



## Peculiarities of Teaching Robotics Topics in Technology Classes

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**Abstract:** Today, programs of technology classes are developing and updating day by day. This article discusses the specific aspects of teaching robotics topics in technology classes.

**Key words:** technology class, robotics, programming, standard of education, extracurricular activities.

### INTRODUCTION

The development of modern society is inextricably linked with scientific and technical progress. Information and communication and engineering technologies have become an integral part of educational activities, significantly increasing their efficiency and contributing to the maximum development of intellectual, emotional and personal abilities of students. This creates a favorable environment for the development of robotics, an innovative direction of technical creativity.

### MATERIALS AND METHODS

The idea of developing the creative abilities of the young generation and improving their technical training is one of the important issues. The concept of the new state educational standards was developed focusing on the development of students' creative potential and the formation of cognitive abilities in the trajectory of personal development. Teaching the basics of robotics is becoming an important element and means of working on the development of creative abilities of students and young people, shaping the self-determination of students and young people, and ensuring the formation of technical and engineering thinking.

### RESULTS AND DISCUSSION

The state education standard of basic general secondary schools has encouraged our teachers to develop topics related to high-tech engineering and programming, and to integrate robotics into classroom and extracurricular activities.

The urgency of teaching the basics of robotics in schools is determined by the new tasks of developing technical creativity, modern science arises from the high demand for specialists who can combine technical and informational knowledge in practical activities.

Revealing the abilities of each student, educating a person ready for life in a high-tech, competitive world - the goals of modern education are defined in the state education standard.

The introduction of robotics into the educational process is one of the main means of implementing "Technological education" and forms the scientific and technical potential corresponding to the modern requirements of world technological development.

The main advantage of extracurricular activities is to provide students with a wide range of activities aimed at their development and meeting their ever-changing individual socio-cultural and educational needs.

The purpose of introducing robotics into the extracurricular activities of the school is to create favorable conditions for the comprehensive development of the individual: intellectual development, responding to the interests, abilities and talents of students, their self-education, professional self-development.

The joint activity of students in the robotics class helps to form the qualities of creativity specified in the state educational standard.

As a result of the introduction of robotics training into the educational process, constructors achieve the formation of the following characteristics in students:

- ✓ motivational basis for extracurricular activities;
- ✓ plan your actions according to the task and the conditions for its implementation;
- ✓ analyze the object, distinguish important and insignificant features;
- ✓ implementation of synthesis as the formation of a whole system from parts;
- ✓ people may have different viewpoints, including viewpoints that do not match their own.

Thus, robotics has great potential in forming students' creative competence, it gives students a high motivational impulse. Organizing robotics lessons based on competence in accordance with the right approach will increase the positive effect. New approaches in education force teachers to reconsider the methods used in teaching, to study them, to search and to move forward.

In technology lessons at school, robotics complexes can be used in the following directions [2]:

- demonstration;
- frontal laboratory work and experiments;
- research project activity.

Forms of organization of extracurricular robotics classes include:

- ✓ workshop;
- ✓ consultation;
- ✓ role-playing game;
- ✓ competition;
- ✓ exhibition;
- ✓ study.

The effectiveness of teaching the basics of robotics also depends on the organization of classes using the following methods [3]:

1. Cognitive (perception, understanding and memorization of new material by students involving observation of ready-made examples, modeling, study of illustrations, perception, analysis and generalization of the presented materials).
2. Project method (in mastering and creative application of skills and abilities in the process of developing one's own models).
3. Systematization (discussion on the topic, creation of systematic tables, graphs, diagrams, etc.).
4. Control method (in determining the quality of acquiring knowledge, skills and abilities and correcting them in the process of performing practical tasks).
5. Group work (used in the joint assembly of models, as well as in the development of projects).

The main method used in learning robotics is the project method. The project method means the technology of organizing educational situations in which the student sets and solves his own problems and the technology of supporting the independent activity of the student.

Project-based learning is a systematic teaching method that engages students in acquiring knowledge and skills through extensive research activities based on complex, realistic questions and carefully designed assignments.

Robotics classes create opportunities for the all-round development of students and the formation of the most important competencies specified in the standards of the new generation. In order to implement a systematic-activity approach to teaching and developing engineering thinking in students, school teachers use the following methods of teaching robotics in their work:

**Pattern design.** This is a demonstration of a robot (or structure) building technique. First, the robot is reviewed, the main parts are highlighted. Then, together with the student, the necessary parts of the designer are selected by size, shape, color, and only then all the parts are assembled together. All activities are accompanied by teacher's explanations and comments.

**Design by model.** Many elements that make up the model are hidden. The student independently determines from which parts the robot (part) should be assembled. Analytical and imaginative thinking is activated when building according to the model.

**Design according to the specified conditions.** The student is offered a set of conditions that he must fulfill without showing the methods of work. That is, the teacher does not give design methods, but only talks about the practical application of the robot. The student learns to analyze samples of finished products, to distinguish their important features, to group them according to the similarity of their main features, to understand that the differences in the main features in shape and size depend on the purpose (specified conditions). In this case, the creative abilities of 5-6 graders will develop [5].

**Design by the simplest drawings and visual diagrams.** At the initial stage of design, the schemes should be very simple and detailed in the drawings. With the help of schemes, students develop the ability not only to build, but also to correctly choose the sequence of actions. Later, the child can not only build according to the scheme, but vice versa - draw a diagram according to visual construction. That is, students learn to independently determine future construction stages and analyze it.

**Design by student creativity.** After mastering previous robotics techniques, students can design however they want. Now they themselves determine the theme of the design, the requirements it should meet and find ways to create it. In creative design, previously acquired knowledge and skills are used creatively. Children develop not only thinking, but also cognitive independence and creative activity. Students can experiment with building materials. It should be achieved that robots will become more and more diverse and dynamic.

## CONCLUSION

Thus, educational robotics:

- effectively forms universal (meta-subject) educational activities of students;
- effectively develops students' scientific and technical creativity and engineering-design thinking;
- the school leadership, pedagogical team, students, parents' team, social partners of the school contribute to the development of students' research and project skills in various disciplines;
- helps to develop students' interest in engineering and technical sciences and careers;
- develops the ability of students to act as a team to achieve the final result.

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