

## STEAM-INTEGRATION AS A REFORMER IN THE EDUCATION SYSTEM OF DEVELOPED COUNTRIES

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**Abstract.** *The article talks about the work being done on the renewal of the education system of our republic, the introduction of the STEAM-integrated education system as a reformer in developed countries and its implementation, and its advantages.*

**Keywords:** *reforms, methodical skills, students, subjects.*

In our republic, updating the content of education, increasing the scientific level, continuous improvement of teaching methods, increasing the knowledge of students requires the teacher to continuously fill and update his knowledge, improve his qualifications and methodical skills. In the years of independence, when the centuries-old dreams of our ancestors were coming true, the head of our state paid constant attention and care to the reform and development of the education system, which is a national issue, including the improvement of school education, like other fields. because the future of the country starts from the school [1].

Based on the above, the priority tasks defined based on modern requirements include improving the content of teaching processes of physics, among other subjects, and increasing the professional competence of teachers.

Current state educational standards, curricula and educational literature are constantly studied by comparing them with educational and normative resources of developed foreign countries, best practices are tested in practice, including currently 7 and In the development of the National curriculum, which began to be implemented in the 8th grade, it was prepared taking into account the requirements and methodology of internationally recognized evaluation programs, in addition to the experiences of countries such as Singapore, the Republic of Korea, the USA, Hong Kong and Japan. For example, in the universities of the United States of America, preparation for teaching natural-scientific and general fundamental sciences is provided from school. The skills acquired in this direction also develop gradually. The application of data analysis and the use of digital technologies will benefit any business, so currently Stem-educated professionals are among the most successful employees in various countries around the world[1-5].

The program on the popular "Stamford" online education platform is aimed at teachers who are interested in organizing the educational activities of schoolchildren in natural sciences. Training is in distance format, trainees participate in free networking projects. At the end of the course, teachers will be able to apply STEM approaches, create curricula, lesson plans and lesson scenarios.

If we look at the Russian education system, since 2017, the first "Pedagogical STEM-Park" has been operating in the fields of mathematics, informatics and natural sciences of the Moscow Pedagogical University. Here, teachers communicate with enterprises that supply modern equipment. For 5 years, he has been accepted to the master's degree program "Physics and STEM education" at the Moscow State Pedagogical University. Such areas as "Theory and Technology of STEM Education", "STEAM Education Practice" are being studied in a number of Russian

HEIs. Also, Stemplab specialists conduct courses for students of grades 8-11. During the study, students will get acquainted with the basics of programming, engineering, radio electronics, and work with the "Smart House" model. There are 24 lessons. for 3 months. As a result, most of the houses currently being built in Russia are built based on this model[3-5].

Stem education is becoming increasingly popular as many large companies are innovating and implementing digital technologies. They use advances in artificial intelligence and computer learning in a variety of industries: banking, education, and healthcare. Specialists who not only understand innovations, but also effectively use them to successfully solve many problems are in demand in the modern labor market. Employers appreciate those who can solve problems in a comprehensive manner, who know how to think creatively and who approach various tasks critically. The demand for such specialists is constantly growing. This leads to a staffing crisis. It is assumed that almost all applicants will need such skills in the future. It will not be possible without technological and mathematical knowledge.

In the case of South Korea, Steam is about training a quality Stem workforce and literate citizens for a high-tech society. STEAM teacher training courses in South Korea have increased teachers' confidence in teaching STEAM [2].

Understanding science and technology knowledge and practice has become a priority in national education programs around the world. takes The UK is promoting an educational policy agenda that promotes the integration of technology, engineering and mathematics (STEM) in schools as well. Germany also created a national STEM forum in 2014 to promote STEM education for all levels of education. In most of the higher education institutions of neighboring Kazakhstan, the "Theory and Technology of Stem Education" educational programs have been opened.

Although Stem integrated education initiatives have been implemented in a number of developed countries, including South Korea, the mechanisms and teaching approaches for integrating Stem subjects are largely inadequate. use multiple disciplines as learning contexts that apply knowledge and practices.

A distinctive feature of STEM integration in South Korea is the integration of fine arts with visual arts, language arts, humanities, and physical sciences. Therefore, STEAM programs in South Korea require participation in all school subjects, which can provide extensive learning opportunities. Although integrated STEAM initiatives in Korea include both in-school and out-of-school education, most STEAM programs in South Korea focus on school education programs. In this context, this program was prepared by STEAM initiators and accepted as a national curriculum for primary and secondary schools.

Based on the practice of developed countries, in order to further develop the education system of our republic, the National Curriculum has been comprehensively improved and based on it, a new generation of textbooks for grades 1-2 has been created in a complete set starting from the first quarter of 2021. It is expected that the national curriculum will be gradually tested starting from the 2021-2022 academic year, and will be fully implemented by the 2026-2027 academic year.

Based on it, it is planned to implement the following measures to strengthen the material and technical base of physics:

Provision of modern educational laboratory equipment of a new type, taking into account international experiences, for general secondary schools within the framework of the "Modern School" state program;

- provision of equipping educational laboratory rooms with modern furniture, equipment, tools and devices, educational materials, computers, interactive whiteboards, tablets and multimedia equipment, internet, video surveillance systems;

- the equipment of educational laboratory rooms should be provided with educational laboratory equipment that meets international standards;

- taking into account the demand of the time and the interests of students, the circles for teaching the primary basics of professions, including the issues of strengthening the material and technical support of STEM, were covered.

Today, the promising technology of education is "STEAM" technology. STEAM education is one of the main global trends. Currently, priority is given to the technical direction. IT classes, STEAM laboratories and LEGO centers are being created in many children's institutions: preschool educational organizations, clubs, schools. The format of additional education and training for children is changing. In pre-school educational institutions, children are educated on the basis of steam technology, and when they reach school age, they conduct innovative research independently can do it.

The content of the STEAM education model is an important component of many projects being implemented today, but it largely depends on the creation of a new subject-spatial environment of the entire educational system, updating its content, software and methodological support. liq. But in many institutions

Due to the lack of STEAM laboratories, it is difficult to provide sufficient knowledge to children. The goal of STEAM - educational technology is to develop intellectual abilities with the possibility of involving children in scientific and technical creativity using modern information and communication technologies. STEAM technology is used in the USA as well as Russia and Germany. From the address of the President of the Russian Federation Vladimir Putin to the Federal Assembly of the Russian Federation on March 1, 2018: "Today, the most important competitive advantage is knowledge, technology. This is the key to real success in improving the quality of life. In the shortest possible time, we need to develop the best, develop a legal framework and remove all barriers to the widespread use of robotics, i.e. artificial intelligence, unmanned transportation, e-commerce, big data processing technologies . Vladimir Putin emphasized STEM education and its benefits by saying the following:

1. An integrated approach to solving modern problems based on the mutual harmonization of various fields of natural sciences, engineering creativity, mathematics, digital technologies, etc. is based on the method of projects with a specific real product as the result of activity and artistic research in the center of this integration.

2. In the process of scientific and research activities, it is aimed not only to develop intellectual abilities, but also to attract children to scientific and technical creativity, to create conditions for a high quality of life in the modern world, in the future, to help self-realization.

What is included in the "STEAM" technology toolkit?

1. Friedrich Froebel's didactic system - STEAM as an educational module

2. Experimenting with animate and inanimate nature - STEAM educational module as

3. LEGO-building, construction - as a STEAM educational module

4. Mathematical and intellectual development in preschool children skills as an educational module  
5. Robotics as a STEAM educational module

6. "Multistudio" as a STEAM educational module

By implementing STEAM (Science - natural sciences, Technology - technologies, Engineering - engineering, Art - art, Mathematics - mathematics) education, it increases the literacy level of its students based on the integration of sciences.

- a database of practical tasks is created that meets the requirements of the international assessment program (PISA, TIMSS) aimed at forming students' logical thinking and practical skills;

- a new generation of educational-methodical sets (textbook, teacher's manual, electronic textbooks) will be developed in the field of physics and astronomy;

- innovative methodology for the use of modern pedagogical technologies will be created in the field of physics teaching;

- STEAM is focused on interdisciplinary connection and practical approach in education of students on an international scale based on the requirements of the times;

- development of educational project and educational research of students;

- through mutual integration with general secondary education subjects, students' career guidance is organized;

- digital technologies are introduced into the educational process, a virtual laboratory and media resources are created;

- educated, experienced and modern-thinking high-potential, competitive, competent personnel are prepared to take a place in the ranks of developed countries;

- Teaching physics - it increases the interest of school graduates in technology and they form the first engineering skills and competencies.

So, what is the difference between this education system and the traditional way of teaching science? STEAM education provides a blended environment where students begin to understand how to apply scientific methods in practice. In this program, students study robotics, designing and manufacturing their own robots, along with mathematics and physics. Special technological equipment is used in the lessons.

The following statements were made at the STEAM forward international conference held in Jerusalem in 2014:

- Engaging children in STEAM. This education should begin at preschool age, so programs should be included in kindergartens.

- The language of science is English. If you want to study science and become a scientist, you need to know this language.

- Steam educational programs for girls are needed. Girls in science can do things that boys can't because of their discipline.

- Science is fun! Science should be fun, it should be interesting and attractive for students.

In conclusion, we would like to emphasize that, compared to traditional teaching methods, the STEAM approach in high school allows children to conduct experiments, build models, independently create music and films, and turn their ideas into reality. and drives the creation of the final product. This educational approach allows children to effectively combine theory and practical skills and facilitates university entrance and further studies.

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