

**THE ROLE OF STEAM EDUCATION IN DEVELOPING STUDENT COMPETENCIES  
BASED ON INTERNATIONAL ASSESSMENT RESULTS.**

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**Abstract:** This article analyzes the role of the STEAM educational approach, which is important in the modern education system, in developing students' competencies. It also highlights the importance of the STEAM approach in forming students' knowledge, skills and competencies based on the results of international assessment programs - PISA, TIMSS and PIRLS. It is shown that through STEAM education, students develop critical thinking, problem solving, creativity and collaboration competencies.

**Keywords:** STEAM education, competency, international assessment, PISA, TIMSS, PIRLS, innovative education, integration.

### **Introduction**

In the current era of globalization, one of the main tasks facing the education system is to prepare students for modern life, to develop in them the skills of independent thinking, problem-solving and creative approach. For this reason, many countries are actively participating in international assessment programs to assess and develop the quality of education. Today, international studies such as PISA (Programme for International Student Assessment), TIMSS (Trends in International Mathematics and Science Study) and PIRLS (Progress in International Reading Literacy Study) play an important role in assessing the quality of education. The Resolution of the Cabinet of Ministers No. 997 dated December 8, 2018 "On measures to organize international research in the field of assessing the quality of education in the public education system", prepared and approved by the order of the President of the Republic of Uzbekistan, for the first time determined the participation of our country in the following international assessment programs. After that, by the Resolution of the President of the Republic of Uzbekistan No. PF-134 dated May 11, 2022 "On approval of the National Program for the Development of Public Education in 2022-2026", the STEAM international assessment program was included in these international assessment programs. Of these international assessment programs, TIMSS and STEAM are aimed directly at primary school students. These assessment programs determine not only the level of knowledge of students, but also their competences in using knowledge in real life. In this regard, the STEAM educational approach in modern education is considered an important tool in developing students' competences.

### **Main part**

A general analysis of the knowledge and skills of students determines the level of education quality in the country. For this purpose, internal and external monitoring is carried out in each educational institution during the academic year. According to its results, the sequence of the most exemplary schools, the potential of teachers and the level of mastery of students are

determined. Since this process is an important criterion determining the progress of education, the first steps have been taken at the initiative of the Ministry of Public Education to implement international standards for assessing the knowledge of students of general secondary schools. That is, in order to bring students' knowledge up to international standards and study its compliance with them, it is planned to widely use assessment programs such as PISA (Programme for International Student Assessment), TIMSS (Trends in Mathematics and Science Study), STEAM.

1. Progress in International Reading and Literacy Study (PIRLS) - to assess the level of reading and comprehension of text of 4th grade students;
2. Trends in International Mathematics and Science Study (TIMSS) - to assess the level of mastery of mathematics and science subjects of 4th and 8th grade students;
3. The Programme for International Student Assessment (PISA) - to assess the level of literacy of 15-year-old students in reading, mathematics and science;
4. The Teaching and Learning International Survey (TALIS) - to study the teaching and learning environment of leaders and pedagogical staff in general secondary educational institutions and the working conditions of teachers;

STEAM is one of the most important innovative methods of education in the world today. At first glance, the STEAM acronym seems very complicated, but if we look at it separately, we can see that it is simple and clear, namely: S - science, T - technology, E - engineering, A - art, M - mathematics, or natural sciences, technology, engineering art, creativity, mathematics. In simple words, these are the most demanded subjects in the modern world.

STEAM ta'limi o'quvchilarda bir qator muhim kompetensiyalarni rivojlantiradi.

#### Critical Thinking Competency

In STEAM classes, students analyze various problems, identify causes and effects, and draw independent conclusions.

#### Problem-solving Competency

In classes organized based on the STEAM approach, students work on various projects. In this process, they develop the skills of identifying a problem, finding a solution, and evaluating the result.

#### Creativity Competency

Since STEAM education also includes an element of art, students develop their creative thinking. They learn to develop new ideas.

#### Collaborative Competence

Many STEAM projects are completed in groups. This develops teamwork skills in students.

#### Practical Skills

In STEAM classes, students:

- conduct experiments
- create models
- develop engineering solutions.

It is no secret that in many scientific fields, achieving great success requires the integration of knowledge from different areas of study. But how can we prepare students for this, because it is very difficult to see the connection between school subjects. STEAM helps to solve precisely such problems. This methodology allows for a mixed type of education and the formation of skills to apply the acquired theoretical knowledge in everyday life. STEAM is an innovative technology that allows for project and educational-research activities in and outside of school. With this method, subjects are taught not in separate areas, but in an integrated manner, showing their common connection. In addition to showing the connection of subjects with everyday life, technology can also show students' creativity. This approach presents students with a number of tasks, and the student learns to show creativity in solving them.

With the help of such tasks, the student not only comes up with ideas, but also learns to implement them in everyday life. Thus, the student learns to solve his activities within the framework of the tasks set before him and the available opportunities. STEAM (S-science, T-technology, E-engineering, A-art, M - mathematics) is a modern approach that combines science, technology, engineering, art and mathematics. STEAM helps children develop the following important characteristics and skills: Comprehensive understanding of problems Creative thinking Engineering approach Critical thinking Understanding and applying scientific methods Understanding the principles of design This approach will help children solve life problems in the future. Today, STEAM education is developing as one of the main trends in the world and is based on the integration of five areas into a single educational scheme using a practical approach. The conditions for such education are its continuity and the development of children's ability to communicate in groups, so that they can collect and exchange ideas. Therefore, the main educational program includes modules for the development of logical thinking, such as Lego technologies, children's research.

Thanks to the STEAM approach, children understand nature and systematically study the world, thereby developing their interests, engineering thinking, the ability to overcome critical situations, teamwork skills, and the foundations of leadership and self-expression, which, in turn, provides a fundamentally new level of children's development.

### **Conclusion**

In conclusion, in the modern education system, the development of students' competencies is of great importance. The results of international assessment programs show that it is necessary to develop students' ability to apply knowledge in practice. The STEAM educational approach serves to form competencies such as critical thinking, problem solving, creativity and collaboration in students through the integration of disciplines. Therefore, the widespread use of STEAM methods in the educational process will also help improve students' results in international assessment studies.

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