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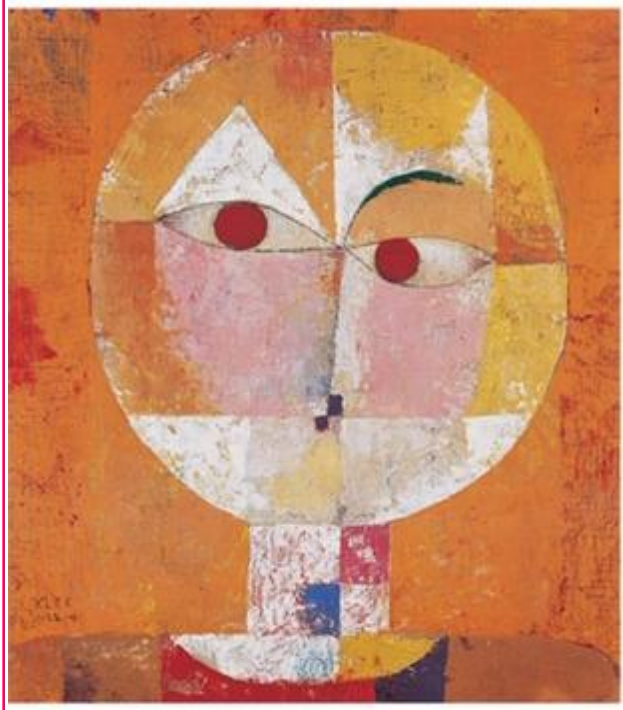

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The development of the informational and communication subject environment for the future mathematics teacher

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Abstract

The article describes the relevance of the formation of professional competence at the future mathematics teacher through the development of ICSE in the school course of mathematics via comparative qualitative research methods. As a result, the majority of students of the group voluntarily expressed a desire to work on their own work and efficiently developed elective courses of ICSE in the

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school course of mathematics. In conclusion, the suggested informational and pedagogical technology of the formation of professional competence at future mathematics teachers through the development of ICSE can be called a breakthrough for the following reasons.

Keywords: Informational, Communication, Subject, Environment, Competence.

El desarrollo del entorno de la información y la comunicación para el futuro profesor de matemáticas

Resumen

El artículo describe la relevancia de la formación de competencia profesional en el futuro profesor de matemáticas a través del desarrollo de ICSE en el curso escolar de matemáticas a través de métodos comparativos de investigación cualitativa. Como resultado, la mayoría de los estudiantes del grupo expresó voluntariamente su deseo de trabajar en su propio trabajo y desarrolló eficientemente cursos electivos de ICSE en el curso escolar de matemáticas. En conclusión, la tecnología informativa y pedagógica sugerida para la formación de PC en futuros profesores de matemáticas a través del desarrollo de ICSE puede considerarse un avance por las siguientes razones.

Palabras clave: Informativo, Comunicación, Tema, Medio ambiente, Competencia.

1. INTRODUCTION

The future of modern civilization is increasingly determined by a person, who is ready to solve the main socio-economic problems for the benefit and for the sake of man. Therefore, the reformation of the

modern educational system has become an urgent problem in different countries of the world, including in the Republic of Kazakhstan. Due to the fact that education as the process and result of the formation of professional competence (PC) determines the stability of pedagogical activity, the determining vector of modernization of the modern educational system is the competency-based approach (VYGOTSKY, 1991: MAWANZA ET AL, 2018).

The competence-based approach arose at the beginning of 1960 in the USA, and at the beginning of 1970 in literature of the western countries, in the Commonwealth of Independent States – in the 1980th years. In the middle of the XX century, an important contribution to the theory of competence was made by the American Scientist R. White. In 1959, he introduced the term competence, as effective interaction (of man) with the environment in order to describe the individual characteristics of man. A special feature of his teaching is the definition of competence in connection with the concept of motivation. The category of competence began to include in itself the personal components taking into account motivation and as a result was expanded to the concept of competence-based motivation.

Foreign scientists Francoise Delamare Le Deist и Jonathan Winterton in their article What is the competence? analyze various definitions of competence and features of their use in the context of training and development in the USA, Great Britain, France and Germany. It is made the attempt to reveal the concept competence by

means of inclusion in it of knowledge, skills and competences within the framework of the typology of holistic competence. The one-dimensional structure of competence is not absolutely sufficient and gives way to a multidimensional structure. The functional and cognitive competences are even more often added to behavioral competences of the USA, and in Great Britain cognitive and behavioral competences are added to the model of professional functional competence. France, Germany and Austria, which appeared on the arena quite recently, from the very beginning accepted more complete approach, but with their distinctive features. Comparing these approaches, authors claim that the complete structure is useful for definition of the combination of competences necessary for concrete professions and for stimulation of labor mobility.

Modern tendencies of development of such directions allow to draw a conclusion about the necessity of formation of new space – the informational and communication environment. That is why the involvement of students in the creation of ICSE plays an important role in formation of PC of future mathematics teachers.

2. MATERIALS AND METHODS

The issues of searching for new opportunities and the need for wider support for education were mentioned in works of domestic and foreign authors.

The researches of Mary Webb provide the analyses of changes of the educational paradigm in connection with the widespread use of the Internet: The Internet and, in particular, mobile technologies had an impact on how the youth communicates and studies. Besides, the last researches in Europe and in the USA showed that the youth spends much more time, using the Internet outside of school, than at school, which indicates the growing opportunities for informal training. In this regard, there are changes and in our view of training. For example, the change in mobility in training, from the point of view of Kress and Pachler, is considered as the constant state of unexpected circumstances, conditionality and the creation of knowledge caused by the expectation of direct access to the world of resources, materials and social interaction. Thus, there is displacement of the emphasis from teaching to training, in which responsibility is transferred to students for management of the trajectory of their training.

The considered approach to the formation of PC at future teacher assumes the creation and subsequent use of the informational and communication subject environment (ICSE) at profile training. At the same time, adhering to the opinion of ROBERT (2008), we understand that ICSE – is a set of conditions that contribute to the emergence and development of processes of educational information interaction between students, teacher and informational and communication technologies (ICT), to formation of cognitive activity of students in conditions of filling of components of the environment the subject contents.

Analyzing the works, devoted to the problem of formation of PC by means of ICSE, it is possible to note that despite a significant amount of researches, the level of effectiveness of the application of ICSE in educational practice of modern school remains low which is the consequence of existence of the contradiction:

- between the rates of development of the modern education system and the low level of renewal of the training content in the secondary education curriculum;

- between the need for the development of ICSE on the basis of the specifics of modern education and its use in the educational process and the uncertainty of function of ICSE development at the formation of PC of the future mathematics teacher.

Proceeding from it, the development of ICSE as the means of forming the PC of the future mathematics teacher is the topical problem of the modern educational system.

The research objective consists of disclosure of essence of formation of the PC at the future mathematics teachers on profile training by means of the development of ICSE in the course of school mathematics in the virtual environment Moodle (KADIRBAEVA ET AL., 2018).

The research object: the process of forming the PC of future teachers in the university.

The research subject: formation of PC of future mathematics teachers.

The research tasks are:

- Determination of the theoretical foundations and basic provisions of formation of pedagogical competence at the future mathematics teacher through the development of ICSE in the school course of mathematics;

- Creation of the structure of information interaction and interface of ICSE course in public virtual system Moodle (PARDAŁA, 2010);

- Proof that the involvement of future mathematics teachers in the development of ICSE in the school mathematics course contributes to the formation of their PC.

Methodological basis of the research are basic provisions of the theory of knowledge and formation of competence, personal and activity approach; theoretical provisions about interconnection of education and development, pedagogical and innovative technologies in the education system, the theory of step-by-step formation of the

concepts and mental actions of GALPERIN (1999), the concept of development of the educational system of the Republic of Kazakhstan.

In carrying out this work, the following research methods were used: theoretical analysis of philosophical, psychological and pedagogical literature on this problem; substantial analysis of periodical materials on the research problem; analysis and synthesis of pedagogical experience in the use of ICSE in the Republic of Kazakhstan and abroad; conducting the quasi-experiment, analysis and processing of results of the quasi-experiment. The experimental base of research is the training process of South Kazakhstan State Pedagogical University (LEONTIEV, 2004).

3. RESULTS

The scientific novelty of the research:

- The theoretical foundations and basic provisions of PC of the future mathematics teacher were determined;

- The method of organization of the two-level process of PC formation of the future mathematics teacher was determined;

- The functional model of ICSE, the structure of interaction of subjects of the educational process in the virtual system Moodle were made. The ICSE interface was developed.

The theoretical importance of the research consists in the justification of new theoretical provisions, revealing the practical essence of PC formation of future mathematics teachers through the development of ICSE on the basis of the theory of the step-by-step formation of the concepts and mental actions of (GALPERIN, 1999).

The practical importance of the research results consists that the development of ICSE in the school course of mathematics will allow the future mathematics teacher:

- To learn to recognize the real state of the education system at the moment;

- To carry out information interaction of users in educational space both among themselves and with screen representations of the studied objects;

- To have the possibility of work in the conditions of realization of built-in training technologies, oriented to regularities of this specific subject area (ANISIMOV, 2009: MUSTAFA ET AL, 2019).

Different virtual systems are used for the developing of ICSE. Among them the Moodle system is popular, representing the control system of website contents, which is specially developed for creation of qualitative online-courses by teachers at distance learning (RAVEN, 2002).

All training materials, which the developer can place in his course in the Moodle system, are separated into two big categories: resources and elements of the course. The teacher places them on the course according to his plan and, thereby, creates the information and education environment for the students. Resources are texts, drawings, files of the presentation or links to the Website, etc. In relation to resources, students act in a passive role of the information user. Elements – are educational tools by means of which interactive communication will be organized: tasks, polls, tests, forums, etc. That is, the students play an active role in relation to elements. They should not only study the material, but have to carry out some actions – to solve the problem, to write the text, to make a choice (ROBERT, 2010).

Having determined the roles of each subject of the educational process in the virtual system Moodle, we created the functional model of ICSE in the school course of mathematics, where their interrelations are reflected. Proceeding from the functional model, we determined the structure of information interaction of the subjects on formation of PC, which is shown in Figure 1.

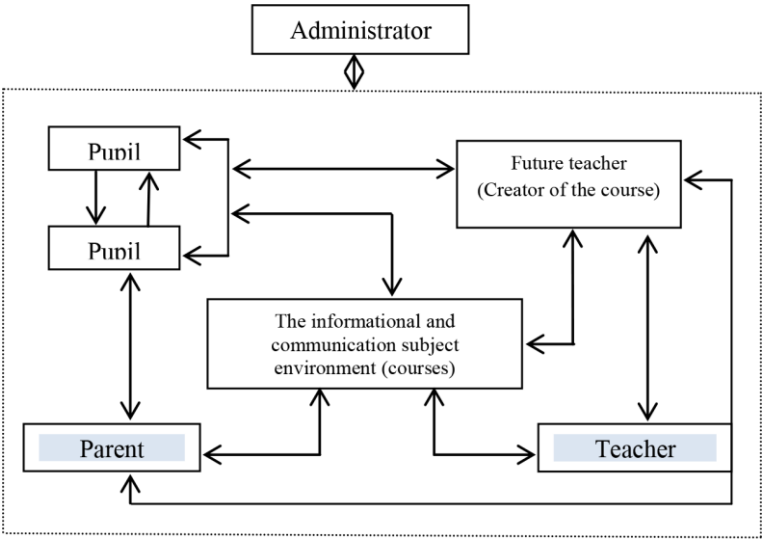


Figure 1: The structure of the informational interaction

During the creation of the ICSE in the school course of mathematics, it was used the program on the study of the educational subject Mathematics (for 5-9 classes) as part of the renewal of the content of education. One of the distinctive features of the updated curricula is that cross-cutting themes serve as the means of integrating subjects, sections, themes, as well as the implementation of intersubject communications. They permeate the content of all subjects and the system of long-term and medium-term planning. In this regard, at the development of ICSE, the themes of category and courses are determined in accordance with the substantial-methodological lines of school mathematics. Therefore, the key link of our subject environment is courses on the substantial-methodical lines of school

mathematics: numbers, algebra, geometry, mathematical modeling and analysis, statistics and probability theory (KUZNETSOVA, 2015).

Above-stated substantial-methodical lines are determined as categories of ICSE courses in the Moodle virtual system, each of which, in turn, consists of courses, corresponding to the topics of a mathematics program for the 5-9 classes. Moodle system elements, such as Chat and Forum are used for the organization of exchange of messages. ICSE courses are built on the modular principle, where the individual modules are course topics that are separated into the equivalence classes. Taking into account the aforesaid and opportunities of the virtual Moodle system, we created the interface of ICSE course (Figure 2).

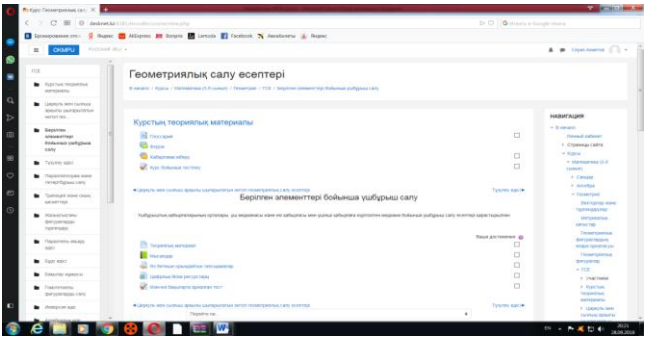
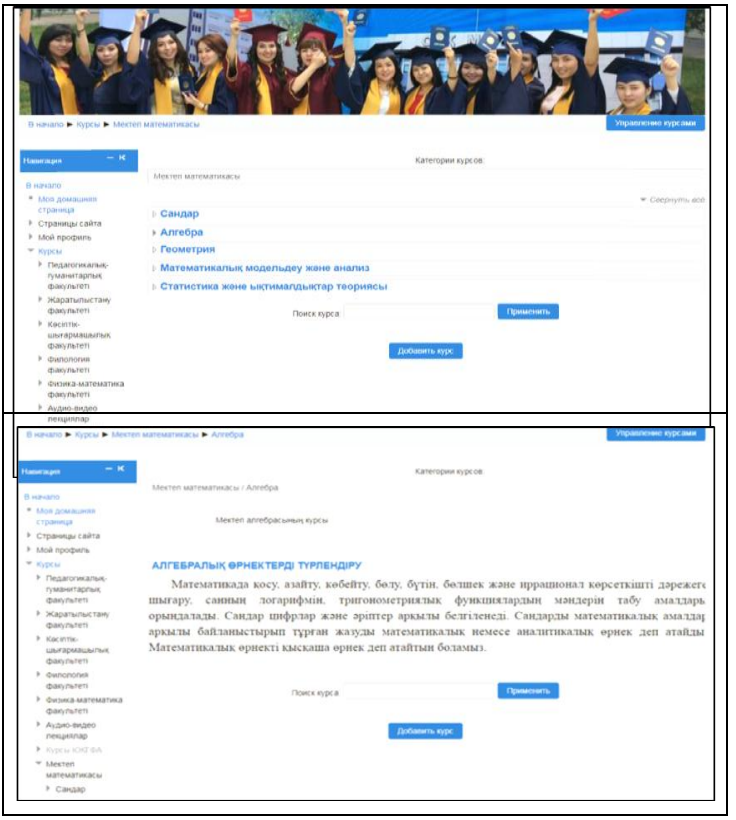


Figure 2: Interface of the course in the Moodle system

The interface consists of the name of a course, the list of course themes, navigation, theoretical material of the course, glossary, course

testing, Forum and Chat for communication, as well as examples, the list of tasks, digital educational resources (DER) and test tasks for self-checking on the selected topic. The fragments of the content of the elective course Expressions, included in the structure of category Algebra in ICSE, developed according to the school course of mathematics are given below (Figure 3).



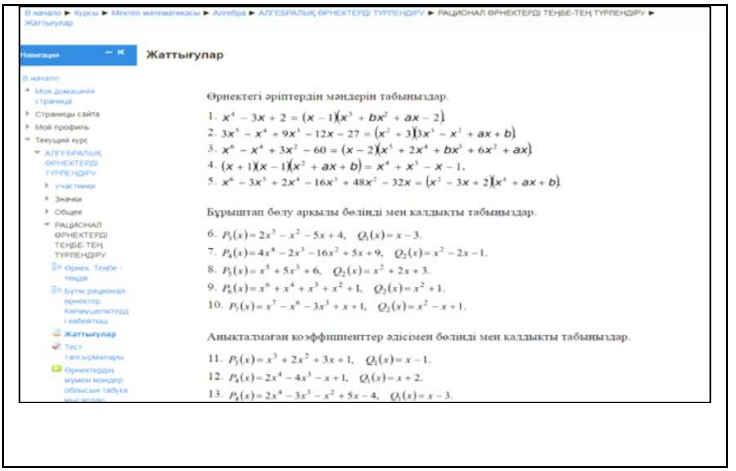


Figure 3: The fragments of the content of elective course Expressions

The effectiveness of the development of ICSE in the school course of mathematics for formation of PC was checked during the studies of course Training methods of elective courses in secondary school for fourth-year students of the Faculty of Physics and Mathematics of South Kazakhstan State Pedagogical University, studying in the direction 5B010900- Mathematics in the number of 20 students.

The placement of the content of the elective courses in the Moodle virtual system was carried out in accordance with the provisions of the development of ICSE specified in paragraph 3.2. At the same time, this work was also carried out collectively: each student not only developed his course, but also participated in the work of another student. Each student performed the function of both student and developer in the Moodle system. Students in the role of pupils

identified shortcomings and achievements of the developed ICSE. In order to estimate work of another person, each student had to be familiar with that work and compare it to his own. Thus, each student was responsible not only for his developed elective course, but also for the results of the other, thereby for the received mark.

The results of the assessment of training on the course Training methods of elective courses in secondary school are given in the following diagram (Figure 4). According to the results of training on the subject Training methods of elective courses in secondary school, it is clear that the majority of students of the group voluntarily expressed a desire to work on their own work and efficiently developed elective courses of ICSE in school course of mathematics. The fact that the above-stated methods turn the development of elective courses into collective work is important. The group in the process of developing elective courses rallies into an integral whole of like-minded people.

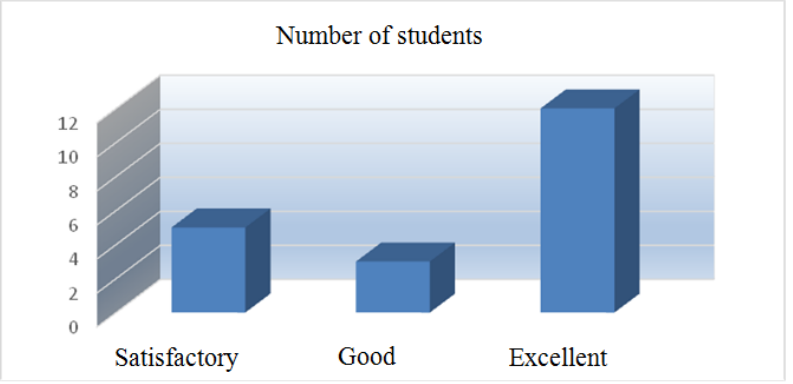


Figure 4: Diagram of the assessment of training

Even more important point in experimental check of efficiency of the development of ICSE is opinions of the students, participating in the development of ICSE, which are reflected in the written essay by results of the performed works:

• Very interesting tasks, interesting facts. Everything is great! I am delighted!

• I really liked the feeling of the importance of each step, no matter how crazy it seemed. Really interesting and useful things were considered.

• I liked the freedom and responsibility of thinking that I used at the development of courses for ICSE. Any step of the process of development was required not so much the correct result as a variety of ways to find it.

• I finally tried to find myself in my business during participation in the development of ICSE. I play thoughts and freedom. Until I complete the begun work - I will not calm down, etc.

These opinions show that at the development of ICSE, there are stages corresponding to the theories of (GALPERIN, 1999). The main point here is the fourth stage: the transition of the external action into the internal one. In other words, the own action on the development of

ICSE, carried out through the external stimulus, as receiving the higher rating, turned into the internal benefit, i.e. into internal motive, as the approval of determination of implementation of pedagogical activity in the form of the organization and management of self-education of schoolchildren. In our opinion, this is the effectiveness of the development of ICSE for the formation of the PC of future teachers.

4. CONCLUSION

The conducted research allows us to draw the following conclusions: The suggested informational and pedagogical technology of formation of PC at future mathematics teachers through the development of ICSE can be called breakthrough for the following reasons. Informational and pedagogical technology, representing integration of various educational technologies and approaches (competence-based, training with formation of critical perception and understanding of performed tasks, personality-oriented, multilevel and individual training), allows to combine in the future the full-time training, distance learning and monitoring researches. During performance of the generalized algorithm of planning of the task solution, it is opened the way to independent reflection of students, i.e. training activity turns into educational activity, and at correction of the reason of discrepancy to the expected result, the student complements

the available data with new knowledge, i.e. the way to self-education is opened.

These circumstances allow the education system to pass from the principle of lifelong knowledge to the principle of acquisition of knowledge during all life. It is expected, that at the mass introduction of the suggested technology in secondary and higher schools, there will be no need to open special schools, it will be increased the social prestige of the profession of pedagogue and the reputation of ordinary secondary and higher educational institutions. Educational institutions from just training institutions are also transformed into educative institutions. At the same time, education in this case is understood as the technology of organization of the process of formation of the conscious person, who effectively, creatively and critically acquired social experience, ways of creative activity, social and spiritual relations, understanding and able to explain to another person the peculiarities of the own actions.

REFERENCES

ANISIMOV, A. 2009. **Work in Moodle distance learning system. Manual. 2nd issue. Corrected and added**. Kharkov, Kharkov National Academy of Municipal Economy. P. 292. Ukraine.

GALPERIN, P. 1999. **Introduction to psychology: Manual for the Universities**. M.: Book house University. p. 332. UAE.

KADIRBAEVA, R., AMIRBEKULY, A., & DZHAMANKARAEVA, M. 2018. **Informational interaction between subjects of the**

educational process in the virtual system Moodle. Bulletin of the Akhmet Yassawi International Kazakh-Turkish University. N^{o} 3. Turkistan.

KUZNETSOVA, I. 2015. **Development of methodical competence of the future mathematics teacher in the training process of mathematical structures in network communities: the dissertation of Candidate of Pedagogical Sciences**. Arkhangelsk. p. 483. Russia.

LEONTIEV, A. 2004. **Activity. Consciousness. Personality**. M.: Smysl; Publishing Center Academy. p. 352. Russia.

MAWANZA, W., NCUBE, M. Z., & MPOFU, B. 2018. "Impact of Trade Facilitation on the Freight Forwarding Industry: A Case of Plumtree Border Post". **Int. J Sup. Chain. Mgt Vol,** 7(4), 48.

MUSTAFA, S., BERANI, F., & BERISHA, H. 2019. "Managing Organizational Conflicts: A Study among Organizations in Kosovo". **Journal of Educational and Social Research,** 9(1), 29-35.

PARDAŁA, A. 2010. **Methods of mathematics teaching vs. distance education // Use of e-learning in the training of professionals in the knowledge society: scientific editor E. Smyrnova-Trybulska**. Cieszyn-Katowice. pp. 91-104. Russia.

RAVEN, J. 2002. **Competence in modern society: identification, development and realization: Translation from English**. - M: Kogito-Center. p. 254. Russia.

ROBERT, I. 2008. **Information and communication technologies in education**. – M.: Drofa. p. 313. Russia.

ROBERT, I. 2010. **Main tendencies of development of informational and communication subject environment**. Electronic periodical publication information environment of education and science. pp. 1-26. UK.

VYGOTSKY, L. 1991. **Pedagogical psychology / Edited by V.V. Davydov**. Moscow: Pedagogy. p. 480. Russia.

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