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Modernization of Physics Education at The Stage of Development

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ABSTRACT

This article analyzes the hierarchical system of modernization of physics education in the development of society. The impact of improving physics education based on modern requirements on scientific and technical progress, the effectiveness of the educational process and the quality of personnel training is studied. Also, innovative approaches, technological means, and methodological foundations for the development of physics education are discussed.

Keywords: Physics education, modernization, hierarchical system, scientific and technical progress, educational methodology, innovative approach, technological means, personnel training.

INTRODUCTION

The rapid development of science and technology in modern society poses new challenges for the education system. In particular, there is a growing need for modernization in physics education, one of the natural sciences. Physics serves not only as a means of studying the laws of nature but also as a solid scientific basis for innovative solutions, technological development, and modern production sectors. Decree of the President of the Republic of Uzbekistan No. PP 2909 dated April 20, 2017 “On measures for the further development of the higher education system” Following the decision of the interstate agreement, more than 30 higher education institutions were supplied with modern laboratory equipment based on software manufactured in Germany with high measurement accuracy, fast recording capabilities and is currently being used. Therefore, the formation of a hierarchical system of physics education and its modernization based on modern requirements are of great importance. The educational reforms being carried out in our republic include the development of a competitive personnel training system in the future, ensuring the formation of a well-rounded personality, introducing innovative technologies into the educational process, enriching it and improving it based on the "National Model", developing education based on advanced pedagogical technologies, and training highly qualified future physics teachers on this basis. In the process of education, in the improvement of the teaching system in higher pedagogic educational institutions, to increase the effectiveness of teaching, to develop it, ensuring the harmony of practice and theory, is one of the main tasks today.

The need to modernize physics education

Introducing modern approaches to physics education, first of all, serves to increase students' interest in science. Classical education often focuses more on theoretical knowledge and less time on practice. This negatively affects the level of students' knowledge acquisition. The use of interactive methods, laboratory developments, virtual simulations and experiments in the modernization process helps to increase the effectiveness of education.

According to a number of researchers, the stage of general secondary education is reflected in the reforms carried out in physics education, taking into account the usual goals of

education, in the activities of future personnel training, in the acceleration of developments inherent in all education systems and society as a whole. The importance of the widespread introduction of physics education abroad was studied by Fay, J. , Boville A , Witten, E , Griffiths, P, Harris, J ., Shafarevich, M.R . and others.

The psychological aspects of the formation of ideas used to analyze and teach physics at this stage are based on the results of scientific research conducted to identify and study the mental characteristics of students. The article is based on the results of research work carried out by local and CIS methodologists in this area. The fact that the physics course in general secondary schools is taught in two stages was taken into account.

The relevant conclusions were drawn from the research work of N.M. Shakhmaev , D.Sh. Shodiev, O.D. Shodiev on the linear structural structure of the physics course in general secondary schools.

The scientific research work of A.I. Bugaev, G.M. Golin, M. Zhuraev, S. Kamenetsky, M. Mamadazimov, V.V. Multanovsky, B.M. Mirzakhmedov and others, devoted to the general principle of the structure of fundamental physical theories, was analyzed.

Analysis of literature on the topic. The conceptual foundations of the formation and development of theoretical foundations of physics in the system of continuous education in our country are studied by Uzbek researchers O. Akhmadjonov , D. Begmatova , M. Boltaeva, , S. Budarina , V. Burov E. Bursian , U. Farmonov on the theoretical and methodological foundations of the use of modern information and communications technologies research by A. Abduqadirov, B. Abdullaeva, M. Allambergenova, U. Begimkulov, I. Bilolov, R. Djuraev, Kh. Mahmudova, M. A. Mirzaeva, B. Sattarova, N. Tailakov, G. Umarova and others. Problems of teaching quantum physics in the countries of the Commonwealth of Independent States. It is reflected in the research of Yu. Yabloshevskaya and others.

METHODOLOGY

The hierarchical system and its components The hierarchical system of physics education can consist of several stages:

1. Primary education stage: At this stage, students are primarily interested in physics. For example, through simple experiments and explanations of physical phenomena in everyday life, positive motivation is formed in children.

2. Secondary education stage: At this stage, students are introduced to the basic concepts, laws and formulas of physics. Tests, practical exercises, laboratory work are involved in the educational process.

3. Higher education and professional development: Specialists are trained in universities and specialized educational institutions. At this stage, more attention is paid to scientific research activities, laboratory research and practice.

Main areas of modernization

• Introduction of innovative technologies: Virtual laboratories, AR/VR simulations, use of digital educational platforms.

• Interactive teaching methods: Case studies, project-based teaching, increase in practical exercises.

RESULTS

Specialist training: organization of special courses on modern science and technology in higher education institutions. In order to determine the priority areas of systemic reform of general secondary and extracurricular education in the Republic of Uzbekistan, to raise the spiritual, moral and intellectual development of the growing younger generation to a qualitatively new level, to introduce innovative forms and methods of education into the educational process, as well as in accordance with the Decree of the President of the Republic of Uzbekistan dated September 5, 2018 No. PF-5538 "On additional measures to improve the public education management system":

1. The following:

a) The Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030 (hereinafter referred to as the Concept) shall be approved in accordance with Appendix 1 and shall provide for the following:

Achieving the Republic of Uzbekistan's entry into the top 30 advanced countries in the world according to the PISA (Programme for International Student Assessment) international student assessment program rating by 2030;

qualitatively renew the content of the continuous education system, as well as train, retrain and improve the skills of professional personnel;

improve teaching methods, gradually implement the principles of individualization in the educational process;

introduce modern information and communication technologies and innovative projects into the field of public education;

strengthen the material and technical base of public education institutions and increase the effectiveness of budget funding;

introduce modern methods and directions of out-of-school education in educating and ensuring the employment of young people;

expand the competitive environment in the public education system through the development of public-private partnerships;

implement five initiatives, which include a set of measures aimed at creating additional conditions for the education and upbringing of young people;

gradually increase the level of remuneration, material incentives and social protection for employees of general secondary education institutions in order to increase the attractiveness of working in the public education system;

b) The "Roadmap" for the implementation of the Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030 in 2019 (hereinafter referred to as the "Roadmap") shall be approved in accordance with Appendix 2.

The Concept shall be implemented in a phased manner through a "Roadmap" approved separately each year, based on the target parameters and main directions for the relevant period.

2. The Ministry of Public Education of the Republic of Uzbekistan shall:

Each year, by December 1, based on a thorough study of the "Roadmap" approved for the current year, develop a draft "Roadmap" for the next year and submit it to the Cabinet of Ministers for approval;

Conduct constant monitoring of the implementation of the "Roadmaps" and submit its results to the Cabinet of Ministers on a quarterly basis.

3. The following shall be determined as sources of financing for the measures envisaged by this Decree:

Republican budget funds;

Fund for Assistance to Reforms in the Field of Public Education under the Ministry of Public Education of the Republic of Uzbekistan;

preferential foreign loans and grants;

sponsorship donations from individuals and legal entities;

other sources not prohibited by legislation.

4. The following are to be held personally responsible:

Deputy Prime Minister of the Republic of Uzbekistan A.A. Abduhakimov - for effective organization and cooperation of the activities of ministries and departments responsible for the implementation of the Concept and the "Road Map", for timely elimination of shortcomings identified as a result of monitoring the implementation of the "Road Maps";

The Chairman of the Council of Ministers of the Republic of Karakalpakstan, khokims of regions and Tashkent city, heads of responsible ministries, departments and other organizations - for timely, high-quality and complete implementation of the measures envisaged in the Concept and the "Road Map";

Minister of Public Education of the Republic of Uzbekistan Sh.Kh. Shermatov - for achieving the target indicators of the Concept.

5. The Agency for Information and Mass Communications under the Administration of the President of the Republic of Uzbekistan, the National Information Agency of Uzbekistan and the National Television and Radio Company of Uzbekistan shall organize speeches and broadcasts on the subject in the mass media to widely

publicize the goals and objectives of this Decree.

6. The Ministry of Public Education of the Republic of Uzbekistan, together with interested ministries and departments, shall submit proposals to the Cabinet of Ministers within two months on amendments and additions to legislative acts arising from this Decree.

CONCLUSIONS

Physics plays a significant role in the sustainable development of society. By modernizing physics education and forming its hierarchical system, it is possible to provide the future generation with solid scientific knowledge and skills. This, in turn, will serve the innovative development of modern society and create a basis for training new specialists.

1. It is necessary to radically renew the experimental base of physics education and provide general secondary schools with modern pedagogical literature in accordance with the requirements of the time.

2. The author expresses serious concern about the shortcomings made in our country in the transition from an unjustified rapid transition to a 12-year education to an unjustified eleven-year education. He once again reminds us that such a transition should be subject to a necessary pedagogical experiment and its results should be discussed in depth and comprehensively with the broad participation of the scientific and pedagogical community.

3. The Ministry of Public Education is instructed to increase the share of open education in curricula at all levels, to ensure the connection of all secondary schools to the global Internet, and to emphasize that it is of great importance in raising the level of education of the country's population.

4. It is necessary to pay special attention to physics education: the integration of secondary schools - pedagogical institutes - universities. It is recommended to discuss educational standards and programs at different levels together.

5. The priority task of physics education is to acquire complete and thorough in-depth scientific knowledge and to form the skills of independent work. It is necessary to educate new specialists - technology managers, who combine knowledge of physics, computer science and economics and have the ability to manage the process of developing new technologies and introducing modern technologies. Such specialists can form the technological elite of society.

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