

Review Article

MODERN REQUIREMENTS FOR QUALITY OF HIGHER TECHNICAL EDUCATION IN RUSSIA

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Abstract

The article presents modern requirements for the quality of higher technical education in Russia: the quality of the content of education, the quality of the organization of the educational process and the quality of its results, the implementation of which should guarantee the training of technical specialists with a high level of creative potential, culture and social adaptation, capable of ensuring current and future the needs of society in the development of science, engineering and technology. The need for the formation of these qualities of future technical specialists determines the relevance of modernization of the modern system of higher technical education.

Keywords: technical education, modernization, quality of education, modern education, vocational training.

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INTRODUCTION

The quality of education is one of the most significant scientific problems that specialists in many countries deal with. At present, it has not yet been possible to achieve unity in understanding the concept of "quality of education". From a philosophical point of view, quality is a category that expresses the essential certainty of an object. Education is a synthesis of the processes of training and study, upbringing and self-upbringing, which form the determining factor in the progressive development of a nation - its intellectual potential. So, the concept of "education" includes not only the process of assimilation by a person of a certain amount of knowledge, but also a reflection of the system of external conditions for the development of the personality, its formation, culture and the like.

In contrast to the current widespread view of education as an activity determined by the needs of the market, without denying the influence of market mechanisms on determining the goals and objectives of modern education, we agree with A.I. Vasiliev that the quality of education is an independent object of management in the concept of total quality management. In different methodological paradigms, the quality of education is associated with compliance with the educational standard, with the assessments of graduates of educational programs, with the effectiveness of educational activities. Assessing the degree of competitiveness of the results of training of graduates of educational programs, any interested party in the field of education will certainly turn to the question of the quality of these results [1].

Belokrenitskaya P.A., Makarova A.O., Kozlovskaya N.A., Kolesnikova T.D., Balashova K.A. conducted a survey among students of a technical university. Students were asked the question - what is "quality of education" for them. Most of the respondents (80.4%) defined the quality of education as "an indicator of the level of knowledge, skills and professional skills of a graduate of a higher educational institution". And none of the students defined the quality of education as a characteristic of educational activity and student training expressing the degree of their compliance with state educational standards [2]

From 1998 to 2006, the number of students increased almost three times. Over the course of 20 years (1990–2010), the annual number of students in Russian universities has increased from 2.8 million to 7 million. According to 2014 data, Russia is in third place in the number of students in the world, and in terms of the number of university students per 10 thousand population - in 6th place (2012). In terms of

youth enrollment in higher education (32%), the Russian Federation is at the level of the United States (34%).

Expressing his understanding of the role of education in the modern world, A.V. Komarov notes that Education in the formation of human capital plays a crucial role, and in the conditions of the information and technological society its importance only increases [4].

So, in his work "Management Tasks in the 21st Century" P.F. Drucker noted that: "The manufacturing equipment was the most valuable asset of any company of the twentieth century. The most valuable asset of any organization of the 21st century - ... will be its brainworkers and their productivity" [5]. Therefore, a fundamental feature of the existing policies of most countries of the world related to higher education is the definition of its sphere of national interests, as well as interest in scientific research on education.

In the second half of the last century, the world educational community raised the issue of the crisis in the field of education, caused by rapid changes in society. In the materials of the General Conference of UNESCO (1965) the term "lifelong education" was first used. The content of the corresponding idea that appeared in the twentieth century, but whose origins are still found among philosophers of antiquity, lies in the following thesis: each person must be provided with the opportunity to permanently update his knowledge, as well as improve professional and creative qualities.

The idea, which is humanistic in nature, puts at the center of all educational principles a person who needs to create the conditions for the full development of his abilities throughout his life. The impetus for creating the theory of lifelong education was the global concept of world unity, according to which all the structural parts of human civilization are closely interconnected and interdependent. And it is man who is the most important value, the most important condition and a powerful "producer" of all that is needed on planet Earth.

By a decision of UNESCO (1972), lifelong education is declared the basic principle, the main construction for innovations and educational reforms in all countries of the world. According to the interpretation of the concept of "lifelong education" proposed by UNESCO (1984), these are all kinds of conscious actions that are mutually complementary and occur both within the educational system and beyond at different periods of life. This activity is focused on the acquisition of knowledge, the development of all personality abilities, including the ability to study and prepare for the performance of various social and professional duties, as well as to participate in social

development both nationwide and worldwide. UNESCO developed the main directions of lifelong education, finally merged into a single concept of "lifelong learning".

In the future, the specification of the main directions of the development of education was reflected in a number of international documents. In 1996, Jacques Delors, President of the UNESCO International Commission on Education in the 21st Century, prepared the final report "Education: a hidden treasure". The report formulated four basic principles of education in the 21st century: learning to live together, learning to learn, learning to do, learning to work.

"Learning to live together" has as its goal the formation of readiness for conflict resolution in conditions of respect for pluralism, mutual understanding and peace.

"Learning to gain knowledge" involves the acquisition of a sufficiently high overall cultural level, which is the basis of lifelong professional education.

"Learning to work" means acquiring an ability that can cope with various difficult life and professional situations that cannot be predicted in advance.

"Learning to do" means contributing to the development of one's own personality, showing independence and autonomy in thoughts, and showing personal responsibility.

So, education is becoming a prerequisite for moving humanity forward to the ideals of peace, freedom and social justice. The Commission considers education policy as a process of enriching knowledge and skills, the formation of personality, as well as relations between individuals, groups and peoples. The mission of education is to provide everyone with the opportunity to show their talent and use their creative potential.

METHODOLOGY

In the context of the contradiction between the extraordinary development of knowledge and the limited possibilities for their assimilation by a person, the task of developing a reform strategy for education with determining its priorities while maintaining the main elements of basic education becomes relevant.

In 1998, the Paris International Conference on Education adopted the World Declaration on Higher Education in the 21st Century: approaches and practical activities. In March 2000, the European Summit in Lisbon stated that a successful transition to a knowledge-based society should be accompanied by a process of continuing education. The UNESCO-CEPES International Anniversary Conference "Higher Education of the 21st Century: Its Role and Contribution to the Development of Society", held in Bucharest in 2000, confirmed the relevance of the lifelong education process, the principles of advanced education and humanization. The 21st century has been declared by UNESCO "the century of education".

Global trends in higher technical education are caused by the prerequisites for the development of a modern post-industrial society, which is characterized by the creation of high-tech industries, the development of energy-saving technologies, intelligent technologies, computerization of society, and the like. N.A. Chitalin, A.R. Kamaleeva, and S.Yu. Gruzkov's attention: "The world powers are entering an era in which the predicted scale of innovative changes, including those associated with the development of new technologies, in particular nanotechnologies, will be more revolutionary than the consequences of information and computer technologies" [6].

Here are examples of significant innovative changes in the modern post-industrial period of the development of science and technology, as well as projected for the future:

- development of new renewable energy sources in connection with the exhaustion of traditional energy resources and their negative impact on the environment;
- application of low- and non-waste technologies for processing raw materials;

- the use of materials with predetermined chemical-physical-mathematical properties as the main structural materials;
- environmentally friendly transport;
- widespread use of laser technology and microprocessors;
- universal computerization of all areas of production;
- development and widespread use of innovative technologies;
- inclusion of a significant part of the population in the global communication space as consumers and creators of information, etc.

Intensification of the production and use of new scientific and technical results led to a sharp reduction in the innovation cycle and the acceleration of the rate of updating of products and technologies. Therefore, in a modern post-industrial society, specialists from various technical areas should have a range of capabilities to ensure production activity in complex dynamic environments. This necessitates the extensive professional training of specialists in the integration of related and even heterogeneous technical activity profiles. In the context of rapid innovative changes, only those professionals who are ready to transfer knowledge and methods of activity to new technical and technological situations can be socially protected.

American experts in the field of education have come to the conclusion that technical education is designed to provide broad rather than highly specialized training for comprehensively developed specialists. These specialists should be able to make decisions in difficult situations, be prepared for continuous independent professional development. An analysis of the features of the preparation of technical bachelors at universities in the UK, France and Germany indicates a widely professional education with a high level of general theoretical training. Moreover, the most important qualification requirements include professional mobility and adaptation in the information society. Professional training of future technical specialists is also relevant in connection with the global humanitarian problems of our time: the crisis of anthropogenic culture, the buildup of social and national conflicts. In conditions of an unstable equilibrium state of civilization, specialists will have to make appropriate life decisions taking into account the interconnectedness of various spheres of life: technology, ecology, economics, politics, etc.

In domestic higher technical education, the ability of future specialists to work effectively throughout their working lives has traditionally been provided due to the extensive nature of training with a fairly high degree of redundancy on the basis of solid general educational fundamental training. After the country's transition to a market system of the economy, for a number of objective circumstances, there was a decrease in the level of fundamental training of future technical specialists and, as a result, a weakening of their professional training.

At present, the provision of a broadly professional higher technical education on the basis of the restored deep fundamental training, by returning to the previous engineering education, is not allowed by the new economic conditions, as well as the multi-stage higher education system: the country lacks tasks adequate to the previous higher education system, and related government funding. The introduction of a multi-stage system of higher education provides for the creation of the concept of a new educational model with the subsequent development on its basis of new approaches to the content of education, didactic methods, teaching technologies and monitoring the results of education.

The fundamental impossibility of returning to the previous system of higher technical education in modern post-industrial society is emphasized by scientists - researchers, from whose point of view we agree: post-industrial transformations in society make it necessary to build an education system that meets the requirements of the 21st century. We are talking about new principles for the selection of educational content and the creation of new teaching technologies. The goal is the formation of future specialists capable of adaptation in the

conditions of a permanently acting factor - technology changes.

The existing higher education system is mainly based on a cognitive-information paradigm. The cognitive-informational paradigm of education presupposes the organization of educational activity, which provides mastery at a fairly high scientific level by a set of certain theoretical principles, as well as the possibility of their practical application in solving various typical and specific professional problems.

The main components of the corresponding educational knowledge system are knowledge, skills. Knowledge means understanding, preservation in memory and reproduction of the basic scientific facts and their theoretical generalizations. The skill lies in the possession of the means of applying the acquired knowledge in practical activities. Skills include mastery of methods for solving individual problems with a high degree of perfection.

The cognitive-information paradigm has a deep theoretical justification, for which the nomenclatures and hierarchies of knowledge, skills, means of their control and evaluation are clearly defined. However, in a modern post-industrial society, this paradigm, focused on the already achieved level of development of sciences and assimilation of existing technologies, is losing its significance.

The dynamics of innovative changes in modern society is such that the renewal of civilizational and cultural values takes place in a short time. Moreover, an exponential increase is observed over time in the amount of information in society. As a result of these circumstances, the special knowledge of future specialists quickly becomes obsolete. In conditions when, during the training of future specialists, many new directions in the development of engineering and technology may still be unknown and difficult to predict, it becomes necessary to coordinate the processes of professional training of future technical specialists with priority innovative programs for the development of high-tech and knowledge-intensive branches of the modern economy.

So, the urgency of the problem is the modernization of the existing system of higher technical education in the direction of creating an innovative system of advanced character, within which every future specialist has the opportunity to obtain a certain amount of necessary knowledge, skills and abilities during training, as well as develop creative abilities to independently master new knowledge and even to change the scope of professional activity at the right time in working life.

RESULTS

The innovative system of higher technical education should form such new qualities of future specialists as professional mobility, constructiveness, flexibility, adaptability, creativity. Future technical specialists need to own new technologies and understand the possibilities of their application and development, be prepared for self-education during their working lives, be able to mobilize their personal potential for independently solving fundamentally new professional, environmental, social, economic and other problems of reasonably appropriate transformation reality.

Knowledge system of higher technical education. In our opinion, its main drawback is the achievement of important innovations without their correlation and connection with social, economic, environmental impacts on natural systems, without a focus on reducing the risks of unwanted interventions in technical systems. It is not always advisable to widely used as an index of national industrial and economic development the indicator of the number of graduates of a technical profile. After all, experts often confirm the appropriate level of quality of the received technical education and the level of formation of the necessary personal properties.

An innovative system of higher technical education should ensure that modern requirements for the quality of education are met. Given the general factors of its quality, we distinguish the following components of the quality of education:

- quality of education (methodologically important elements of human culture)
- knowledge, methods of activity, emotional-value relationships, etc.);
- the quality of the organization of the educational process (resource support, human resources, educational process management, scientific, methodological and educational work, the initiation of the creative potential of students, etc.);
- the quality of the results of the educational process (the level of knowledge of graduates, their creative abilities, general and communicative culture, social adaptation, etc.).

So, we consider the modern requirements for the quality of higher technical education: the quality of the content of education, the quality of the organization of the educational process and the quality of its results, the implementation of which should guarantee the training of technical specialists with a high level of creative potential, culture and social adaptation, able to meet the current and future needs of society in the development of science, engineering and technology.

The need for the formation of these qualities of future technical specialists determines the relevance of modernization of the modern system of higher technical education.

Traditionally, the concept of "modernization" is defined as bringing something in line with modern requirements. Today, modernization is understood as the formation, dissemination and development of social institutions, structures, technologies, approaches, etc. In other words, modernization is a complex macro-process of transition to modern society. The modernization of higher education is understood as the search for a "new course" in education, which involves the updating and improvement of the content and structural components. In the last decade, significant changes in the field of education have taken place in Russia and foreign countries, which have affected the concept and content of education, organizational structures, financing, global goals and objectives, and other aspects. The following main global trends in the modernization of education are distinguished: 1) the integration of education in the world space and the creation of international standards for the quality of educational training of competent specialists; 2) a change in the conceptual approach to education and the transition to a competency-based learning model; 3) strengthening the prognostic orientation of education, which is oriented both to meeting the urgent needs of modern society, and to socio-economic needs that may arise in the future (the transition from the concept of supporting education to the concept of advanced education) [7].

To date, the strategic principles of modernization of education in Russia at the present stage are expressed in the following documents: Federal Law "On Education in the Russian Federation", the Concept of the Federal Target Program for the Development of Education for 2016-2020, the Federal Target Program for the Development of Education for 2016-2020.

Modern requirements for the quality of the innovative system of higher technical education provide for the training of specialists who are able to carry out professional activities on a democratic and humanistic basis in an information and technological society, as part of a social policy aimed at the development and self-realization of the individual, and the satisfaction of his educational, spiritual and cultural needs. So, based on the characteristics of the innovative system of higher technical education, the logic of the modern educational process receives a new direction in understanding the goals, objectives and content of professional technical training of future specialists.

Thus, in response to the requirements of the time for the quality of technical education, modern higher education institutions should train future specialists of a new generation of technical profile - developers of high technologies and high-tech industries. These specialists should be able to effectively

solve traditional and non-traditional complex technical problems, implement their own technical and technological developments in the production process, think systematically and independently. They should have modern information technologies, be ready to work in a team, in particular to discuss and make joint decisions, be able to take responsibility for their implementation. Future specialists should show mutual understanding in communication and relations, tolerance in resolving and preventing conflict situations. In this regard, the importance of the fundamental basis of vocational technical training in universities, as well as its humanitarian component, is growing.

The task of higher education as a social institution is to promote the professional self-realization of the individual by teaching him professionally-directed interaction with the natural and social environment.

CONCLUSIONS

Based on modern research by scientists to solve the problem of modernization of education, in particular higher technical education, domestic scientists distinguish the following components of modernization:

- the preservation and development of a common culture as the semantic basis of higher technical education;
- introduction of unique, innovative, creative elements, the latest achievements of science and technology into the educational process;
- expansion and deepening of interdisciplinary knowledge focused on solving problematic situations in scientific, design and business activities;
- implementation of the strategy of generalization of knowledge into the educational process as the basis of continuing professional education;
- ensuring a high level of methodological culture, deep, integrated and creative assimilation of knowledge and methods of practical activity, guaranteeing the successful functioning of specialists in key areas of life;
- development of personal qualities of future specialists, independent mastery of knowledge, cultural and communicative preparedness, self-determination and self-improvement;
- ensuring the social context of higher technical education in order to take into account the universal values and personal responsibility in future professional activities;
- the formation of economic activity of future specialists, readiness for highly productive labor in the modern production system;
- the formation of innovative thinking as an important component of the training of highly qualified specialists.

Currently, the State Program of the Russian Federation "Development of Education" for 2018–2025 and the National Project "Education" are being implemented, which provide a breakthrough character in the development of education. In order to achieve the goals and solve the tasks put forward in these state strategies for the development of education, a systematic character should be given to the state management of their implementation [8].

In the National Program, developed in connection with the need for radical changes aimed at improving its quality and competitiveness in the new economic and sociocultural conditions, accelerating Russia's integration into the international educational space, modernization of the structure, content and organization of education is called one of the main strategic directions for the development of Russian education based on a competency-based approach.

The implementation of the National Education Project is based on a list of regional, municipal projects, the development of which is associated with indicators established in accordance with the powers and capabilities of each level [8].

The primary goal of the program is "updating the goals and content of education on the basis of a competency-based approach and personal orientation, taking into account world experience and principles of sustainable development".

At the same time, it should be noted that public education policy does not always give the effect that was expected. Let us dwell on the issue of competitiveness of universities at the world level. There are a large number of world and national university rankings. But to a greater extent, the governments of many countries of the world are guided by the following rating agencies: The World University Rankings (Great Britain), QS World University Rankings (Great Britain), Academic Ranking of World Universities (Shanghai). In Russia, as in many countries of the world, there is a great desire to increase the competitiveness of higher education. However, measures taken by governing bodies do not always take into account the characteristics of the Russian economy, the experience of the development of education in the pre-revolutionary and Soviet periods of history, the advantages and disadvantages of modern trends in the development of education and science in the countries of the world. It should be noted that the Russian government in education is more focused on copying foreign models and methods of forming world-class universities. At present, there is no generalizing document where strategic directions for the development of education in Russia would be clearly formulated, its importance for ensuring economic growth and raising the standard of living of the population, prospects, priorities, strategic goals, objectives, etc. have been defined. An analysis of the development of the Russian education system from 1992 to 2017 showed that during this period, national projects for the development of education began to be implemented - PNP "Education", "5-100" (five universities in the first hundred of university world ratings), etc. However, in On the whole, a study of the goals and content of state policy in the field of education and science shows its inconsistency with the modern needs of the Russian economy. The state's withdrawal from the educational and scientific spheres is clearly traced, the share of government spending on education continues to decline [9-11].

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