"STEAM" - EDUCATION AS AN INNOVATIVE APPROACH TO THE DEVELOPMENT OF VOCATIONAL TRAINING FOR STUDENTS

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ABSTRACT

Implementation and implementation of the STEAM education approach in organization of out-of-school learning based on international best practices. The successful use of STEAM-based robotics in the learning process is a successful foundation for scientific research aimed at expanding education based on indicators such as critical thinking, genetics of ideas, communicative, operational, reflexive and self-assessment.

Keywords: STEAM approach, robotics, interdisciplinary integration, approach, STEAM learning, creativity, skills.

INTRODUCTION

In the research conducted by leading universities and research centers of the world on innovative development of vocational training, implementation of modern education, special attention is paid to the introduction of criteria for research skills of students, creation of innovative educational environment, international educational standards. These studies play an important role in enhancing the technological competence of students through the use of modern information and robotics techniques in education, such as indicators of critical thinking, genetics of ideas, communicative, operational, reflexive and self-assessment. Issues of improving the content of out-of-school learning, the introduction of state-of-the-art knowledge and advanced practices into practice , as well as the development of vocational training for students based on the STEAM approach, are emerging as a scientific challenge:

- changes taking place in the world community in connection with the development of society;
- positive change in the way vocational training of students is based on a scientific approach;
- Implementation of STEAM programs in the content reform of the educational process;
- to study STEAM educational practices as a holistic problem based on interdisciplinary content.

RESEARCH METHODOLOGY

This study was a qualitative study and used a document analysis method. Document Analysis is a single text that has been explored through quantitative determination of document content through content analysis. The analysis of the benefits of traditional STEAM teaching through out-of-school learning was analyzed. The method is, first, a means of achieving educational outcomes and, secondly, a prerequisite for educational activities. Teachers and students collaborate through teaching. Teaching is a way to direct teachers and students to the content of the information. Teaching methods are structured as teaching methods and teaching methods.

Conclusion and Suggestions

The need to modernize the content of education in today's out-of-school education is to bring up a well-educated person, the social order for extracurricular education is not aligned with best international practices; insufficient provision of programs and methodological materials for individual development of children with the wide use of modern information and communication technologies in the development of vocational training of students; The incompatibility of students' knowledge and skills with the skills and abilities required in their professional activities determines the relevance of the problem under study.

-In the course of extracurricular learning, before we can justify the need to use STEAM-based learning technologies to enhance vocational training, it is important to focus on the concept of "STEAM-education".

This research is a qualitative study, and document analysis method was used. Document analysis is the investigation of features of one text, document by quantifying through content analysis

The concept of "STEM" came to the US in the late 20th century, when high-tech companies in the country were forced to recognize the acute shortage of highly-skilled professionals in certain fields of science. Rapid advances in various technologies have led many to look for solutions, and in the 1990s, an abridgement was proposed and subsequently adopted by R.F. Collwell, the Director of the NSF, at a meeting of the US National Science Foundation P. Faletra. "STEAM" Combines the terms: Science - Science (only the natural sciences department, ie biology, geography, astronomy, chemistry, physics, etc.), Technology - Technology, Engineering - English (engineering can be translated from English as engineering), math – mathematics.

Currently, there are various variations in the abbreviation “STEAM”. STEAM is gaining in popularity, with the first letter of the term "Art" being added - that is, when translated into Uzbek - art. However, there is no big difference between acronyms, they mean only one thing - combining a number of disciplines that are focused on high technology, innovation development, and the need for mature science and engineering personnel. However, the acronym STEAM highlights the importance of creativity and creativity for modern innovative technologies. Another version of this acronym is "STREM", which contains the capital letter R, which reflects the importance of design and modeling for scientific and innovative development. Recognizing the importance of providing appropriate levels of education and encouraging students to learn STEAM subjects, the US Government is actively involved in the development of a new educational area - STEAM education. The United States Congress passed the STEAM Education Coordination Act in 2009, according to which state and commercial organizations and associations working in the field were established nationwide. For those interested in STEAM subjects, US immigration policy is of particular interest. With her help, more than 40% of students in the United States have chosen to study STEAM related subjects. Many high-tech manufacturing countries are now embracing the idea and initiative of the United States and strongly support the development of STEAM education. It is mainly about developing and supporting educational strategies and initiatives related to STEAM development. Finland, Great Britain, Kazakhstan, and others are among these countries. Some of these countries have begun to develop a curriculum called K-12 STEAM, which will allow them to implement the principles of this course in various areas of education. Creates STEAM centers around the country and introduces STEAM-based curricula into the learning process. What is the basic idea behind STEAM education, which has been a major breakthrough in education policy and is backed by a number of states that are leaders in science and innovation?

Today, it is widely acknowledged that education is mainly about successful exams. Students "prepare" for tests for a certain number of points based on memorizing a large amount of theoretical data and evidence in a variety of subjects. Students at the end of secondary school often do not understand how these disciplines are interrelated and, in general, apply what they have learned in mathematics, physics, or other life sciences.

This leads to the emergence of professionals who are unable to support high-tech enterprises in the global labor market and are unable to make scientific discoveries and achievements in science-intensive areas. That is why STEAM education is so popular at the moment and it continues to grow every year, because the leading idea of STEAM is to integrate science into one single area of human knowledge and apply that knowledge in practice.

The change was partly triggered by an interdepartmental meeting by Peter Faletra, director of the science development department for teachers and scholars. This acronym was adopted in 2001 by Rita Colwell and other academic administrators at the National Science Foundation (NSF). However, the acronym STEAM creates the NSF, and it has a number of different teachers, including Charles E., the founder and director of the Center. Used by Vela. For the development of Spanish in Science and Engineering Education (CAHSEE). In the early 1990s, CAHSEE began a summer program for gifted students in the District of Washington, DC called the STEAM Institute. Based on the program's recognized success and experience in STEAM education, Charles Velah was asked to serve on numerous NSF and Congressional panels on science, mathematics and engineering education; This was the first time the NSF was introduced. STEAM acronym. One of the first NSF projects to use the acronym was STEAMTEC in 1998, University of Massachusetts Amherst University Science, Technology, Engineering and Mathematics Teacher Education.

However, despite the popularity of STEAM education, its support from different countries, and its commitment to scientific and technical guidance, it remains unclear what the phenomenon is. There is no consensus and position in determining this concept. In various scientific papers, popular scientific articles, STEAM education is defined differently: in one work it is written technology, in another - approach, in the third - sySTEAM. Some authors do not aim at defining this concept, but only focus on the benefits of implementing it. Some of these are limited to superficial interpretations and do not clarify the nature of this phenomenon: "STEAM education is a set of disciplines aimed at developing and developing new technologies that address the need for high-tech science and engineering personnel". The controversy is that with the help of STEAM education, the quality of future scientific and engineering personnel and motivation of students to study the profession in the field of "STEAM" is also lacking in the theoretical development of the problem. All this complicates the understanding of STEAM education by local teachers and hinders its implementation in STEAM centers and secondary schools throughout the country. The small number of STEAM-EDUCATION materials available in Uzbekistan's information space and their scientific work should be studied in detail by American scientists and experts, and link STEAM-education with a new approach to pedagogical science.

In recent years, there has been talk of approaches in the context of pedagogical science. The term "approach" has begun to be used not only by theorists but also by practitioners. If earlier there were three basic approaches to education - gender and age, activity and personality, now there are synergistic, sySTEAMic, individualized, sociocultural, communicative and many other approaches to teaching and educating students in pedagogy. - a conscious orientation to the implementation of certain interrelated values, goals, principles and methods of pedagogical

activity in the professional activity of the teacher. Any holistic approach should include three main components:

1. Concepts. The basic concepts of the approach are the main tool for its characterization and thinking activity. The concepts of any approach are an integral set of terms. One of the concepts is the key, which usually defines the name of the approach itself. The name of the active approach defines the concept of "activity".

2. Principles. In pedagogy, principles are defined as fundamental ideas or starting points. The set of guidelines identifies the pedagogical beliefs of the teacher who chose this or that approach, as well as the choice of content, methods, means and forms of educational activities.

3. Technological component. This component of the approach consists of methods and tools that are selected and applied in a specific pedagogical activity according to a specific area.

Describing the term “approach” and its key components, we begin to interpret the concept of “STEAM education” as a new approach to pedagogical science. "STEAM Education" is a teacher's methodological focus that integrates a child's learning activities in physics, mathematics and natural sciences, and uses the acquired knowledge to form a student's engineering vision.

- STEAM - a combination of physical and mathematical and natural sciences (physics, mathematics, computer science, biology, chemistry, astronomy, geology, etc.);
- STEAM center - design laboratories on the basis of educational institutions, universities, centers of advanced generation, which allow students and students to carry out scientific researches and create scientific projects;
- Robotics - a practical science involved in the development of automated sySTEAMs;
- 3D modeling - the process of creating three-dimensional objects of various models.
- Engineering thinking is the type of thinking that is formed and demonstrated in solving engineering problems, allowing you to quickly, accurately and initially resolve any problems in a particular science field.

The following principles of STEAM education can be highlighted:

1. The principle of compulsory work. Creating real product prototypes in the classroom is essential in the STEAM learning context.

2. The principle of cooperation. In the classroom, collaborative activities are organized with the students as teachers, with the students interacting with each other and interacting with each other.

3. The principle of creativity and success. Individual or collective training reveals students' creative abilities.

4. The principle of personality. In the classroom, the teacher helps create the conditions for the individual development of each student.

If the global STEAM approach began to declare itself in the 2000s, it has now begun to manifest itself in the country, with the need to develop robotics and software at the general secondary level, as well as to address a number of problems in school education. STEAM is a new minded specialist focused on the centrifugal force of learning, which needs the economy and society as a whole. Such an expert can be called that. STEAM develops a range of competencies called learning hybrid skills or 4K: communication, collaboration, creativity and critical thinking. In addition to training skilled personnel for IT and high-tech industries, there is also the task of developing universal STEAM education literacy in STEAM education.

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