

THE IMPORTANCE OF USING STEAM EDUCATION IN TEACHING CHEMISTRY IN GENERAL SECONDARY SCHOOLS

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Abstract:

The article highlights the importance of using Steam education in teaching chemistry in secondary schools, the use of Steam education to perform laboratory and practical classes in chemistry, teaching students to perform project work using Steam education, the formation of students' scientific and practical competencies using STEAM education

Keywords: STEAM, Science, technology, engineering, art, mathematics.

Introduction

Decree of the President of the Republic of Uzbekistan dated August 12, 2020 PD - In Resolutions No. 4805 "On measures to improve the quality of continuing education and the effectiveness of science in the areas of chemistry and biology"[1] and Decree No. PD-5712 "On approval of the Concept of Development of the public Education system of the Republic of Uzbekistan until 2030" dated April 29, 2019 the modern principles of the development of the education system have been approved. When implementing the established implementation priorities, mentors engaged in activities in the field of education are assigned a number of tasks. The introduction of new pedagogical competencies into the educational process using technologies and active methods contributes to the development of students: creative thinking, independent decision-making, the ability to independently acquire new knowledge, the transition to an innovative educational process, mastering the basics of STEAM pedagogy, taking into account the need for modern personnel, the formation of teachers of new professional competencies, the necessary knowledge base [2].

It is planned to introduce advanced foreign experience into the system of public education, modern pedagogical technologies in the educational process, including innovative teaching methods, the creation of a new generation of educational and methodical literature, conducting fundamental and applied scientific research.

Decree of the President of the Republic of Uzbekistan dated September 5, 2018 "On measures to introduce new management principles into the public education system", adopted in order to ensure the implementation of this decree, the program "Program of measures for further improvement of the public education system of the Republic of Uzbekistan for 2018-2021", approved by Resolution No. 3931, defines: improvement of new state educational standards and curricula of general secondary education, as well as the gradual introduction into practice



of STEAM methods (science, technology, engineering and mathematics). To fulfill these tasks, it is necessary that the participants of education - teachers, methodologists, students, parents and others - know about the methods of STEAM and international research in the field of education quality, and they must also have the qualifications to apply them in practice [3].

Support of modern educational technologies based on the principle of learning and life, in contrast to the traditional learning process, to increase students' interest in science, contributes to improving the quality of education, achieving effective results.

STEAM educational technology poses such tasks to secondary schools as conducting a lesson with an approach to project activities from a classroom-based system, organizing lessons based on the integration of disciplines through the process of transferring fundamental knowledge to functional ones, actively applying them in practice, focusing on finding and, if necessary, discovering new ways to solve problems in newly set situations [4].

STEAM is a technology that connects education with real life.

STEAM: Science means natural sciences, Technology - technology, Engineering - engineering, Art - art, Mathematics - Mathematics.

When the principle of correlating learning with life is more fully implemented in the learning process based on the educational technology STEAM, students' interest in chemistry awakens, the effectiveness of learning increases, they can fully realize the chemical phenomena occurring during their lives, conduct independent research and can express their opinion about the processes taking place. Organization and discussion of conditions and opportunities for independent experiments under the supervision of a teacher, and their practical implementation [5].

The STEAM approach allows you to systematically explore the world, logically observe the processes taking place around, realize the relationship in them, discover something new, unusual and interesting.

According to statistics, since 2011, the level of demand for STEAM professions has increased by 17%, while the demand for ordinary professions has increased by only 9.8%, which indicates a great demand for this education system worldwide.

But what is the reason for such a high demand?

In many countries, the importance of STEAM education is a priority for the following reasons:

- in the near future, there will be very few engineers, specialists in high-tech production, etc. in the world [6].

- in the long term, we will have professions related to technology and high-tech production in combination with natural sciences, especially with a great demand for specialists in the field of bio- and nanotechnology.

- professionals will need extensive education and knowledge from various fields of technology, natural sciences and engineering.

In the near future, there will be very few engineers, specialists in high-tech production, etc. in the world

Natural sciences, technology, engineering, creativity, mathematics. Translated from English it looks like this: S - science, T - technology, E - engineering, A - art and M - Math. Please note that natural sciences remain the most popular in the modern world. Today, the STEAM system



is developing as one of the main educational technologies. The introduction of STEAM technology into general school education can develop students' practical and scientific competencies [7].

If, during the lesson, students are presented with the opportunity to make a mock-up of equipment, while explaining modern laboratory equipment and the rules for working with them, teaching them creativity, the ability to express ideas, determine and evaluate the quality level of the equipment they manufacture, then students will be able to create devices and equipment for conducting laboratory classes in chemistry (test tube, glass, beaker etc.), and equipment layouts independently [8].

As an example, tasks assigned to students in the form of a project can be given. Technologies for cleaning contaminated water at home can be studied and applied in practical classes with students [9].

When solving environmental problems, STEAM can conduct practical classes as follows. For example: the processing of polluted waters can lead to the introduction of technologies provided to increase the level of water purity [10].

Method 1: Separation of contaminated water using a filter. To do this, you can use a pre-known method of preparing the filter. This is shown in the figure below. You can also try this method and explore a way to clean polluted water.

Method 2: Separation of contaminated water using a filter. You will need 2 pods and 0.5 meters (50 cm) of gauze (gauze). This is shown in the figure below. You can also try this method and study the method of cleaning contaminated water [10].



As a conclusion, I want to say that the organization of education based on STEAM technology is aimed at developing the child's mental work based on practical skills, understanding of being in it and understanding the relationship between sciences. It is also worth noting that STEAM is not just an integration of five disciplines: natural sciences, technology, engineering, art and mathematics, but a point of intersection of knowledge within one discipline with knowledge within another discipline with an approach to the subject. This direction has such positive qualities as the child's interest in science, easy assimilation of knowledge on the subject based on their own interests.

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