The State and Prospects of Development of Problem-Based Learning in Higher Education

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ABSTRACT

Relevance of the work due to the need to resolve the contradiction between the new requirements for future professionals associated with the presence of experts formed by the ability to see, to identify and find solutions to problems that arise in their professional activity and the lack of readiness of teachers to implement the learning process of these requirements. The purpose of the article is to substantiate the thesis that the problem-based learning in a modern high school is objectively demanded as a basic foundation training. The methodological basis of the study was a systematic, competence and problem approaches. We used methods of study, analysis and synthesis of innovative experience of high school, the requirements of employers to the graduates, the latest scientific and educational literature in the field of didactics of vocational schools. The main results are that: The basic requirements for a modern model of learning in higher education; It justified the conclusion that in today's higher education Problem-based learning should be seen as a basic type of training that allows you to integrate educational opportunities and other learning technologies; revealed three major trends in the development of problem-based learning: the formation of an active problem-interactive learning technology, which is based on the interaction of at least three core technologies - the problem, and an interactive computer-based training; extension of the core of didactic teaching aids the creation of problematic situations in order to create all sorts of competencies; active development of integrative forms of realization of problem-based learning (problem-situational, problem-activity, problem-modular, task-design, problem-targeted, problem-playing, etc.). Materials may be useful to those skilled in the field of didactics of general and higher education, post-graduate students, university professors and secondary education system.

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Introduction

The study of the theory and practice of higher education shows that one of the trends of its development in recent years has become the problem-oriented nature of the educational process. What is the reason? What factors do give rise to life the development direction of teaching in higher education?

If we talk about external factors to the education system, let's select one characteristic, which is discussed by almost all experts – the world has moved into a new era of development, which is called informational, post-industrial, knowledge society, etc. Regardless of how you call this new time, many agree that it is caused by revolutionary changes in the field of information technologies, the appearance of the Internet, which has led in turn to significant changes in society, government and the education system as the most important social institution and, of course, each individual. The speed of changes increased rapidly that has caused the uncertainty has become a feature of the time. Instability, uncertainty, and similar characteristics of the time lead to the fact that in professional and social activities of people are increasingly faced with situations out of which ambiguous and sometimes unknown, that is, with problematic situations. For effective conduct in problem situations, students should acquire experience in similar situations while learning.

All of this changes the education requirements. Most succinctly, these changes are expressed by academician A.M. Novikov (2010). He proved that education today is not the abundance of knowledge and a set of six groups of skills: to communicate, to analyze, to select, to design, to learn, to create. As you can see, all of these requirements are operational in nature (Novikov, 2010).

The second objective circumstance – the requirements of the National (Federal) Education Standards of Higher Education (NFES HE), formulated in the format of competences (cultural and professional – for the professional schools). The competence-based paradigm gives priority to the activity of learning outcomes, which are expressed in the ability and willingness of graduates to solve certain problems (intellectual, communicative, organizational, axiological, etc.). Studies show that domestic industrial enterprises and engineering companies are in demand among key learning outcomes competences such as: the ability to systematically and independently and to effectively solve production problems; the ability to generate and perceive innovative ideas; the ability to independently apply the methods and means of cognition, learning and self-control to acquire new knowledge and skills; the ability to generalize, analysis, critical reflection; the ability to work in a team; knowledge of business processes and the overall business environment; the ability to learn throughout life (Tolkacheva, 2015).

Experts in the field of professional education draw attention to the fact that in terms of competence paradigm of the formation of students' readiness to vision and problem-solving extends the priority aims of education. This is due to the fact that today's work requires "not so much adaptation to professional tradition, it is the ability to respond to new situations, analyze and solve problems independently... becomes dominant research approach to a problem situation, and the problem is the norm of professional activity...." (Karpov, 2009). It is emphasized that in modern society knowledge is more than generative, that is, having properties that allow it to create new knowledge.

It can be stated that the main trends of social development indicate that labor acquires its creative nature, and tendencies of development of higher education

characterized by increased activity of an orientation of educational process, the formation of students' competences, allowing to see, identify and solve problems in professional and social activities.

The third external factor is associated with the penetration of new means of communication in the life, study and students' communication. Today it is almost impossible to find a subject or course which materials would be absent in the Internet, as well as a rare student or the student does not carry a tablet or smartphone. Scrolling Internet content with these devices, social networks has become part of the everyday life of young people. Virtual communication has become a factor, distracting them from communicating in the real world, especially from monologic forms, which can be attributed to the traditional lessons or lectures, when the student is forced to sit and listen to what he said.

In the past the invariable attribute of "boring" lectures was the students talking among themselves, now those are infamous for "scrolling" and social networking, which does not create audible noise in the audience and do not formally violate any rules, but distracts from training far more students than before "virtualization" of communication. The role of the content of the training as factor for attracting and holding the attention of students, almost continuously communicating in social networks, naturally reduced, bringing to the fore the form (context, sequence, rhythm, visual and voice guidance etc.) of the material. This means in turn that the actual conditions conducive to attracting and retaining the attention of students in the classroom, put forward the improvement of communication processes in class (Rozhkov, 2014).

But in addition to objective factors, there are subjective factors, accruing interest in the problem of learning. The first of these is the fact that on May 1, 2016 would be the 90th anniversary of the birth of one of the brightest creators of the theory and practice of problem-based learning academician RAS (Russian Academy of Sciences) and ASRT (Academy of Sciences of Republic of Tatarstan) Mirza Ismailovich Makhmutov. Moreover, the second subjective factor – the presence of M. I. Mahmutov's followers of, the existence of his scientific school, developing ideas of problem-based learning at the present stage.

However, analysis of actual practice of the higher school indicates that education technologies that focus on performance and reproductive activity of students continue to dominate: "massive domestic the school works on long-outdated models of knowledge" - record the state of the practice R.S. Boziev & A.I. Dontsov (2016). The content of most textbooks also focused on the implementation, mainly the information function of education. Didactic mechanisms for implementation of the developmental function of training, reflected either partially or completely absent.

As a result, the system of higher education faced with the contradiction between the new requirements for future professionals with advanced post-industrial economies and implementation of the NFES HE (to be ready to analyze, to communicate, to choose, to create, to see, to identify and seek solutions to problems arising in professional activities, etc.) and the insufficient readiness of teachers to implement these requirements.

The perceived contradiction causes the important problem of finding and developing pedagogical tools and conditions to ensure that the requirements of the modern economy, companies and employers to graduates.

Methodological bases and methods

The study was based on the methodology of the system approach, involving the study of the internal laws of the learning process in unity with the requirements of the external environment (production, employers, society and the state). The conceptual nature of the work led to the use of methods of theoretical research (analysis, classification, synthesis, modeling, forecasting), in close conjunction with the study of innovative experiences of high school, the requirements of employers to the graduates, the latest scientific and educational literature in the field of didactics of the higher school.

Results of the study

What conditionals must educational technology require to help the formation of students' experience of creative activity? Based on the analysis of employers' requirements, NFES HE, the innovative experience of higher education, as well as relying on A.M. Novikov's (2010) four laws of pedagogy (law of inheritance of culture, law of socialization, law of succession, the law of self-determination), we can conclude that modern educational technology must provide: 1) a reasoned activity the development of human culture in the form of: a) the objective results of human activities; b) the subjective abilities of the individual (intellectual, moral, aesthetic etc.); 2) creating the necessary conditions for the formation of each student as an active subject: interaction with each other, information exchange, collaborative modeling situations, identify and solve problems; 3) the orientation as made, and the prospective level of development of cognitive and creative abilities of students; 4) the opportunity for each student creative self-development, self-determination in educational activities, to run motivational and consumerism mechanism of the "self" of the student.

The implementation of these basic requirements for educational technologies generally focuses to provide effective motivation, communication, independence and creative self-development of students. Modern educational technology suggests the training, which is a significant extent in the formulation and solution of practical problem situations, using active and interactive forms and methods of solving problems. So it is natural that a growing interest in mechanisms to include students in activities, contributing to the development of their thinking and creativity (Ibragimov & Ibragimova, 2013; Ibragimov & Ibragimova, 2014).

Which of the famous educational technology meets these requirements? There are in Russian didactics quite a lot of science-based learning technologies, focused on solving the tasks of training, education and development of students. In relation to high school is widely known for the context-based and project (Ilyin, 2007; Novikov, 2010), problem-modular (Choshanov, 1996), concentrated (Ibragimov & Ibragimova, 2013), interactive (Polat, 2006), personality-oriented (Bondarevskaya & Kulnevich, 2004) training. Each of these techniques differs with the dominant goal orientation, its specific forms and methods of training. However, they have in common – all of them in modern conditions are of such characteristics as problematic.

The problematic nature of learning in higher education objectively becomes its attribute property. The modern theory of learning needs to be addressed together with the challenges of overall development of student's personality and the special task of developing their thinking and creative abilities, skills to see and solve problems.

Therefore, we can conclude that the higher education system objectively sought-after model of problem-based learning as a type of training whose main objective is the formation of creative abilities of students, development of their personality as a whole. One of the founders of this theory, M.I. Makhmutov (1975) has underlined that the characteristics of problem-based learning are: a natural relationship between academic issues and practical life experience of students, the systematic use of the most effective types and kinds of independent work of students as a form of organization of their activities by the decision of educational problems, the compulsory individualization of learning, the dynamism, the obligatory presence of high emotional activity of the student (Makhmutov, 1975). Their comparison with the demands of employers for key competencies of graduates shows that there is a fairly high degree of conformity of characteristics of problem-based learning to data requirements. This conclusion is confirmed by the fact that since the beginning of XX1 century saw the rise again of interest in the technologies of active and interactive learning, under different forms which is hidden, as a rule, one or another kind of problem-based learning – all focused on the revitalization of productive cognitive, motor, communication, value-orientation activity of students.

Does the above mean that the problem education must necessarily occupy a predominant place in the system of professional education? No, it does not. In our opinion, problematic approach, as a norm of professional activity, must become the same important in professional education too. Orientation on formation of creative thinking of future specialists assumes the organization of purposeful and systematic training and independent professional activity of students in solving problems (academic, professional, social). It is necessary to use the educational opportunities of other technologies. For example, in the technology of problem-based learning can be successfully implemented capacity of most other technologies - modular, contextual, concentrated, collective way of learning and others. The methodological basis of this association is to serve as a multiparadigm approach of soft combining the different paradigms on the principles of cooperation, complementarity, holography (Muhametzyanova, Shirshov & Ibragimov, 1999).

Discussion

What are the major trends in the development of problem-based learning at the present stage of education development? Problem-based learning technology has been developed in the works of modern researchers. In recent years, a number of dissertation studies concerned some issues of problem-based learning. For example, at the level of doctoral thesis the problem of the genesis and current status of problem-based learning (Kovalevskaya, 2000), the development of the theory and practice of problem-solving training in a higher military school (Gulyaev, 2003), build a methodical system of problem-based teaching of chemistry at secondary school (Surin, 2003), problem-project approach to formation of professional foreign language competence of students were investigated.

The analysis of the topics of PhD theses performed in the period from 2000 to the present shows that it is possible to distinguish several groups depending on the content of the issues.

The first group of research is devoted to development of theoretical aspects and models of implementation of problem-based learning in higher education. It includes I.A., Safiullina's (2001), A.A. Nesterenko's (2006) researches.

The second group of studies discusses the problem of development of professional competence, creative thinking, motivation of educational activity and other qualities in the process of problem-based learning. These include the work of N. A. Demchenkova (2000), I. P. Ivanov (2002), V.A. Tubaltseva (2004), etc.

The third group of dissertation research reflects issues of realization of problem-based learning in learning of specific disciplines. This group includes the works by G.M. Makhutova (2013) and others.

The fourth group of research questions concerns the integration of problem-based learning with other technologies and includes works by S.D. Pivkin (2000), N.S. Slepuhina (2015) and others.

The study shows that the orientation on the use of problem-based learning as a means of formation of professional competence of future specialists, development of their creative potential, creative and critical thinking, and research competence prevails. Some elements of problem-based learning are developed, other significantly changed, and new structural elements appear. Moreover, the most mobile elements are the means and forms of organization of learning. It is no occasion that the development of the means and forms of organization of education are primarily associated and trends problem-based learning.

The first trend is caused by intensive development of information and computer tools and their integration into the education system. The problem of learning is expressed in the active development of problem-interactive learning technologies, which is based on the interaction of at least three basic technologies – problem, interactive and computer aided learning. There is a change in the nature of information interaction between the trainers, trainees and interactive source of educational information resource because of the information-educational environment becomes a full-fledged "member" of learning. Using online sources of information changes the paradigm of interaction between learning, learner and interactive source of information. This interaction creates new opportunities to increase the effectiveness of training due to the fact that: a) feedback becomes instantaneous, immediate; all participants in the learning process have the opportunity of obtaining non-lagged information on the results of its activities; b) there is a real opportunity to provision (receipt) of audiovisual information in any volume – the information is not limited to the textbook or multiple textbooks and manuals; not limited in amount and time of receipt, etc.; C) automization of routine processes associated with finding, processing, formalization, using information in modern conditions; as a result of sharply reduced time spent on these processes and, consequently, increases the time and the role of the creative component, design activities, etc.; d) the essential role played by the factor of computer modeling of objects, processes, phenomena; in virtual form can simulate any processes.

In recent years in the world of pedagogy in connection with wide introduction of information technologies, new concepts – information-educational space, e-pedagogy, didactics etc. electronic and Modern information technologies and electronic educational resources of new generation allow to implement a new method of organization of the educational process, and professional communication. They determine the following areas of radical changes in the education system: a replacement for closed educational environment of open information-educational environment; individualization of education; adoption of the self-study and self-study as the leading forms of education; orientation to education that builds knowledge.

Nowadays being actively developed the category of "personal learning environment" related to practical application of the ideas of e-learning. With the emergence of e-pedagogy, new principles: interactivity, starting knowledge, identification, pedagogical expediency of application of ICT etc.

The second trend is directly related to one of the basic concepts of problem-based learning – problem situation. The creation of problem situations in the learning process in order to create a different kind of competencies in modern education becomes one of the basic didactic means. And note that this takes place in education regardless of what technology training is implemented in a particular case. So, if personal-oriented technology of training is implemented as basic, it creates a problem situation, actualizing the personality aspects of the training; in the context of learning situations are created that define professional and social contexts, and requiring students active development of new knowledge (cognitive activity), a new method of communication (communicative activities), etc.

The third trend is associated with the processes of integration in didactics. First of all, there is the process of integrating forms of learning: lesson study, lesson, game, slide lecture, computer workshop, lecture, debate, seminar, discussion, etc. in addition, the integration of General and professional knowledge, theory and practice, content and process of learning.

In modern pedagogy is a very clear trend of integration of problem-based learning with other technologies. It is manifested in the development of such areas as: problem-situational, problem-solving, problem-modular, domain-design, problem-targeted, problem-playing, problem-integrative, problem training, problem-model training, etc.

We must say that in foreign higher school (UK, Germany, Holland, USA, France etc.) also gets a fairly widespread experience of implementation of problem-based learning (Brown, Collins & Duguid, 1989; Johnson & Johnson, 1980; Sharan, 1990). Moreover, in some schools this model of training is introduced at the level of its inclusion in the structure of curriculum of training. For example, at the University of Alburgh in Germany, the curricula based on training model based on problem-oriented educational technologies. It is implemented in the form of project-based learning (the project is allocated 50% of the time, the other 50% of the time the students study courses related to the project (25% of the time) and not associated with it (25% of the time) (Tolkacheva, 2015).

Conclusion

Based on the above, and given that the problem developing training has incorporated many of the ideas and the dignity of other teaching systems (context, modular, explanatory and illustrative, design, concentrated, and others.) We believe that the problem-based learning in the modern school It should be considered as a basic type of training, a kind of systemic basis allowing to integrate educational opportunities and other models and technology training and education. The development of problem-based learning is characterized by the following trends: the formation of an active problem-interactive learning technology, which is based on the interaction of problematic technology, and interactive computer-based training; extension of the core of didactic teaching aids the creation of problematic situations in order to form a common cultural and professional competences; widely used in the practice of the higher school of integrative forms of realization of problem-based

learning (problem-situational, problem-activity, problem-modular, task-design, problem-playing, problem-concentrated and others.).

Recommendation

Material articles, in our opinion, will help to attract the attention of researchers and practitioners to well-known theory and technology problem-based learning, which at the present stage of development of education should be given a significant impetus for further theoretical understanding in the new environment and the practical application in order to prepare specialists on demand. Results of the study may be useful for specialists in the field of didactics of higher education, and for teachers in higher education, continuing education.

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