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IN-DEPTH STUDY OF ROBOTICS IN SCHOOL BY IMPLEMENTATION OF ELECTIVE COURSES

Today, the field of robotics has developed extremely widely. Robots for a wide variety of purposes can be found in production, in everyday life, in the military industry, in medicine and in other industries. Therefore, the creation and maintenance of such robots require highly qualified engineering personnel, which should begin to be trained already at school.

The purpose of studying the "Informatics" course in grades 5–6, in accordance with the new State standard of basic secondary education, is the development of a personality capable of using digital tools and technologies for problem-solving, development, creative expression, ensuring personal and social well-being, capable of critical to think, act safely and responsibly in the information society. The content of the specified standard in the technological educational field specifies the ability to "use digital technologies in modern production, in particular, robotics", in the IT field – "to use technological tools and devices, including robotic ones; involvement in the formation of one's own scientific culture, cultural values of science, including the use of STEM (STREAM) – approach".

Thus, the need to teach students the basics of robotics is legally defined. Robotics is one of the areas of implementation of STEM education. She teaches how to model real-world objects and create a play environment for learning and development by building and programming robot models from constructors. Thanks to such constructors, students learn the basics of mathematics, mechanics and programming, and develop creativity, imagination and fantasy.

We have analyzed model curricula for grades 5–6, recommended by the Ministry of Education and Science of Ukraine, regarding the study of topics related to robotics, based on which we draw the following conclusions:

• the study of robotics in 5–6 grades of NUS is planned, but not in all model programs; The model program of S.S. Radchenko and E.V. Borovtsova is the broadest in terms of the content of the "Robotics" topic, attention is also paid to this topic in the programs of N.V. Morse, O.V. Barna. and Kozak L. Z., Vorozhbyt A.V.;

• the content of the educational material to be studied by students is not unified;

• currently there is no sufficiently developed methodical support for teaching this topic in the school computer science course for grades 5–6;

• the only model curriculum "Robotics. 5–6 grades", authors I.M. Sokol, and O.M. Chentsov, do not take into account the specifics of specific designers and corresponding software environments.

These considerations indicate that the topic "Robotics" in the computer science course of the new Ukrainian school is not sufficient for schoolchildren's assimilation of modern methods of cognition, and confirm the relevance of introducing a selective integration course "Fundamentals of robotics", which would supplement the curricula and take into account existing robot designers.

We have developed a selective course "Fundamentals of robotics", which is intended for students of grades 5–6 of a new Ukrainian school for in-depth study of informatics. The course is based on the RoboKit series of constructors. The course program is designed for 22 hours using one simpler Roboseries constructor (RoboKit series). It can be expanded using six more from the specified RoboKit series. It is aimed at forming the basic knowledge and skills of students in order to facilitate the further study of programming languages for the creation of software applications. The implementation of this program is aimed at developing students' abilities for research, analytical work, experimentation, and critical thinking, as well as the development of students' responsibility, patience, self-organization and other positive personality qualities.

The program has been successfully tested in the Chernivtsi multidisciplinary Lyceum No. 4 of the Chernivtsi City Council: for two years, it has been used for

classes in the robotics group for children in grades 5–6. The implementation of the developed selective program increased the motivation of students to study robotics, which is evidenced by a 28.5% increase in the attendance of the circle, the level of knowledge acquisition of students from the basic computer science course also increased (the level of knowledge increased on average in the first year in 35.7% of students, in the second – in 55.5% of students). In addition, as noted by the teachers of the specified lyceum, the participants of the group became self-confident and ready to perform tasks of various complexity, they show their creativity, creativity and knowledge in the lessons. Robotic systems created and programmed by students in the group are used in computer science classes as demonstration samples. Therefore, the implementation of this program is aimed at developing students' abilities for research, analytical work, experimentation, and critical thinking, as well as the development of students' responsibility, patience, self-organization and other positive personality qualities.

The application of the elective course "Fundamentals of Robotics" in the conditions of the new Ukrainian school gives students the opportunity not only to acquire knowledge but also to be able to use it in everyday life, creating something new, thanks to which students develop the basic competencies of the new Ukrainian school. This approach will help prepare highly qualified specialists who will contribute to the growth of Ukraine's competitiveness in the world.