

### Variable component of a course of electrodynamics

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**Abstract.** In work problems of variable training in physics at the present stage according to problems of the general education in the conditions of innovative technologies are considered. The maintenance of a variable material of electrodynamics which allows to project physics courses according to the main directions of modern production and with laws of development of power industry is defined. Methodological bases of a variable component of a course of electrodynamics at high school are developed and possibilities of methodical realization of training in physics are created as is personal - the focused training model of science. The variable component of a course of electrodynamics is created and introduced in student teaching. The variable component includes educational and methodical grants and recommendations for teachers and pupils on variable studying of a new material and the solution of physical tasks of all main sections of a course of electrodynamics in educational institutions. The scientific and methodical bases of design of variable training in the physics, providing realization of the basic didactic principles are developed. The practical role of physical knowledge is shown at selection of the maintenance of a course of electrodynamics in system of variable training.

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#### Introduction

Variability of a modern education system allows different level of physical education on different educational profiles. Natural-science education is today obligatory for any educational profile. The physical knowledge opens laws of knowledge of world around therefore it is necessary also for humanists. Integration character of modern science considerably expanded area of physical knowledge. When studying physics bases of scientific outlook, scientific thinking, modern nature of research activity, creative approach to the solution of real tasks are formed [1, 2]. The huge baggage of a factual material in physics demands high level of its systematization. In system of variable training this problem is particularly acute especially. In today's time felt the potential for high-quality knowledge in the solution of the political, social and economic problems in the development of mankind? Speed development of science and education are the contribution to the structure of the new technology, higher commodity industry and the economic development of the country. And with it the development of the main direction of scientific and technological advances in modern industry and the country to the new socio-economic condition requires students to further improve the application of the material during the process of learning physics. Important in the education system in the developed countries is to inform learning, that is, the use of information technology in the learning process [3]. Today's time is the problem is the date. The inclusion

of new technologies into the educational system and improve provisioning, a new information technology is closely related to information culture of students, that is, require the inclusion in the learning process improved and new information technology and technical training. Nowadays the use of informational technology is getting way more successful in our everyday life, in exchanging various information. Therefore the special society is been created based on computer technology. The first important requirement for our young generation is to create that culture focusing on technology of information [3, 4]. Pointing to this, the first important step is to develop the critical thinking of school children, focusing on their scientific based actions and create an effective teaching methodology to enhance their education level. The practical action result will be more efficient in preparing future teachers to use new technology. Professional training on computer modeling and informational technology and special system will be required.

**Aim of work:** The use of materials applied physics course in the new technology.

**Object of work:** Application and definition of variable materials physics courses.

**Prognosis of work:** If we consider the problem of variable physics course as a basis for industrial-innovative direction it will affect the development of vocational education students.

**Objectives work:** analysis of variable issues physics course; consider the practical problems as educational technology; determination of the

effective methods in computer modeling of variable materials and their application.

### Materials and methods

Methods of research were selected on request of adequacy to research problems. At different investigation phases the following methods are used: the theoretical analysis of literature on a research problem; studying mass and synthesis of the best pedagogical practices; modeling of educational systems and processes; method of expert evaluations; pedagogical experiment with statistical processing of its results for the purpose of determination of efficiency and correction of an offered technique [5, 6]. The methodological basis of research was made by laws of development of scientific, educational knowledge, the methodological principles of physics, the methodological principles of pedagogics, idea of personally focused education, idea of developing education, research on the theory and practice of physical education. This program aims to develop students' research skills, competitions and formation of ability to perform the experimental task. This is particularly important lab work. A leader of students is based on the selection of learning technologies. In the area of component-active method in the organization of the learning process is an effective training technique that tells the self, cognitive activity of students. Physics Teaching Technology: importance in education; the applicability; appropriateness of the national-edge features; systematic, efficiency; take into account the features of the subject; compliance of the level of development of individual students; selection criterion of age features. Based on these criteria, in teaching physics, applied developmental, unit, level learning, learning through the reference signal. In the application of these technologies are the most effective interactive, problem-search, the communicative method, and self-development, active, cultural forms of student's students' interest in the subject matter and competence [7, 8]. Applied courses are required for participation of students, they include training programs. Exchange performs two functions: in-depth basic training oriented subjects and focused on a particular profession. Elective courses outside the curriculum implemented at the expense of component learners. Application rates should, first serve to deepen the knowledge and secondly to promote the continuation of knowledge in the direction. Therefore, the teacher should pay attention to their actions. If up to now have elective courses were their academic titles, but now applied courses have a promotional description: it is for the students should be clear and interesting. In general, the problems of applied courses is based on the

practical applications of physics, it is "not at the expense of the subject, but due to practical use." Accordingly, the goals and objectives of the course based learning application do the following functions: determine the current major problems; to focus on the features of the future professional activity; improve cognitive skills to focus on organizational activities; supplement the basic subject knowledge; acceleration of the object-oriented training deficiencies. Although the above functions have a special place, it is necessary to define the principles of management to choose the educational content of the variable part of the curriculum [8]. From this selection of content knowledge of variable component in the senior high school, along with inter-subject combination, system, integrity, completeness, modular principle should be based on important principles: the specificity of applicability; to perfect cognitive skills; the orientation to the profession. Because he pursues the content that provides the zeal to study and work, public service, the formation of view, skills and abilities to work independently, the assimilation of new knowledge, which is not included in the curriculum. In the course of the application materials are chosen that are needed for a new future career of students.

### Discussion

Polytechnic education in learning physics is realized through the introduction of physical bases of these industries: of energy (mechanical, thermal, electrical, nuclear, quantum); material properties and mechanical engineer (thermal, reactive, electric motor); transport and communications (a type of transport, radio, telegraph, picture telegraphy, telephone, radar, and underwater acoustics); automation and electronics (light barrier, electronics and appliances semi conductivity, computing facilities, radio control operation of satellites, earth, machines, etc.). Physics teacher familiar with the scientific principles of the industry, bringing concrete examples to show the place of physics in the development of engineering and technology. Assimilation of working with laboratory instruments and equipment, train students to connect theoretical knowledge with practice [9, 10]. In the scientific and technological revolution, physics is an advanced science. Significant achievements of modern technology associated with the development of the science of physics. In this regard, increasing the role of physics in the polytechnic training of students. Education superconductivity allows exploring the use of these phenomena in engineering and science. At the same must be said about the importance of using superconductivity to avoid spending during the transfer of power, which is the main problem of

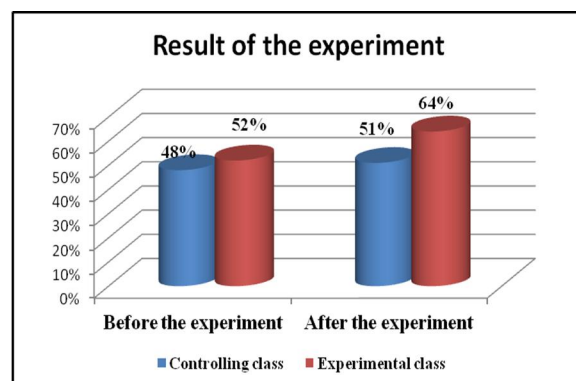
energy. Special attention has always been given to the development of electric power. The widespread use of electricity opened the way to solve an important problem (for example, the reduction of hard work through the development of electro-mechanization and development base, saving oil and gas consumption, etc). Electricity is energy based computer, the device's manual and an electron. Electrodynamics - one of the main sections of the physics course in high school, where students receive information about the mutual influence of electromagnets on the field as matter, and their close mutual. And it gives students an idea of the physical form of the modern world, the formation of the dialectical materialist concept. This section has a value in the polytechnic education. Electrodynamics - as part of physical science, is the theoretical foundation of such sciences as electrical engineering, radio engineering and automation, etc. When training section electro-dynamics Polytechnic content material is determined by the two directions of technological progress: the use of electric power in a highly automated industry and its generation and road transport [10]. In this section, students improve their knowledge of the new field of physics, that is, a variety of new ways of energy, the appearance of MND generators, iron and superconductors. This is following the requirements of the choice of educational material on the branch of electro-dynamics: should show the physical basis of a wide spread technology and industrial sectors, the main directions of scientific and technical direction of educational material; electro-dynamics' exchange rate policy, the problems of the materials should be in the organic harmony; technical development of mental abilities of students. The above requirements choice of educational materials should be closely related to each other. Students studying electrical phenomena familiar with the wide applicability of electricity in the home. At school, in particular, we study the laws and phenomena that make up the physical basis of electrification. Economic development cannot be without the material basis of the energy industry. Electric power is the main developing direction of scientific and technological revolution.

Part of electrostatics using the elements of the new information technologies, conducted a lesson using an interactive whiteboard, computer modeling of electrical charges on the topic, the law of conservation of electric charge, Coulomb force, the electric field, the relationship between tension and release potential and conductivity of the electric field.

## Results

In high school, shown in this work, during the training section of electro-dynamics system is a technique which is designed for education using innovative technology has been tested as a Pedagogical experiment. The experiment began with the training of polytechnic students in determining the ability to respond to the practical issues associated with the production and modern appliances [8, 11]. These include a: open the application in engineering laws and electro-dynamics' phenomena in the course; to acquaint students with the physical basis of new materials production. After passed the new theme experimental and control classes performed physical examinations and technical nature. Analysis of these examinations made it possible to compare the level of knowledge of the two classes. In this school, the experimental and the control class, students were offered two control works. The result of newly conducted test work has shown maintain the trend of quality knowledge.

**Diagram I. Result of the experiment**



Experiment showed that the developed technique of variable education in the course of training in physics at comprehensive school differs from the previous: accounting of development of social and economic and scientific and technical progress; the maintenance of the selected material; consideration of separate technical objects and technological processes of modern industrial and agricultural production; use of means and methods of active transformation of physical knowledge in the course of their application in various situations.

## Conclusion

The content of physical knowledge on the basis of a variable material opens the general laws of formation of scientific knowledge and allows to stir up cognitive activity of pupils. Basic opportunities and methodological bases of variable creation of the

content of training in physics at high school are defined. The offered variable creation of the content of training in physics promotes intensive development of identity of pupils as subjects of training that determines improvement of quality of training in physics of various categories of pupils. Variable creation of training in physics in the form of personal allows to achieve the focused model of science both improvement of quality of training in physics, and an intensification of development of creative identity of all pupils studying physics. Pedagogical experiment on application of a variable material when studying physics gives the grounds to claim that the practical preparation constructed on a new methodical basis in the conditions of modern production, effectively influences teaching and educational process and development of the personality on all factors.

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