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INTERACTIVE TECHNOLOGIES AS A MEAN OF FORMING THE PROFESSIONAL COMPETENCIES OF A FUTURE PHYSICS TEACHER

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Abstract

The article is devoted to revealing the essence of interactive technologies as a tool that contributes to formation of professional competencies of a future physics teacher. An overview of interactive teaching methods and technologies used in the process of preparation of future physics teachers is given, the conditions of their effective usage are clarified. These technologies are now being examined as an effective method of students` education and become one of the most promising and successful approaches to modern studying. The article describes such concepts as «professional competencies», «interactive teaching methods», «interactive learning tools», «interactive panel».

Keywords: professional competencies; interactive technologies; interactive teaching methods; interactive learning tools; interactive panel; mozaBook; future physics teacher; willingness of future teachers to professional activities.

Relevance of the research

The urgency of forming the professional competences of a future physics teacher is due to the need to expand his professional recognition in Ukraine, because there is need for

competent, successful and competitive specialists. The widespread use of new pedagogical technologies will allow to change the paradigm of education itself, information technologies will help to realize the opportunities provided in new pedagogical technologies most effectively. The most modern pedagogical technologies used in the learning process are interactive technologies.

Interactive technologies are technologies based on dialogue, cooperation and participation of all subjects of learning. These technologies provide the learning process that is carried out in the forms of collaborative students: activity all participants of the educational process exchange information, solve problems, collectively simulate situations, evaluate colleagues` and actions their own behavior, immerse in a real atmosphere of business cooperation to solve problems [7].

Nowadays there are not enough scientific works that would fully reveal the essence and possibilities of using interactive technologies in the process of preparing a future physics teacher for the purpose of forming professional competencies, which caused the relevance of my article.

Analysis of previous research

The current situation of the modernization of the education system poses new requirements for IHE graduate, who receives pedagogical education. Today, competitive professionals with great creative potential are requared, who seek self-development and self-improvement and are able to solve professional tasks depending on the following types of professional work like pedagogical, project, research and cultural-educational. The modern physics teacher should be able to organize the students 'collaboration, develop their creative abilities and manage the students' educational and research activities.

The idea, essence and problem of professional competence of teachers were being studied by V. P. Bespalko, A. O. Verbitsky, M. V. Clarin, T. G. Brage. The problems of using information and communication technologies in the educational process of graduate school were being investigated in the works of Yu. V. Goroshko, M. I. Zhaldak, N. V. Morse, S. A. Rakov, S. O. Semerikov, Yu. V. Trius and others. The essence of interactive learning is shown in the works of N. Balitska, G. Voloshyna [4], O. Glotov, O. Pometun [9], L. Pirozhenko and others. The problem of integration of interactive technologies was investigated by O. Korotayeva, V. Krichevskyi, S. Mukhina, V. Palamarchuk, G. Selevko [10], S. Sysoeva and others. The works of N. Balitska [4], L. Bogdanova, G. Dovgan, M. Clarin, O. Pometun [9], L. Pirozhenko and others devoted to features of integration of interactive technologies in graduate school.

Presenting main material

The basis of the study was the assumption that interactive teaching of future physics teachers contributes to more effective formation of professional competence. As a result of the analysis of psychological and pedagogical and methodological literature on this problem of research, the main functional features of interactive learning were revealed: activity of cognitive process, personal orientation, communicativeness of subjects of educational – cognitive process. Interactive learning is built with qualities and features, mentioned above provides a positive dynamic of the formation of professional competence of students-physicists of pedagogical IHE.

One of the criteria, which define changes, happening in system of higher education, to provide professional education and to educate teachers on the basis of professional competence. On the whole, professional competence in the context of European trends in modernization, of content, methods and technologies for organizing educational process forms includes existence of specific qualities which involve professional mobility, independence, resoluteness and ability to professional growth of a graduate.

Modern theory and practice have a wealth of experience in understanding the concept of «interactive» at first. The concept of «interaction» appeared for the first in the field of sociology and social psychology and means the process of interaction, dialogue with anyone (human) or with anything (for example, with a computer). The word "interactive" originates from the English «interact» (inter – «mutual», act – «to act») and means to interact, to be in the mode of conversation, dialogue with anyone [8].

Below there some scholars` views on the concept of interactive learning. According to O. Pometun, «Interactive learning is a special form of organization of cognitive activity that has a specific, intended purpose – to create comfortable learning conditions, where each student feels successfulness, intellectual possibility» [9]. According to G. Selevko, interactive learning is «learning with well-organized feedback of subjects and objects of learning, with bilateral exchange of information between them» [10].

The concept of «technology» came in pedagogics from production. In the manufacturing field, «technology» is defined as a set of different techniques, operations, actions, processes and their sequence, to change the state of the object. In other words, it is the algorithm that helps to get the aimed result. There are different interpretations of the concept of «interactive technology». We are most impressed by the definition of «interactive technologies» by O. Pometun and L. Pyrozhenko. They consider interactive learning technologies to be technologies that include a well-planned learning outcome, the using of

individual interactive methods and techniques that ensure the active nature of interaction between participants in the learning process on a collaborative and collaborative basis [9].

Understanding different scientific positions regarding understanding of nature Interactive learning and interactive technologies allows us to affirm that there are common and different opinions about the activation of students' learning activities. At the same time, all researchers recognize the common feature of interactive learning – it`s of value interpersonal interaction that makes the learning process productive.

The goals of the interactive study of physics are achieved through the use of methods of teaching physics, adapted to the concept of interactive learning. According to the study of Yu. Yu. Gavronska, we consider four groups of methods, related to the stages of the methodology of interactive learning [5]:

- methods of creating positive motivation (motivational stage);
- methods of organizing interactive cognitive and practical activity of the student (performing stage);
- reflexive assessment methods (evaluative stage);
- methods of developing a personal educational environment that are relevant at all stages of learning.

With all the variety of interactive teaching methods, the most common ones are those that can be used in the process of preparation of future physics teachers for the formation of professional competencies.

1. Method of projects. The basis of this method is the idea of developing cognitive skills of future teachers, creative initiative, the ability to think independently, find and solve problems. Project activity is an activity in which students acquire knowledge and skills in the process of independent planning and execution of research and project work.

2. Case method – analysis of specific situations for students to make decisions, using their experience and acquired knowledge in the process of previously obtained education in physics and teaching methodology. When using this method, future teachers are offered a real life pedagogical situation, the description of which reflects some practical problem [6].

3. Research method. This method is aimed to formation of creative activity and the development of activity, responsibility and independence of the future teacher in decision-making [2].

4. The game method. It is used to encourage the active participation of future teachers in the learning process and is a simulation of the professional environment to make

management decisions in different situations under certain rules, which allows to develop a model of behavior and professional qualities of the students.

5. Training. It is a method whose purpose is to develop the competence of interpersonal and professional behavior of a future teacher in pedagogical communication.

6. Information technologies – are technologies that involve interaction of participants in the educational process by means of computer tools and modern information and communication technologies [3].

The considered interactive teaching methods and educational technologies are aimed, first of all, on increasing students' own activity and their motivation for educational and professional activity. They allow you to proceed to creation and synthesis of open systems of intensive learning and represent one of the most promising areas for the development of educational technologies that contribute not only to intensification of learning, but also the self-organization, formation and self-actualization of individual.

Among interactive technologies are quite popular in educational institutions are using interactive multimedia panels. Today, Internet offers many interactive tools such as EdPro, SmartBoard, Intboard, Touch Education Systems. The most promising and most used among educational institutions is Prestigio Multiboard.

Multiboard comes with two preinstalled Android 8.0 and Windows 10 Pro operating systems, complete with many required educational software, providing a teacher not just with a device, but a ready-made educational solution. MultiBoard Screens come with UHD resolution displays and ELED technology, the Intel® Core ™ i5-8400 processor in the new Multiboard is a new level of speed for UHD displays. Best-in-class sensor technology now supports up to 20 touch points and up to 10 write points [1].

Below we consider educational software to work with interactive panel. MozaBook is an interactive educational software designed specifically for MultiBoard panels. The license gives the teacher access to a library of textbooks, images, 3D drawings, games and a variety of tools. The software is fully compatible with MS Windows.

MozaBook is an interactive presentation program that allows you to have great lessons. In mozaBook the teacher can display digital textbooks and supplement them with digital content (video, audio, 3D models, tasks) in a few clicks, including on the basis of program suggestions. You can also create presentations, lecture notes, physical demonstrations, and task sheets that will interest students and help to master the topic more easily [1].

Here is an example of using additional tools in the section «Physics» of the interactive application mozaBook – electric panels. A physics teacher can draw up a circuit to change the output parameters in a few minutes.

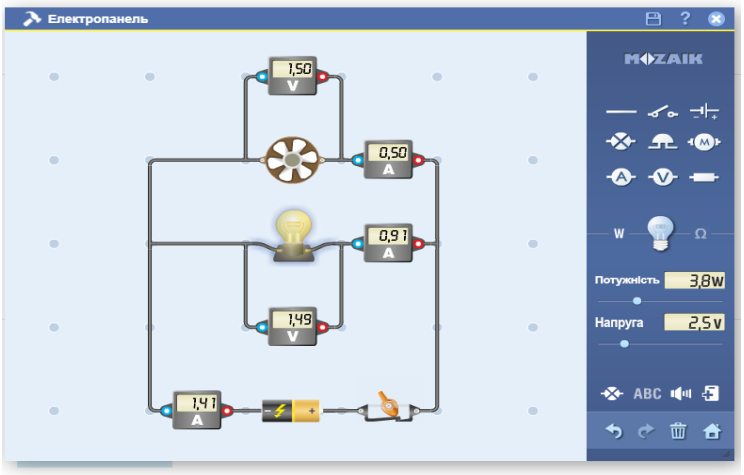

Fig. 1. Drawing up the electrical circuit using the electric panel

MozaBook diversifies the toolkit of lessons through numerous illustrative, animated and creative presentation opportunities. Spectacular interactive elements and built-in applications designed to develop skills, conduct experiments and illustrate, arouse students` interest and help facilitate learning.

Models in the scene rotate freely and most 3D include voice-over stories, built-in animations and quizzes. Here is an example of using a 3D model in the profession of physics teacher.

Fig. 2. 3D model Dopler effect

The effectiveness of the use of interactive panels in educational process is determined by the fact that they comply with the principle of interactivity as a mandatory property of

computer material, which allows to make the transition from virtual visualization to the sensory perception and organization of mental activity of future physics teachers. In this case, the final "picture" is not statically displayed on the board, but is formed in the process of collaborative work of students and teachers.

Conclusions

Thus, interactive training in the IHE promotes activation of the educational and cognitive process, formation of deep internal motivation of students. Thanks to it, it creates opportunities for intellectual and creative development, expression of initiative, improvement of communication skills. The use of this type of teaching is an organic part of the process of future teachers' professional training.

The introduction of interactive teaching methods is foreseen by the educational standards of the new generation and becomes one of the most important directions of improving the training of physics students in modern pedagogical IHE. As a result of interactive training, a certain set of personal qualities of the future teacher is formed: responsibility, discipline, creativity, communicative abilities, purposefulness, ingenuity, ingenuity, independence of thinking, ability to work in a team. The use of interactive technologies in the preparation of future physics teachers is a necessary element in the formation of the foundations of professionalism and professional competences.

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