



THE USE OF STEAM EDUCATIONAL TECHNOLOGY IN THE TEACHING OF NATURAL SCIENCES

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Received: November 28 th 2023	This article highlights Steam education and its importance today, the use of this educational technology in the organization of classes and its connection with practice, interdisciplinary integration and its role and importance today. Its significance has been analyzed as the use of Steam technology in the teaching of Natural Sciences has adapted the sciences to the requirements of the Times.
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The last years in the Society of the whole world, the transition to the industrial revolution is going through a period of rapid development, globalization. This process led to the widespread development of global electronics, computerization, automation, informatization, digitization, technologization, virtualization, intellectualization. It now requires the development in the country of highly cited areas in front of the world community and the cultivation of personnel from this area. The present day in which we live can be called the era of technological developments. Technologies that are an inexhaustible part of modern society are developing further. Due to innovation development, the level of demand for Steam professions in the world community has now increased by 17%, and for ordinary professions-by 9.8%. This is why there is a growing demand for this educational system around the world. In this regard, the field of computer technology is rising to the level of state policy. The introduction of Steam education is also determined by the requirement of a "new economy". In the distant future, modern professions will appear that are now difficult to imagine. All of them are at one point adjacent to the Natural Sciences. The demand for Bio and nanotechnology professionals increases especially.

Today, production problems are multifaceted in nature and, accordingly, require an interdisciplinary approach. For this reason, large-scale work is being carried out on the introduction of Steam education into the national educational program and its effectiveness. The general public as well as faculty are providing information to the general public about the benefits and opportunities of Steam education. Significant work is also being carried out on improving the skills of teachers in this regard. According to the Order of the Ministry of public education of the Republic of Uzbekistan dated August 27, 2021 No. 274 "on the implementation of the system of Stem education in general secondary schools", the systematization of subjects of secondary schools to Steam education was carried out. Stem programs were developed for general secondary education. Instead of the world around us in grades 1-6, natural science, biology, geography, physical sciences (Science), a program was developed and put into practice. A "teacher's book" was created as a guide for teachers in teaching Natural Sciences. Natural science textbooks were introduced in schools as a general subject. The aim of this was chnashr as a dasrlik that would complement the national education plan to meet the requirements of the Times, which would be compatible with the Steam program. In the teaching of subjects in general secondary institutions, a lot of attention is paid to integration. This, together with ensuring that it is compatible with Steam programs, provides an opportunity for students in the community to acquire knowledge worthy of the requirements of the Times.

The inclusion of Steam education in the program of the educational system in the Republic of Uzbekistan is the result of the evolution of professions. That is, today, a modern profession suitable for new Steam disciplines in accordance with the requirements of the time is being implemented in the matter of mastering khunar and growing personnel worthy of it. Currently, the education system is also at the center of major changes. Teachers strive to form the competencies necessary for successful professional activities and a high level of competitiveness through various modern technologies. This undoubtedly served as a prerequisite for the emergence of relevant, period-appropriate technologies, all global trends in the transformation of society described above. One of them is Steam education.

The concept of Steam programs involves creating readers themselves. Science does not stand still changes depending on time and space. Steam education, in conjunction with qlling the knowledge gained, critically revises the available information to find new solutions and discovers the possibilities that science and technology have not used before. Steam has is an education aimed at developing practical skills. Students further enhance their practical skills through

some hands-on experiences. It is difficult to improve the skills of teachers in Steam education and help them to have a profession worthy of the requirements of the time.

Currently, the demand for Steam Specials is growing in countries around the world. Including in our country, with the creation of Steam educational programs and the initiative to switch to Steam education, the demand for educators who can respond to Steam education in the educational system also increases. It therefore creates the need to organize qualification courses and train teachers in Steam education. By paying attention to those in our eyes in the organization of qualification courses, it gives teachers the opportunity to increase their professional components in Steam education.

1. Giving new knowledge of special and Steam education
2. To meet the need for knowledge on Steam education
3. Enriching the ability to think critically and creatively
4. Further development of organizational and practical training skills
5. Further improvement of pedagogical skills and formation worthy of Steam education

Teachers should constantly increase their work on themselves even more. Also, being able to analyze themselves and form an assessment of their activities guarantees quality education. In teaching Natural Sciences on the basis of Steam education, teachers indicate the use of modern innovative educational technologies in the process of advanced training courses, the organization of practical classes, the close connection of Steam education with practice. The organization of creative seminars, using several modern techniques such as problem situation methods, Group Discussion, training scientific and practical experiments, guarantees that these courses will be more effective. Through observations and learned experiences, we can say that Steam training in teachers can also be developed through their independent work in their own OTS in addition to skill development courses. In the organization of methodological work, the pedagogical skills of the employees of educational institutions and their creative thinking abilities are potentially growing and expanding. Advanced pedagogical experiments are widely used. In the qualification courses named the importance of Steam education in the teaching of Natural Sciences, the course organizers must draw up an "algorithm plan", and in accordance with this plan they will have to sequentially record the innovations and changes that will be needed for their learning and practical activities, and organize classes from the areas of interest, being monitored in this. In teaching Steam education, it is necessary to teach learners that Steam learning tools are: tools, ideas, tools, and a set of methods that provide experimental, design implementation, and that they are able to shape inventive ability in the learning process.

The introduction of methodological solutions of Steam education into the educational process makes it possible to combine science with knowledge, to form the most relevant amalimy skills. The following topics are expressed in the 6th grade natural science DASR:

Nature study;

Substance and its structure;

Variety and structure of living organisms

Ecology and sustainable development;

Solar sitema and the universe;

Geographical maps;

Earth shells;

Energy, ejector and magnetic host;

It consists of topics such as character and power.

Until this time, the transformation of these subjects, which were studied separately in textbooks in general schools into natural science, was caused by the introduction of steam into the educational system and the modernization of education, the integration of several disciplines. According to the context of Natural Sciences, the teacher will have the opportunity to study the various phenomena that are taking place in our atorof tevarak on the basis of understanding and knowledge about science.

Modern professions require comprehensive training and a wide variety of knowledge. The introduction of Steam education also requires the creation of a scientific and methodological base for strengthening scientific and technical progress, increasing the creative potential and career of young people, increasing the number of scientific and pedagogical personnel. The Steam education direction is improved in educational programs with a natural science component in combination with innovative technologies. However, Steam embodies a wider concept, namely a successful combination of creativity and technical knowledge. Steam education both teaches and allows you to be able to apply the acquired knowledge in amliyot in combination with successful integration. As a result, an educated student becomes more involved in the adult world and is not afraid of the problems he may face in the future.

Educational institutions provide the opportunity to improve the skills of teachers to apply their new Steam education in practice and in the course of the lesson, and to be able to apply pedagogical technologies corresponding to the topic. Targeted use of modern information technologies in Mlaka improvement courses, meaningful use of pedagogical technologies in the educational process, together with the goal of organizing trainings on Steam education in advanced training courses. When teaching Natural Sciences, educators are now faced with the need to provide interdisciplinary engagement as well. Today's rapidly developing world requires strong knowledge and initiative in all areas. The development of Steam education has led to the development of engagement among the sciences, and integration among the sciences is also emerging today. Integrated education is the use of a second

discipline in the study of one discipline based on the scientific engagement of two or more disciplines. In this place, Steam is much larger and at the same time the study of four disciplines in interoperability. The difficulties of Steam education when a science teacher, together with his knowledge of the subject, is required to know two or three more subjects together and integrate them into the subject to be passed, therefore, today it is necessary for teachers to organize Steam advanced training courses. In the newly introduced natural science textbooks, we can also see that there was one subject, with the addition of several subjects. That is, as a result of the integration of such subjects as physics, chemistry, biology, geography and ecology, natural science textbooks were developed in accordance with the Steam education program.

From our studies above, we can say that several teachers of one subject can pass together until the completion of advanced training courses in the teaching of Natural Sciences. Their interplay can be seen when these disciplines differ from each other. Because of this, students can show their unique abilities if teachers organize classes in joint engagement.

The most common tools used in Steam education are constructors, robotic systems, electronic devices, video games, 3D printers, models used in modelization, laboratories, and devices that are considered basic tools. As a result of the introduction and study of Steam education, the following are formed in students.

- Problem vision;
- Ability to see more sides and connections to the problem;
- Ability to formulate research questions and ways to solve it;
- Flexibility ability to understand a new perspective;
- The ability to stability in the aim of one's own thought;
- Ability to analyze ideas and connections;
- Ability to clarify and analyze;
- Allows the formation of abilities such as Initiative in the organization of ideas. The main secret is not in technology, but in the talent of student – requirements and in the educational system.

Steam education teaches a creative approach to the independent study of information in a large company, the use of technology and the independent search for solutions.

When organizing classes based on Steam education programs in the US, the K-12 designation is used. K Harfi preschool i.e. children's borghum number 12 it is a symbol of twelve years of school education. Their school classes focus more on autonomy. In the teaching of Natural Sciences, it is possible to explain the connections between nature and the science of physics through the subject of Natural Science and Biophysics. It is with these few disciplines that the role and importance of experimental work is great in teaching Natural Sciences in order to explain its integration to children.

Volosaves T.V. in his scientific research work, he believes that the use of Steam technologies should begin at an early age. Thanks to this method of learning, immersion in the logic of the host in which they are taking place will make it possible to study their relationship. Through this, knowledge of the world is formed in the minds of children, such qualities as curiosity, my way of thinking and skills to work in the guru are formed. This allows children to achieve a completely new level of development .

Starting Steam education for children at an early age forms a deep understanding of the logic of events, the fact that they learn understand their interconnections, the systematic study of the world through which an increase in curiosity, a way of thinking in opposition, the ability to get out of critical situations. In the future, mature Steam will lead to becoming an expert. This education is the reason for mastering the basics of management and self-expression, for the child to develop perfectly, and to achieve a new level.

As proof of what we have cited above, we are concerned to reveal Steam education and its interdisciplinary integrations through the subject of mechanical forces in Physical Science. In this case, problem situations are proposed in physics using literary creativity. Mastering experimental research methods occurs by working in groups. The main reason for the effectiveness is the proven use of creative thinking technology at different stages of the lesson. During Dasr, the integration of subjects such as Physics, Mathematics, Biology, literature, English was realized. In the process of practically explaining theoretical knowledge in physics lessons, i.e., interdisciplinary integration occurs in practice, experimental work.

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