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Development of Creative Potential of Students by Means of Educational Robotics

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Abstract: The study is devoted to one of the innovative areas of work with children in the sphere of education educational robotics. The researchers believe that robotics allows realizing the complex solution of educational issues and personal development, maintaining continuity robotics provides a new key to the means and methods of organization of the educational process.

Key words: Education, technology, expertise, innovation, robotics, training, educational robotics, creativity, creative potential, technical ability

INTRODUCTION

Modern school fulfills society and state order. Federal State Educational Standards (FSES) provide guidance on the development of education and training that the family, the society and the state expect of us. In the standards, a model of the school leaver is offered. This model became our landmark. The key characteristics of it became the personal ones such as: curiosity, activity and interest to knowledge of the world, the ability to think creatively and to find creative solutions, willingness to learn throughout the life (FSES, 2009; Akhtarieva, 2015; Zlakazov *et al*., 2011).

Therefore, modern education must meet the challenges of preventive development ensure the study of the educational robotics as the future technologies.

D.V. Livanov suggested the robotics should become the part of the curriculum and should be introduced into the subject "technology": the aim of the Ministry of Education and Science of the Russian Federation is the popularization of engineering specialties, IT-professionals and starting training personnel in this area since school. Every child has to try himself in the field of robotics, the minister of education Dmitry Livanov said at the last Olympiad on World Robotics in Sochi (WRO Russia in 2014). The minister announced that the prize-winners of such Olympiads would have the possibility of obtaining benefits when entering universities. According to Dmitry Livanov, the main aim of the ministry of education is the following: every Russian schoolchild could do scientific and technical creativity.

Robotics offers the technology of the 21st century at school; it contributes to the development of schoolchildren's communication skills, develops interaction skills, autonomy in making decision and reveals their creativity. Schoolchildren understand better when they create or invent something self-independently. This fact has a considerable importance during the lessons and activities in robotics.

Dmitry Anatolyevich Medvedev also instructed the Ministry of Education to include the All-Russian Olympiad on Robotics and Festival "Robofest" in the list of competitions, on the basis of which the winners receive the right to enter the universities without taking exams (Unified State Exam).

The urgency of this area is emphasized in the documents of the federal level, such as the State Programme "The Development of Education in "2013-2020", Federal Special Purpose Programme "Children of Russia" and National Educational Strategy "Our New School" (Anonymous, 2013; FLRF, 2012).

Robotics is the universal tool for education: The educational robotics is becoming an important element and is working on the formation of self-determination of children and youth, it develops their creative abilities and ensures the formation of technical and engineering thinking. In these circumstances, the educational robotics has great importance as a new technology and an effective tool for teaching and training of engineers in modern Russia.

The use of robotics in schools, kindergartens, institutions of supplementary education allows children of all social levels have the equal access to the modern educational technologies. Robotics can be used in supplementary education, in extracurricular activities and in teaching school subjects in accordance with the requirements of the FSES.

According to the FSES, the main goal of the educational robotics is the forming of creative, technically competent, harmoniously developed personality having logical thinking and ability to analyze.

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After analyzing the educational robotics according to the requirement of Federal State Educational Standard of the second generation the following can be stated:

- The development of creative competencies provides the modeling of processes and objects which are the essential component of the educational robotics
- The formation of subject competencies through the creation of models illustrating the laws, processes, experiences
- Metasubject is ensured by creating of the virtual models in which the general knowledge of different subjects is used
- The communicative competencies are formed in the group practice projects
- The information competencies with educational robotics can extend the information field and information processing technology

Thus, the educational robotics is one of the means providing the formation of the creative abilities of the students, demanded by modern society.

The concept of the new educational standards is focused on the development of the creative potential of students and the formation of cognitive abilities in their own personal development.

Now a days, the educational robotics is secured organizationally, technically and methodically best of all and the most prepared for the introduction to school. However, this process requires appropriate teachers training. Today, the educational robotics gives a new urge on the theory and methodology of teaching.

METERIALS AND METHODS

The creativity is based on the desire to do something that nobody has ever done before or do it in a new and better way: creativity is the desire to progress and perfection. Creativity should be the value orientation during school years otherwise, it is likely it will not to be formed in future. If we do not support the development of the creative potential of the child, we condemn it to the great difficulties. How is a creative person manifested? Perhaps, that no one, except the researcher can get exactly the same result.

The creative personality is a personality, having ability to find the new and better ways of solving the problems. They can look at a problem from different angles see it as no one had seen it before, this is a constructive way of thinking, bringing practical benefits in various activities. Humanist psychologist A. Maslow singled out the motive of personal growth, the need for free realization of abilities and life opportunities as a source of creativity.

A. Maslow noted that creativity is an essential characteristic of human nature and creativity is laid as a foundation in every person. Creative potential is in every person but not everyone wants to develop it during his life. How to develop creativity? First of all:

- Development of creative abilities of children should start almost from their birth
- Every parent can choose how and what he will do with the child
- Allow and help to realize the new ideas and inventions
- Let your child unleash will to imagination, thinking and logic
- Do not punish your child for creative experiments
- The development of creative abilities of children is affected by various questions that they will have to answer
- Constructors, blocks, puzzles will help to develop the creative potential of the child

There are a variety of psychological exercises, games, trainings aimed at helping your child to manage the creative process. The technical creativity is considered to be one of the kinds of creativity, the result of which is the technical object which is of utility and novelty. From a psychological point of view the children's technical creativity is an effective means of education, a purposeful process of teaching and development of creative abilities of students.

The classes in technical creativity promote the development of students' algorithmic and logical thinking, easy understanding of the principles of algorithmic structures. They also help develop skills to think independently and creatively and increase motivation for learning.

The introduction of the elements of robotics in the process of teaching and education is necessary for the development of children's technical creativity. This is the most favorable environment for the formation of observation, the development of independence, initiative, ingenuity, diligence, perseverance and determination.

Now a days with the spread of robotics a new stage begins which means the understanding what technical creativity is. Traditionally technical creativity is the destiny of the boys but now girls are actively involved in robotics.

The educational robotics is a special instrument for the development of the child, his intellectual and creative abilities. Psychological and educational support of children involved in educational robotics should be carried out through individual work with teachers which

includes educational and counseling activities to improve the psycho-pedagogical competence of the teacher as well as individual work on the interaction problems of a particular student with a particular teacher and parent.

Modern computer technologies are the key to future success in a challenging competitive environment. One should start to involve a child without delay not only into computer games but also into the programming of active robots.

The teaching of children with the use of robotics equipment is carried out through the game and with the technical creativity at the same time. Such teaching helps to develop the fine motor skills, which is directly linked to the development of thinking. While constructing logic and creative thinking are activated, the attention is developed, as only with a careful study of the instructions you can construct the model correctly. The ability to assemble a device will certainly be useful in future. The result brings satisfaction and desire to create more complex models.

According to, Petrovski (1987) in the creative process children overcome the fear to make a mistake, do something wrong which significantly contributes to the development of courage and freedom of the child's perception and thinking. The above mentioned develop a fundamental need to be an active participant in life, to know and transform the world.

The qualities that children involved in the educational robotics possess deserve special attention. Qualities typical for the future "technicians" are the following:

- Mastering knowledge in the chosen field at an early stage
- Demonstrating high intelligence, good memory
- Enthusiasm in their work, energy
- Demonstration of independence, the desire to work alone, individualism
- Skill to extract experience and the rapid acquisition of artistic and intellectual experience

The development of creative potential of students is one of the most important tasks of modern education. For successful solution of this task good conditions which provide psychological comfort for students and teachers should be created at school.

RESULTS AND DISCUSSION

The purpose of psychological support is assistance to identify, support and develop the talented children, their self-realization and professional self-determination, preservation of mental and physical healt. The term "psycho-pedagogical support" is widely used in the field of education.

The purpose of psychological and educational support is the creation of conditions for successful teaching and development. This technology is created to assist the child in preventing or solving problems in the educational process. Thus, psychological and pedagogical support is a special way of assistance to the child during the educational process.

The development of students consists in studying the implementation of opportunities which this age gives to a child as well as the realization of the possibilities which this socio-pedagogical environment offers. The certain range of goals and objectives is realized at each stage of teaching.

The teaching of preschool children (5-6 years) of LEGO-construction contributes to the development of their scientific and technological thinking, stimulates children's imagination and develops their fine motor skills, lays the basis for further successful learning. Preschool age is the period for the development of creative activity of the child, his creative imagination. Preschool educational institutions aim at creating a favorable learning environment, optimal psychological and pedagogical conditions for the development of creative activity of children.

In elementary school, the teacher may form a small group of children which can be categorized as "talented and gifted children" according to the results of psycho-diagnostics and observation.

Psychological and educational support of these children involves drawing up an individual route, i.e., the individual development programmes. The aim of work with the constructor is the development of flexible, creative thinking, speech and imagination. With the help of the constructor junior school students learn the features of the world, explore the objects of the environment and learn the first steps of building algorithms.

In secondary school, the development of gifted teenagers depends on the teacher and on his professionalism. "Robotics club" is a new trend among teenagers which becomes more and more popular every year. This club is interesting due to its unusual knowledge and skills, the ability to produce various models of robots. This club will help you find new friends and like-minded people. This club gives the teenager the opportunity to research work that provides an integrated basis for the process of learning the scientific world model. The main activity of a teacher and a psychologist is a psychological preparation of students to participate in competitions and contests on robotics.

The activities of vocational guidance of schoolchildren are of a particular significance in high school. Modern robotics is a working profession. It is necessary to motivate children to transfer the interest in

technical means to the hobby and then to the profession. Among the tasks of psycho-pedagogical support the following can be singled out:

- Development of emotional stability, formation of self-control skills
- Coping with stress in extreme situations (competitions, contests)
- Promoting socialization
- Formation of communicative skills
- Training of teachers working with gifted children

Robotics became active in education being widely used in industry. Elements of robotics have been successfully used in educational activity, contributing to more successful mastering subjects and the development of research skills. The development of technical capacity is necessary for all students, even for those who are not going to connect his professional career with technology. These capabilities can solve the problem by using modern technology in their everyday life.

In schools, clubs and electives related to teaching robotics have been introduced. Classes in robotics arouse children interest to scientific and technical creativity.

Today, having a complete picture of the role of robotics in education and a certain experience, we have an understanding of development prospects in this area.

Summary: It must be noted that due to its unique synthetic nature robotics is a powerful means of developing unique skills and abilities of the child in different areas of technical creativity and also robotics can serve as a tool for career guidance and the start of professional development of the youth.

CONCLUSION

Education is the sphere of social life which actively explores new technologies, integrate them into the educational process and thus, change it. Taking into account the modern changes, the education forms a basis for the training of qualified, competitive, thinking young people.

Thus, the conducted research will become an important part of the implementation of new educational technologies and educational robotics is one of the promising areas.

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