

## **Use of Educational Technologies to Increase the Effectiveness of Natural Education. (Integrated Integrated Education and Technological Steam).**

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**Abstract:** The article discusses the implementation of an integrated approach in the educational process, knowledge of the internal and external relations of a system or an existing object in its existing form, the patterns of its organization and management, as well as theoretical and practical approaches of the STEAM learning system, all five disciplines based on integration into a single educational scheme.

**Keywords:** STEAM, integration, technological equipment, reading, the world around us, etiquette, fine arts, technology, natural sciences, integrated approach in primary education, integrated curricula and textbooks.

Since the birth of the child, the universe is mastered on the basis of the simplest imagination. To feel, imagine, understand, realize, strive for the essence and reach it, to come to a certain conclusion – to the stages of the formation of the concept is praised by the help of an analysis. This admiration initially focuses on the thinking process of the child. Therefore, in today's philosophy of analysis, it is interpreted that the harmonization of content with the purpose of analysis allows to study and understand man and society, man and nature as a holistic, inseparable, interrelated process. And the integration of Natural, Scientific and humanitarian knowledge in the “nature – man” system requires the priority of certain didactic principles. These principles are reflected in the content of integrated technology. It is necessary that the Cabinet of Ministers of the Republic of Uzbekistan is “aimed at

estimating the connection between everyday life and practice, shaping the capabilities of applying the acquired knowledge in practice, estimating the interdependence with other educational sciences”, as proposed in Appendix 5 of Resolution No. 187 of April 6, 2017 [1]. Through integration, a new psychological process, a new structure of activity is formed. This new structure is created by synthesizing elements that were previously separate ”[2]. There is a differential situation in the theoretical development of sciences, and integration means interdependence in practice, and it increases the social, pedagogical and psychological significance of the process, says H. Yulbarsova [3]. Genetically integrated, interdisciplinary, interdependent, and, finally, complementary, expansive, and deepening, is a form of logic and a high level of content that synthesizes the content of subjects at least at the level of educational standards. Because each sub-level of interdisciplinary connection is established between certain didactic units within the studied subjects and provides for the coordination of their content and duration of study, in contrast to the integrated interdisciplinary subject or integrated studied subject, event or process as a whole system requires interpretation in terms of bilateral connections and relationships. This, in turn, allows the formation of a mature person who meets the requirements of the present and the future, who thinks independently and acts creatively. Indeed, it requires students not only to perform analysis and synthesis operations, but also high-level thinking operations such as abstraction, algorithmization, categorization, conditional expression, cause-and-effect relationships, analysis, synthesis, systematization, modeling. . These operations are carried out by distinguishing (stratifying) all the important aspects and features of the object under study, understanding the essence and content and generalizing them. This means that integration always develops on the basis of differentiation, which is the other side of it, or integrated connections are important in building an integrated system, and they are also called internal scientific connections. The main purpose of the systematization is to create integrity by regulating the internal scientific relationship. The integrity created in this process will have new quality indicators. The essence of integration is to achieve a new level of learning outcomes as a means of theoretical synthesis.

The implementation of an integrative approach in the educational process can be carried out with knowledge of the internal and external relations of the system or the whole object of the existing form, the laws of its organization and management.

An integrative approach is used to integrate content-bound, interconnected, logically interdependent and deepening and expanding learning disciplines that incorporate holistic logical perfect knowledge, action patterns, and personal qualities.

S - science, T - technology, e - engineering, a - art and m - mathematics. In English, it would be: science, technology, engineering, creativity, math. This technology is becoming increasingly important today. That is why today the STEAM system is evolving as one of the main trends. The STEAM education system is based on the simultaneous application of a theoretical and practical approach, as well as the integration of all five disciplines into a single educational scheme.

But what is the reason for such a high demand? In many countries, the STEAM education system is a priority for some reasons:

- In the long run, we will have professions related to technology and high-tech manufacturing

along with the natural sciences, which will be in great demand, especially for bio and nanotechnology professionals.

\* Specialists will need extensive training and knowledge from various fields of technology, natural sciences and engineering.

Integrated learning...

So what is the difference between this education system and the traditional way of teaching science? The STEAM-education system provides a mixed environment in which students begin to understand how to apply scientific methods in practice. In this program, students, in addition to math and physics, learn about robots that design and build their own robots. Special technological equipment is used in the lessons.

Currently, the STEAM (Science, Technology, Engineering, Arts, Math) method is considered to be the highest quality and most popular system in education. This program has been tested in practice in Western countries and is now widely used in practice. If we want our children to be globally competitive in the future, we must do so now.

STEAM was first published in 1990 by American bacteriologist Rita Colwell with a proposal to introduce it to science. However, the term has only been actively used since 2000. The main purpose of the introduction of the STEAM-education system is to imagine society, education, the world and work as a whole [4].

STEAM educational technology is a new method of teaching school students, which is different from traditional teaching methods. It is designed to teach students four subjects simultaneously - Science, Technology, Engineering, Fine Arts, and Math. STEAM is an integrated learning system for subjects, not for science [9].

The views of scholars mean that the main purpose of the integration of education is to give students a holistic view of nature and society from the earliest grades and to structure the student's attitude to the laws of their development. Repetition and repetition, on the other hand, bore the reader and hinder the efficient use of time. As an example, if we take the annual calendar work plan for grades 1-4, we will see that a number of topics are repeated. This repetition mainly occurs at one time (during the week, one day). So, by linking them together, we create an integrated lesson as a result of creating a single complex lesson plan. As a result, students will have the opportunity to acquire comprehensive knowledge. Poetry "Vatan" from the lesson "Reading", the story "Land inherited from ancestors" from "Odobnoma", "Rules of singing" from "Music", "My homeland is my homeland" from "Fine arts" studied. Therefore, if these topics are integrated using interdisciplinary integration, one lesson will save time and opportunities. Below is a table of subjects and topics that can be integrated for grades 1-4, based on the Annual Curriculum. (See Tables 1, 2, 3).

Table 1  
 Integrated map of 1st grade curriculum

№	Ўқиш	The world around us	Ethics	Fine arts
1	Vatanjonim-vatanim		Ona - Vatan	
4	Autumn	Autumn blessings		Painting on the theme "Autumn has come"

5	Autumn	Autumn Socially useful work or life of animals and insects in autumn		Painting on the theme "Autumn work"
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Table 2

An integrated map of the 2nd grade curriculum

No	Reading	Etiquette	Music	Fine Arts	The World Around Us	Technology
1	Homeland	Inherited from ancestors	Singing rules.. Vatanjonim-vatanim	Working with the flag image		
2	A pigeon	Caring for animals is a virtue		Parrot painting	Birds	Making bird shapes from natural and different materials
3	Winter	Caring for animals - a virtue	"The first snow" R. Talib's poem	painting on the theme "Winter"	Winter	Winter making winter landscape by application

Table 3

Integrated map of 3rd grade curriculum

No	Reading	Natural	Technology	Etiquette	Fine Arts
		Air in nature	Application of "Autumn" landscape		Composition work on the theme "Late autumn"
	A fairy tale about water	Features of water	Making fairy-tale characters by application	Water is a source of life	A fairy tale about water
	Winter is also a beautiful		"Winter" landscape application work composition		Composition on the theme of winter games
	Navruz has arrived		Preparation of decorations for Navruz.		Preparation of a sketch of a greeting card for Navruz
	Journey to the Fauna	Fauna and its diversity			Drawing on the theme "In the zoo"

It is observed that students find it very difficult to apply the knowledge, skills or abilities acquired in a particular subject in another direction. All this requires the formation of

knowledge, skills and competencies that students acquire from the elementary level of education on the basis of the principles of interdependence, coherence and integrity. That interdisciplinary integration is more effective in mastering them systematically; argues that further increase in educational effectiveness can be achieved by deepening interdisciplinary links. STEAM technology consists of in-depth teaching of natural and exact sciences, the acquisition of innovative knowledge by students, the discovery and development of their intellectual, scientific and creative potential. Therefore, it can be concluded that STEAM technology can be used from primary school.

STEAM technology is aimed at the student's activity, the constant increase in the efficiency of this activity, the main purpose of which is not only the effective acquisition of knowledge. Rather, it presupposes the continuous acquisition of knowledge by the reader on the basis of his or her search for aspirations from the most convenient, simple concepts and imaginations to complex ones. Simple topics gradually become more complex, transforming from the form of information, understanding, imagination into a holistic, integrated knowledge and skills. Students will be able to use this knowledge and skills to solve a specific life problem when needed.

As you move from class to class, topics, problems, knowledge, and skills also become more complex, and practical skills deepen. Most importantly, these processes are organized taking into account the interests and needs of primary school students.

An integrated approach in primary education also provides an opportunity to develop students' creative thinking skills. The composition of creative thinking influences the formation of the most vital and spiritual qualities for the student, regardless of the field or profession in the future. Creativity in the reader gradually prepares the ground for creative ideas. With this in mind, it is recommended to give free rein to the student's imagination by presenting fairy tales and stories "There is a beginning, there is no continuation" in the native language and reading lessons. In grades 3-4, students can weave fairy tales or create text on specific topics themselves. Given that the formation of creative thinking begins in the minds and minds of children in the same primary school, it is advisable to develop the ability to express their impressions through reading and studying works that affect the student in the reading lessons of 1st and 2nd grades.

In recent years, 70 percent of developed countries have been working with integrated curricula and textbooks in the education system. Teaching subjects in accordance with the goals and objectives of education requires improvement of its content and form. Primary education The state educational standards provide for the integration of the subjects "Mother Tongue", "Reading", "Mathematics", "Natural Science" into the field of education "Man and Society", as this field includes concepts related to a number of subjects. In primary education, the issue of teaching subjects in the field of "Man and Society" on the basis of an integrated curriculum is one of the problems that still need to be addressed.

"Given the effectiveness of the learning process through the organization of the educational process on the basis of integrative programs and textbooks, it is advisable to use different levels of integration:

- a) present the topics in sequence, focusing on completing the previous one;
- b) finding common ground in curricula and ensuring interdisciplinary coherence;

- c) systematization of knowledge and concepts to be mastered through related subjects using modular integration;
- g) interdisciplinary integration (ie the achievement of a single goal by combining materials that are close in nature; the formation of the necessary skills and abilities) using different texts, exercises, problems, "Mother tongue", "Reading", "Mathematics", "Natural Science" ("The world around us"), "Fine Arts" ("Painting"), "Technology";
- d) presenting a combination of topics in several subjects through the creation of integrative programs (for example: "Mother tongue", "Mathematics", "Etiquette", "Natural sciences", combining concepts related to the subjects in the lessons "Reading", "Natural sciences" ) is emphasized by scientists ”[6].

If we look at the annual plan of the 4th grade, in fact, the topics are very close in content [7]. The teacher has no difficulty in integrating them, but rather has the opportunity to provide students with additional information outside of the textbook during the time saved as a result of non-repetition. For example, in the Reading lesson, students integrate not only the map of Uzbekistan, but also the map of the world and the location of Central Asia, then the map of Central Asia and then the map of Central Asia and Uzbekistan, the border of Uzbekistan. It is possible to provide detailed information about the countries, the location of the capital of the Republic, as well as why Tashkent was chosen as the capital, the location of regions in the country, in particular, the Fergana Valley, oasis and other regions on the map (See Table 4).

Table 4  
 An integrated map of the 4th grade curriculum

№	Ўқиш	The world around us	Technology	Fine Arts	Educational Hour
1	Map (N.Norqobil) (17.09).	Maps (29.11).		Interview on the architectural monument of Uzbekistan (13.11)	
2	Courage and Light of Mind (Miraziz A'zam) (19.09).				Knowledge is an unparalleled treasure (10.05).
3	Autumn. Sh. Sa'dulla ( 25.09).		Making flowers from autumn leaves (24.09).	Painting on the theme "Autumn flowers" (9.10).	
4	Melon Festival (Sh. Sa'dulla) (26.09).		Flower making by application of natural materials (24.09).	Composition work on the theme of melon festival (25.09).	Autumn blessings (16.11).

Everything that is studied on the basis of STEAM educational technology is reflected in our

modern life. It provides knowledge in a balanced way, not separately, as opposed to regular education. The child develops the ability to solve non-standard problems, create opportunities and creativity, which will be very useful in his future life.

So what is the difference between this education system and integrated teaching? In the STEAM-education system, it is a mixed environment in which students begin to understand how to apply scientific methods in practice. Under this program, in the elementary grades, students learn the equipment that develops and manufactures their inventions in integrated lessons of mathematics, drawing, and technology. Later in the senior year, students in this program, along with math and physics, learn about robots that design and build their own robots. Special technological equipment is used in the lessons.

As a result of the use of integrated technology, favorable conditions are created for the implementation of pedagogical, psychological educational goals; general didactic requirements are fulfilled in membership; saves student time and energy; excessive mental and physical stress is prevented, the effectiveness of training increases. Students will have the opportunity to master the necessary skills and abilities, concepts and knowledge in a comprehensive way as a result of combining the content of the subjects. In particular, the content of the subjects "Mother tongue" and "Reading" are texts, poems, proverbs, exercises, stories, aimed at the formation of concepts of morality, speech, fine arts, culture of communication, study of national and universal values, nature, society, enriched on the basis of samples from works of art.

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