

Problems of the Development of Polytechnic Education in Conditions of Modernization of Teaching Physics

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Abstract: The study examined the socio-economic and educational foundation to improve polytechnic education of students in the study of physics at secondary school. The work deals with one of the most pressing educational problems - polytechnical education at this stage. The short analysis of the researches sanctified to perfection of polytechnic maintenance of school course of physics is given in the article. The problems of teaching of physics are in-process examined at high school in accordance with the tasks of polytechnic education in the conditions of innovative technologies. The necessity of increasing the polytechnic trying of learners in the process of learning physical basis of main directions of scientific-technical progress in modern stage is shown in dissertation on the basis of scientific pedagogical analyse of theory and practices of polytechnical physics teaching. The most important tendencies, characterizing the development of polytechnical teaching in the process of physics learning in secondary school are revealed and based. The content of polytechnical material of teaching the school course of physics in modern conditions in accordance with the requirements of scientific technical progress is defined. Methods of learning the physical bases of modern production are prepared. The model of polytechnical education of learners in the process of physics teaching is created, its criterions degrees, exponents are defined and its effectiveness is experimentally proved.

Key words: Methodical system of physics teaching • Conception model • Modern production • Electrodynamics • Scientific - Technical progress • Kvant physics • Ecological education profile teaching • Polytechnical purposefully • Proforientation

INTRODUCTION

In this paper we investigate one aspect of improving the study of physics in high school - the problem of polytechnic education in innovative technology. In an industrial - innovative school must provide not only a certain amount of knowledge, but also to teach the future specialist creative thinking, self-improve, upgrade and develop their knowledge. Polytechnic education is considered here as process and result of mastering of the systematized knowledge on the general scientific bases of modern manufacture, formation of the skills necessary for the reference with typical (accessible) instruments of labor, extended in various branches [1-3]. Certain aspects of polytechnic education of students were investigated by domestic and foreign scientists during the different periods of development of pedagogical science. Possible approaches to definition of the maintenance of polytechnic education in the conditions of scientific and technical revolution are considered. Problems of

polytechnism were and remain one of the main ones in a pedagogical science and comprehensive school practice. Physicists and methodologists L.I. Reznikov, V.G. Razumovsky, A.V. Usova, A.I. Bugaev, N.T. Glazunov, S.U. Goncharenko, B.M. Mirzahmedov, E.D. ShChukin and others devoted their researches to these problems. They have defined content of an applied material of physics course. They have revealed the structure of polytechnic knowledge and technique of acquaintance of students with main branches of modern manufacture. The urgency of this problem is caused by integrative processes in school education, radical changes in contemporary industrial-innovative development [3-5].

MATERIALS AND METHODS

The purpose of the study is to develop a didactic system of polytechnical education students in the process of teaching physics at secondary school.

The Object of Investigation: process of teaching Physics in Secondary Schools.

The aim of Investigation is to prepare the didactic system of polytechnical education in the process of teaching physics in secondary schools.

The Methodological bases of Investigation are: epistemology; theory of human development and formation as an active, creative and socially adapted to activity person; modern theory of polytechnic education; theory of integral pedagogical process and systems approach to the study of new techniques and industrial technology.

RESULTS AND DISCUSSION

Scientific Novelty of Investigation Lies in the Following That:

- Are determined the scientific- theoretical base of polytechnical education for modern stage in teaching physics in secondary schools.
- Is worked out the methodological system of polytechnical training of learners in learning electrostatics and quantum physics in a secondary schools.
- Are showed and based the main tendencies, which characterize the development of polytechnical education in the process of learning current physics in a secondary school (eg.: technique connection, pupil's familiarization orientation to up-to-date machinery and advanced technology, separation of principle and general technical materials, facultative approach to the substance of teaching physics, ecological education and training);
- Is created the polytechnical education model of learners in the process of teaching physics, are determined its criteria, figures, degrees, is experimentally proved its effectiveness.
- Are found the conceptual foundation of polytechnical education development in the process of teaching physics in a secondary school [6, 7].

Theoretical importance of investigation carries about the material of perfection of polytechnical education in learning physics on the base of scientific-didactical system of polytechnical training of learners, which gives the effective and quality chance to provide the process of education in the accordance to the requirements of development of modern production; new methodological systems of polytechnical education perfection in the

course of learning physics in "Electrodynamics" and "Quantum Physics" sections in secondary schools is developed.

Practical Importance of Investigation Lies in the Following That:

- Is defined the content and system of polytechnical education and skills in the process of learning physics in a secondary school.
- Is created a new methodological system model of polytechnical physics education in modern production conditions.
- Is worked out the methodological complex which deals with the problem of perfection of polytechnical education and strengthening of learners polytechnical training in the process of physics as a main directions of scientific- technical progress.
- Is showed the training and publishing aids as "Electrostatics", "Quantum physics" and electronic material "Electrodynamics"
- Is realized the generalized work of physico-technical content on themes "Physic and heat-power engineering", "The materials for production and technics", " Physical base of electrical energy industry", laboratory works in the course of electrostatics.
- Is realized an inter subject connection by polytechnical education formation in process of learning electrostatics with chemistry, biology and labor learning in a secondary school [7,8].
- Is showed a methodological recommendation about perfection of polytechnical education of learners by learning divisions such as "Electrodynamics", "Quantum physics", methodological instructions "Decision of task with polytechnical content", special course "Physics and environment", facultative courses "Electronic automation elements", "Innovation materials in techniques".

Approbation and Introduction of Results of Investigation: the main positions and ideas of dissertation work have been published in the materials of different international scientific-practical conferences.

Determined role and place of polytechnical education in the matter of perfection of teaching physics in a secondary school, defined main pedagogical requirements to current polytechnical training of learners [9-11].

Determined content of polytechnical materials in a current condition of course in teaching physics on a base of list of social- economical aspects in correspondence with requirements scientific technological progress. It was established that main place in the content of polytechnical teaching must take place the physical base of technical objects technological and productive processes.

Investigated devices of learning physical base of automatization production electronic-calculated technics, energetics, getting materials with given feature on the base of using experimental means, offered by the author.

Developed methods of learning physics base of modern production and model of methodological system of polytechnical education in the process of learning physics.

Defined possible ways developing content and methods of organization facultative lessons directed on developing polytechnical education and skills of learners by learning division of "Electrodynamics" and "Quantum physics".

In development of polytechnical education of pupils in the course of thermodynamics and electrodynamics the new methods and approaches in ecological education are presented.

The main bases of scientific progress help us to develop Kazakhstan's education in the world system of education, also to prepare the skilled and competitive professionals and to enter the program of 12 year school education.

To fulfill the learning process in physics we have to use the essential and optional courses in physics [12-14].

As made in the dissertation work the author tried to show the main new techniques and technologies have enough power to be learned.

It's also very important to develop the higher education of teachers in special teacher training courses.

CONCLUSIONS

In Future the Process of Polytechnic Education in Teaching Physics Can Be Followed in the next Directions:

- To develop polytechnic education system and content through new pedagogical technologies;
- To strengthen the connection of social useful professional works of pupils' with it's main orientations in teaching physics;
- To develop the pupils' scientific-technological thought and social opinion.

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