



## Methods of developing special competencies of future technological education teachers

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### ABSTRACT

Currently, training of future teachers at the level of modern requirements remains one of the urgent issues. This article provides feedback on the development of special competencies of the future technological education teacher (design, Arduino programming, 3D modeling, production)

### Keywords:

competence, technology, robotics, design, Arduino, Arduino programming, 3D modeling, production

Fundamental revision of the content of personnel training in accordance with the priority tasks for the socio-economic development of our country, creation of necessary conditions for the training of highly educated specialists at the level of international standards, quality improvement and fundamental improvement of the level of higher education, higher education The program for the comprehensive development of the higher education system on strengthening and modernization of the material and technical base of educational institutions, equipping modern educational and scientific laboratories with information and communication technologies was approved. Determining the priorities of the systematic reform of higher education in the Republic of Uzbekistan, raising the process of training highly qualified personnel with modern knowledge and high moral and ethical qualities to a new level in terms of quality, modernization of higher education , the

concept of development of the higher education system until 2030 was adopted in order to develop the social sphere and economic sectors based on advanced educational technologies. The rapid development of science and technology and modern technologies means that the content of the competences that the future teacher of technological education, who is being trained in higher educational institutions, should have, is constantly changing, and the volume is increasing sharply. This, in turn, requires them to have a system of necessary competencies that will allow them to effectively use innovative technologies in their future professional activities. In general, the development of special competencies in the training of teachers of technological education is considered to be an important factor in improving the quality of the education given to them, and in becoming personnel who can meet the requirements of the time. It is understood that the future technological

education teacher should have modern knowledge of his subject from the point of view of his special competence. Therefore, it is necessary to pay attention to the process of training future teachers.

The development of mechanisms for the integration of science and modern industrial achievements into the educational process in the organization of classes, its introduction into the educational process, and the organization of student learning using the means of innovative and automated technical systems are solutions to such urgent tasks. means that there is a need.

What knowledge should a future technological education teacher acquire in order to become a competent teacher?

- Being able to independently organize professional and pedagogical activities;
- To be able to correctly solve the usual professional and pedagogical tasks and to have the ability to realistically evaluate the results of one's work;
- Having the ability to independently and consistently acquire new knowledge and skills in their specialty;
- knowledge of special methods related to science;
- knowing the needs of students during the activity.

Special competence is understood as the competence needed for the effective performance of specific professional duties. It is important to develop the special competencies of the future technological education teacher (design, Arduino programming, 3D modeling, production). The science of technology is included in the category of practical-aesthetic sciences and is focused on doing more practical exercises in the lessons. At least 80% of the lesson should be devoted to practical work. Work to be done before practical work is planned. When making any product, a technological map of the product is first developed.

Projecting (proektirovanie) includes technical and economic bases, calculations, drawings, layouts, estimates, explanatory letters and other materials necessary for the construction, (reconstruction), development of

products, etc. development of a complex technical document (project). There are many design methods, depending on the goals, objects and means of the project. According to the type of representation of the object, there will be graphic and volumetric design (layout, modeling). Cybernetic design methods (using EXM) are used to select optimal spatial parameters. The serial method of design is related to the structural uniformity of the size of details and modular coordination. The serial design method allows for the creation of a series of product types with a single design[]. Practical work on product preparation is carried out in technological education classes. First, the practical work is designed. During design, a sketch of the product to be made is drawn, and the necessary materials are selected. A technological map of the product is developed and the product is made on this basis. Students' knowledge of design information indicates the quality of the product they are preparing.

Currently, one of the urgent issues is the formation of the knowledge and skills of future teachers of technological education related to Arduino programming. The national curriculum developed for general secondary schools also includes topics related to teaching students Arduino programming. Through this, the goal is to teach robotics. Robotics (robotics - robotics, robotics) is the first step for technical creativity, inventiveness, design activities, and together with programming, knowledge about mechanics, schematics, and electronics is formed. By building robots, children develop attention, accuracy, discipline, imagination, responsibility and, of course, learn to work in a friendly and coordinated team. Robotics allows each child to go from simple to complex, first participating in the development stage of the project, and then receiving the final result during the final assembly of all parts. First of all, it is required to have knowledge about Arduino. Arduino is an open source platform used to create electronic projects. It is a small board with its own processor (microcontroller) and memory. Arduino consists of an electronic microcontroller and a software or IDE (Integrated Development

Environment) component used to write computer code to physical devices. There are several types of Arduino: Arduino UNO, Arduino Leonardo, Arduino ProMini, Arduino Mega, LilyPad Arduino. The most common of them is the Arduino UNO. It is effective to start working with microcontrollers with this controller first.

It is necessary to include topics related to Arduino programming in the educational programs of technological education and teach them to students. It is required to develop recommendations for implementation of various practical projects based on Arduino programming. It is important to teach the design of models and layouts of smart greenhouses, smart lights and other automatically controlled structures, as well as 3D modeling. 3D modeling is the creation of a three-dimensional project based on a drawing or a drawing. To create a 3D model of objects, special programs are used on devices, for example, tablets, computers, etc. Rendering is one of the important steps in the modeling process. Modern three-dimensional computer graphics make it possible to create a 3D model of an object or a person that looks as realistic as possible, difficult to distinguish from a real person or object. A professionally modeled product can be easily presented to customers, investors or partners[]. Production of furniture and furniture accessories - furniture manufacturing companies are now using three-dimensional graphics on a large scale. In order to create their products without difficulty, they create 3D models based on special programs and become owners of ready-made products. In the field of industry, it is difficult to imagine modern production without modeling. It is more efficient to make a 3D model of each part or product and assemble it ready. In the production of many serial products, a 3D model of the product is prepared first. Serial production will be launched based on the 3D model. What is production? Production is the creation of material products necessary for human existence and development. One of the factors of development of any country is related to production processes. Information about production is given in the technology

subject taught in general education schools. Pupils study all products and materials used in production, their components, manufacturing technology. At school, students who have mastered the science of technology well will learn a number of crafts, some secrets of product preparation, and will have extensive information about production. This directs young people to entrepreneurship. In the process of consistent reforms implemented in our country, special attention is paid to the development of small business, especially private entrepreneurship. Currently, the level of enrollment of school graduates in higher education institutions is 26-28%. In the concept of development of the higher education system of the Republic of Uzbekistan until 2030, it is planned to increase the level of coverage of graduates with higher education to 50 percent by 2030 compared to the total number of graduates. For young people who did not want to enter higher education and could not enter, he introduced education in professional educational institutions. Students who excel in technology studies in secondary schools choose their major without any difficulties. And he finds his place in society with his craft or entrepreneurship.

Based on the above information, it can be said that the development of special competencies of students (designing, Arduino programming, 3D modeling, production) is one of the most urgent issues in technological education classes.

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