24, 26, 27, 28, 29, 30, 31, 32)

The maximum values of Index *A* are distinguished in *Litho-Podzol* (profile 31) and *Gleyzem* (profile 24), but with sharply differing values of Index *B*. This indicates a different effect of soil formation in excessively humid conditions of the mountains, which may be accompanied by signs of gleying (profile 24) or their absence (profile 31). The gleying process develops under the conditions of alternating periods of water saturation and aeration, which causes reductive-oxidative differentiation of iron. This water saturation regime produces gley horizons, having bluish color (profile 24, *Gleyzem*). The *Alfehumus Podzol* formation leads to chemogenic eluvial-illuvial differentiation of the soil profile. A bleached whitish podzolic horizon is formed under the organogenic horizon. Such podzolic horizon is depleted sesquioxides and enriched with silica as compared to the underlying alfehumus horizon and the rock (profile 31, *Litho-Podzol*).

Burozems (profiles 15, 19, 30) by index B are concentrated at the next level with the increasing values of Index *A* from profile 19 (565 m.a.s.l.) to profile 30 (794 m.a.s.l.). The eluviated subtype (profile 19) is somewhat different in weathering conditions. The intensity of weathering in *Gleyzem* (profile 24), *Gray-Humus* (profile 28) and *Sod-Podbur* (profile 18) occupies the next third level of values, with a decrease in both indices. The soils on the southeastern slopes of the mountain (profiles 32, 29, 27, 17) are at the next level (the lowest one by index *B*), and this means that the intensity of weathering is close to these soils by its manifestation. *Litho-Podzol* is characterized by excellent weathering intensity. This fact confirms the origin of this soil at excessive moisture, but without visible signs of gleying, which consequently creates other conditions for the weathering of the mineral mass of the soil.

5. Conclusion

Geochemical indices, characterizing various conditions and intensity of weathering and soil formation, help to understand the geochemical features of the soil composition in the Middle Urals. The study established that:

– the soil in the studied area endured a change of environmental conditions in the process of its formation;

– the heterogeneous mineral composition had an impact on the degree and the intensity of weathering of the mineral soil mass;

– the most heterogeneous in their mineral and total composition are the soils of the sparse park-like forest belt and the mountain taiga belt (below 600 m.a.s.l.), which points to the polygenetic nature of profiles and different age of the studied horizons;

– the soil formation processes predominate in the soils of the sparse park-like forest belt and the mountain taiga belt, while the weathering processes predominate in the soils above these belts;

– the physical and chemical weathering manifests itself in various combinations, depending on the altitude, vegetation and morphometric characteristics of the territory: in the soils of the sparse park-like forest belt and the mountain taiga belt weathering is mainly chemical, while in the soils of the subgoltsy belt and the tundra best (above 700 m.a.s.l.) weathering is mainly physical;

– geochemical index CaO/MgO indicates soils with pronounced sod processes; moreover, the evenly accumulative distribution of the index is an indicator of the development of *Burozems* and *Organic Matter Accumulative Soils*;

– the Na:K ratio helps to rank the soil profiles according to the degree of physical weathering and reveals the geochemical barriers in the soil profile and their heterogeneity in mineral composition; the evenly accumulative distribution of Na:K within the profile indicates gleying;

– the narrow (K+Na)/Al ratio points to ferruginization in the *Burozem* profile, and the broad ratio indicates eluvial processes, which are most pronounced in *Litho-Podzol* (profile 31 at 743 m.a.s.l.);

– in the soils forming above 600 m.a.s.l. homogeneity Index TiO_2/Al_2O_3 points to the heterogeneity of the mineral composition of the profile horizons and the eluvium of rocks, while in the soils below 600 m.a.s.l. the heterogeneity of horizons within the profile occurs due to superimposed horizon-forming processes, which are manifested in the form of genetic features of the soil; this indicates polymorphism and polygenetic character of the soil in the sparse park-like forest belt and in the mountain forest belt, as well as different age of the horizons;

– the evolutionary-genetic peculiarities of the TiO_2/Al_2O_3 distribution confirm the development of soils in different directions: upward due to the aerial transport of fine earth, denudation on the slope, the thickening of the organogenic horizons; down due to the transformation of rubble and eluvium of rocks during weathering and primary soil formation into fine earth in the mineral soil horizons; joint manifestation and combination of these trends in can be observed in the profile development;

– lithochemical index CIA indicates the degree of chemical weathering of the mineral mass in soils: from moderate (60–80 units) in transition zones of ecotones (in *Litho-Podzol, Gray-Humus*, *Gleyic Ferrous Burozem*) to active (more than 80 units) in *Podburs* of the tundra belt, *Burozems* the goltsy-podgoltsy belt and the mountain forest belt, and in *Gleyzems*;

– CIA allows arranging the soil types by their chemical transformation and weathering as follows: *Litho-Podzol* < *Gray-Humus* < *Clay-Illuvial Burozem* < *Eluviated Burozem* < *Peat Gleyzem* < *Gleyic Burozem* < *Sod-Podbur* < *Raw Humus Burozem* < *Ferrous Burozem;*

– as for the degree of weathering intensity of the upper horizons by indices *A* and *B*, the maximum values of index *A* are noted in *Litho-Podzol* (profile 31) and *Gleyzem* (profile 24), but with sharply differing values of index *B*; this indicates the chemogenic differentiation of the soil profile, such as *Alfehumus Podzol* formation in *Litho-Podzo*l and reductive-oxidative differentiation of iron in gley.

Therefore, the geochemical indication of the processes of weathering and soil formation in the soils of the Basegi Ridge established the evolutionary genetic features of the total composition of mountain soils and the geochemical heterogeneity of the soil cover of high-altitude landscapes in the Middle Urals.

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School Forestry "Forest Land": Vectors of Modern De-Velopment of Children's Association

The study was performed in the framework of the projects
– №17-2-004618 "Quest technology as a means of promoting school forestries of the Zabaikalsky Krai" – the winner of the second contest of the Presidential grant fund for the development of civil society (2017);
– №18-2-004649 "Lestorium", the developing innovative space for members of the school forestry" – winner of the second contest of the Presidential grant fund for the development of civil society (2018).

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Abstract

This study deals with the specifics of the children's associations as a so-cial institution and their educational potential in modern society. The paper presents the features of the organization and activities of the special children's association of the Zabaykalsky Krai, the school forestry "Forest land". It is classified as state and public one. The study involved grouping and compari-son to analyze a series of surveys of 130 students in general education and 130 parents. It is concluded that the involvement of children and adolescents in school forestry directly depends on their parents. The project "Quest technolo-gy as a means of popularizing school forestry of the Zabaikalsky Krai" was implemented with the support of the Presidential grants fund. The project in-volved the schoolchildren of Chita into environmental activities and organized the activities of children's association (school forestry) together with their par-ents. Currently, there are 11 school forestries in Chita with a total membership of more than 1,000 people. This study presents the development of innovative space for members of school forestry with no analogues on the territory of the Russian Federation: "Lestorium".

Keywords: children's associations, children's organizations, school forestry, quest technol-ogy, presidential grants, Lestorium.

1. Introduction

According to candidate of sociology and doctor of pedagogical sciences S. B. Tsymbalenko, a new living environment of humankind has almost been formed. He wrote: "The Internet and the information space in general are a continuation, strengthening of personal and group social space" [18]. The study performed by the group leaded by the corresponding member of RAO, doctor of psychological sciences G. U. Soldatova on using information and communication technologies in various online contexts by modern Russian children and adolescents concluded about the phenomenon of media multitasking and multitasking mode in children and adolescents. The realities of the information world allowed the researchers to state the emergence of a new social situation of the development of the modern child, the most important component of which is the Internet [13].

The specifics of social development of a person in the information society is its dependence on the diversity of social institutions (both real and virtual), the subject of which a person becomes as they grow up. Assuming that social institution is a set of norms, regulations and requirements with which society regulates and controls the activities of people in the most important spheres of social life, ***it seems that the result of the social formation of a young person within a particular social institution is accepting of a system of social values and norms, the assimilation of patterns of behavior in group processes, the adoption of a system of statuses and roles inherent in this social institution***.

The most important social institutions for adolescents are those that make their leisure. It is in leisure that has institutions of additional education, public associations, sports clubs and art schools, youth clubs,

yard companies, informal associations that provide positive socialization. On the one hand, it is a fact. On the other hand, there are criminal groups and religious sects that make negative socialization. All of them together affect the formation of a growing person [5, 6].

The Institute of children's (youth) public organization significantly contributes to individual adaptation to the system of existing social relations, as well as to their transformation. A. V. Volokhov argues that "children's socialization in the children's public organization is a dialectic process of gaining experience in social relations and the development of new social roles. It takes place in the spheres of activity, communication and self-knowledge by learning, assimilation, appropriation, enrichment and transfer of the child's experience of social interaction of children and adults. Features of children's socialization in children's public organizations are the relative independence of children's organizations from state social institutions, allowing to predictably 'focus' children on the nature of social relations in future. The voluntary inclusion of children in social relations allows for their socialization, and takes into account their interests and needs. Optional assimilation of social experience, carried out by children in children's organizations, takes into account the adults' opinions, mediated by their attitude to these adults and the specifics of the activities of the preferred children social institution" [1].

Main research problems. What are the characteristics of children's association as a social institution? What is the educational potential of children's association? What are the features of the school forestry "Forest land" (Zabaikalsky Krai) as a state public children's association?

Aim of research is to define essential characteristics and educational potential of children's school forestry as a special type of children's public association on the example of the school forestry "Forest land" (Zabaikalsky Krai).

2. Research methods of this study are:

method of mass questionnaire survey; analysis of scientific literature on the studied problem; knowing the practices of running children's public organizations in the Zabaikalsky Krai, development and provision of scientific and methodological support for school forestries.

3. Results

The essential characteristics and content of children's associations has been stidued for more than 25 years.

The basic concept of a public association in the arguments about the children's movement lies in the provisions of the federal law of the Russian Federation "On public associations" (Article 5): "A public association is a voluntary, self-governing, non-profit formation created on the initiative of citizens united on the basis of common interests for common goals specified in the charter of a public association" [17].

Children's public association is an association with 2/3 of the payroll consisting of people under 18.

In Russian socio-pedagogical practice, there are two types of children's associations. Their differences lie in the field of legislation. This study calls them public children's associations and non-public children's associations (the names are conditional because they are not legally recorded).

Public children's associations are various children's formations created to implement the state developing, educational, upbringing, and other programs. They are created within the framework of state institutions (schools, afterschool institutions) on the basis of the law of the Russian Federation "On education in the Russian Federation" [14], and they are subject to this institution. Their activities are regulated by the corresponding documents of ministries and departments.

The criteria of the state children's association are:

1.Existing program of activity of children's associations approved by the educational organization or its founder (standard, experimental, etc.)

2.Existing adult head of a children's association, i.e. an employee of a state institution that implements the program and is responsible to the administration of the state institution for achieving certain pedagogical results. This person receives the corresponding salary for their pedagogical activity.

3.The number of children's associations determined by institutional regulations and financial rules.

4.Certain institutional normative documents that fix the academic hours of the association members

for a day, week, or an academic year.

5.Voluntary participation in educational and organizational activities of children and adolescents-members of the association.

6.Freedom of choice for children and adolescents who are members of a hobby association.

7.Freedom to quit an association.

8.The main types of state children's associations are educational groups, classes, schools, clubs, hobby clubs, ensembles, studios, or sports clubs.

Parameters of the each type

Educational group (hobby club) – a group of students with common interests with a single curriculum for a certain time (school year, semester, or term).

School – a specialized (professional) unit that provides special education.

Class - a group of students studying a certain subject guided by a certain teacher or senior students.

Club - a specialized academic unit under a certain institution, organization, or an association.

Studio – school for training specialists in various art. It is created to develop artistic and creative abilities or to discover talents in children.

Ensemble - a group of performers acting as a single artistic group.

Club - an association of children and adolescents with common interests for joint activities and leisure for their all-round development [5].

Children's public associations are described in the regulatory framework as "associations of citizens under 18 and adult citizens united for joint activities aimed at satisfying the interests, developing creative abilities and social formation of association members, as well as for protecting their rights and freedoms". They are created based on the laws of the Russian Federation "On public associations" [17], "On state support of youth and children's associations" [18], as well as the laws and regulations of the subjects of the Russian Federation.

The criteria of the children's public association are:

1. Existing pedagogical system implemented within the framework of this association (scouting, pioneering, communar movement, socio-dramatic plays, etc.)
2. Acting leader – an adult member responsible for life and health of children to their parents, to superior organization, as well as being the carrier and implementer of certain pedagogical methodology.
3. Existing statutory and program documents reflecting the essential characteristics of the association within the current legislation, adopted by the association at the foundation conference.
4. Certain financial basis of the association created by its founders, sponsors, parents, and members to implement the statutory and program activities.
5. Certain external involvement into some activities of the adult population (religious, national, or specialized children's associations)
6. Distinctive symbols, rituals, or attributes typical for members of the particular association.
7. Existing system of internal interpersonal and group relationships and interactions (often it is given by the framework of the association). This system includes the management system, self-government and the structure of the association.
8. Voluntary participation and secession from the association.

Children's associations include organizations, federations, associations, unions, leagues, and other types.

Organization – an independent self-governing association meant for reproducing and developing personal traits, system of views and attitudes, rules of social behavior typical for a certain category of the adult population (class, stratum, professional or amateur association, party, youth organization, group of parents) in the younger generation. It implements its goal in the joint activities of children and adults through a certain system of relations, structure, financial and personnel mechanisms defined in the Charter, having special external differences (symbols, rituals, ceremonies, and attributes). A good example here is Orel regional pioneers organization or Scout Squad named after Alexander Nevsky.

As a rule, children's organizations act according to four scenarios:

Club activity – a permanent mode of activity of the children's organization. It is carried out on the basis of the organization, it is permanent (for example, it holds weekly meetings)and includes elements of educational activities (various trainings, training courses, etc.). Another goal is performing traditions and rituals of this association and communication programs.

Camp – the seasonal mode of activities of the children's organization (the scout camp, summer camp, Children and Youth Social Initiatives camps). This activity can be both long-term (2-3 weeks) and short-term (2-3 days camporee). The camp drills the style of activity, models of existence of association is fulfilled, forms new programs, new traditions and rituals, which are later implemented in club activity. For large associations the camp is a meeting place of representatives of various departments.

Socially meaningful campaigns - the deeds, through which the organization demonstrates its social orientation, focus on implementing the social order. It brings real help to people and promotes itself among the population.

The most important in the information society is the **virtual mode of the organization** – the image of the association created by the media. Nowadays, a significant number of organizations and associations are represented in the Internet on their websites and portals.

Associations and federations of children's organizations – large children's associations, uniting small children's associations, which are smaller both in number and in their activity. A good example is Federation of children's associations of Russia, International federation of children's associations, Federation of scouts of Russia, and DIMSI (Children and Youth Social Initiatives)

Leagues – large-scale specialized unions that implement similar comprehensive programs (like International youth sea league, Small press league)

Activity of a public association is based on the principles of voluntariness, equality, self-government, legality; it should be public, as well as the information on constituent and program documents (Art. 15 of the Federal Law "On public associations»)

Participation in the activities of the children's association can teach the specific roles of an active participant in the life of the association: initiator, organizer, leader, tutor, and others. These roles are set by the Charter of the organization. However, the degree of their participation is the essence of teenager's choice in the given conditions.

The children's movement is a set of children's associations and organizations within a certain social space like district, city, region, country, or the whole world [5, 6].

The study focuses on considering the social institution as a set of rules, regulations and requirements, by which society regulates human activities in the most important spheres of social life.

Bearing in mind that social institutions are described by formal external structure and meaningful internal activities, it is easy to see that the modern children's movement is clearly institutionalized.

Same, the components of the children's movements are the social institutions: children's associations, children's organizations, and youth clubs.

This approach allows determining the specific characteristics, social and pedagogical tasks and mechanisms for regulating children's movement in certain regions of the Russian Federation.

In the background of the variability of social institutions, children's associations and organizations contribute to the successful social formation of the younger generation, acting as one of the alternatives for social tries (the term introduced by M. I. Rozhkov). Having various alternatives, during social tests children look for their 'place', interests, best opportunities for self-realization, and, consequently, for te formation of their personality [12].

This is a full-fledged social institution that regulates the children's and adolescents leisure. It is a certain social model of innovative society, 'aiming' young people at social activity to change the surrounding society, to achieve the specified social parameters (see table.1).

Table 1. Characteristics of the children's movement as a social institution

Point No.	*Parameter of a social institution*	*Characteristics of children's movement*
1.	The sphere of social life	Children and adolescents leisure sphere

	regulated by the social institution	
2.	Social function	Being a certain social model of innovative society, it focuses young people on social activity to change the world and to achieve the set social parameters.
3.	Aim:	To form real civil experience in younger generation through the organization of the activities of public associations
4.	Formalization	The variety of children's associations and organizations within a certain social space (district, city, region, country, or world) is formalized in legislation as an organization, league, federation, association, or union. Formalization of each association in accordance with the stated objectives
5.	Structure	It is formally structured within a certain social space: district, city, region, country, or world
6.	Content of the activity	Institutional content is determined by social function. The content of the activities of each association is determined by its purpose and program of activities.
7.	Standard of conduct	Citizenship, law abidance, structuredness, compliance with specified procedures and requirements
8	Financial provision	It is guaranteed by the legislation of the Russian Federation and the Russian Federation entities.

Within the framework of fulfilling the **state task №073-00092-19-00 to 2019** of "Institute for the Study of Childhood, Family and Education of the Russian Academy of Education" under the project "Development of mechanisms of socio-pedagogical support of children's public associations", the laboratory of psycho-pedagogical problems of self-organization of children and adults concluded that the educational potential of the child association is as follows:

– opportunity to acquire the socially approved experience of individual and public self-organization of children different from student's one;

– children's organization and participation in socially meaningful activities of the association;

– children's independent choice of forms and methods of participating in the activities of the association through the selection of programs and forms of activity;

– gaining real experience of citizenship through participating in democratic procedures of self-government: electing the governing bodies of the association, accountability of elected bodies to the council of the association; rotation of elected bodies;

– gaining real experience in ruling the association by controlling shares, events, projects, and programs implemented in the organization;

– acquisition of teenager's own leadership position;

– experiencing real responsibility for the results of activities acquired through the delivery of reports for the executed order;

– formation of a sense of belonging to the collective by paying respect for the attributes, symbols, rituals, and ceremonies typical for the subculture of the particular association;

– acquisition of real experience in development and support of media image of children's public association in information resources of preschool institutions and educational organizations;

– in gaining experience in promoting the interests of preschool institutions in the management of educational organizations (governing council, teachers council, parents meeting, general school meeting, student government);

– expansion of positive social and cultural space of life, reducing the level of aggression of adolescents and their destructive behavior.

4. Discussion

Analysis of the specifics of the children's associations (namely, the school forestry "Forest land" reveals the characteristics of both state and public associations, referring it to the state public organizations. Although this type of association is not legitimate from the point of view of the legal framework of the children's movements [4], the precedent of establishing the state public children's organization "Russian school movement" on the basis of the decree of the RF President dated October 29, 2015 [15] gives the grounds for such classification.

Table 2. School forestry "Forest land" as a state public children's association

Point No.	*Parameter*	*Characteristics of school forestry "Forest land" as a state association*	*Characteristics of school forestry "Forest land" as a public association*
1.	Founders	"Center of youth tourism and local history", Ministry of natural resources of Zabaikalsky Krai, branch of "Russian Forest Protection Center of Zabaikalsky Krai".	Branches of the school forestry "Forest land" are created on the premises of educational organizations.
2.	Program	Within the innovative project "Formation of creative activity in adolescents in activity of children's association "Forest land" on the city introduction platform "Use of modern educational technologies in system of additional education (on the example of profile tent camp)". Activity of associations on the premises of educational organization uses programs of school forestry "Forest land" in the following directions: "Cognitive activities"; "Research activity"; "Pre-professional activities"; "Public activities"; "Public relations»	Camporees of children's associations, charity, presentations and advertising campaigns, recruiting actions, rituals of acceptance to the organization are carried out.
3.	Head	Varfolomeeva O. G. is the organizing teacher of the Municipal Budgetary Institution for Supplementary Education "Children's health and educational center of youth tourism and local history of Chita", the initiator and organizer of the children's movements school forestry "Forest land" in Chita, organizer and coordinator of social partners, initiator and organizer of the profile tent camp "Forest land" in Chita. Each educational organization has the teacher who is head of the association. They are responsible for the activities of the school forestry.	There is a children's self-government body.
4.	The number of children's	No	No

	associations determined by institutional regulations and financial rules.		
5.	Fixed institutional normative documents that fix the academic hours of the association members for a day, week, or an academic year.	Programs of additional education and extracurricular activities	Children's association programs
6.	Voluntary participation in educational and organizational activities of children and adolescents-members of the association.	In the framework of extracurricular activities of students	Free choice of the content of the activities according to the program of the association
7.	Freedom of choice for children and adolescents who are members of a hobby association.	Children's associations of school forestry are created in the following educational organizations of Chita: Municipal budgetary general education institution "School №25", Municipal budgetary general education institution "School №36", Municipal budgetary general education institution "School №17", Municipal budgetary general education institution "School №7", Municipal budgetary general education institution "School №16", Municipal budgetary general education institution "School №23", Municipal budgetary general education institution "School №40", Municipal budgetary general education institution "School №51", Municipal budgetary general education institution "School №11", Municipal budgetary general education institution "School №44".	Students of educational institutions join the association and work on a voluntary basis. Each member of the association is given a certificate of a young forester.
8.	Freedom to quit an association.	By decision of the educational organization	The student has the right to quit the association

The table shows that the school forestry "Forest land" is a **state public association**, as well as the "Russian movement of schoolchildren" [4; 15]. The specifics of the school forestry "Forest land" is the environmental focus of its activities. In order to develop the programs of activities of the association, this

work studied request of customers of educational services for programs of extracurricular activities of various directions. On the premises of the municipal budgetary general education institutions "School №40" (central city district) and "School №44" in Chita (peripheral city district) there was conducted a survey of 130 students of general education and 130 parents. The questionnaire for each category of respondents contained three questions based on provisions of the Order of the Ministry of education of the Russian Federation of 29.08.2013 No. 1008 "On the statement of the order of organization and implementation of educational activity on additional general education programs" [8].

The first question for schoolchildren was "**Which two directions in the system of additional education will you choose for yourself regarding your own interests and wishes?".** It had multiple choice answers: technical, natural science (environmental), sports, art, tourism and local history, and social and pedagogical.

The analysis of the students' answers allowed to conclude that the most attractive are technical (24.6%) and natural science (environmental) (19.4%) areas. Sports (17.7%) and tourism and local history (15.7%) areas took third and fourth places respectively. Art was chosen by 13% of students. The socio-pedagogical direction (9.6%) was the least chosen.

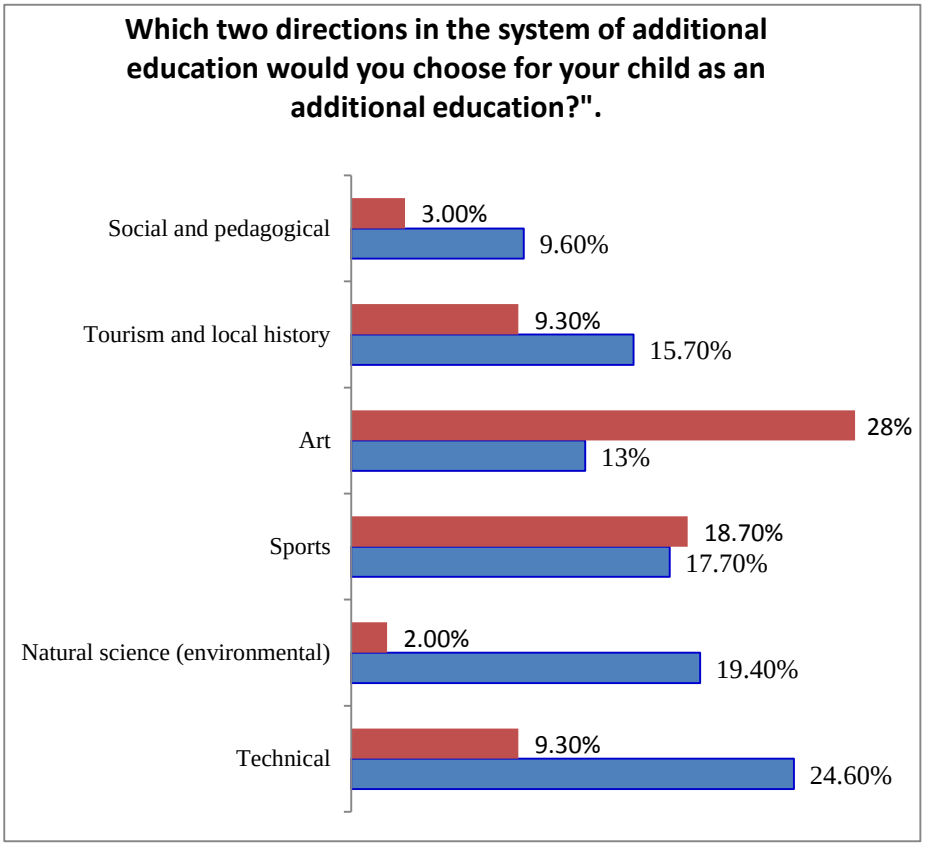

Fig. 1. Attractive areas of additional education for students of basic general education and their parents. Chita, 2017.

The same question was answered by parents of these schoolchildren: "**Which two directions in the system of additional education would you choose for your child as an additional education?**". Parents consider technical (39.0%) and artistic (28.0%) directions to be the most attractive for their children. The third place is occupied by sports direction (18.7%), the fourth – by tourism and local history (9.3%). Socio-pedagogical (3.0%) and natural science (environmental) (2.0%) directions are inattractive for parents (see Fig. 1)

The second question was **"Would you like to become a member of the children's association – school forestry?"**. The following answers have been proposed: Yes; no; no opinion. It has been concluded that 63 out of 130 surveyed schoolchildren **(48.4%)** would like to become members of the school forestry, **27 (20.8%)** wouldn't, and 40 **children (30.8%)** were not ready to choose.

The question "**Would you like your child to become a member of the children's association – school forestry?**" was answered as follows: 91.5% (119 out of 130) of parents surveyed in 2017 would not like their child to be engaged in school forestry. 6.2% (8 people) of parents were for such decision, and only 2.3% (3 out of 130) of parents at the time of the survey hesitated to answer (see Fig.2).

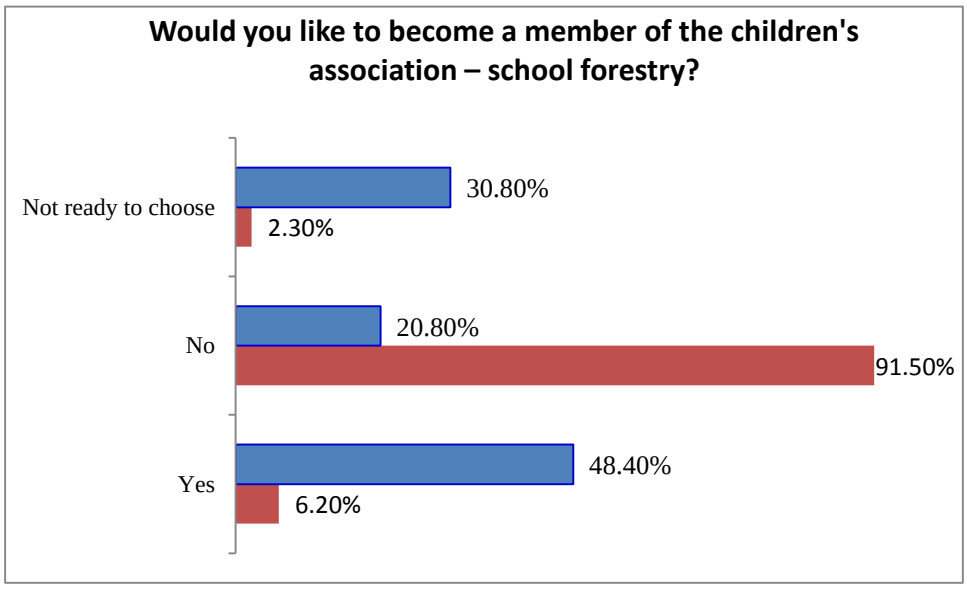

Fig. 2. Children and parents' willingness to participate in school forestry

The students explained their negative response by personal disinterest (15%), lack of understanding of the purpose of the school forestry (43%), and parents' opinion (42%).

Parents were also asked to explain their choice. The most common answer was personal disinterest (57%), the arguments included: "we do not have time to do homework", "it is not promising", "it is useless for future activities", "I do not have time to understand it". The second variant (41% of all responses) was "the lack of understanding the purpose of school forestry." Only 2% of parents considered it necessary to take into account their children's opinion before choosing the direction of additional education.

The conclusion is that **the involvement of children and adolescents in school forestries directly depends on the position of their parents**. Thus, the vector for the promotion of its activities for parents and the creation of a positive image of the children's association in the social environment of the region is affected by this conclusion. The project "Quest technology as a means of promoting school forestries of the Zabaikalsky Krai" launched in **2017** at the competition of the Presidential grant fund for the development of civil society was approved by experts and received financial support [19].

The landing quest is an innovative quest technology. This study presents its algorithm: goal setting, defining starting conditions of operation, system of purposeful step-by-step actions, tool support of these actions, the definition of achievable results, and the analysis of the achieved result. This algorithm in teaching were practiced, implemented and described especially in career guidance.

In the period of November 1917-October 2018, more than 40 educational mass events took place. They were visited by more than 6900 people, and they were described in 110 announcements and articles. A documentary film about the activities of school forestry in the Zabaikalsky Krai was released.

The project made allowed to engage the schoolchildren in Chita in environmental activities and the activities of the children's association (school forestry) together with their parents. Thus, according to the Ministry of natural resources of the Zabaikalsky Krai, as of **June 01, 2019, about 29 school forest areas with a total number of 200 members operate in the territory of the region. Eleven of them are organized in the municipal education system of Chita with a total number of more than 1,000 people.**

Children's association school forestry "Forest land" on the premises of the Center of tourism and local history of Chita is widely recognizable in the region and effective nationally [2; 3; 7].

In 2018, the agenda included the task of developing the essential characteristics of the school forestry "Forest land" as a regional children's association. Namely they consisted of:

development of the content of the school forestries activities focused on the implementation of children's initiatives, projects of primary organizations in forestry and environmental activities, as well as participation in joint (cross-cutting) municipal and regional programs and projects;

development of incentive-motivational system in the association based on the recognition of individual and group achievements of young foresters;

development and implementation of a unified system of symbols and rituals of the association;

development and introduction of the growth system for the children's association members (i.e., promotion from the participant of the program to the head or member of the local governing body of the regional association).

Taking into account the specific nature of the school forestry, the ***task of creating an innovative developing space*** that stimulates the interest of students in the field of innovation in forestry, contributing to the support of talented adolescents, the involvement of children in scientific and technical creativity, providing them with the opportunity to work with modern technology, the development of skills to solve urgent problems of forest preservation is of particular importance. **"Lestorium"** is of that very type: developing innovative space for members of the school forestry, on the sites of which the young foresters receive knowledge beyond and cross-subject and preprofessional competence, master the forestry activities, have the opportunity to apply it in practice, implementing their own initiatives [9].

This educational space focused on three sites: "Children's health and education center of youth tourism and local history" of Chita, branch of the "Russian Forest Protection Center of Zabaikalsky Krai", and regional coworking center "Boiling point". According to the calendar plan of the project, the research, competitive, environmental, educational and career guidance activities under the guidance of experienced experts in the industry are to take place. All activities are aimed at raising interest in the field of innovation in forestry in students. They are organized in small groups (within one school association) and use mass interaction of all members of school forestry.

As a single incentive and motivation system, the teams of children's associations are rewarded with thematic badges for the successful participation in the events.

Mass campaigns are obligatory for all members of school forestries. However, children are free to choose in what event to participate in. These practices are covered in the Vkontakte social network group "Lestorium"(https://vk.com/club172960934). School forestry leaders provide news, photos and video materials about the events and feedback from their participants, their parents and the public. Now the group has a tournament table with the current rating (number of badges) of all school forestries, as well as individual scoring of all children's associations. Twenty four young members of the school forestries with the highest number of badges got the opportunity to visit the historic homeland of the school of forestry - Bryansk region. They stayed at the international children's camp "Novokemp" and participated in the thematic sessions that was specially organized for the younger members of the school forestries of Zabaikalsky Krai.

The project №18-2-004649 "Lestorium" - a developing innovative space for members of the school forestry" was supported in the framework of the second contest of the Presidential grant fund for the development of civil society in 2019 [20]

5. Conclusion

The conducted research allowed to conclude on the following:

1. This study considers the social institution to be a set of norms, regulations and requirements, using which the society regulates and controls the activities of people in the most important spheres of social life. It has a formal external structure and meaningful internal activities. This paper assumes that **modern children's movements are obviously institutionalized.** The components of the children's movements are the social institutions: children's associations, children's organizations, and youth clubs.

2. **The educational potential of children's associations** lies in the possibility of acquiring socially approved experience of individual and social self-organization on the basis of the child's independent choice of forms and methods of participation in the activities of the association; participation in collective socially useful activities, in democratic procedures of self-government; managing the association through the participation in its management as a leader; real responsibility for the results of activities.

3. Since the 1990s, two types of children's associations have been formed in the national socio-pedagogical practice, which is reflected in science [1; 5; 6; 12; 14]. The differences between these types of children's associations lie in the area of legislation and organization. Conventionally, there are state children's associations and non-state (public) children's associations. The Decree of the President of the Russian Federation of the public-state children's organization "Russian movement of schoolchildren" dated 2015 [15] introduced the category "public state children's organization" into practice. According to this classification, the studied children's association **school forestry "Forest land" is a public state children's organization.** Criteria of school forestry "Forest land" as a public state children's organization are as follows: *the founders are:* state organizations "Center of youth tourism and local history", Ministry of natural resources of Zabaikalsky Krai, branch of "Russian Forest Protection Center of Zabaikalsky Krai"; the *activity* of the umbrella association is implemented within the framework of the urban implementation platform "Use of modern educational technologies in the system of additional education (on the example of the profile tent camp)", as well as on the basis of non-state projects supported by the Presidential grants fund for the development of civil society; membership associations emerge and operate on the basis of educational organizations of general and additional education, their programs are implemented within the framework of additional education. This ensures the principle of voluntary children's participation in the association, the free choice of the content of the activities of the association program, and the right to quit the association.

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Analysis of Metrics of Occupational Stress Classification by CNN with Softmax Classifier

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Abstract

Stress is major health related issue globally. It is important to manage the stress for the healthcare as well as the quality of life of an individual. For this purpose an effective classification model is required. Therefore, a novel stress classification model based on convolutional neural network (CNN) has been proposed. The aim of this paper is to enhance the accuracy of stress prediction model using CNN for a participant in a real-world environment based on insurance sector data. To obtain the desired model the data set cleaned and statistically analyzed using z-score, Annova test, paired t -test and bootstrap paired t-test. On the basis of this analysis stress detection featured identified. We performed an experiment using the dataset by applying CNN. For assessing the performance of proposed classifier we made a comparison with other stress prediction model. The OSI questionnaire used for primary data collection. It has total nine demographic variables and 12 sub scales for assessing occupational stress. The questionnaire has total 46 items related to these 12 dimensions, and each one is rated on 5 point Lickert scale. The northern Indian states were surveyed for data collection. Out of 630 participants 500 were finally selected. They were categorized into gender age, education, management, work experience, marital status and religion. The implementation performed using R open source environment and SPSS. In this proposed CNN model SGD optimization technique employed for reducing the error and enhancing the accuracy. The statistically analyzed dataset was used as an input for deep learning algorithm called convolution Neural Network for stress classification modeling. In this analysis, 280 epochs and approximately 500 Instances used. The experimental result obtained from the proposed model succeeded to achieve an accuracy of 75.52 and specificity of 80.42. The performance of proposed CNN model is found better in comparison to artificial neural network. The proposed model is able to effectively classify the stress and it can be applied for stress prediction in stress monitoring system

Keywords: Occupational Stress, Artificial Neural Network, Convolutional Neural Network, SGD, Epoch.

Introduction

Whenever there is an imbalance due to demands and resources exist for a person the body reaction or response against this imbalance is termed as stress. It is found in three different forms alarm, resistance and exhaustion state [1].These three factors help in preparing for the flight or fight response to safeguard the body from threats. When stress experienced for a longer interval without proper management it may cause economic costs in various ways, because of this it is recognized as a growing concern widely. Stress has some benefits also. It may improve the day to day activities which enhance the work productivity ultimately providing some benefits to the society. On the one hand, it has some positive side while on the other hand if not managed properly it might cause a negative effect This makes it a challenge for computer science as a beneficial area of research [2]

Stress is the part and parcel of everyday life and it is observed as a major concern for society. It might cause multiple health issues and many other risk factors in the organization, therefore, an effective stress prediction mechanism is required. That can be able to provide proper prevention and intervention in the health care sector [3, 4]. Usually, stress is assessed in a subjective manner by means of questionnaire and this technique measure health condition in better ways than the actual health status of the individual [3]. However, it provides ease of measurement and requires a smaller time. So far there are very few studies related to stress evaluation under the working environment of the insurance sector personal. Therefore an

effective stress prediction modeling techniques for evaluating the stress of insurance sector personal using CNN based approach with reasonable accuracy.

In this present paper, we proposed a novel stress classification model using deep learning techniques based on CNN. The real-life stress-related data collected from the survey of Life Insurance Corporation (LIC) and the Industrial Credit and Investment Corporation of India (**ICICI**) Sector.

The other section of this paper is organized as follows. Section II discusses in details the proposed system and data processing techniques. Section III presents the implementation details of the proposed model using the stress dataset. Section IV elaborates the results obtained from the experiment and conclusions.

Proposed System and Data Processing Method

Figure1 showed the structure of this research work. We performed statistical analysis on the selected dataset in order to extract the significant variables for stress management. Later on we employed the CNN modeling techniques for the stress prediction model. In this research work, deep learning techniques such as Convolution Neural Networks (CNN) have been used for prediction of occupational stress. In this study, at first stage normalization of the dataset using Z-Score for dependency between features have been performed. In the second stage, various statistical tests paired with T-test, Annova test have been done for co-relation testing. In the third stage, the dataset has been analyzed by using different classifications techniques Random Forest, Classification and Regression Tree, Support Vector Machine and Artificial Neural Network and done comparative study to check the accuracy using various parameters like Precision, Recall, and Accuracy. In this study, a novel approach has been implemented and utilized using R code in a research dataset. Then, a plan has been proposed to create a model using deep learning using CNN Algorithm which provides better accuracy. After that, Parameter learning (updating in connection weight) and then Structure learning (change in the network) has been done. The experimental setup used in this study is based on the R environment.

In this process we used statistically analyzed data as a feature. This becomes the input for the CNN modeling techniques. At last we did performance evaluation of the CNN model by means of comparison using stress classification results based on different machine learning techniques

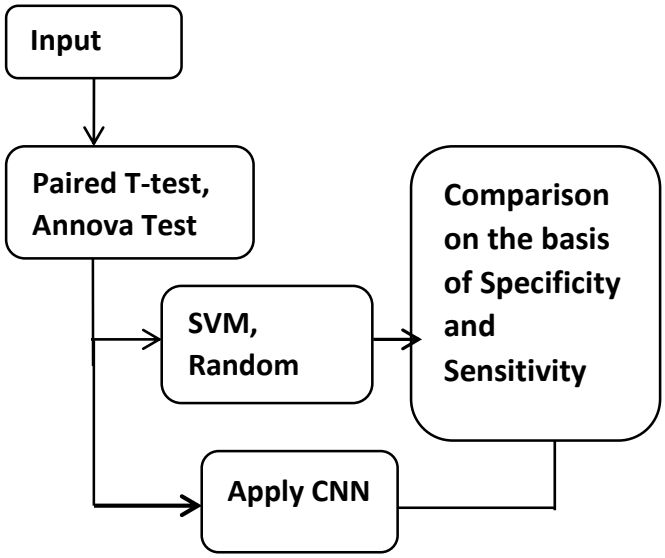

Figure: 1 Methodology Design

Dataset

This study analyzed the records consisting of 53.4 percent of male and 9.4 percent of female out of total 500 sample. Out of which 314 employees associated with LIC and the rest 186 with ICICI. Their age group vary from 20 to 60 years which are taken in different slabs of 20-30, 31-40, 41-50 and above 50. The dataset have three different types of educational level of employees as Under Graduate, Post Graduate and Professional from the Public and Private life insurance sectors. The employee's marital status is partitioned into three group's spouse working or not working, or unmarried. On the religion basis the sample is categorized into 5 levels, i.e., Hindu, Muslim, Christian, Sikh, and Jain.

Statistical Analysis

A paired t-test was conducted between the low-stress and high stress groups to make comparison. This analysis feature does not show any significant benefit. So, it doesn't allow to make feature selection because feature selection eliminates some features which increase the ambiguity at time of classification. The one-way analysis of variance (ANOVA) was conducted to predict the statistical difference between two or more unrelated stress and without stress features. In this analysis, only feature "Intrinsic Impoverishment" shows effective, significant value (0.069), no others feature shows this type of value. Thus, this feature improves the classification of stress and non-stress efficiently. Another feature "Powerlessness" represents the significance value of 0.70 which is somehow close and shows that this feature also plays a vital role in the classification of stress and non-stress. Figure 2 illustrates typical CNN architecture for a stress classification task.

Overview of CNN architecture

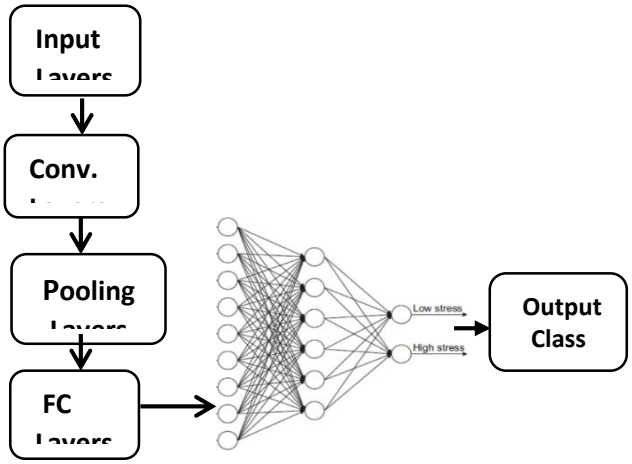

Figure: 2 CNN Architecture Overview

Convolutional layer is regarded as the core building block. It has the capability of transforming the input data from the previous layer with the help of a patch of locally connected neurons. Parameters are used which are directly related to the connections in the network.

The feature extraction is performed from the input data by the convolutional layer. The neurons in the convolutional layer have some specific arrangements to create a feature map. Each neuron in a feature map has a receptive field. Neighboring neuron in the previous layer has a connection with the receptive fields employing trainable weights and is also termed as a filter bank [5]. In the deep convolutional neural network, convolutional filters are considered as workhorses. These filters are similar to generalized linear models of patches. They showed a good response to the extraction of the feature at a low level of abstraction. But when applied for the extraction of a nonlinear function of input data there is performance issue arising.

There is a mechanism for the convolution of inputs with the learned weights for new feature map computation. The results obtained from the convolution are communicated using a nonlinear activation function. Usually, certain weights are associated with all neurons within a feature map.

The same convolutional layer has different feature maps, and for each feature map, there might have different weights to extract several features at each location [5, 6].

Computation of K_{th} output feature map $Y_{K\,is}$ performed using

$$=f(W_k * x)$$

Where x represents the input

W_k represents the convolutional filter associated with K_{th} feature map.

*…represents the 2D convolutional operator

f() denotes non- linear activation function [7]

Pooling Layers. For reducing the spatial resolution of feature maps pooling layers are mainly used [5, 8]. Max pooling performs the selection of the largest element within each receptive fields. This pooling layer is responsible for reducing the dimensions of their input symbols and representation [5, 9].

Fully Connected Layers. For extraction of more abstract feature from the network, the convolutional and pooling layers are stacked on the top of each other. Fully connected layers are responsible for interpreting the feature representation [10, 11, and 12]. Usually, softmax operator is used for the classification problem on the top of DCNN[9,13,14,15].To achieve the required network output CNN and ANN try to make some adjustment related to the free parameters like biases and weights utilizing learning algorithms. Network training time has a significant impact on the performance of DCNN when the dataset is large [9] .This training timing is based on activation function selection.

Softmax Classifier is a generalized logistic function that lies among K dimensional vector with arbitrary values. This K dimensional vector lies in real values ranges from [0,1] can be added up to 1 . The softmax function can be used to present a probability distribution in K different possible classes [16]

$$\sigma(z)j = \frac{e_j^z}{\sum_{k=1}^{K} e_k^z} \text{ for i =1….K}$$

These types of functions are used in many classification methods like naive Bayes classifiers, and artificial neural networks.

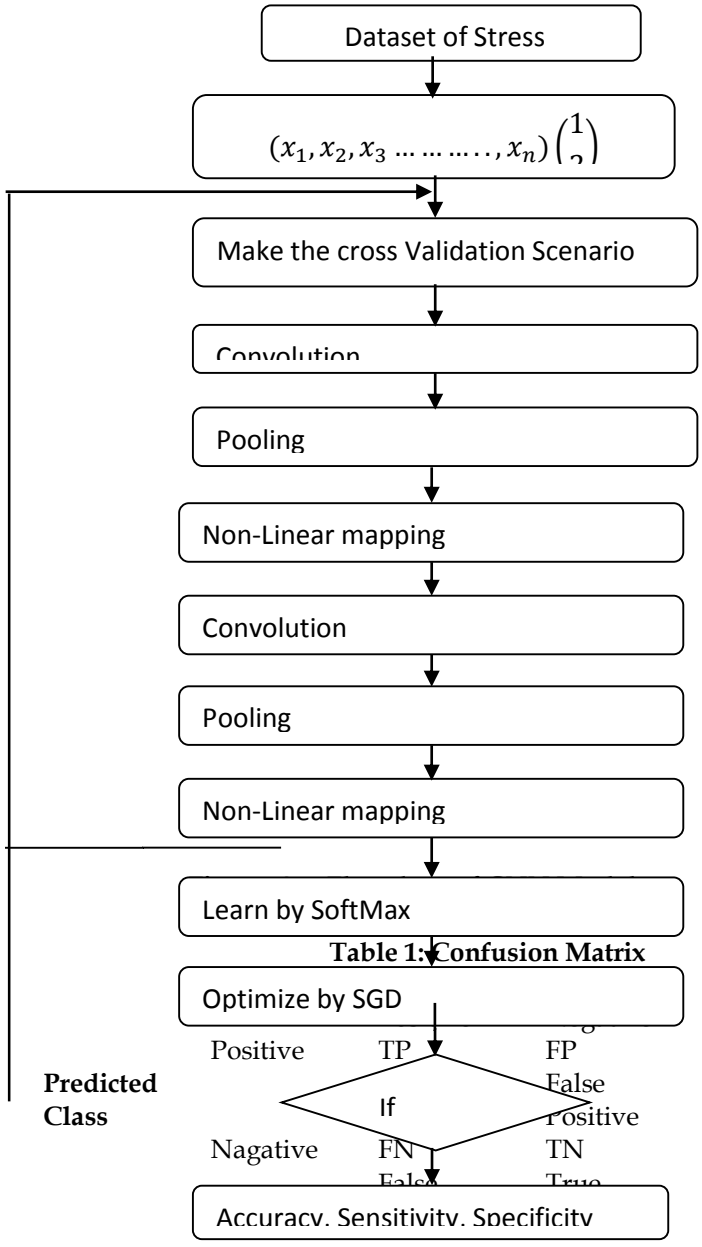

Table 1: Confusion Matrix

		Predicted Class	
		Positive	Nagative
Actual Class	Positive	TP	FP
	Nagative	FN	TN

Sensitivity=TP/(TP+FN)
Specificity=TN/(TN+FP)
Accuracy=TP+TN/(TP+FN+FP+TN)

CNN learning platform:

In this study deep learning used under the R environment for building, training, and evaluating neural network employing tensor flow library in backend and Keras in the front end. Deep neural network consists of multiple layers and it is domain specific language. In this hyperparameters are considered as variables. How neural network learn in any specific language say in R environment is determined by these hyperparameters.

CNN Model

The CNN model has 3 convolutional layers like convolution, polling and softmax layer. Each iteration is optimized by gradient descent which reduced the error and improves the accuracy. The statistically analyzed dataset was used as an input for deep learning algorithm called convolution Neural Network for stress classification modeling.

In this analysis, 280 epochs and approximately 500 Instances have been used so that it can take about the half epoch of single step in training a neural network. Furthermore, if the neural network is trained on every training sample only in one pass, then one epoch is finished. Thus, the training process has more than one epoch. The measured accuracy of the stress classification model generated through learning was found 75.52 %.

Experimental Results

We compared the performance of the proposed CNN with various models, namely, ANN, Random Forest decision tree (DT) and SVM. The proposed statistical CNN accuracy, sensitivity, specificity, and ROC results are shown in Table 2

Classifier	Accuracy	Sensitivity	Specificity	ROC
ANN	52.75	60.23	42.23	51.23
Decision Tree	49.72	52.20	47.80	49.10
Random Forest	50.78	59.18	44.96	51.80
SVM	52.89	88.53	18.70	50.08
CNN	75.52	89.62	80.42	80.13

Table: 2- Comparative results

Training of Accuracy and Loss of CNN Model at different epoch

The figure: 4 represents the accuracy and loss during training and testing. These graphs are used to analyze the behavior of a convolution neural network at different epochs. In this purposed approach, 3 convolution layers named convolution, polling and softmax layer have been used. Each iteration is optimized by gradient descent which reduced the error and improves the accuracy. In this approach, the dataset with 55 features has been used which encourage using the deep learning and feed-forward neural network. In the above graph, the training accuracy is improved when there is an increase in the epoch (on the x-axis).

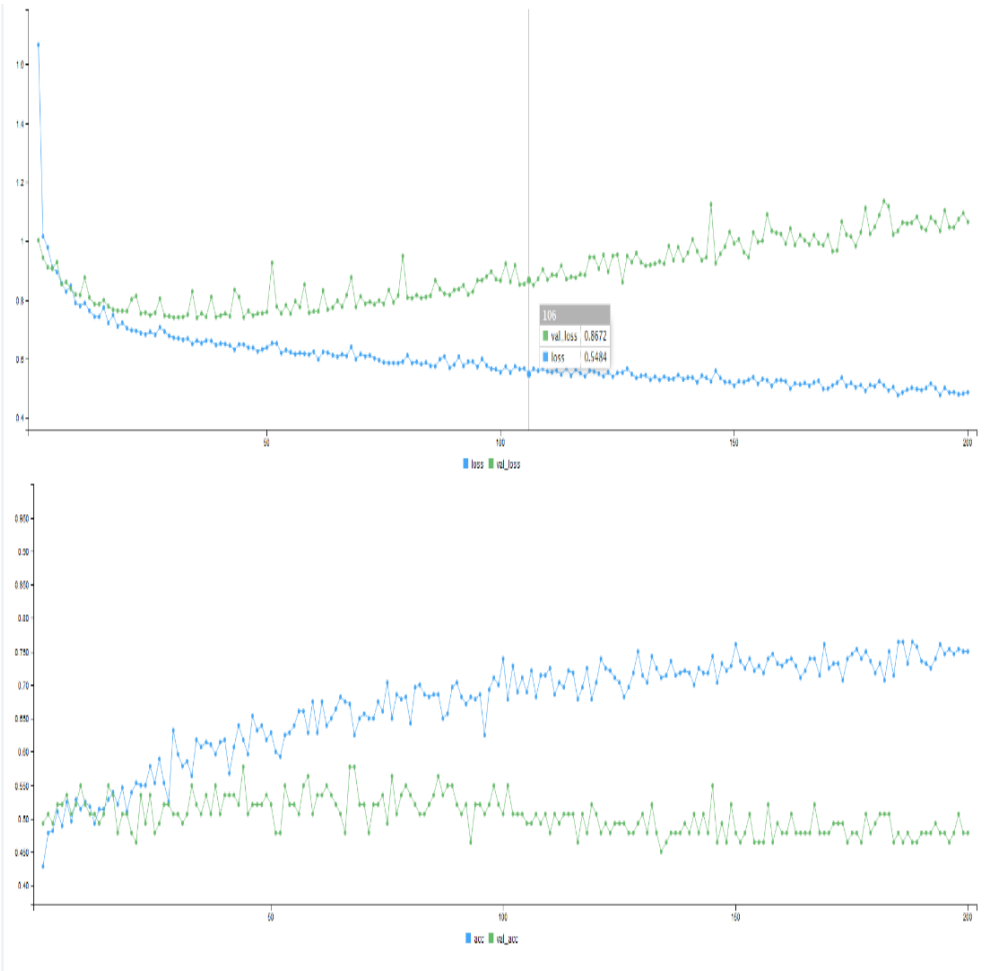

Figure: 4 Represents accuracy and loss during training and testing

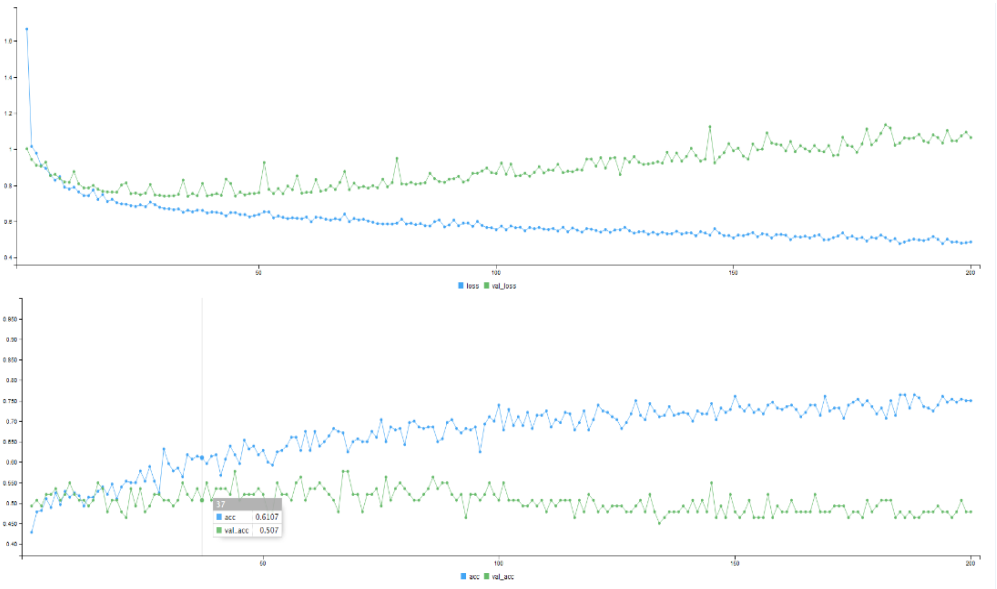

Figure: 5 Training of Accuracy of CNN

Testing of Accuracy on CNN at start of EPOCH

Figure: 5 shows a graph of accuracy and loss during training and testing. In testing of accuracy with a loss, it is less in starting and then increases. Table: 3 shows the accuracy at a different number of epochs, when there is an increase in epochs, then resources such as time and memory also increased. As compared to resources, accuracy will increase efficiency due to nonlinear mapping or latent features extracted by convolution and learned by softmax classifier

Accuracy at Different Number of Epochs in CNN

Number of EPOCH	Accuracy
1	42.86
20	53.93
50	62.86
80	64.29
100	73.93
150	76.07
200	75
250	75.23
280	75.62

Table: 3 Accuracy at different approach

Comparative Analysis of Classifier

This section discussed the obtained experimental results. For results validation, we used five different machine learning family techniques such as decision tree, random forest, support vector machine, artificial neural network and convolutional neural network. After comparison, it is observed that deep learning algorithm has shown the best performance in terms of accuracy and positive hits and the obtained accuracy is 75.52%, while other algorithms are able to predict stress by 52% max. This performance showed by support vector machine. The deep learning techniques introduced a novel approach for multilayer network training which helps us in discovering the complex relationship among variables. Below summarized result shows a comparative analysis of stress and non-stress based on classification capability of metrics like Accuracy, Specificity, Sensitivity, and ROC (Receiver Operating Characteristic). It is analyzed that accuracy in the decision tree, and convolution neural network is 49.52% to 75.52% respectively. Actually, accuracy indicates the correctly classified instances of stress and non-stress, but it is not able to show the effect of wrongly classified instances of stress and non-stress. That's why another parameter named Specificity and Sensitivity has been used. Parameter Sensitivity is used to indicate the performance of type two Errors. We compared the performance of the proposed CNN with various models, namely, ANN, Random Forest decision tree (DT) and SVM. The proposed statistical CNN accuracy, sensitivity, specificity, and ROC results are shown in

Below figure: 6 shows the graphical representations of comparative analysis of various classifiers. In this analysis, it has been found that in Support Vector Machines (SVM) classifiers the Sensitivity is highly improved up to 88.53% while in (Convolution Neural Network) CNN it is improved to 89.82 %. Another parameter ROC is also analyzed which indicate the true positive and false positive analysis. If the values of ROC increased then the area of true positive also increased and in the decision tree and convolution neural network it is highly improved from 49.1 to 80.13 respectively.

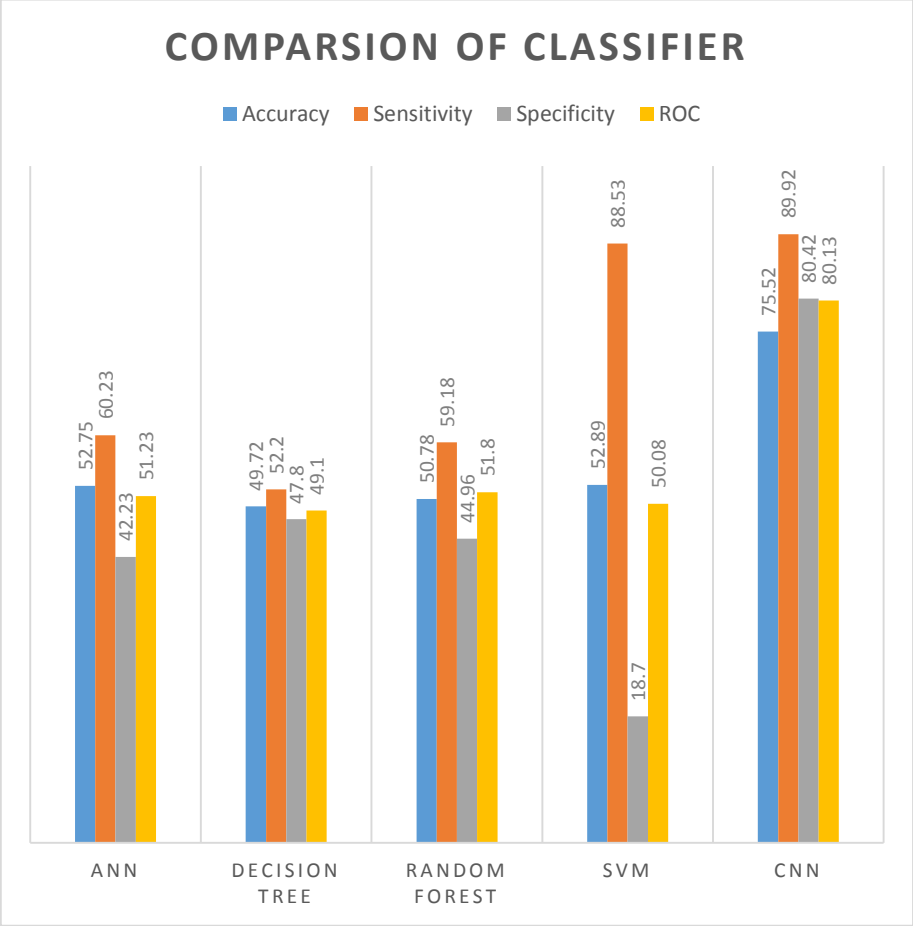

Figure: 6 Comparison of accuracy of Classifier

Comparative Analysis of Various Classifiers

The following summarized result shows the comparative analysis of stress and non-stress classification capability based on metrics, i.e., Accuracy on Complexity parameter (CP). If the value of CP increases the complexity of the model and overfitting will also increase. The analysis shows that in the decision tree and neural networks, the accuracy goes up to 49.73% to 53.12% respectively. Here, Accuracy indicates the correctly classified instances of stress and non-stress. It has been analyzed that in different classifiers Accuracy is improved when complexity increased

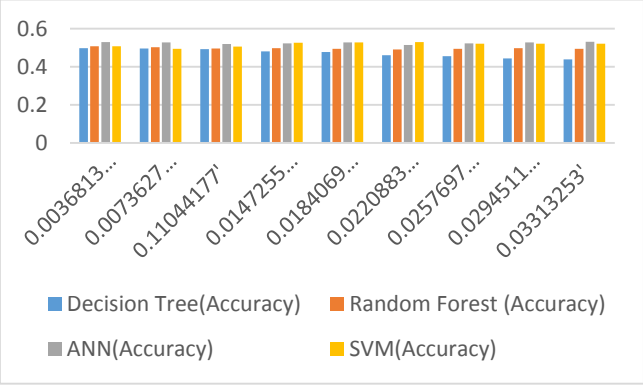

Figure: 7 Comparison based on Metrics

Graph Analysis of Various Classifiers Based on Accuracy

Below mentioned summarized result shows the comparative analysis of stress and non-stress classification capability based on ROC. This indicates that if there is an increase in values of ROC then the area of true positive increased. In the decision tree and convolution neural network, it is 49.1 to 80.13 respectively.

Below Fig 6.14 shows that in various classifiers such as in Decision Tree, Random Forest, and ANN and in SVM the accuracy is 49.52%, 51.8%, 50.48% and 50.70% respectively. The parameter ROC indicates the relationship between true positive and false positive rate. Its increasing values indicate that the classifier is more effective.

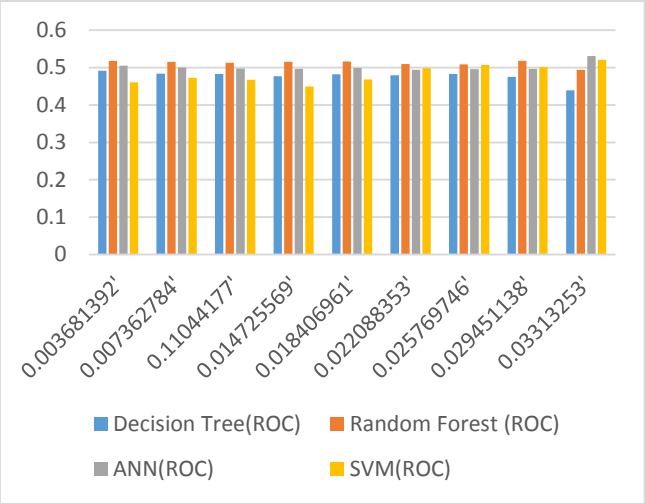

Figure: 8: Comparison based on ROC

Graph Analysis of Various Classifiers Based on ROC

Summarized result and figure 8 represent the comparative analysis of stress and non-stress classification capability based on metrics, i.e., Sensitivity. In Decision Tree, Random Forest, ANN and SVM maximum value of Sensitivity goes to 57.16%, 57 %, 55.42% and 86.9% respectively. Sensitivity indicates the correctly classified ratio with incorrect prediction. The analysis based on Sensitivity shows Type 1 error.

Discussion

In this study, we classified stress based on the CNN model using LIC and ICICI insurance sector data. The data collected using a questionnaire which has 46 statements (features) to measure the 12 types of variables used in the study. The input variables showed a statistically significant relationship with stress. Stress classification using the CNN model based on twelve types of input variables and low-stress, high-stress as two output variables. Employing fine-tuning of hyperparameters result might be enhanced in terms of sensitivity, specificity, and accuracy. Unlabeled training samples are used in the CNN model so it can save time and it has shown better performance in comparison with the human label time.

Off course there are some limitations in this study. The degree of stress should be studied in greater detail for the more accurate stress classification model. The model evaluation performed using dataset consists of five hundred records. The statistically analyzed data used as a feature. It is observed from the result analysis proposed model achieved better accuracy and specificity. The obtained results are 75.52 % and 80.42 % respectively. The proposed CNN model has shown enhanced performance in comparison to other classification model using different machine learning techniques. The proposed model can be effectively used for stress classification and it can be applied for stress prediction in a stress monitoring system.

Conclusions

The experimental results are effectively able to demonstrate the appropriateness of deep learning algorithms for the prediction of perceived stress. For the enhancement of accuracy level, we will add more information related to stress as a future work.

Acknowledgement

The authors would like to thanks to the Dean of FCIT in Rabigh, King Abdulaziz University for providing the outstanding platform for doing research work.

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Higher Education as a Means of Formation of Innovative Personality at Different Periods of Society Reform

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Abstract

In their study, the authors made an attempt to rethink the educational achievements of society, with the aim of understanding the further tasks of development set by the state and the means to achieve them. Leaving behind the scenes issues of the production of material values, the authors of the study aim to consider education in a systematic analysis of the process of its development, as a sphere that is a direct "supplier of intellectual" products - a graduate who produces both material and spiritual values. The authors give a brief research analysis of modern educational technologies, analyze the possible ways and prospects for the further development of higher education in the context of the formation of new educational paradigms, directions and technologies in the innovative model of the graduate. The study contains an analysis of the possible options for the development of education in connection with the transition of civilization to new industrial, digital educational technologies.

The research materials also contain a retrospective analysis of the history of the development of education in Russia during periods of global restructuring, at the stage of new meaning-forming goals in solving problems aimed at the development of society and the individual. Planned results Analyzed are the achieved in different periods of social formations, in direct connection with value-semantic guidelines, educational technologies, pedagogical approaches, in close interconnection with changes in tasks, goals, strategies, and risks. The indicators are studied that create an objective picture of the quality status of higher education.

The relevance of the study comes from the reforms occurring in the state and society associated with the emergence of innovative ideas and technologies in the design and management of the educational process, the need for implementation at the stage of political and technical and economic development. From what a natural need arises for a theoretical analysis, a review of all existing state structures - the education involved in organizing social production (material and spiritual). The materials of the article are of practical value for the processes taking place in the field of education, contributing to the formation of new ideas, ideals, concepts, paradigms of aspirations and prospects for the development of the individual, society and its structures.

Keywords:
higher education, modernization, modern technologies, competency-based approach innovative personality, intellectual resource, graduate model, reference university.

Introduction

Modern education is undergoing a new period of transformations based on the rapid development of the information and communication sphere, which is due to new concepts, paradigms, forms, structures and teaching technologies. In changing conditions, the search for innovative, organizational and pedagogical tools for the traditional classical form of higher education does not lead to the planned result, and attempts to adapt the "old" technologies to the new conditions of the educational process lead to a conflict of semantic orientations, forms, contents that do not meet the requirements of federal state standards and formed professional competencies of graduates. The classical version of the educational model of training

professionals that has been relevant until a certain time has lost its significance at a rapid pace, leaving modern pedagogy to search for ways to adequately balance the ever-accelerating pace of development of the information technology field, which creates an objective need for the development and use of digital innovations in the organization of forms of education, the design of educational technologies implementing the new content of instruction. Achievements in the technological, information and communication spheres inevitably entail changes and reforms in the structural-semantic, orientational and value part of education, and this leads to changes in the requirements in the content, technologies and levels of graduates of higher educational institutions.

Analyzing the level of education, taking into account spatio-temporal changes in ensuring and realizing the tasks facing society, inevitably, there is a need to reconstruct and update the educational system as an integral part of statehood. A vivid example is the period of the loss of the old system during the country's transition to a new socio-technological basis of Russian society, associated with educational reforms, distance and smart technologies, and the political and economic reorganization of society.

As a retrospective analysis of the history of the development of education in Russia during global reorganization shows, after the 1917 revolution, one of the main problems solved at the state level was the general illiteracy of the population. On the way to its solution, the primary task of the new state was the restructuring of the entire educational system, new goals and objectives of education were set, the implementation of which would contribute to the promotion of a new ideological policy. The new government was solving primary tasks: to create a "new" person, a member of a socialist society. National schools, gymnasiums and real schools were replaced by the Unified Labor School, which was supposed to carry out the functions of a regulator of the formation of a new free person. The principles of humanization, democratization and self-government were proclaimed in education. The leading documents of the People's Commissariat of Education proclaimed the idea of developing self-government in the school, which is a means of achieving the democratization of the educational process. Work on the organization of a new school was carried out under the direction of A.V. Lunacharsky - the main ideologist of the country during the reformation [1].

The leaders of the People's Commissariat (A.V. Lunacharsky, N.K. Krupskaya, M.N. Pokrovsky) proclaimed the idea of educating a person in the spirit of humanism, which reflected the principles of the formation of communist conviction, therefore a firm opinion was introduced that only one can educate a humanist a teacher who is a convinced bearer of a socialist idea. It was in this ideological direction that the training of "new" citizens was carried out. Various problems of socio-economic, political development of the formation of youth consciousness could not be solved outside the educational system. The school itself was conceived as a center for organizing the life of children, in which the process of training and education was planned for the whole year. Education was so important that in 1920, by a decision of the Council of People's Commissars of the RSFSR, a special state system of adult education was created in places called "liquidation centers," literacy schools, where people who were not on the lists of schools aged 16-50 were trained years, thanks to which, in the first years of Soviet power, the number of students increased significantly, and the literacy rate of the population increased. "Unified Labor School", made it possible for all children to study in the same age and gender collective, passing two (basic and educational, having a general educational and professional orientation) levels; Graduates of the second level could enter and continue their studies at higher professional institutions, institutes, and after graduating from a vocational school they could study at technical schools [2].

In general, the Soviet educational system developed by 1922. Its further development led to a significant growth of scientific institutions and research institutes, which provided the new economy with qualified force. The goal of higher education in the new socialist society in this difficult period was the formation of qualified personnel for the developing industry, i.e. the creation of a "class" of workers and peasants intelligentsia with a professional education, and capable of replacing old specialists. At the same time, the school solved the global task of forming a new person — the builder of a socialist society, capable of restoring and further developing industry.

In the aspect of the relationship between state reorganization and the education system, we give one more example from the recent past of the socio-political reformation of Russia in the mid-80s - the period

when the new political leader, Secretary General of the Central Control Commission of Communist Party of the Soviet Union, M.S. Gorbachev (from March 11, 1985 to August 24, 1991 - General Secretary of the CPSU Central Committee 1 7 3.). The new government set itself the task of creating a new civil legal society in which the monopoly position of the Communist Party of the USSR (1990) was abolished. The main goal of the reform during this period was the transition to the democratization of the socio-political and economic system in the USSR, which meant the restructuring of socio-state significance (1987-1991), which consisted in identifying and radically transforming all spheres of public life, starting with the state reorganization, changes in the course of domestic and foreign policy, economy, culture and spiritual life of the population [3]. The striking critical indicators at the beginning of the reform were the accelerating processes of domestic development lagging behind world standards: the low level of industrial production results in all sectors; non-compliance of products with the requirements of the time; lack of investment in the development of production; poor preparation and lack of necessary personnel capable of solving the current situation. In the sphere of culture, there was also a contradiction between a socially oriented professional structure that meets the "official" spiritual needs of society, and a developing subculture of informal groups that have their own position in society and a special look at its development. In this environment, there was a wide range of informal groups with their own social base, their own culture of communication, "informal" leaders, their scientists and researchers, members of professional and integrated associations. This situation demonstrated a deep crisis in the consciousness of the individual and society, in the cultural and spiritual spheres. There was an urgent need for effective measures and a new focus on both economic and social policies.

The difficult economic, industrial and social situation in the country created the need for competent practice-oriented specialists who are ready for qualified rethinking and solving the problems of the content and forms of organization of higher professional education. The situation required not only improvement, but rather a radical revision of the education system, its meaningful and semantic aspect. Under these conditions, the State Committee for the Development of Public and Public Administration of Education defined the main ways and stages of its reform, which are more detailed expression in state legislative acts (1984 - 1991), which support the reform of secondary and vocational education.

The result of the work of the Committee was the introduction into the education of "forgotten" and new for that time pedagogical approaches based on the principles of democratization, humanization, proclaiming the value of the personality itself, and its development, which expanded the powers and allowed to give educational institutions more independence, allowing them to conduct educational activities with taking into account regional conditions (Resolution of the Central Committee of the CPSU and the Council of Ministers of the USSR "(03/18/1987)). Such a shift in emphasis towards the expansion and diversity of goals, objectives and technologies of education (December 20-22, 1988) led to the development of various projects, programs and regulations on the implementation of liberal ideology; on financing education in high volumes; the introduction of tax benefits and the provision of social guarantees for students and education workers (Draft Law of the RSFSR "On Education, early 1991); during this period, a draft legal act on education was developed; a system of elected leaders of institutes and universities was created [4].

The main direction of changes in education that took place since 1987 was the integration processes of production and science in higher education. Based on contractual relations in vocational education, the principle of interaction between the university and the enterprise was introduced, in accordance with which, the enterprise paid for training for its future specialist. The importance of the teacher was revised, the teacher became the main figure in education.

The rearrangement of emphasis contributed to the search for a new educational ideology, reflecting the development trends of society. As a result of discussions on the transformation of higher professional education, it was noted that the achievement of a new educational level is possible due to the introduction of relevant areas, including the transition to productive democratic relations, the humanization of the social sphere, a varied approach to education policy, rationalization of production activities and social relations, openness , mobility and continuity of education. In the interaction of educators and managers of industrial enterprises (1988), the principles of regulation of the educational process were developed: continuity, continuity of education, interaction with heads of economic enterprises; integrative relations of education,

science, production; cooperation of education management structures and interdepartmental organizations; computerization of education; assistance in material and technical support, updating and improving the forms of organization of the educational process. This approach, which represents a new system-integrative view of the economic mechanism and organization of the educational process of professional educational institutions in the period under review, was a new phenomenon in higher education.

The Reformation covered all the geographical regions of the Soviet Union. So, general schools, secondary and higher educational institutions, faculties and departments that carry out work in new industrial specialties, that is, in accordance with the requirements and social orders of society. Commercial departments were created at universities, and it became possible to obtain a second higher education and study at a paid graduate school. The Higher School set and carried out new educational tasks, focusing on world technical and educational technologies.

Based on the results of the reform actions, the following were introduced: new curricula, which, if necessary, could be changed or adjusted; the proportion of students' independent work has increased; at universities, upon admission, privileges and privileges are canceled; an alternative educational system was introduced in the general school, providing for a variety of forms of organization of the educational process (gymnasiums, lyceums, colleges), which had their own curricula; in new organizational forms, non-traditional subjects have been introduced; students had the opportunity to choose the discipline to study; the plans for restructuring the education structure included the creation of a system of continuing education in the country, as a result of which (1988) an administrative reorganization of the educational institution management system took place.

The "restructuring" of education (1985-1991) created the necessary conditions for the emergence of new scientific areas in universities, reflecting the specifics of the social, cultural and technical level of development of the country. The higher school was called up and practically fulfilled the state order to provide the national economy developing in a new way with qualified professionals, scientifically-oriented in their profession, owning timely technologies and their application in the industrial sector [5].

However, many undertakings during this period, the computerization program and the creation of a continuing education system remained in practice only a beautiful slogan. Nevertheless, the period of perestroika of the 80s of the last century, eventually formed a person as a citizen of his country, who is on the path to understanding his own existence and destiny, who “woke up” from a dream and began to make independent decisions and responsibility for his life.

Methodology

Today, the current round of social development is in a protracted stage of reformation. The period of the beginning of the 21st century was marked by the process of globalization, and this has become a key characteristic of the current era. Globalization has penetrated into the educational sphere: a number of leading higher education institutions of various countries have entered the Bologna system, the purpose of which is to create a single educational space. Russia, being a part of the Bologna system since 2003, has undergone the processes of perestroika for more than 20 years, being in a continuous crisis movement to this day. In education, “the crisis is determined by the goals, methods and content of knowledge, the attitude to the education of students” and requires new strategic decisions [6].

The competency-based approach to higher education carried out in accordance with the requirements of the Bologna system requires a different view on building a professionally-oriented educational process, including various, and sometimes “other” educational forms, technologies and conditions. The need for this is dictated by the rethinking of the scientific and technological achievements of the world industrial and technical production. This shifts the emphasis of all economic, political and socio-social processes, including the range of educational services, towards globalization, digitalization and digital communication.

At the current stage of reforming a democratic and legal society, the instability in the socio-economic, political and cultural development of the country indicates the need for the state to overcome the global crisis, which consists in solving the problems that direct the market demand “to the results of intellectual activity” as a factor in the innovative improvement of production, technology , science, culture and education, which is connected with the “strengthening of institutions in the global competition for attracting

strategic and investment "[7], what is human intelligence. Education is becoming one of the priority innovative factors ensuring Russia's competitiveness. The formation of society and the development of the economy needs appropriate scientific personnel: engineering, teaching, which are focused on the development, implementation of new technologies and innovations. An intellectual resource is precisely that innovation that allows creating, expanding and disseminating new knowledge [8].

In this regard, the aim of the study for the authors is to determine the formulation of further ways and prospects for the development of higher education, the formation of new educational paradigms, directions and technologies in accordance with the tasks of the state and the means to achieve them.

In constantly changing conditions of the social, industrial and technological spheres, the spectrum of variability of possible ways for the further development of the image of higher education depending on changes in the social and industrial development of the country was studied by a group of scientists and presented in the studies of A. Verbitsky [9], I.V. Arzhanova [10], [11], S.M. Avdeeva [12], A.B. Thief [13], D.O. Derman [14], E.A. Dyachkova [15], A.V. Klyagina [16], V.S. Efimov and A.V. Laptev [17], [18].

So, taking into account the socio-economic development of the country, all kinds of education scenarios arise - roadmaps of the future "Education 2030". The analysis of the opinions of experts, consisting of more than 1000 representatives of the scientific community of various cities and regions of Russia, showed several ways of economic development and possible directions of development of education - modern hypothetical missions and higher school functions in the future [19].

1. The raw materials development of the regions of the Russian Federation, which solves the problems of modernizing education with adequate mechanisms, with the aim of preserving the content and forms of education, entering the Bologna process, developing optimization processes for some higher education institutions, integrating leading domestic universities into world information-educational and research centers (about 40 universities have already entered the Bologna system).

2. Job growth and leadership positions in high-tech industries focused on replacing imported products will provide the Way for "catching up with modernization of the processing industry"

3. Modernization of industry, "growing" competitive specialists, inculturation of migrants and adult education, creating an innovative and competitive environment characterized by "local leadership", leading universities, accelerated development of high-tech industries (IT, nano-, biotechnologies), design and business components education

4. The modernization of all sectors of the economy and the social sphere will lead to increased civic and innovative activity of the people, the formation of the sector of "cognitive society" [19].

In accordance with this forecast and based on an analysis of expert questionnaires, the researchers suggested the most possible functions of universities and determined their significance in the period until 2020 and until 2030:

1. Higher school - as an institution of development for the country and regions, as a "school of adults." According to experts, with "raw" or "catching up" development, this function will not be in demand, since the readiness of a higher school to implement it is low.

2. The development of higher education in Russia along the path of "school as an" incubator ", which" grows "young people up to the age of adulthood. According to experts, this role of higher education is unpromising.

3. The functioning of higher education as a "supermarket", aimed at offering the demand for educational services and applied developments. With this option, the higher school will not meet the requirements of the current development of society, but it will carry out the familiar fulfilled functions [20].

4. Experts consider the "University" function to be the key link in the center of the social and cultural environment of the region, the bearer of the worldview and ideology of public policy. However, it is noted that the higher education is not developed and ready for the implementation of this plan. This leads to another problem associated with the development of educational strategies in the regions [21], [22].

The materials presented are a fragment of a broader analysis, but they also show a far from optimistic picture of the state of a professional school, which, as the study showed, currently does not have time to follow the development of a socio-industrial, technological, informational complex, is not ready for a new round of development and for expanding its functions and tasks, not ready or partially ready to become a

leader of national importance.

Nevertheless, due to special attention to achieving the quality of education, its vector has changed, and this is due to the need to solve the problem of forming an effective, innovative, informational and educational infrastructure, that is, a complex of educational structures that ensure the functioning of this system and improve its elements, implementation new educational technologies, a center of competence, the development of new training, distance "on-line" programs that are primarily needed by the city, the region y country.

The innovative educational infrastructure refers to such processes of modernization in the content of education, in the structure of educational content, in teaching technologies that ensure the functioning of the educational sphere, its organization, management and control. According to sociological studies, it is precisely the issue of modernizing the strategy of Russian education and the application of innovative technological models in the educational process of higher education that is by far the most relevant and relevant. A number of scientific publications among authors M.A. Izmailova [23], E.V. Bryzgalina [24], E.N. Klochko and V.R. Mezhlumova [25], E.G. Gulicheva [26], G.V. Voronkov [27], affect various changes in the educational sphere, especially the process of introducing innovations in the professional space, which requires the introduction of technologies adequate to today's trends in education [28].

The education system is faced not so much with the tasks of quality education as with the peculiarities of constructing an educational space in the context of digitalization, in which the most effective technologies allow students to learn self-education skills and gain knowledge that a graduate can use in any socio-economic changes in various spheres of life [29; 30]. So at what level are universities and universities ready to solve these problems. To understand this, it is necessary to highlight the key meanings that are embedded in the model of the pedagogical process, in the unity of its components “Form-Tools-Content-Competencies-Graduate”, as the basis of a new substantial strategic policy in education [31].

Results

Today, higher education is in search of possible effective directions of its development. The current trend in the implementation of education reform is the process of globalization, that is, the creation of a single global information and educational space and, as a result, the development of the Supporting Universities in the regions. The quality of education will depend on the creation of such a space in universities, ensuring its functioning and development [32]. How will this happen? Ways to create a “new” university are discussed by the leaders of large educational institutions at conferences and pages of scientific journals. The views of leaders show the conceptual guidelines for the development of higher education. For example, “A reference university assumes responsibility for the development of a region, and accordingly, it must solve the tasks of consolidating all the intellectual resources of the region and create a synergistic effect” [33]; "A reference university should become an integrator of the education, science and production system, a center providing services - competencies, a center of entrepreneurial activity, social responsibility, cultural and historical heritage and social policy, ensuring scientific, educational and socio-cultural development of local communities in the region."

The main goal of the Basic Universities, according to logisticians, is the transition to close integrated interaction between industry, science and education, with the goal of “cultivating” and effectively using human, material, spiritual resources for the city and the region.

So what is a supporting university in the opinion of experts? The fundamental basis, which is part of the infrastructure of the University, which ensures its functioning, includes: professionalism and activity of the teaching staff, material and technical equipment of the educational process in conjunction with marketing activities aimed at promoting the brand of the university and its positioning in the education market [34].

1. Material and technical equipment of the educational process - an indicator of the quality of higher education is determined by the educational and methodical, electronic library, equipment (remote, digital), the involvement of material and technical equipment, classroom fund in the educational process. Developing the information and technical infrastructure within the framework of the innovative educational program, we not only introduce modern teaching technologies in the educational space, but also provide

information and communication competence of students.

2. The vector of development of education largely depends on the faculty, whose main activity is: improving technologies and curricula, developing a fund of assessment tools in accordance with the types of professional activities aimed at developing a specific set of competencies, creating a point-rating system for assessing education with its modularity, expanding the possibilities of choice and allowing students to independently determine their educational trajectory.

3. The availability of the university with highly qualified faculty determines the quality and compliance of the content of training students with the requirements of the Federal State Educational Standard. The demand for educational services, the publishing activity of a university, the volume of scientific research and publication activity, authority, and scientific and pedagogical schools are important here. The methodological, research, educational, educational and social activities of the teacher are evaluated. The rating of faculty as a carrier of modernization of content and technologies in education is determined from the standpoint of its status, productivity and prospects.

4. Marketing infrastructure ensures the implementation of innovative policies in education and is based on the principles of project management, engineering and marketing, the purpose of which is to organize the activities of the university through modernization and promotion of educational programs and new areas of training, in accordance with the requirements of the educational services market.

Thus, the creation of a qualitatively new information and technical infrastructure and its implementation in the university's management system will provide the university with the implementation of distance-modular technologies forming new additional knowledge, scientific data, and competencies, helping to increase the availability of high-quality educational services, creating a unified innovative educational system of "scientific technological forecasting and implementation of scientific and technological priorities "[35], the introduction of new educational technologies and standards that ensure a competency-based approach, expressed in the "interconnection of science, education and production", in the development of "educational clusters, modules", where the content of the educational structure corresponds to professional training on a competitive basis.

On the other hand, "the general target model of the University of Reference provides for the establishment of universities as centers of attraction and talent development in the region, guarantors of quality training in a wide range of areas of regional scientific and innovation centers and drivers of positive changes in the urban and regional environment" [36].

From this position, in the conditions of reformation, modernization, globalization, distance, on-line education is a key area that contributes to the formation of the competencies of an "innovative person", which includes the following components: professional mobility, readiness for continuing education, creativity, critical and systemic thinking, a combination of personality-individual and managerial abilities, knowledge of foreign languages as communication tools that can act in a competitive environment educational services market, owning professional skills in project work, the ability to solve various problems in the field of management and organization of the educational space, using a set of modern strategic tools.

However, the formation of such competencies is possible if the educational system is created on the principles of reforming its internal, semantic structure. Which fundamentally changes technology, methods and its content, being essentially innovative [37].

Innovation, as a paradigm of modern education, is manifested in the students' project activities, in obtaining competencies, the formation of which is checked by a specific fund of assessment tools. At the same time, the learning process itself has an electronic, "on-line", remote, digital format, which ultimately determines the formation of a new type of students' thinking - oriented, systemic, scientific, methodological, engineering, technological. As well as new competencies - the formation of an information culture, technological, environmental awareness.

Observations, monitoring and analysis of the educational activities of students of higher educational institutions and universities allowed the authors to present the image of a graduate of a higher school: young people who are fluent in the products of the modern digital industry, systemic, methodological, engineering thinking, ready for constructive analysis and solving tasks, most of which are passionate about their future profession, participants in practice-oriented project activities and social events in accordance

with their dominant interests.

Conclusions

The planned results during the transition of civilization to new industrial forms, in direct connection with value-semantic guidelines, educational technologies, and pedagogical approaches, allowed us to draw certain conclusions.

In the framework of a theoretical study, the authors of the article proceed from the assumption whether the infrastructure of the educational model of the "Reference University" is able to provide a comprehensive solution to problems, to search for new development mechanisms and teaching methods, forming a universal bank of competencies for on-line training. Will this be expressed in the revision and updating of training programs in the direction of active forms of learning (SMART technology), student participation in research, design, practice-oriented activities, in new forms of the relationship of education, science and practice.

Digitalization is aimed at ensuring the individualization and continuity of the learning process, that is, "lifelong learning" based on advanced learning technologies. At the heart of such training is the adaptation and mastering by students of disciplines supplemented as virtual models, cloud and other technologies. The virtual and real world are interconnected and according to A.V. Koshelaeva, their merger forms a hybrid world, through which you can identify a person, perform the necessary real actions using the virtual world [38]. From this statement it is clear that the nature of human relations with each other and with society has changed. Is today's student, teacher, ready for such changes? On the one hand, this implies the presence of educational portals, content, information resources and a network environment. On the other hand, this digital platform is similar to a single educational window, allowing students to choose training based on the need for disciplines, popularity and authority of the teacher.

What are the capabilities of SMART technology here? SMART translates as a specific, measurable, achievable, relevant, time-limited "smart environment". As the setting and implementation of SMART goals, technologies imply a reasonable learning process, where each stage is rational and balanced. However, today's curricula and standards are not tailored to such technologies. Even if such a reformation and modernization is possible with technical specialties, then how to be humanitarian, pedagogical or creative?

Already now we can say that ensuring such interaction reveals several internal key problems. So, at the stage of transition of a graduate from one level to a higher one, a problem arises, and it consists in the unresolved organizational and substantive aspects of the continuity of the higher educational levels "Bachelor" and "Master", "full-time education" and "correspondence". The transition from one educational level to another presupposes an increase in research components in the structure of competency-based preparation of a holistic process of personal and professional development of students.

For example, a bachelor's graduate, moving on to the next level, finds himself in new conditions, where he has to carry out research work on the principles of science and creativity, solving contemporary problems. But, as practice shows, in most cases (especially if the applicant decided to change the profile of his profession), he is not ready for this training and this activity. This change creates a barrier that does not contribute to educational logic, significantly hinders the achievement of the desired quality and full development of the individual as a professional. The unresolved problem of the continuity of the organization of the educational process, its structure and the content of successive stages causes certain contradictions that point to ways of further structuring the education system, taking into account the need to form a model of an "innovative" personality.

These contradictions include:

- lack of continuity of the curricula of two consecutive educational levels;
- Inconsistency of representations of graduates of the baccalaureate about the content and conditions of the learning process in the magistracy and the benefits of studying in the magistracy;
- the lack of readiness of graduates of the bachelor's program to solve problems at the next educational level.

Another problem arises from this. The current continuity of the steps of the educational structure does not fully reflect and does not fully represent the state goals and interests of the development of society and

the educational system.

Thus, these problems require their understanding and development. One way or another, the "Oporny Vuz" system and its infrastructure, active pedagogical technologies, approaches and existing paradigms are called upon to solve a global problem, namely, the development of the educational sphere with the goal of preserving, transforming, and gaining a new innovative personality as a professional in the chosen field of activity necessary city, region, country.

Conclusions

In the modern conditions of globalization, education should not only keep pace with the development of science and production, but also be the flagship in the creation of scientific, informational and practical values, on the basis of which scientifically based areas of modern industry and society will develop. Higher education today is not only a means of learning, it is always the potential of the present and the vector of future development. Acting as a single world educational space, it should fulfill the mission of an integration center for the preservation, generation, comprehension and development of new scientific knowledge, fulfill the functions of developing and implementing innovative ideas, be an innovator and developer of future technologies, organizer of cooperation between science and production, and become an innovative, professional exchange platform experience, the center for the development of the sociocultural environment of regions, cities, the bearer of the worldview and self-realization of a person in the conditions of formation new society. Education should prepare students to perform social functions, developing personal, professionally significant qualities in it, manifested in universal, multifunctional competencies. However, at this stage this is not possible, because there are contradictions, both in the most meaningful and semantic continuity of the structure of education, in the technologies for its implementation, and in the model of an innovative graduate.

At the present stage of the study, in the context of modern requirements of the labor market, it has allowed the authors to see the content line of higher education, to establish an object in which the personality of the graduate, the construction of the educational system depends not only on its structure - the university, but also on innovative teaching technologies. Education system technologies are built on the basis of a concept that defines the ultimate goal of learning. What kind of specialist do we want to see, who do we want to get? A university, a strategy for its development, learning technology is both a means and a tool for achieving it.

The educational paradigm allows you to build an action strategy, determine the goal and means of achieving it, find tools to influence not only the individual, but through the individual - on the region and society as a whole. The reference university is presented as an organizational, functional, innovative, design, resource, marketing and conceptual structure in which education, politics, economics, culture are interconnected.

For the authors of the study, questions were interesting: do the education system have a development concept today, are there ways to design a model of the educational space and the process of achieving the goal, as an indicator of its quality. Education, in the broadest sense, has a systematic order, building it, we create special intellectual, informational, communicative relations, where a student is an intellectual resource, a product of an educational idea, technology and concept of a university. A student entering into a complementary and mutually influential "Student-University-Education" relationship with a university, having an important communicatively significant phenomenon, creates a platform for revealing one's intellectual resource.

The reference university as a world information, educational, and communication center allows you to simulate the trajectory of a future graduate, design processes, the environment in which the formation, development and formation of a new intellectual resource - a specialist (graduate) takes place.

To date, the university and the education system must be proactive. So, owning communication mechanisms, means, forms and technologies, we not only form a competitive specialist in the labor market, we are building a system that allows us to achieve key quality indicators in achieving the goal. If a university is a communicative and educational platform in designing a new way of thinking, a graduate model, then its main task is to create competitive conditions that provide the graduate with the necessary competencies (the

"center of competencies"), without which he, as a resource of the future, cannot exist.

The commercialization of intellectual labor touches on the problems of constructing a value-semantic, meaningful model of education, answers the question what qualities, what competencies we want to form among students, taking into account the interests of both the manufacturer and the consumer. Today's student is an engine, and the main effect of the development of his personality is to provide services that are important for the city, region, state.

Thus, moving to a new path of development of society, it is necessary to determine the system of relations "University-city-region", to build the concept of the educational policy "Form-Tools-Content-Competencies-Graduate", and a management strategy. That is, education today is an innovative, integral, social and managerial model of a scientific school that defines "quality-content-control", in the system of which the production of new tools, technologies, competencies and knowledge transfer takes place.

A retrospective analysis of theoretical and methodological research allowed the authors, taking into account the spatio-temporal conditions, changing new socio-economic, political and cultural situations, to compare the planned results achieved in different time periods, which makes it possible to optimize and manage risks in the future. The final results of the study and indicators of the development of the educational structure made it possible to see the activities of the university organization, the effectiveness of the main components in the essential model of the development of the world educational space, which forms an innovative model of the intellectual personality, capable of self-development and transfer of knowledge to a new generation, taking into account the necessary transformation of education towards digital, Smart technologies .

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Implementation of It-Communication of Participants of the Educational Process Under Conditions of Digitalization of Higher Education

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Abstract

Among a lot of factors that determine the possibility of implementing intercultural communication, the use of information and communication digital technologies (ICDT) with proper organization of interaction between the participants of the educational process plays a significant role. An integrated approach to the organization of the educational process is based on the use of educational materials based on ICDT tools and the organization of interaction between participants in the educational process. IT creates an integrated computer learning environment that allows to organize intercultural communication, to improve the quality of training and educational services, and to provide access to educational resources from any mobile device.

Keywords: means of information and communication digital technologies (ICDT); self-study work, intercultural communication, informatization of education, information exchange, management of educational activities, participants in the educational process.

Introduction

Today there is no question whether it is necessary to use the means of information and communication digital technologies (ICDT), since they have already entered the life of society in all its fields, including educational. The use of a personal computer in the educational process has led to the development of a new branch of knowledge – computer didactics, where a personal computer is characterized as a didactic tool, representing the material in a special way and influencing the learning process.

Modern ICDT tools are confidently being introduced into the educational process. ICDT tools are used in all forms of training – full-time, part-time, distance technology, telecommuting. The concept of «digitalization» means the complete automation of the educational process, starting from the design of the stages of the supply of educational material and ending with its delivery to students, as well as subsequent maintenance of the product. The rapid development of ICDT funds requires employees who are ready to work with their implementation in the educational process and have special skills. The solution to these problems should undoubtedly come from the reorganization of the educational process. The digitalization of education is changing the labor market and creating the conditions for the emergence of new competencies. The education reform in the field of digitalization is to equip educational institutions with high-quality software, for example, information systems that allow access to educational resources, the results of modern research and development, electronic scientific libraries in different languages of the world. For this, it is necessary to provide educational institutions with modern technology, namely, computers with the ability to connect to the Internet, smart boards, mobile computer tablet booths, laboratories of virtual and added reality etc.

Methodology

The theoretical and methodological basis of the study is the scientific works of Russian and foreign researchers on the problem of using ICDT tools in educational process (Mazur Z.F., Chertakova E.M., Smirnova E.V., Kireeva I.A., Robert I.V.).

The following methods are used in the article: theoretical methods: analysis and study of psychological, educational, scientific and methodical literature on the problem of research, questionnaires, analysis of educational materials.

The basis for creating a paradigm for the using of ICDT tools in the process of self-education of students is the research of Russian scientists in the field of development: principles of subject-activity, acmeological, competence, cultural and synergistic approaches (Evdokimova, 2007; Gessen, 1995); theories of polycultural education (Apanasyuk, Kaziakhmedova, Belozertseva & Kireeva, 2019; Kireeva, Apanasyuk, Grigor'eva, Bogatyreva & Alekseeva, 2018); theories of self-education and purposeful preparation for self-educational activities (Smirnova, 2019, Bobykina, 2009; Bobykina, 2011); the main provisions of linguodidacty and methods of teaching foreign languages (Merkulova, Smirnova, Kaziakhmedova & Kireeva, 2018; Merkulova, Krasnoshchekova, Smirnova, Meteleva & Kireeva, 2019).

Results

The digitalization of education is directly related to the educational tools that ICDT open for universities and schools that were not previously available. The most prominent of them can be considered online learning, which includes both mixed forms of learning, i.e., combining watching online lectures and seminars at the university, and directly online. Digitalization undoubtedly affects the process and quality of education. ICDT tools introduced into the educational process are able to captivate students much more than simple lectures. Using ICDT tools, students develop their skills in real-world situations. This requires the availability of high-speed Internet, the introduction of ICDT at a new technical level: the equipment of educational buildings with many access points to the Wi-Fi wireless network in order to ensure uninterrupted access to the Internet; installation of interactive panels connected to the electronic educational portal, as well as to the scientific library; students get work on laptops and tablets.

The digitalization of education sets the goal of improving the quality of training and educational resources; organization of a single information space; operational collection of relevant data characterizing the state of all areas of university activities; providing access to educational resources from any mobile device; the provision of educational services; anti-terrorism security [1]. To implement these tasks, it is necessary to develop individual educational paths, create a unique set of tasks, the answer to which will require a creative approach, the ability to compare, weigh, analyze, filter out unnecessary information, communicate and so on. To develop courses using ICDT tools, a teacher needs to take specialized training courses to solve the problems of creating modern educational contents.

The interest of teachers in ICDT tools is due to the search for solutions to such problems as:

- implementation of intercommunication;
- organization of self-study work;
- creation and processing of texts, tasks;
- release of a teacher from routine work;
- modeling situations;
- recreation of a professional-oriented environment.

As a tool for educational activities, ICDT tools can be used by a teacher, firstly, to receive informational support in the framework of intercommunication, secondly, technical support, and thirdly, professional support. Computer functions allow you to accurately record facts, store and transmit a large amount of information, group and process statistical data. This allows you to use it to optimize learning management, increase the efficiency and objectivity of the educational process while significantly saving the teacher's time in the following areas:

- receiving informational support in the framework of intercommunication;
- work with educational materials;
- organization of teamwork (conferences, exchange of opinions, etc.);
- implementation of distance learning (part-time students, part-time students, distance learning, elective courses, people with disabilities, etc.).

ICDT funds provide the teacher with various types of assistance:

- as a means of preparing handout educational material;

• search for the necessary information when creating new teaching materials through reference and information support systems;
• registration of materials for training (texts, drawings);
• analysis of existing programs and developments;
• as a means to determine the level of knowledge and control the assimilation of educational material;
• as a tool for conducting educational experiments and business games [2].

The use of ICDT tools solves the problems of updating didactic materials, which must be periodically carried out in connection with the development of science and with changes in curricula, which is especially important for modern dynamic areas of training and specialties.

A teacher with the help of ICDT can select and analyze materials. In addition to the development of printed teaching materials, modern ICDT tools allow the teacher create new computer training programs (for example, modifying and supplementing databases of open or generative programs). The most popular generative computer programs designed for the teacher are:

• programs for the automatic creation of tests based on the multiple choice technique with the only correct option or with several possible options;
• programs for automatically generating exercises in the form of texts with omissions with the only possible correct option, or in the form of text with errors.

Using a computer as a tool to support the teacher's professional activities allows not only to work effectively with educational material, but also to optimize the educational process by systematically registering its parameters and creating data banks for each specific student (group of students):

• information on the initial level of knowledge;
• results of current control;
• average mark;
• data on the prevailing pace of work.

Some forms of the educational process cannot be implemented without the use of a computer. Computer networks and telecommunication facilities make it possible to organize real-time creative work on joint projects of students from different educational institutions. At the same time, the process of collective creativity makes it possible to increase skills, because a great role here is played by the high intention of the students to build intercommunication [3].

Thus, at present, for a teacher in an open information environment, the use of ICDT tools has obvious advantages for teaching.

One of the actual issues of the modern educational process is the training of the teaching staff for work in the context of informatization of education. Today, the role, place and tasks of both the teacher and the student are changing significantly. All this, accordingly, entails the transformation of the main components of the educational process: the nature of the joint activities of its subjects is changing; the ratio of didactic functions implemented in the system «teacher – computer – student»; programs and technologies for teaching subjects are becoming more complicated; methods and forms of conducting training sessions are changing. Moreover, the «man-computer» scheme has sufficiently high capabilities and is able to offer fundamentally new approaches to solving individual tasks of the educational process, which are different from traditional ones.

Traditionally, the exchange of information was carried out between two subjects of the educational process (teacher and student), who had the opportunity to provide feedback. With the advent of interactive teaching aids, a third subject is included in the information interaction – a learning tool that operates on the basis of information and communication technologies (ICT) [4], which has the ability to provide feedback with the first two. At the present time, when it is possible to use a distributed information resource (for example, educational sites), information interaction (with feedback) can be carried out with several partners in various modes of work on the Internet, and within the framework of open education, in the educational space.

Traditionally, the content of information activities was limited to local, framework volumes of educational information between two subjects of the educational process (teacher and student). Information exchange was carried out with specific portions of educational information from teacher to student and back

for control goals, for example, the teacher explains that the student answers to the teacher's questions or talks about what he's learnt. With the advent of interactive teaching aids, a third subject is included in the information interaction – a teaching tool, ICDT-based, which has the ability to provide feedback to the first two, being not only a partner in information interaction, but also a source of educational information of a significant volume and various levels both in complexity and content. With different levels of knowledge of educational material, the solution of the problem of individualization and differentiation of the educational process is possible only through the joint use of traditional and computer-based components in the educational process. At the same time, the student can choose the content of the educational information himself, in accordance with his preferences and level of preparedness.

Traditionally, the type of student's informational activity was limited by a well-known set: perception (when listening, viewing) in the process of explaining to the students a new educational material of a certain specific volume; memorization, learning only part of the educational material presented; reproduction (verbally or in writing) of the learnt material. [5] The emergence of interactive teaching tools provides such new forms of educational activity for a student as registration, collection, accumulation, storage, processing of information about the studied objects, phenomena, processes, the transfer of a sufficiently large amount of information presented in various forms, the management of the display models of various objects, phenomena, processes. An interactive dialogue is also being carried out not only with the student and teacher, but also with a learning tool that operates on the basis of ICDT.

It is important to note that the role of a teacher in the conditions of informatization of education remains not only a leading one, but also intensifies. This is due to the fact that the teacher implements it in a new pedagogical environment, characterized by the use of modern information tools. The teacher gets the opportunity to expand the range of his impacts on students through a new strategy of pedagogical activity, originally laid down in the implemented information technology of education. Under these conditions, the nature of the work is changing. The teacher has, firstly, to design and construct the aforementioned learning technology, setting different learning paths; secondly, to develop on its basis a didactic informational complex of academic discipline; thirdly, to justify the logic of the organization of pedagogical interaction with students both at the communicative level, and at the level of user interaction with computers; fourthly, to choose adequate forms and methods for managing cognitive activity of students; fifthly, to develop and form pedagogical tests and test tasks for the organization of control and self-control, etc. The role of the teacher as the only source of educational information with the ability to provide feedback is changing. [6] First of all, it is shifting towards curating or mentoring. The teacher no longer spends time on the transfer of educational information, on the message «knowledge sum». The time previously spent by the teacher on the retelling of teaching materials is freed up to solve creative and managerial tasks.

Conclusion

Thus, the content of the teacher and student's activity is increasingly becoming creative, which requires them to constantly update knowledge and professional growth, as the most important condition for the effectiveness of a their professional and studying activity in the context of informatization of education.

It means that the teacher, along with the basics of pedagogy and psychology, needs to know the capabilities of ICDT in the subject area and have the skills to work with it; have the skills of managing cognitive activity of students both in the display class, and during their independent work with the didactic complex of information support of academic discipline; be able to select and appropriately compose educational material for its implementation in pedagogical software products; in collaboration with programmers and independently develop the elements of the named didactic complex and implement them in the educational process of the school.

The role of the student as a «consumer» of educational information or a participant in a problematic educational situation is also changing. He moves to a more complex way of searching, selecting information, processing and transmitting it. The use of educational information obtained by students on their own, transfers the learning process from the level of passive consumption of information to the level of active information conversion. And in a more advanced version – at the level of independent formulation of the educational task (problem), hypothesizing to solve it, checking its correctness and formulating conclusions

and generalizations on the desired regularity. At the same time, the organization of both individual and group, as well as collective forms and types of educational activities using ICT tools is important.

A learning tool that operates on the basis of ICDT is considered as a tool to increase motivation, develop skills to effectively use the knowledge gained, the ability to act independently in a situation of uncertainty when solving urgent problems in the educational and future professional areas of activity, and also as a tool that ensures the intensification of students' independent work. The ICDT-based learning tool realizes the possibility of non-linearity in the provision of information that enhances students' independence in the choice of learning activity modes, the automation of control and self-control, provides an individual way of managing educational activities, adapting the presentation of educational material to individual characteristics of information perception, online access to additional and reference material, etc.

Thus, the implementation of the information interaction of the participants in the educational process in the context of informatization of education orientates the educational process towards the implementation of a dialogue of cultures, the activation of each student's intellectual abilities, knowledge and competencies, the development of the ability to self-education, self-cultivation, self-mottion, self-development; the formation of creative abilities, cognitive interest, hard work; maximum consideration of the individual characteristics of the student and preferred methods of working with educational material, ensures the implementation of an individual approach and the intensification of students' self-study work.

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Study of the Features of Development of Ecologıcal Concepts in Children of Preschool Age

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Abstract

This article is devoted to the problem of development of ecological ideas in children of preschool age. The author pays special attention to the diagnosis, results and analysis of the levels of development of environmental concepts in preschool children. The article reveals the features of the development of ecological ideas in preschool children. The results of the study of parents of older preschoolers on their attitude to the relevance of the theme of ecology, environmental problems, environmental protection, environmental management. Identified the relationship between environmental education of children and work of the staff of preschool educational institutions. The greatest impact on the environmental education of preschool children has environmental education of parents, training and retraining of relevant personnel, greening the developing subject environment, greening of various activities, working with other educational institutions, etc.). Our study has led to the conclusion that environmental education of preschool children is currently taking place in an incomplete manner, and environmental protection is a rare phenomenon in the activities of children. Accordingly, in order to increase the level of environmental perceptions of preschool children, we have developed a working program "Nature – our wealth" (5-7 years), the main purpose of which is to educate children of preschool age of the person who is able to understand, protect, love and protect the environment. In addition, the program covers various aspects of environmental education of preschool children. It provides not only environmental education of children of preschool age, but also motivation of development of abilities at them to render the feasible help to the nature. Much attention is paid to joint with adults practical activities of children, observations, experiments, games, excursions, experiments.

Keywords: ecological representations, ecological education, ecological education, ecological culture, system of preschool education, ecological knowledge, abilities, skills, levels of ecological representations, ecological responsibility, diagnostics.

1. Introductıon

Now the world stands at the decisive line behind which the death of nature and all human civilization or the definition of a way to eliminate the environmental disaster that threatens universal destruction. It is necessary to completely change this situation, if the entire human community is really going to preserve the environment of its existence and activity. The international ecological community of educators considers education in the field of the natural environment (ecological education) to be the dominant direction and considers it necessary for all States and governments to consider it in the light of the global ecological crisis (hereinafter referred to as the GEC) (Choking, 2009). Most scientists believe that the GEK becomes a reflection of the crisis of society, the crisis of the modern mentality, which is focused on increasing the growing needs of man, even without taking into account the possibilities of the biosphere.

The ecological situation has built before the pedagogical theory the purpose education of youth in the spirit of careful, responsible attitude to the environment, which is able to adequately solve the problems of nature management, to protect natural resources, subsoil. In order to transform the requirements into the rules of behavior of each individual, it is necessary from early childhood to purposefully cultivate a sense of responsibility for the state of the environment (Glazychev, 2007).

Currently, the state of the environment is determined primarily by the environmental illiteracy of people, as well as the lack of basic environmental culture in society. In this regard, the dominant task of environmental education was organized by the formation of an eco-cultural and eco-literacy of the young generation (Glazachev, 2007). Kindergarten has a huge impact on the environmental education of children. It is in it that the origins of ecological culture are laid, and its formation is the main goal of the entire teaching staff. In modern methods and practice of training and education, more and more attention is paid to the effective combination of a variety of organizational forms, methods, means, ways. That gives you the opportunity to more successfully address the educational objectives, taking into consideration the age psychophysiological features of children (Vinokurova, 2012).

The dominant factor in the education and upbringing of children of preschool age was considered in pedagogy living (biotic) nature. Interacting with biota, studying its objects, processes and phenomena, preschoolers gradually study the nature in which they live. Children learn the diversity of flora and fauna, consider the place of natural factors in everyday life, experience moral and aesthetic feelings, emotions that oblige them to take care of natural resources (Alekseeva, 2011).

2. Methodology

The basis for the development of responsible attitude to nature, ecological culture of preschool children determines the content of classes in preschool educational institutions, which contain the necessary knowledge about the biotic and abiotic nature, the interaction of man (society) with natural objects, its value properties. For example, the content of classes in music, fine arts allow children to multiply the stock of sensory-harmonic impressions of children, contribute to full communication with the natural environment, rational and adequate behavior in it.

Pedagogical justification of the necessity of formation of ecological concepts in children is reflected in studies of many domestic and foreign researchers (Alekseev S. V. (Alekseev, 2012), Aniskin, S.V. (Aniskin, 2005), Lepeshkina AA (Lebedkina, 2011), Mamedov N. M. (Mammadov, 2011), Nikolina N. S. (Nikolina, 2011), Martynenko A. G. (Andreeva, 2012), Andreev M. P. (Andreeva, 2012) etc.)

Environmental education in pre-school educational institutions (hereinafter DOW) is the most important condition for the formation of literate and educated people who from an early age apply in their behavior and activities the principle of humane, careful and responsible attitude to nature, which in turn contributes to the emergence of young people with ecologocentric type of thinking, seeking to overcome the crisis of environmental phenomena, cataclysms, disasters.

In the senior preschool age children easily acquire a complex of ecological knowledge, especially if knowledge is presented in an easily accessible, interesting form. Modern preschoolers receive a huge amount of information about the environment from TV shows, books, magazines, the Internet, but, unfortunately, this information is scattered and often not quite accurate. The dominant task of the educator is to activate this knowledge base in children and bring it into the system as such in the process of training and education.

The base of ecological education of children is aimed at the formation of a responsible attitude to the environment. Unfortunately, only pre-school without the help of the family can not do anything. Environmental education of parents is becoming a global, and at the same time, one of the most difficult areas of pedagogical activity. The preschool staff has advantages, which are that they have the opportunity to meet with parents daily and in personal contact to carry out joint cooperation.

The family, as an environment of formation and development of personality, has a great impact on the formation of the foundations of the ecological worldview of man. It is impossible to instill the skills of ecological culture without interaction with the family. Work with parents on environmental education of preschool children is becoming one of the components of the preschool educational institution.

2.1. Analysis of recent studies and publications, which considered aspects of this problem and on which the author is based; allocation of previously unresolved parts of the overall problem.

In modern scientific literature, there are opinions that differently reflect the content of environmental education of children in preschool educational institutions. So, the problem of ecological education and upbringing belong to the research of most Methodists, ecologists, pedagogues and psychologists: O. A.

Kornilova, A. N. Solenogo, Mistle Thrush, S. D., I. D. Zverev, I. T. Surovegina, V. N. Asvina, N. I. Escalona, V. S. Kuchmenko, I. N. Ponomareva and others.

In his methodological and pedagogical research K. Romanova believes that environmental education is "a purposeful environmental process that has a high developmental potential, allowing to develop in a person his mental (cognitive) processes (attention, memory, thinking, imagination, etc.) and abilities (intellectual, creative, musical, linguistic, etc.)".

A.N. Zakhlebny gives the following definition of environmental education, understanding it as "an element of General education associated with the mastery of students of the scientific foundations of the interaction of nature and society", with the main task of environmental education, he considers the education of a person focused on the values of sustainable development; education of responsible consciousness and reasonable behavior; the formation of environmental culture, etc.

Analyzing the work of L.V. Moiseeva, we came to the conclusion that the result of environmental education is formed in human ecological consciousness, ecological thinking, ecological culture, environmentally oriented behavior, humane environmental, rational activity.

In the Concept of environmental education edited by I. D. Zverev and I.T. Suravegina environmental education is presented as a holistic unity of the processes of education, upbringing and development, that is, as a whole.

In the formation of the basics of environmental culture in older preschoolers, which are based on environmental concepts, representations, the main place is given to education, which assists the individual in its spiritual and moral construction, in the harmonization of relations with the outside world and generally determines the future prospects of socio-cultural development, according to Ivanova A.I. (Lizunova & Lizunova, 2018; Ivanov, 2004).

2.2. Formation of the article goals (task setting).

The question of the survival of the whole society directly depends on the degree of ecological education, ecological culture. Environmental responsibility is associated with such personal qualities as self-control, self-esteem, self-organization, the ability to foresee the immediate and long-term consequences of their actions in the natural environment, a critical attitude to themselves and others. The system of pre-school education contains a huge amount of environmental knowledge, skills (skills worked out to automatism), which implement the requirements in the direction of changing the growth and formation of environmental culture.

Organization of fruitful work on environmental education of children is impossible without determining the degree (level) of environmental representations in older preschoolers. The method of work developed by us included the following conditions of its organization and carrying out:

– diagnosis was carried out in natural conditions with a comparative homogeneity of the composition of children in groups in PRESCHOOL;

– pedagogical research was conducted on the material, the content of which corresponds to the tasks of the educational process in kindergarten;

– in groups, classes were conducted by one teacher (Arzamas, 2018).

The study was conducted on the basis of the municipal budget preschool educational institution "Kindergarten of combined type №275" of the Soviet district of the city district of Samara during the 2017-2019 school year. The first stage of our pedagogical research was attended by parents of older preschoolers. They were offered a questionnaire "Environmental education of children", consisting of 15 questions to identify the attitude of parents to the relevance of the theme of ecology, environmental problems, global environmental crisis, environmental protection, environmental management, especially environmental education of children of preschool age.

The second stage of the study involved children of preschool age. The primary section was attended by 52 senior preschoolers. This group "Droplets" and "Beads" (preparatory group). The main purpose of this stage of work was to determine the initial level of ecological ideas about the laws and relationships of natural phenomena, the unity of living and inanimate nature, the interaction and interdependence of nature, society and man in older preschoolers.

In the third stage of our work involved only 25 preschoolers (group "Droplets) (experimental group). In the course of the study it was planned to compare the effectiveness of the final cut with the effectiveness of the initial cut, draw appropriate conclusions and suggest ways out of the current situation (Gilyarov, 2014).

3. Results

By analyzing the results of the survey of parents of preschoolers MBDOU "the kindergarten of the combined kind №275", we found that many of the parents know very well what is ecology and what is this science, like animals, birds, animals, many are plants (geraniums, ficus, cactus, Orchid, Cymbidium, zalogina, can, miltonia) and animals (cats, parrots, dogs, hamsters, Guinea pigs, aquarium fish) at home, a positive attitude to the nature. However, only 10% of respondents acquaint children with the rules of behavior in the natural environment, with the dangers that it can meet in nature. 84% of parents found it difficult to answer the question of how You can help a preschool educational institution in ecology, 78% of parents need help from a kindergarten on this problem (for example, how to monitor the weather, what environmental topics to talk with children, how to conduct basic experiments and experiments using natural material, what practical activities in nature can be carried out with children, etc.). 82% of parents do not talk to their children about nature, environmental protection and environmental management. The results showed that most parents have a low level of environmental knowledge and need the help of a kindergarten on this issue (Ladilova, 2012).

Diagnosis of the level of development of the initial environmental concepts in children of preschool age was determined by us through a number of tasks that were carried out individually with each child.

Task 1. "Determination of the characteristic features of the representatives of the animal world", whose main purpose is to determine the level of knowledge of the characteristic features of the representatives of the animal world, their otice from plants.

Task 2. "Identification of the characteristics of the plant world", the purpose of which is to determine the level of knowledge of the characteristics of the plant world.

Task 3. "Determination of the characteristics of inanimate nature", the main purpose of which is to determine the level of knowledge of the characteristics of inanimate nature in children.

Task 4. "Knowledge of the seasons", the purpose of which is to determine the level of knowledge of the seasons and their distinctive features.

Task 5. "Ecological attitude to the world of nature", which aims to determine the level of environmentally correct attitude to the world of nature, aesthetic education of preschoolers.

We have identified three levels of environmental performance in older preschoolers:

High - children independently distribute representatives of flora and fauna by species, explain their choice, correlate the inhabitants of the animal and plant world with the habitat, know the distinctive features of plants and animals, consistently answer the questions asked by the educator, are interested in the plant and animal world, emotionally Express their feelings to houseplants, animals, birds and insects, without the support of adults call the conditions that are necessary for the life of houseplants, Pets, explain the basic rules of plant care, from memory reproduces the seasonal characteristics of a particular time of year, expresses an aesthetic attitude to natural objects, explain the relationship between human activity and the life of animals, birds and plants.

Average – children rarely admit to a small error in the distribution of the main inhabitants of the animal and vegetable world types, you can, but not always, argue your choice, usually identify the main representatives of plants and animals with the environment, possess the distinctive characters of plants and animals, but sometimes there may be inaccuracies in the answers to the questions the answers are in most cases consistent, systematic, but sometimes there are very short, children do not always show interest in indoor plants, animals, birds and insects, practical skills and skills of care of houseplants are formed to an insufficient extent, after additional adult questions can give examples of how people use objects of inanimate nature in their practical and daily activities, correctly called the seasons, cannot always show the relationship between human activity and the life of animals, birds and plants.

Low – children very often makes mistakes when splitting the main inhabitants of flora and fauna on the species, cannot explain their choice, often cannot identify species of flora and fauna with the environment, with a work called characteristic features, on the questions of the teacher difficult to answer, in the process of practical activities constantly turn to their elders, not always correctly identifies the distinctive characteristics of the objects of inanimate nature, wrong to define the seasons, hard to call them in the correct sequence, does not know the characteristic signs of the different seasons.

Analyzing the results of the primary diagnosis of the task №1 in preschool children, we have established the following ratio of levels of environmental representations: low level of environmental representations had 57% of children, average – 26% and high - only 17%. When performing this task preschoolers hardly placed animals, birds and insects on the map, taking into account their place of residence. In addition, they had to talk about the proposed animals and Express their attitude to him.

When analyzing the answers of the task №2 in preschool children, the results were as follows: low level – 62%, average 29% and high – 9%. Children of preschool age had to name 5 houseplants, then show them and answer the questions of the teacher. Most children could not list the conditions necessary for the life, growth and development of houseplants, to name the basic rules of care for houseplants. When asked whether you like houseplants, the children replied that they are neutral.

The analysis of the results of task 3 was as follows: low level – 52.8%, average 37.8% and high – 9.4%. In this task, the children had to determine the contents of the jar (soil, sand, water), and then answer the questions of the teacher. Preschoolers with difficulty, and in most cases with the help of adults listed the basic properties of sand, soil and water. Only a small number of children know what a person uses objects of inanimate nature.

After analyzing the results of task number 4, we came to the conclusion that the low level – have 47.2% of preschoolers, the average - 39.6% and high – 13.2%. When performing this task, the children had to answer a number of questions offered by the teacher. For example, what season do you like best and why? Draw a picture, which will be shown this time of year. What time of year will come after your favorite time of year, tell me what will follow it, etc.?

The analysis of the answers of the task №5 in children of preschool age allowed to establish the following ratio of levels of environmental representations: low level – 45.3%, average 43% and high – 11.7%. Most children answer the teacher's question: "How do you help adults take care of Pets (if any)?"with virtually no errors listed basic methods of pet care. The complexity of the question: "What do you with adults can do to on the kindergarten territory was growing the plants?»

The results of the cutoff showed that almost all older preschoolers have little idea about the patterns and relationships of natural phenomena, the unity of animate and inanimate nature, on the interaction and interdependence of nature, society and man, the rational use of natural resources.

4. Conclusıons

The results of the pedagogical research allowed us to change the approach to environmental education of children in preschool educational institutions.

For children of preschool age (senior and preparatory group) in order to improve the level of environmental performance we have developed the author's work program "Nature – our wealth" (5-7 years), which focuses the teacher (teacher) on a systematic, integrated approach to environmental education of senior preschoolers. All its sections are related to each other, and the final topics are a generalization of the previous ones, which is extremely important.

This work program is made in accordance with the modern requirements of the regulatory framework of preschool education (GEF DO). The structure of the program reflects the problematic approach in education, which allows you to logically organize the material of the program and consider it in a complex (Ponomareva, 1989). All its blocks provide for multiple repetition of the content at different levels. In General, the program can be divided into three main levels:

The first level - the child is introduced to the world of the natural environment from the position of a holistic perception of the world. The principle of integrity is realized through the statement "man is an integral part of nature". Educators introduce children to the diversity of components of the world. Child

gradually learns, that around him there is air, water, plants, animals, soils, the sun, which are interconnected between themselves and with man.

The second level - pre-K completely enough learn the basic components of the environment; first, the inanimate (the sections on "Water", "Air", "Sun") and then with the component occupying the intermediate space between the animate and inanimate nature ("Soil"), and finally - with nature ("Plants", "Animals").

The third level - children on some examples consider the basic questions of relationship of the person with environment and certain options, ways of their decision. At the same time, the teacher (educator) starts from the training of preschoolers, which they received in the process of acquaintance with the previous blocks.

The application of this author's program "Nature is our wealth" (5-7 years) involves the construction of a developing environment by the teacher, integrating, system-forming approach in the education of children in kindergarten. Environmental knowledge, skills and abilities children get not only in the classroom, but also during walks, excursions, reading books, visual and musical activities. The dominant attention is paid to joint practical activities of children with adults, conducting observations, experiments, games, etc. Since the thinking of preschool children is visually-effective and visually-imaginative, the main emphasis is made on observation, experiment and their own productive activity of children in nature.

Working on this author's program in the group "Droplets (experimental group), we again made a diagnosis. During the study, it turned out that the final cut showed positive results. The majority of older preschoolers with a low level of environmental awareness have become intermediate, and children with a medium level have moved to a high level. Thus, analyzing the results of the secondary diagnosis of task №1 in preschool children, we have established the following ratio of levels of environmental representations: low level of environmental representations had 17% of children, the average – 56% and high - 27%.

When analyzing the answers of the task №2 in preschool children, the results were as follows: low level – 12%, average 49% and high – 39%.

The analysis of the results of task 3 was as follows: low level – 10%, average 68% and high – 22%.

After analyzing the results of task number 4, we came to the conclusion that the low level – have only 7 % of preschoolers, the average – 53% and high – 40%.

The analysis of the answers of the task №5 in children of preschool age allowed to establish the following ratio of levels of environmental representations: low - 13%, average 63% and high – 24%. It speaks about pedagogical expediency of the author's program developed by us (Zverev, 1996).

Thus, kindergarten is one of the most important stages of active accumulation of knowledge about the surrounding natural world, the development and formation of multifaceted relations of preschool children to the natural and social environment, contributing to the formation of personality, the formation of environmental thinking, behavior and culture (Metlina, 2011).

The idea of forming the foundations of environmental education for preschool children is embodied in the program "Nature is our wealth". The formation of the foundations of environmental education and upbringing of preschool children is becoming the dominant task of the modern system of preschool education. Particular attention should be paid to: the formation of children's understanding of the intrinsic value of nature; the realization that everything in the environment is interconnected, interdependent and violation of one of the links leads to a violation of the natural balance; the formation of the perception of the child himself as an integral part of nature; education of careful attitude to living and non-living natural objects; the development of positive emotional attitude to the surrounding world, the ability to see its beauty and harmony (Frolova, 2012; Lizunova, 2016).

Finally, in order to get the expected positive result in a preschool educational institution, it is necessary to create the necessary pedagogical conditions, which include the system of work of the entire kindergarten staff. The system of organization of environmental education in preschool institutions should consist of interrelated components, each of which performs its specific function in the implementation of environmental education (for example, environmental education of parents, training of relevant personnel, working with other educational institutions, etc.). The preschool institution achieves the most effective results in the presence of all components of the system, which are closely interrelated (Lizunova, 2015).

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A Compilation of the Studies Conducted on the Interval Training Model in the Last 5 Years

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Abstract

Endurance training is generally defined as being able to sustain the energy capacity or power available during the activity during fatigue as well. The interval training method differs slightly from other endurance training sessions, since it does not require continuous workload. Interval training that is performed with consecutive short-term workout and rest in unspecified numbers improves MaxVO_2 usage in the body; in addition, it has physiologically improving effects on athletes. In this research, interval training studies, including theses and articles written in the last 5 years, were compiled and similar results were encountered as a result of the researches.

KeyWords: Interval, max VO_2, training.

Introduction

Sports vary according to the branch performed in terms of physical and physiological characteristics. "It is known that every sport has its own discipline, rules and training types. For this reason, the type of players needed by sports branches also varies "(Yolcu, 2012).

Throughout the history of sports research, the relation between the functions of body structure and body parts has always been an issue to be investigated. "Physiological and psychological features, physical performance capacity and anthropometric features are important factors in achieving success in sports branches."(Aydos et al., 2009). According to Duyul (2005), "Knowing the physiological and physical characteristics of athletes has enabled scientists working on training science to introduce many innovations to sports branches. Coaches can develop their training plans through this information and create strategies specific to branches "(Öktem and Şentürk, 2017).

Physical properties and capabilities

Physical characteristics of athletes are examined under the headings of body composition and body size. Body composition consists of muscle, water, fat and dry weight. Body size, on the other hand, is the appropriate physical competence required by different sports branches. The physical capabilities sought in athletes can be categorized under 7 main headings. These capabilities are:

- Muscle power
- Muscle strength
- Muscle endurance
- Speed
- Flexibility
- Agility
- Heart and lungs endurance.

Training and endurance are defined as

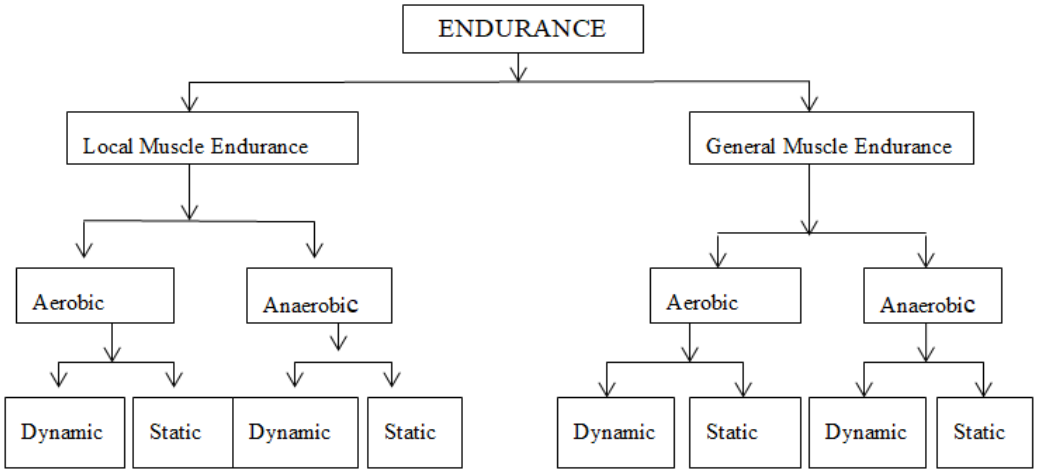
Functional and morphology suitability in all loads on the body, a change in the organism as a result of loads and a resulting increase in efficiency. We see another definition of training as follows: It is the physical, technical, tactical, mental, psychological and motor preparation of athletes through the help of exercises. Sevim (2007) defines endurance as "the ability of the whole organism to resist fatigue in long-lasting sports exercises and to sustain very high intensity loads for a long time" .

Endurance Training

Endurance mostly depends on the aerobic capacity of the athlete, while it also depends, to a lesser extent, on anaerobic capacity. More specifically, endurance activates the use of fatty acids while physiologically reducing glycogen storage (Karatosun, 2003). Taşpınar (2003), on the other hand, defines endurance as the capacity to produce a high percentage of work related or special technical behavior, a metabolism, the highest power of a movement. Endurance is "the ability to withstand fatigue ", which means that it allows you to continue your activity at an efficient exercise intensity without muscular fatigue, or rather, in spite of muscular fatigue. Endurance is as important as other performance elements (endurance, strength, speed, flexibility, skill and others). Long-term exercises with low intensity are related to endurance, and they are also called aerobic exercises (Ay, 2008). Endurance training is important for general training status as well as motor-condition capabilities (Çetin and Flock, 2011).

Hollmann claims that there are different types of endurance as explained in the following table

1.depending on which muscles are used (local-general),
2.type of energy provided (aerobic-anaerobic) and
3.the way the muscles work (dynamic-static).



Hollmann & Hettinger, (1980)

The Purpose of Endurance Training

The main purpose of endurance training is to ensure that the movements are performed for a long time and quickly by making the athlete need less anaerobic metabolism, decreasing acid accumulation and procrastinating acidosis.

Physiological effect of endurance

Although the 'low intensity, slow, long-term workouts' effect of endurance training is generally seen on the metabolic potential of slow-contracting type 1 fibrils, it may be seen that the fast contracting fibrils such as type II a and type II b also increase in this type of training. Biochemical changes in skeletal muscle following endurance training can be summarized as follows:

- Increase in the number and volume of mitochondria,
- Increase in the activity and concentration of enzymes of Krebs cycle and electron-transport system,
- Increase in the glycogen storage of the muscle,
- Increase in myoglobin content,
- Increased capacity to oxidize carbohydrates and fats,
- Increased triglyceride storage in muscle,

•Increased activity of enzymes involved in the activation, transport and destruction of fatty acids (Erzeybek, 2004),

- The body being fit in a very short time,
- Increase in vital capacity,
- Strengthening the heart,
- Increased number of active capillaries,
- Increased energy capacity of the organism,
- Developing their combined relationships with each other (Revan, 2007),
- Increase in the level of energy formation, and

•the increase in the ventilation capacity of the organism (Sevim, 1997). It was observed that through endurance training increases occurred in $MaxVO_2$ capillarization, mitochondrial respiratory enzyme levels, fiber size and conversion from type II b to type II a (Çindaş, 2001).

Effect of Endurance on MaxVO2

$MaxVO_2$ is the most important physiological factor affecting performance in endurance sports. As $MaxVO_2$ is the indicator of aerobic path in endurance sports, it has the same meaning as aerobic power.

In relation to the development of endurance capacity, provided that the intensity, frequency and duration of the training was sufficient, MaxVO2 in adults was observed to increase by approximately 15-30 percent (Açıkada, 2004).

"Sports scientists consider $MaxVO_2$as an important indicator in terms of endurance" (Ay, 2008).

"The maximal oxygen consumption, which is one of the most important criteria of endurance, is considered to be the best indicator of aerobic endurance. Performance in endurance activities depends on the ability to sustain the use of $MaxVO_2$ percentages for a long time" (Köklü et al., 2009).

While practicing endurance training, though $MaxVO_2$ borrowing occurs in short term exercises, the continuation of the exercise in order to use O_2 at the maximal level during long-term exercises as well is the main purpose.

Classification of Endurance

Classification of endurance in terms of energy production;

a) Aerobic Endurance:

"The energy consumed in the exercise is balanced. In general, the endurance activities in O_2 environments where there is sufficient amount of oxygen in the organism without any need for borrowing oxygen (O_2) are a condition feature completely based on aerobic energy production of the organism" (Sevim, 2002).

b) Anaerobic Endurance:

"It is the name given to the energy system that produces energy without using O_2. Anaerobic endurance consists of two parts, being the ATP-CP system (phosphagen) and the lactic acid system. During all short-term exercises, adenosine triphosphate (ATP), which is available in the muscle cell, is activated first. In the next stage, if sufficient amount of $O_2$is not available, energy-giving substances are burnt without O_2. At the end of this process, lactic acid is formed as a by-product. This system is called lactic acid system " (Zorba, 2001).

c) Alactic anaerobic pathway

"With this reaction, creatine phosphate is used as an energy source to recycle ATP (Marangoz 2008). Creatine phosphate is located in muscle cells like ATP and has high energy bonds. The energy released as a result of the breaking of these bonds is used for producing ATP.It enables muscle contraction in very high-intensity activities that last less than 10 seconds."

- Creatine + Inorganic Phosphate + Energy
- Energy + ADP + P ATP (Önder, 2007).

"Since only a small amount of ATP can be stored in the muscle, energy consumption is pretty fast when there is strenuous physical activity. In contrast, creatine phosphate 'CP', or phosphocreatine in the

muscle cells, decomposes into creatine and phosphate. This process reveals the energy used to convert ADP + P to ATP, and then once again converts ADP + P to ATP, resulting in the energy required for muscular contraction. The conversion of CP to C + P does not provide energy that can be directly used for muscular contraction. Rather, this energy is used to convert ADP + P to ATP. The energy provided by this system lasts for approximately 8–10 seconds, since CP is stored at a limited level in muscle cells" (Gökpınar, 2010).

d) Lactic anaerobic pathway

The lactic anaerobic pathway is realized by fermentation of carbohydrates. Aerobic-anaerobic endurance is a whole, and both can be corrected through training. However, the most important condition for the development of anaerobic capacity is aerobic capacity (Marangoz, 2008). In general terms, it can be called as "the breaking of glucose and glycogen through anaerobic pathway. When energy is being produced through lactic anaerobic pathway, only glucose is used. Two pyruvic molecules are formed by glucose breakdown. The system has been given this name due to the emergence of lactic acid as the final product when creating ATP" (Önder, 2007). "Sports events of about 40 seconds are very tiring in nature. Energy is first supplied by the ATP-CP system and and later by the lactic acid system for the following 8-10 seconds. The lactic acid system breaks down the glycogen in muscle cells and liver, releasing energy to form ATP from ADP + P. Due to the absence of O2 during the breakdown of glycogen, lactic acid is formed as a by-product. If an activity continues very long with high intensity, a large amount of lactic acid accumulates in the muscle and causes fatigue. This leads to the interruption of physical activity" (Gökpınar, 2010; Güldalı, 2018).

Classification of endurance in terms of motor properties (Sevim, 2007):

a) "Continuity in Strength: It is described as the capacity of the muscular system to resist fatigue in continuous loads. "

b) "Continuity in Agile Strength: It is expressed as the ability of the nervous muscle system to overcome the resistance for a long time by contracting at a high speed. "

c) "Continuity in Speed: It is known as the ability of the athlete to maintain his maximal speed for a long time without reducing it." (Yıldırım, 2019)

Interval Training

"Interval training differs from other endurance workouts due to the lack of continuous workload. Interval training is characterized by periods of rest or low-intensity exercises with preparation for recovery for the next loaded exercise interspersed between recurrent violent exercise periods "(Laursen & Jenkins, 2002). "Exercise intensities, work and rest ratios and the number combinations of intervals are endless and there are many interval training protocols" (Buchheit and Laursen, 2013). As a result, "the frequency, volume, intensity and duration of each protocol may differ. This makes it difficult to compare training methods. In addition, it is often unclear to make sure which adapter is responsible for which factors" (Laursen, 2010). "There are various terms for interval training types such as medium intensity interval training (MIIT), high intensity interval training (HIIT), speed endurance training (SET) and sprint interval training (SIT)" (Burgomaster et al., 2005; Ön, 2018)

High Intensity Interval Training

It is one of the training types that includes exercise periods that are characterized by fluctuation of exercise intensity over a certain period of time. Typically, they are exercises where high-intensity activities are combined with low intensity exercises of repetitive periods (near-maximal or supramaximal) or, in some cases, with complete rest.

High-intensity interval training is very important for endurance training for sports, where the load intensity varies during the match, such as football, volleyball, handball and basketball. (Altınkök, 2015).

If the goal of training is to improve speed, the intensity of the sprint should be maximal and less than 10 seconds, so that the main contribution to the ATP cycle will be focused on the use of phosphocreatine hydrolysis and glucose "(Mohr, 2010). Similarly, it is believed that it is necessary to keep the rest periods

between sprints not less than 60 seconds, so that muscle PH can be recovered and and creatine phosphate recycle can be maximized.

If it is desired to continuously improve the ability to generate high power, interval times should be increased to 30-90 seconds, so speed endurance will be improved (approximately equal to rest time) and it will be fully suitable for training the glycolytic and oxidation system. (Mohr et al., 2007).

Finally, if the purpose of the training is to optimize the development of the aerobic system (oxidative capacity of the skeletal muscles and oxygen uptake), the duration and intensity of the intervals should be 2-4 seconds close to VO2max, 2-3 seconds active recovery. (Helgerud et al. 2007; Perry et al. 2008).

High Intensity Interval Training Methods

One of the first examples of high intensity interval training methods is the wingate style. This style is widely applied in scientific studies. (30 seconds x 4-6 times on the wingate bike, against a load of 7.5% of the body weight, 3 every other days a week with 4 minutes intervals by asking to do the best the athlete can) Apart from Wingate style, high intensity interval training styles such as bicycle ergometry, Tabata style, Gibala Style, Timmon Style, Circular Weight Training, Insanity workout, running, walking, swimming, aqua training are available. Although these styles are used in applications, sufficient literature related to them has not been created yet. Fitness experts can combine the method of HIIT with other high intensity exercise programs. Individuals are advised to be checked by a doctor before applying any high-intensity training method. (Bayati et al., 2011).

High Intensity Interval Training And Cognitive, Mental Health

New studies emphasize that physical activity and fitness can have positive effects on young people's mental health (depression, anxiety, etc.) (Parfitt and Eston, 2005). Studies also report that doing physical activity and achieving high physical fitness improves learning mechanisms, psychology, emotional development and mental health in young people (Hillman et al., 2008). It is reported that high intensity interval training effectively improves body health in young people

(Buchheit and Laursen, 2013). It has also been proven with strong evidence that this training method has positive effects on the adult group population, for older individuals, cancer patients, cancer survivors, as well as on physical health and depression, and that it improves sleep quality and emotional well-being (Singh et al., 2005). Recent studies, on the other hand, are investigating the effects of this method on cognitive and mental health. Although there is a limited number of studies, the results show that this method has positive impacts on physical self-concept , emotional well-being and psychological stress in the youth (ACSM, 2014; Akgül et al., 2017).

Method

In this review, studies conducted interval training method implemented as a type of endurance training for sedentary individuals and athletes in Turkey between the years 2015-2020 were examined. In line with the objective of the study, it was tried to reach published and unpublished scientific researches within the scope of research articles, compilation articles, and thesis written as graduation final project, graduate, doctorate and medical specialty thesis studies. In addition to the academic works, books related to the topic of the study were included.

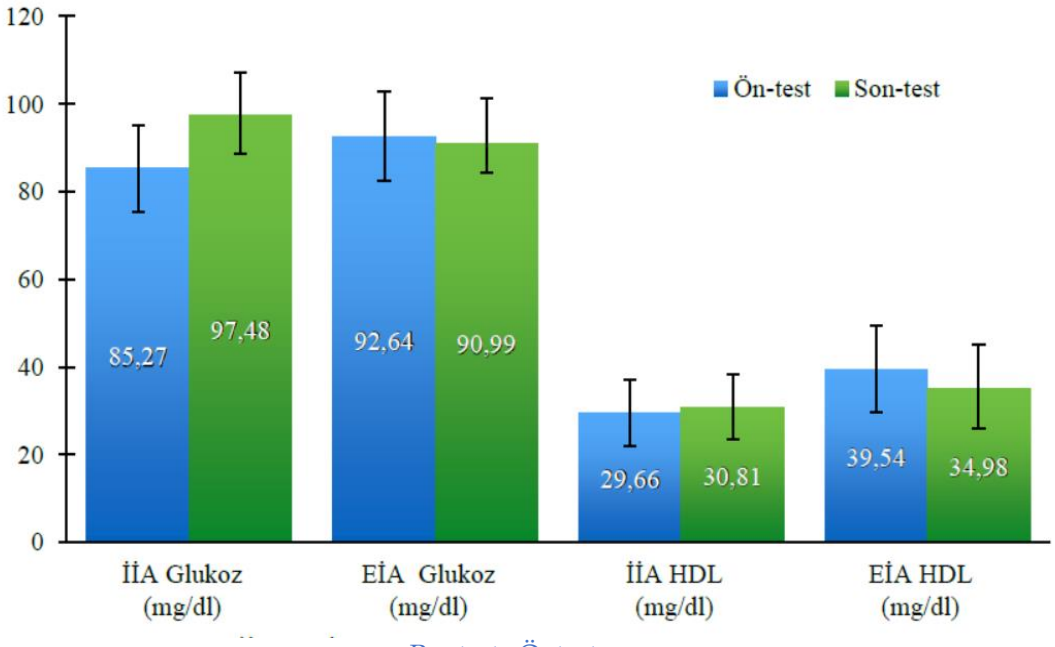
The studies reached include training styles of interval training method and its effects on health in various individuals. The appropriate studies were accessed by using "Google Scholar, Dergipark and Higher Education Institution Thesis Screening System" and the issues we focused on were added to our study.

Findings

In their research, Demiriz et al. (2015) selected 20 out of 100 athletes and formed two groups of 10 individuals, and implemented intensive interval training for the first group (IIT group, N = 10) and extensive interval training for the second group (EIT group, N = 10). When the results of the study were examined, it was observed that there was no change in the VO2max (z = -1.68) and anaerobic threshold (z = -1.60) values before and after the training as a result of the training performed in the IIT group. In contrast, the VO2max (z = -2.44) values of the EIT group increased at the level of p <0.05 and the anaerobic threshold (z = -2.80) increased at the level of p0.01. They concluded that extensive interval training can be

implemented by coaches in order to increase VO2max and anaerobic threshold levels. Pretest and posttest differences between groups are shown in Chart 1.

Chart 1. VO2max and anaerobic threshold averages of IIT and EIT group subjects.



Pre-test : Öntest
Post-test : Son-test

In a study conducted by Halson et al. (2003), in which they implemented 4 weeks of intensive training following a two-week normal training, they found rhythmic and insignificant decreases in erythrocyte and hemoglobin parameters in the first, second and third weeks, while they identified regular and significant increases in the fourth, fifth and sixth weeks. In the study carried out by Erol et al. (1997), where they applied a 10-week extensive interval training method on young male basketball players of 13-14 years old, they determined a decrease by 13.56% in body fat average and 3.84% increase in the average body fat weight (Altınkök, 2015).

Bostancı et al. (2019) applied a high-intensity interval training (HIIT) in their study on 16 elite athletes with a sports history of at least two years. When the percentage changes between the pretest and the posttest scores of the experimental and control groups were examined, they reached significant differences in the experimental group in all parameters but flexibility presented in the table ($p < 0.05$; p0.001).

Table 1. Percentage change between pre-test and post-test

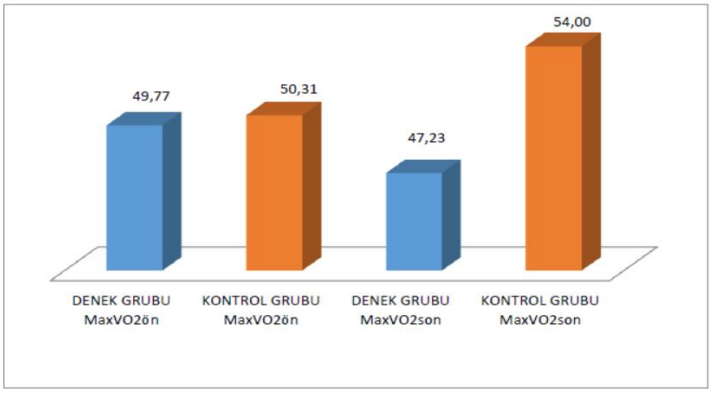
	Mean +SD	Cohen's d	p	
Anaerobic (kg-m/sec)	Experiment	5.13±2.54		
			1.93	0.002*
	Control	1.33±1.13		
Aerobic (ml/kg/min)	Experiment	4.28±1.12		
			3.54	<0.001*
	Control	1.12±0.58		
MIP (cmH_2O)	Experiment	20.09±4.92		
			3.07	<0.001*
	Control	6.78±3.67		
MEP (cmH_2O)	Experiment	11.95±5.66		

	Control	4.39±1.91	1.79	<0.006*
Heart rate at rest (pulse/min)	Experiment	-8.10±2.57	2.29	<0.001*
	Control	-2.20±2.59		
Flexibility (cm))	Experiment	27.85±23.28	0.60	0.253
	Control	15.99±15.87		
Long Jump without running (cm)	Experiment	4.44±2.89	1.42	<0.021*
	Control	1.39±0.95		

*p<0.05 p<0.01 Mean :Mean SD: Standard Deviation Cohen's d: Effect Size

In his thesis study, Egeaka (2015) studied the effects of 8-week intensive interval training on aerobic performance and body composition in football players aged between 18-23. The findings of the study are presented below in charts and tables;

Chart 2: MaxVO$_2$ Statistics Graphic of the Experimental and Control Groups



EXPERIMENTAL GROUP MaxVO2pre
CONTROL GROUP MaxVO2 pre
EXPERIMENTAL GROUP MaxVO2 post
CONTROL GROUP MaxVO2 post

When Table 2 and Chart 2 were examined, while no significant difference was found between the pretest and posttest averages of the experimental group and control groups in terms of weight, fat ratio, fat weight, and lean body weight (p> 0.05), significant differences were determined in MaxVO2 values of the experimental and control groups (p <0.05).

Table 2. Significance Difference Between Group Pretest and Posttest Results of Experimental and Control Group

VARIABLES	GROUP	SIGNIFICANCE
WEIGHT pre-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0.129
WEIGHT post-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0.089
BFR pre-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0.034
BFR post-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0.156
FW pre-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0.013*
FW post-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0.053

LBW pre-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0341
LBW post-measurement (kg)	CONTROL GROUP EXPERIMENTAL GROUP	0.165
MaxVO2 pre-test (ml/min)	CONTROL GROUP EXPERIMENTAL GROUP	0.856
MaxVO2 post-test (ml/min)	CONTROL GROUP EXPERIMENTAL GROUP	0.000*

Conclusion and Suggestions

High intensity interval training can be employed to improve aerobic and anaerobic capacity in all branches. It should be planned by considering the specialty of the branch as the high intensity interval method. It is recommended to be included in training programs to improve endurance, especially during the preparatory period. The main factors to be considered when planning HIIT are given below relevant explanations:

Type of Exercise:	It should be planned in a way to aim the achievements of the branch (running, basketball, swimming, cycling, weightlifting, etc.).
Intensity of Exercise:	High intensity exercises (≥ 90% maximal heart rate - ≥ 90% VO2max- All-out sprint)
Frequency of Exercise:	It should be adjusted between 3 or 5 days a week, taking into account the current situation of the athlete.
Duration of Exercise:	30 seconds - 2 minutes after a movement during training (≥ 90% maximal heart rate - ≥ 90% VO2max - All-out sprint), then 2-4 minutes break and 4-6 repetitions are recommended (Akgül et al., 2017).

It is known that high intensity interval training has brought about significant improvements in the health level for sedentary individuals and physical performance level for athletes in a short time, and it is also known as an alternative to long endurance training. For the athletes to increase their physical performance during the implementation of this training method, it should be emphasized that diet is the most important issue in increasing the overall exercise performance and shortening the recovery period. When viewed from a health perspective, no matter they are sedentary individuals or athletes, all individuals should have their health checked before applying the HIIT method. In addition, when programming this exercise method, the trainers who will apply it on individuals should be qualified and experienced in high intensity interval training method, and individuals who will perform by this training method should have sufficient levels of readiness for exercise.

The contribution of the study to the literature may not be very much, since the studies on the interval training method in the last 5 years have yielded very similar results, and the present study reached repetitive results. Based on this, it would be beneficial to conduct in-depth research by applying not only quantitative tests but also improved qualitative methods related to interval training method.

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