Journal of Management World **2025**, 2: 587-599
DOI: 10.53935/jomw.v2024i4.1002

Improving Integral Education – An Opportunity to Prepare Future Primary Teachers for Computer Education

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Abstract. In the article, it is important to raise a young generation worthy of our great scholars such as Muhammad al-Khorazmi, Ahmad al-Farghani, Abu Rayhan Beruni and Mirza Ulugbek, who made a great contribution to the creation of the foundations of the science of mathematics, to convey modern knowledge to students, and to educate the youth of our country about the beauty of mathematics. In the implementation of integrated education, competence in mathematics sharpens the human mind, develops attention, educates determination and will to achieve the intended goal, teaches discipline in an algorithmic way, and most importantly, to spread the principles and solve problems. , calls for innovations and expands thinking issues are considered, as well as researches of a number of international organizations on primary education. At this point, the results of PISA - the international program for assessing student achievement, aimed at assessing the level of literacy of 15-year-old students in their mother tongue, mathematics and natural sciences, of the Organization for Economic Cooperation and Development (OECD) are noteworthy. In addition, it is possible to cite TIMSS - the international monitoring program of the quality of education in mathematics and natural sciences, organized by the International Association for the Evaluation of Educational Achievements (IEA). This study helps to compare the level and quality of students' knowledge of mathematics and science in different countries and to identify differences in national education systems.

Keywords: Competence, Education and training, Integration, Mathematics, National curriculum, Personnel training process, Principle didactics.

1. INTRODUCTION

Mathematics develops a person's mind, develops his focus, develops determination and will to achieve the desired goal, ensures algorithmic discipline in him, and most importantly, expands his thinking. Mathematics is the basis of knowledge of the universe, the world around us is of such great importance in revealing the specific laws of events that development of production and science cannot be imagined without mathematical knowledge. Therefore, mathematical culture is a component of universal human culture.

Currently, the development of the national innovation system and the improvement of innovation potential are considered the most important factors of the country's economic growth. The problems of researching these factors are relevant for many state and international organizations of the world. In this regard, the assessment system is designed to quickly and reliably analyze the level of innovative development speed is of great importance. International evaluation systems created by reputable international organizations are used as such evaluation systems.

"Professional education system improvement" of the President of the Republic of Uzbekistan on additional measures to improve" with the Decree No. PF-5812 dated September 6, 2019, harmonized with the levels of the International Standard Classifier of Education in the Republic of Uzbekistan starting from the 2020/2021 academic year a new system of primary, secondary and secondary special professional education, as well as a network of educational institutions where differentiated educational programs will be introduced.

It is carried out in the form of full-time education based on 2-year integrated programs of general education and specialized subjects in groups formed at the expense of 9th grade graduates of general education institutions in vocational schools that train personnel at the level of primary professional education.

From the 2020/2021 academic year, the number and hours of general education subjects taught in vocational schools in the fields of preparation are taught as determined by the Ministry of Higher and Secondary Special Education and the Ministry of Public Education of the Republic of Uzbekistan .

2. METHOD - HOW THE STUDY WAS CONDUCTED

The pedagogical system of each historical era undergoes significant changes. However, at all stages of the development of society, special attention should be paid to the quality preparation of the younger generation for independent life. Students today have high mental potential, but, although they have good knowledge, they often cannot apply it in practical activities. One of the effective means of solving this problem can be the integration of educational content, which helps to form in primary school students an idea of a holistic picture of the world. Integration in psychological and pedagogical literature is understood as a process during which disparate elements are combined through synthesis into a system that has the property of integrity.

The problem of integrating the content of education was considered in pedagogy back in the days of Ya.A.

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Comenius, but systematic research began only in the second half of the twentieth century. G.F.Fedorets1 considers integration in various connections and dependencies between the structural components of the pedagogical system. M.I.Dzhumaev takes the entire integrity of the education system as a fundamental sign of integration. M.I.Dzhumaev explains the integration of educational content by the need to establish interdisciplinary connections in order to form a holistic picture of the world in students. E.E.Zhumaev sees integration as a radical renewal of the content of education.

The ideas of integrated learning are especially relevant today, as they contribute to the successful implementation of new educational tasks defined by government documents. Integration of learning involves the creation of fundamentally new educational information with the appropriate content of educational material, educational and methodological support, and new technologies.

The problem of scientific understanding of integration in education is being studied by scientists and practitioners in various fields of knowledge. It can be said that, from a theoretical perspective, integration as a methodological phenomenon in primary school has not been sufficiently considered. But in school practice we can observe a rather positive use of it in the form of integrated courses and integrated lessons. But if the development of courses should be carried out by a creative team, then every teacher can conduct integrated lessons, which will contribute to a personally significant and meaningful perception of knowledge, increased motivation, and will allow for more efficient use of working time by eliminating duplication and repetition.

The following are the strategic goals of the development of mathematics education: - mathematics education based on international experiences and labor market requirements modernization, socio-economically stable development;

- Independent knowledge, skills and qualifications of graduates in mathematics applying in practical activities, choosing a profession, being able to engage in social relations based on national and universal values, forming competencies needed in the labor market;
- To create the necessary conditions for mathematical literacy, critical, creative and systematic thinking, the ability to make independent decisions, the ability to demonstrate one's intellectual abilities and the formation of a spiritually mature person.

The development of mathematics education is carried out based on the following tasks:

- A consistent system of teaching mathematics at all stages of education Create;
- Development of scientific methodical support of mathematics education;
- Developing proposals for strengthening the material and technical support of the mathematics education system, providing it with modern techniques and technologies;
- Formation of innovative infrastructure by introducing digital technologies and modern methods to the process of mathematics education;
- Achieving the status of the mathematics education system in accordance with its main role in ensuring the connection of fundamental knowledge with human creative activity and the interaction between the environment and the general educational content;
- To ensure the coherence of the process of mathematics education taught in preschool, general secondary and secondary special, professional and higher education systems;
- To serve as a base stage for the training of professions and specialists that are taught within the scope of science and are selected as promising for the economy of our country;
- Personnel training, modernization of existing personnel supply and effective use of human potential; - introduction of new methods of determining qualification requirements, as well as skills to be acquired for the introduction of updated educational standards;
- Development of an evaluation system based on the content of the subject, its specific characteristics, qualification requirements and competencies to be formed;
- Organization of contests and exhibitions on mathematical modeling of the system of identifying, evaluating and motivating talented students;
- Formation of the culture of design and research work in students;
- Popularization of the advanced practice of education and teaching of mathematics education encourage diversity of forms.

3. RESULTS

When processing literary sources (experience of practicing teachers, researchers of domestic and foreign achievements) on this topic. The following tasks have been outlined, which are embodied in the relevant chapters of this work.

What is the essence of the concept “integration”?

How is integration in education reflected in the history of school development?

What is the psychological basis of the integration process?

What are the conditions, factors, levels, mechanisms of integration?

What is the difference between knowledge integration and differentiation?

What is the role of integration directly in primary school?

How to develop and conduct an integrated lesson in the traditional teaching system for a primary school teacher?

The methodology for preparing and conducting an integrated lesson is the subject of practical research in this work.

In preparing the thesis, the following methods of scientific and pedagogical research were used:

- Studying psychological and pedagogical publications for the purpose of theoretical research on this topic;
- Studying the work experience of practicing teachers;
- Questioning to confirm relevance in city schools.

Thus, the problem of integrating the content of education is quite relevant and versatile. A comprehensive solution to this will make it possible to eliminate a whole group of disagreements that have been facing the school education system for a long time.

Modern education is characterized by systemic changes in structure and content. Rethinking the priorities of learning, the role of the student as a subject of the educational process, as well as social changes, determine non-traditional approaches to solving many educational problems. One of the leading trends in the development of modern education is the integration of its content.

The literal content of the concept of "integration" was introduced in the 60s of the 19th century. Englishman G.Spencer (from Latin integratio - whole), but it little reflected the real content of those processes that are defined by this term today.

In dictionaries, the concept of "integration" is defined as the unification into one whole of previously isolated parts, elements, components, which is accompanied by the complication and strengthening of connections and relationships between them 3. Philosophers define it as a process of movement and development of a certain system in which the frequency and intensity of its interactions elements grows - their interaction intensifies and their relative independence in relation to one another decreases. At the same time, new forms may appear that have not existed in the history of this system4. The formation of connections, further significant interdependencies, the emergence of qualitatively new properties inherent only in a set of interconnected elements, processes, phenomena - all this is nothing more than the consistent establishment of integrity.

Integration in a broad sense is understood as the process of developing integrity. The definition of integration as a process of interpenetration does not mean the dissolution of one into the other, but their unity, that is, the preservation of interacting systems and the establishment of mutual contacts between them.

We can conclude from the definition of integration that it occurs when:

- There are previously independent things, processes, phenomena;
- There are objective prerequisites for their unification;
- Unification occurs by establishing significant relationships that determine and change the functioning of the elements that are integrated;
- The result of unification is a system that has properties of integrity.

In modern conditions, as a result of the rapid development of numerous branches of knowledge, the concept of "integration" has outgrown the specific scientific framework. It is successfully used by science in the process of researching significant aspects of the development of society. This makes it possible to consider that integration from a tendency turns into an objective pattern. Under the influence of socio-historical practice, integration is filled with new content, enriched, becoming a philosophical category designed to reflect the most significant connections and relationships between various aspects of the surrounding reality.

What is meant by integration in education? Among didactics, there is no single point of view on the interpretation of this concept, since questions about the main functions, forms, and levels of integration are controversial, and the age capabilities of students regarding their use are insufficiently determined. So, for example, B. Bernstein considers integration to be the subordination of educational subjects to a single rational idea [4].

4. DISCUSSION

P.Black provides for combining the material into separate educational subjects. G.Oveus suggests the need for a holistic set of educational subjects.

Integration is also considered as a hierarchical generalization {synthesis}, unification at various levels (subject, interdisciplinary, psychological). S. Kui considers integration as a synthesis of educational material at the level of global problems: people, the surrounding reality, etc.

Many modern scientists and teachers (A.P.Belyaev, M.I.Dzhumaev, M.I.Makhmutov, A.A.Pinsky, V.G.Rozumovsky) believe that integrative processes are becoming a trend in pedagogy, especially in the theory of learning: they are increasingly merging together didactics and psychology of thinking, educational psychology and sociology, theory of the content of general and technical education. The integrative trends of modern didactics are mainly manifested in the fact that to determine the patterns of learning, researchers use the concepts

and theoretical premises of related sciences.

In relation to the educational system, the concept of "integration" can take on two meanings: firstly, it is the creation in the student of a holistic view of the world around him (here integration is considered as the goal of learning); secondly, it is finding a common platform for bringing together subject knowledge (here integration is a means of learning). Integration as a learning goal should give the student the knowledge that reflects the connectedness of individual parts of the world as a system, teach the child from the first steps of learning to imagine the world as a single whole in which all elements are interconnected. The implementation of this goal can begin as early as primary school. Integration is also a means of obtaining new ideas at the intersection of traditional subject knowledge.

First of all, it is designed to fill ignorance at the junction of existing differentiated knowledge to establish existing connections between them. It is aimed at developing the student's erudition and updating the existing narrow specialization in training. At the same time, integration should not replace teaching classical academic subjects; it should only combine the acquired knowledge into a single system [5].

In the educational process, the concept of integration is interpreted differently by different researchers: S.I. Arkhangelsky draws attention to the interconnectedness of content, methods and types of training; G.I.Baturina understands integration as the creation of a holistic educational process and a scientifically based system of targeted management of the process of personality formation; O.I.Bugaev explains the integration of educational content by the need to establish interdisciplinary connections in order to form a holistic picture of the world among students. M.I.Dzhumaev takes the integrity of the education system as a fundamental feature of integration; V.R.Ilchenko argues that the integration of knowledge is a necessary condition for the formation of students' natural history and scientific worldview and is carried out on the basis of the fundamental laws of nature common to all subjects. L.M.Momot and V.G.Glomozda believe that in the content of training, integration is carried out by merging in one synthesized subject, course, topic, elements of various educational subjects based on the broad interdisciplinary scientific approach of G.F.Fedorets sees integration in various connections and dependencies between the structural components of the pedagogical system.

Based on the analysis of integrative processes, it can be noted that integration is a deep process of internal interaction, the interpenetration of scientific knowledge representing educational subjects. Practice confirms that when integration is carried out, the subject, structure, and connected academic disciplines change, the tasks expand, and their conceptual-categorical apparatus and methodological tools rise to the highest level.

Integration as a process of adapting and combining certain elements or parts of different types of academic activities (and it is precisely different kinds of vital activities that primary school teaches children!) into a single whole, provided that they are of the same type in terms of purpose and functionality, is not a new methodological phenomenon at all.

The idea of the unity of scientific knowledge, albeit in primitive natural-philosophical ideas, was reflected in the works of ancient thinkers: Aristotle, Democritus, Epicurus, Plato. This problem was addressed by G.Hegel and I.Kant, L.Feuerbach [6].

I.G. Pestalozzi argued that the learning process should be structured in such a way as, on the one hand, to differentiate between individual objects, and on the other, to unite similar and related ones in our consciousness, thereby bringing great clarity to our consciousness and, after their complete clarification, increase to clear concepts.

K.D.Ushinsky, by integrating writing and reading, developed and implemented an analytical-synthetic method of teaching literacy. Moreover, integration initially consisted of the novelty and essence of this method, since it, according to the author's plan, made it possible to adapt and merge into a single whole the individual elements of two types of speech activity - writing and reading - for the quick and lasting achievement of one goal: the formation of ability to communicate remotely via text. The path of fusion is the single-direction of all performing actions towards the child's intuitive, practical comprehension of techniques for correlating oral and written speech8.

A brilliant example of conducting integrated lessons was the experience of V.O.Sukhomlinsky, his "lessons of thinking in nature," which he conducted at the Pavlysh school for six-year-old children. This is the integration of the main types of cognitive activity (observation, thinking, speech) for the purpose of teaching, educating and developing children.

A new attempt to integrate education was made already in the Soviet school (1923 - 1933). The problem of integration of academic subjects was considered in connection with the development of the theory of the content of general secondary education, in particular, the principles of constructing a secondary school curriculum. It must be pointed out that these issues have not been fully resolved to this day. As for the principles of curriculum construction, there are major discussions among educators around the world. Let's say that the question is being studied about whether to create plans for individual academic subjects, or complex ones, in which the knowledge of various sciences would be grouped around some area of knowledge.

At that time, Soviet and Western teachers worked in the same direction: they sought to strengthen the connection between learning and life. Abroad, this manifested itself in the fact that the school was overwhelmed by a wave of utilitarianism. School courses, for example, natural history, were "enriched" with economical topics:

"Domestic Animals", "Cultivated Plants", "Pests", etc. In the American school, under the influence of the pragmatic ideas of J. Dewey, educational material was grouped around courses that seemed to meet the interests and wishes of children: first aid, sexology, child care, etc. [7].

In the Soviet school, teachers, relying on the experience of D.Dai, P.P.Blonsky and others, developed a variant of constructing the educational process, which was called an integrated teaching system for first-level schools. The construction of new educational content was aimed at developing in students the foundations of a dialectical-materialistic worldview, revealing phenomena in their interaction and relationship with the practice of social construction.

The psychological justification of the basic principle - complexity - was seen in the need to study the phenomena of life and culture by perceiving them in a holistic form, and only then by means of analysis accessible to children. The need for a new approach to teaching was substantiated, which would provide not only analytical knowledge of the subject, but also its synthetic perception, first as a whole.

Considering questions about ways to combine educational material: teacher-researchers offered several options. Thus, the unification of individual elements of knowledge, abilities, skills around one or another idea could be different: a) elements were combined until the boundaries between academic subjects were completely lost; b) the elements were combined in the form of separate independent school subjects. What was common in solving these issues was the desire to shift the focus of attention from educational subjects to the objects that were studied [8].

The reasons for the failure of these programs are easily explained if we consider them from the point of view of the levels and possibilities of integration of academic subjects in primary education. There is unity of purpose: by integrating educational subjects into complexes, the authors of the programs dreamed of forming a liberated, creative personality. Complexes, as conceived by the authors of the programs, were those parts or elements, the totality of which was supposed to make learning interesting, connected with life, awakening and nourishing the creative initiative of children, and the unidirectionality of educational efforts was repeated within the framework of each complex. Thus, it would seem that everything was taken into account from the general conditions ensuring the success of integration and its plan. The only thing that was not taken into account (and most likely this could not be taken into account then) was that a broad interdisciplinary model of integration was initially unproductive in the lower grades of school, since it could not provide students with elementary, but strong and systematic skills; it already presupposes that they have such a base and, moreover, is built within the framework of one leading special subject, i.e. no earlier than in middle school. Due to the complex construction of scientific programs in the content of education, the natural connections between subjects were disrupted, and special attention was not paid to the study of the fundamentals of science. Excessive enthusiasm for the individualization of education has led to the abolition of educational subjects and planning. Artificiality is also visible in the choice of topics and construction of the content of education, an attempt to combine concepts of different levels of generality. The logic of the development of concepts and systematicity in the acquisition of knowledge were almost completely ignored. These miscalculations are considered quite serious. Practice immediately confirmed and continues to confirm this to this day. Where complex programs were truly introduced, at first glance they achieved their goal: the children liked the process of communicating with the teacher, they thirsted for creativity, the most talented of them showed an amazingly uninhibited imagination, but they also clearly lacked systemic knowledge, and for the most part they they simply did not know how to read fluently and write correctly. [9].

After the complexes, subjects began to appear in our country that are ideologically close to integrated courses in our understanding. When constructing integrated courses, teachers relied on their defined criteria for selecting educational material. These are: the scientific nature of the material, the correspondence of the material to the age of the students; the conditions of the area where the school was located were taken into account; the presence of material that makes it possible to purposefully form supra-subject skills; selection of such material that would make it possible to apply the research method; the material must be related to the objectives of the school.

In the early 30s, in connection with the tasks of industrialization of the country, changes took place in the educational policy of our state. Resolutions of the Central Committee of the All-Union Communist Party (b) 1931-1933. prohibited the development of integrated courses. The disciplinary education system was returned. After these decisions, the school retained separate integrated topics in disciplinary subjects (for example, "Cultivated plants," "Domestic animals," etc.) [10].

At a time when Soviet pedagogy abandoned the integrated approach to teaching, in the West, under the influence of the development of science, technology and industry in the late 50s and early 60s, the pedagogy of integration was of particular importance. At the center of the training system, the requirements for strengthening an integrated approach and coordination were brought to the fore. The authors of the programs united the material around core ideas, encouraging creative thinking among students [11].

An interesting approach to implementing an integrated approach to teaching was proposed by US schools. The training was interdisciplinary in nature. It was organized on the principle of creating extended curricula, when various subjects are combined; core programs, when material from various fields of knowledge is combined around one core program. The choice of topic and its disclosure are determined, first of all, by the task of orienting students, helping them to understand themselves and the world around them. This approach allows

students to identify relationships between different areas of knowledge, creates conditions for more flexible planning of educational work and the development of individual characteristics of students. This is how the integrated training course "Social Sciences" arose, which included elements of history, geography, and social science. An attempt to create an integrated training course "Culture" took place in Poland.

In general, it is believed that in the practice of foreign schools, two types of integration are most often implemented - subject and problem-based - depending on whether information from several traditional subjects or sciences is integrated in a certain course, or whether the synthesizing principle is a specific problem. Sometimes courses that integrate knowledge of a problem or topic are often called projects. An example would be the courses "Forces in Nature", "Energy", etc., which comprehensively examine the manifestation and nature of various forces, the characteristics of various types of energies, their interconversion, and the problems of use by humanity.

In different countries, the problem of designing integrated courses, especially selecting content for them, was addressed in different ways. Thus, in schools in England, local educational authorities selected content taking into account traditions that had developed, depending on the amount of funds allocated for the needs of the school, on the needs and interests of students, on the availability of teachers, on the prestige of a particular educational institution in a given district, as well as taking into account the requirements for entry into college. Often when creating integrated courses, preferences are given to the interests of students, which are the determining factor. The teacher ceases to be a "supplier" of knowledge, but becomes a consultant, a leader. The structure of the content of educational material is not clearly defined; it is more often modified during the discussion between the teacher and students, in the process of solving a problem (task, project).

Integrated courses contributed to the formation of qualitatively new knowledge in students, which is characterized by a higher level of meaningfulness, dynamic application in new situations, increasing their effectiveness and consistency as a result of systematic teaching of educational material in new organic relationships. Each of these courses was developed in accordance with the educational standard of primary general education and was based on clearly defined content lines, which provide a qualitatively superior way of its structuring and presentation [12].

The need for a comprehensive understanding of the world, the search for deep connections between individual phenomena of objective reality, and the identification of relationships between various structural levels of matter leads to the interaction and interpenetration of sciences, to the integration of scientific knowledge.

Integration is an important condition for modern science and the development of civilization as a whole. Since the current stage of scientific thinking is increasingly characterized by the desire to consider not individual isolated objects, life phenomena, but their more or less broad unities.

The essence of these ideas is that any knowledge is an association, and a system of knowledge is a system of associations. Yu.A.Samarin identifies the following types of associations: local, particular-system, intra-system and inter-system, and classifies the levels of mental activity depending on the nature of the association of associations in systems of the corresponding level.

The simplest neural connection that forms elementary knowledge about an object or phenomenon is a local association. This connection is relatively isolated (since it is not correlated with other knowledge), and therefore can provide only elementary mental activity. It is typical for primary school age. Private-system associations are the simplest system associations. They arise on the basis of the study of a separate particular topic or any subject or phenomenon. Knowledge of individual objects and phenomena is accompanied by the selection of new facts and concepts and their comparison with existing ones. A simple generalization of knowledge occurs, but the acquired knowledge is not yet correlated with related knowledge.

At this level, students' analytical and synthetic activity occurs. Intrasystem associations ensure students' knowledge of holistic knowledge systems. There is a widespread use of knowledge within the subject being studied, since intrasystem associations reflect cause-and-effect, temporal, spatial, quantitative and other connections. Interdisciplinary associations are the highest level of mental activity. They unite different systems of knowledge, generalize them, and make it possible to understand a phenomenon or process in its diversity. At the level of these associations, general concepts arise. the formation of intersystem associations allows you to use knowledge from different areas, subordinate them to each other, and establish relationships at the intersection of knowledge[14].

The stated psychological premises make it possible to determine the main features of the possible integration of scientific knowledge.

The integration of scientific knowledge is possible due to certain conditions, among which one of the main ones is the presence of integrative factors or, as they are also called, "integrators". They may be:

- Complex objects of knowledge (atom, man, space);
- Scientific ideas and theories (systems theory, information theory, game theory);
- Scientific and interscientific principles (minimalization, invariance, simplicity);
- General research methods (mathematical, modeling, system-structural);
- Individual sciences;

- Scientific pictures of the world.

Knowledge integration is a holistic process of interaction and interpenetration of various knowledge systems, which is expressed in the emergence of their integral forms, generalizing theories and methods, strengthening and interchange of knowledge information, st Since integration can be based on various factors, there are many types and levels of integration. First of all, they depend on the nature of the interaction and relationship between different areas of knowledge. There are several types of such connections:

- Unification into one science, theory or scientific system of several spheres that are at the descriptive-empirical level and develop relatively independently, separately from each other. At the same time, they become specific sections of a given scientific system;
- Interaction of developed fundamental sciences, which are at the theoretical level, as a result of which a certain scientific picture of the world arises;
- The relationship between theoretical disciplines and scientific pictures of the world based on generalized logical, mathematical and other methods;
- Interaction of various specific spheres of knowledge and scientific pictures of the world with philosophical ideas and principles, the relationship of specific sciences with philosophy.

Depending on the integrated factors, subject integration is distinguished (aimed at the study of a specific complex object or phenomenon, complex problem) and method integration (when a general method or general scientific principle of research is used to solve a specific problem of cognition of various objects).

Let's consider four levels of integration of scientific knowledge[15]. At the interdisciplinary level, integration processes occur within individual sciences - social, natural sciences. They are based on certain principles of mathematical logic, statistics, etc. Characteristic of these processes is the fact that in one specific discipline the results and research methods of other scientific disciplines can simultaneously be manifested. For example, biological processes are studied using physics and chemistry.

Interdisciplinary connections confirm the organic unity of the world. They lead to blurring the lines between sciences that are separate from each other. In modern conditions, connections between sciences at this level are carried out in the following areas:

- in the middle of each of the three spheres of science (in social sciences - social psychology, sociolinguistics, historical demography; in natural sciences - biophysics, physical chemistry, bioclimatology);
- within two spheres of science (between natural sciences and technical sciences - biomechanics; between natural sciences and social sciences - historical geography);
- within three spheres of science (between natural sciences, technical and social sciences - ecology, biotechnology, etc.);
- in the form of groups of disciplines related to the mathematization of scientific knowledge (sociometry, psychometry, etc.).

The supradisciplinary level of integration is characterized by a high level of generalization. The processes at this level consist of the integration of scientific knowledge based on generalization and abstraction, which is of great importance for individual sciences (the use of a systems approach, theory of functions and many models, etc.).

At the transdisciplinary level, the integration of scientific concepts, theories, methods in philosophical concepts is carried out. These principles permeate more and more branches of scientific knowledge. Being a science about the most general laws of development of nature, society and thinking. Materialistic dialectics makes it possible to understand the unity and development of the whole world, to unite disparate pictures of the world created by individual sciences into a holistic image.

The mechanism for the integration of scientific knowledge is determined by the dialectical-materialistic relationship between the forms of motion of matter and the coincidence of the logical and historical. The operation of the integration mechanism can occur in various processes. Regarding the synthesis of scientific knowledge, there are four forms of operation of the integration mechanism:

- Internal - the interpenetration of directions that occurs in each individual science;
- External – interconnection, unity between spheres of knowledge, creation of complexes that are part of an integral system of science;
- Vertical - the integrated movement of sciences from more generalized theoretical to intermediate, and then applied;
- Horizontal - the connection of scientific spheres in the middle of large and long-existing complexes of sciences.

Integration mechanisms provide targeted interaction between different areas of knowledge and consciously regulate the process of their interaction. Based on the analysis of historical-genetic, methodological, logical and other aspects of the integration of scientific knowledge, we can conclude that the main mechanisms of interaction between sciences include the following:

- Reduction of general phenomena to specific ones;

- Movement from a first-order entity to a higher order;
- The use of methods of knowledge of one science in another;
- Approaching a single information and integration level;
- Mutual reflection of sciences (providing "feedbackrengthening its interdisciplinarity and complexity, as a result of which a new integrity is created, which is manifested through unity with the opposite process – differentiation.20

Based on a comprehensive analysis of interdisciplinary connections and integrative trends in the school, possible options for integration have been identified.

1st – almost complete fusion of educational material of integrated subjects in one course (as happened with algebra and geometry).

2nd – combining individual parts of the material of integrated objects with the designation of special sections.

3rd – building a new item from autonomous blocks.

The choice of one option or another depends on the conditions of integration, which are general didactic, since they allow for the integration of all related academic subjects. These include:

- The presence of common goals and objectives of learning that arise from the genetic commonality of educational subjects;
- Implementation of general didactic principles and teaching methods;
- Coincidence or commonality of objects of scientific knowledge that form the basis of integrated subjects;
- The presence of concepts and terms that are similar in content;
- Ensuring a unified logic for assimilating educational information;
- The presence of general patterns on the basis of which integrated objects are built.

Among the three indicated options, most scientists on this problem give preference to the block form. Its essence lies in the fact that for each integrated subject, separate educational programs, textbooks and teaching aids can be stored as independent ones.

The synthesis of psychological and pedagogical knowledge, as a condition for the formation of a holistic theory of learning, can be implemented at three levels:

- Methodological - integration within the laws, patterns and principles of personality development;
- Didactic – integration within the framework of ideas, patterns and principles of educational organization;
- Applied – integration of the content of specific educational subjects, methods and methods of education.

The following measures will be taken to introduce digital technologies and modern methods into the process of mathematics education:

- Creation and involvement of new information and pedagogical technologies to accelerate teaching processes and increase their efficiency in all educational systems;
- To increase its excellence, productivity, quality and efficiency by introducing all the possibilities and software tools of information and telecommunication technologies into the field of education;
- Deepening of interdisciplinary relations with the help of information and telecommunication technologies, at the same time applying modern technologies to all fields;
- Ensuring the solid integration of modern digital technologies and educational technologies, creating additional conditions for the continuous development of the professional skills of pedagogues in this regard;
- Individualization of educational processes based on digital technologies;
- Download e-books on mathematics education to mobile devices and with the help of a QR-code for the purpose of copying, teaching-methodical sets (textbook, exercise book, teacher's manual, multi-textbook of textbooks)

  with media application) to create a system for placing information about;
- Distance education based on modern information and communication technologies organization of programs;
- Allows you to observe and learn theoretical and practical training online provider, as well as a platform that uploads them to electronic information custodians (Edu Market interactive-virtual educational program) and use of innovative technologies in educational processes;
- Placement of educational-methodical complexes, electronic educational resources developed on the mathematics education system in the electronic library system that allows for remote access and expanding the possibilities of their use;Nowadays, integrative processes occur mainly at the application level. That is, integration is the purposeful combination (synthesis) of certain educational subjects into independent pedagogical systems for a specific purpose, aimed at ensuring the integrity of knowledge.

Not every combination of academic subjects or their components is integration. A leading idea is needed, the implementation of which ensures an inextricable connection and integrity of this course. It is also clear that the integration of academic and extracurricular disciplines has many options; it can be complete or partial. Thus, one group of American scientific teachers takes as the basis for integration the features of the cognition process

(observation, classification, use of numbers, measurement, derivation of consequences, etc.), which is illustrated in any subject area related to human life and activity. Another group of teachers sees the basis of integration in the gradual explanation to children of the structure of the external laws of nature and society, in which certain "subject information" is used. It is assumed that the integrated nature of education takes place from the first to the last grade of basic school. It is difficult to imagine such revolutionary learning integrations making their way into schools in the near future, if only because a new generation of teachers will need to be trained to teach such courses.

At the present stage of development of science and scientific knowledge, new forms of interaction between differentiated and integrated processes are observed. Differentiation is understood as dismemberment, the division of a whole into its constituent elements; by integration - the process of bringing together and connecting sciences, the state of connectedness of individual parts of a system into a whole, as well as the process leading to such a state [21].

The nature of the differentiation of sciences is undergoing significant changes under the influence of integration processes and the characteristics of their manifestation. If earlier individual sciences were forced to divide nature, to isolate one part of it from another for the purpose of convenience of studying them, then over time the objective process of their rapprochement and mutual enrichment of techniques and methods of research (thanks to the unity of the material world) slowly began.

The impetus for this was the problem between the boundaries of individual sciences, the study of which required the efforts of not one, but several different branches of science. New directions of research have led to the "erasing" of previously existing boundaries between individual sciences. That is, if earlier new sciences arose due to the dismemberment and differentiation of knowledge, then in our time they began to appear due to the interaction of knowledge integration. Integration has transformed into a dominant trend and manifests itself at a higher theoretical level, and differentiation is, in fact, a unique form of identifying integration processes, a specific mechanism for their execution. After all, you can only unite what was in a dismembered, scattered form[20-21].

Differentiation and integration, as two mutually opposite trends in the development of science, uniquely manifest the effect of the law of unity and the struggle of two opposites in knowledge. These two trends not only mutually exclude, but also presuppose and condition

It is easy to see that in the content of modern education one can encounter these two opposing trends. The advantage of one or the other or their relatively stable balance depends on many factors (the level of development of programs or textbooks, the qualifications of the teacher, the level of general development of the child, etc.). The implementation of directed integration of learning or its differentiation actually upsets a certain balance and therefore has both advantages and disadvantages that are characteristic of each extreme.

The complementarity of such counter-trends in education is called "integration," which is defined as a pulsating mutual transition between integration and differentiation of the content of education. Differential teaching of academic subjects does not contain sufficient conditions for students to mentally comprehend a holistic picture of the world. Causing difficulties in students establishing relationships between a scientific concept or function and the corresponding subject, in the practical application of theoretical knowledge. Children develop their own "image of the world" quite early. Despite all its imperfections, it has an essential characteristic - the integrity of the perception of the environment. When a child enters school, this integrity of perception is often destroyed due to the boundaries between individual subjects.

Let us explain that the world about which a person must form certain ideas is the world of various material creatures (phenomena, things, objects) and the world of people. However, it is important to decide where to start introducing children to the world around them. This is answered by generalized scientific postulates such as: "The entire ocean is imprinted in a drop of water", "A microcosm is a macrocosm in miniature" - a cell contains all the necessary reasons for the birth of a whole organism." The primary object of scientific knowledge should be an object, a phenomenon and their totality, which should act as a center that generates the integrity of their knowledge in the subject of learning. And integrity, as the structural organization of a thing and integrity as a way of comprehending it by the subject, is the defining characteristic of the integrated approach[19].

At the psychological level of seeing an object, all its components are reflected in the consciousness of the subject as a system of certain qualities, properties and characteristics, which, being in certain relationships with each other, give rise to a new functional quality, i.e. integrative essence.

The decisive role in the lack of a holistic understanding by students of objects and phenomena belongs to the scientific approach that has traditionally developed in our cognitive culture. Science, which sought to understand the deep laws and regularities of the surrounding world, was obliged to differentiate itself by isolating individual objects of knowledge. This methodological approach was directly transferred to the construction of the educational process. Academic disciplines clearly corresponded to specific sciences. At the same time, any subject as a holistic education is torn into separate "pieces", which are studied inconsistently and in isolation in various training courses. The student cannot objectively integrate this disparate knowledge into an independent system on his own, therefore there is no need to talk about the quality of a holistic scientific worldview. At best, a student may develop different worldviews without the necessary internal connection between them.

Figuratively speaking, in relation to any subject, for example, a birch, a student must act as a gardener

(possessing specific biological knowledge regarding the care of this plant), as a chemist (possessing specific chemical knowledge about the growth of this plant), as a physicist (having specific physical knowledge about the functioning of this tree), in the role of a geographer (possessing specific geographical knowledge about the distribution area of the plant), in the role of a technologist (possessing certain knowledge about the quality of birch wood), in the role of an artist (being able to convey the aesthetic characteristics of birch). It is this student's understanding of this object that serves as a full-fledged unit of his holistic picture of the world.

And so, the introduction of an integration system that does not reject differentiation in teaching, but complements it, can, to a real extent, than traditional subject-specific training, contribute to the education of a widely erudite young person with a holistic worldview, the ability to independently systematize his knowledge and have an unconventional approach to decisions various problems[16-18].

Today they are trying to introduce integration of learning primarily at its first stage - in primary school. The essence of integrating the multicomponent content of primary education is that it enables the child to perceive objects and phenomena holistically, comprehensively, systematically and emotionally.

Essentially, the integration of learning aims to lay the foundations of a holistic

5. METHOD

The traditional division of the content of school education into separate autonomous academic subjects is caused by the desire to give the student more thorough training in a particular academic discipline, so that upon completion of training, each student, having a good understanding of the particular, would have a general understanding of the whole. However, teaching practice shows how difficult it is to implement the principle of inter- and intra-subject connections in reality, how often "a student does not see the forest for the trees." Moreover, having different abilities for studying a particular academic subject (which is quite natural for a child), he is not able to comprehend the whole if there are gaps in certain details. Very often, for one child, school knowledge remains scattered information, artificially divided according to subject matter. As a result, the student does not perceive the educational material holistically, much less the picture of the world around him.

Integration in primary school should be quantitative – "a little bit about everything." This means that children receive more and more new ideas about concepts, systematically complementing and expanding the range of existing knowledge (moving in a spiral position). The psychological basis of this type of integration is the existence of a local association, characteristic of primary school age, and the possibility of forming private system associations[24].

The growing flow of social, scientific and technical information with traditional methods of selecting the content of education inevitably influences it. This extensive way of developing the content of education, when all problems were resolved by simply including new topics in programs and new subjects in curricula, has exhausted itself. The expansion of the number of compulsory disciplines in the school curriculum often complicates the content, disrupts stability, significantly increases the volume of textbooks in all subjects with educational information that does not have general educational significance, which has led to unreasonable physical and mental overload of schoolchildren and, as a result, to a decrease in the quality of their knowledge[25].Integration of the multicomponent content of primary education allows the teacher to rationally allocate time for studying the subjects of the invariant part, reduce the number of hours for their study and, using the freed up hours, organize work aimed at developing the creative abilities of students and realizing their personal potential. Integration helps to expand the problem of redistributing time for the implementation of educational programs in the new conditions of individualization of education. Intensification of the content and structure of education can greatly help the creation of new academic subjects due to the combination (merger) of two or even several related courses. This approach will make it possible, without changing the basic content of education, to reduce the number of disciplines studied, reduce mandatory overload, and get rid of ineffective study of subjects, for which fewer hours are allocated.

The previously existing school curriculum contained a number of such subjects, the study of which was allocated a small number of hours. As a rule, during the week that was between lessons in such subjects, students forgot previously learned material. And if at this time there were also holidays or the teacher's illness, then the gap between lessons increased. It is difficult to control knowledge and objectively evaluate it under such conditions. And this, in turn, causes a certain attitude of students towards the educational process in general, and towards learning the material in particular [27-29].

It can be concluded that the proper level of student knowledge and high quality of teaching were not ensured, and, accordingly, the goals and objectives that were set when introducing new subjects into the curriculum were not met.

Under these conditions, attempts at an unconventional solution to the problem of updating the content of education and upbringing are legitimate. Positive factors of integration in primary school include the relative readiness of the teacher teaching most subjects, the naturalness of the transition from holistic family or kindergarten education to holistic education, and the experience of studying a somewhat integrated natural history course. The main argument in favor, in our opinion, is the presence of great potential opportunities in the development of a child's intelligence. According to the results of a study by one of the American psychologists,

20% of the intelligence (human thinking abilities) of a school graduate is formed in the first year of life, 50% by the age of four, 80% by the age of eight and 90% by the age of thirteen [30].

Let us point out that the integration of educational subjects can be based on the following didactic potentials:

- Subordination of the functions of individual academic disciplines, for example, history and social science - on the study of the patterns of development of the state;
- Efficiency - strengthening and concentration of educational material, eliminating duplication in its study (generalized study of the laws of phenomena, geometric constructions, etc.)
- Constancy of the integrated basis, integration of two academic subjects based on one of them (several subjects need to be integrated on the basis of the one that studies certain laws or processes more widely and deeply);
- The presence of a sufficient amount of educational material that can be studied on the basis of another discipline (the basis for the implementation of this condition is the volume of existing connections between related academic subjects).

Obviously, it is too early to talk about full integration now: programs and skills in different subjects are so specific that it is impossible to violate their integrity. Neither school science, nor didactics, nor individual methods are ready for this. This can be evidenced by directly conducted surveys in city schools, which make it possible to conclude that in reality, in practice, teachers use only elements of integrating the content of education. Giving relevance to this topic, but not having sufficient theoretical knowledge, they look for opportunities to connect common blocks of knowledge, topics, sections in order to avoid duplication and increase students' interest in the subjects being studied.

Different ways of doing integration cannot be abstractly good or bad. The essence of the problem is not to reject one of them and apply the other, but to introduce a system of integration measures taking into account the age (physiological and psychological) characteristics of students at all levels of education. This formulation of the problem, it seems to us, should satisfy the fact recognized by many that integration at different levels of education has its own characteristics.

When considering the problem of integration from the perspective of its practical implementation, it should be remembered that the integration of educational subjects is far from a mechanical process, and an integrated educational course is not a random combination of individual disciplines. After all, combining two or more subjects can disrupt the logic and intra-subject continuity of the discipline on the basis of which the integration is carried out. In addition, it should be taken into account that the content of items that are subject to integration must be at the same information level. Integration is not a change of activity and not a simple transfer of knowledge or actions that children have learned from one subject to another to eliminate tedious repeated explanations of what is already known, or to speed up the learning process, or to consolidate the transfer of knowledge, skills and abilities.

A process of this kind is traditionally called in pedagogy and methodology the use of intra- and interdisciplinary connections in learning, which, of course, is a manifestation of trends, prerequisites for future integration, but not integration itself. Integration is the creation of a new whole based on identified similar elements and parts in several previously different units (academic subjects, activities, etc.).

6. CONCLUSION

Summing up the results of the theoretical and practical study of the problem of integrating the content of education in primary school, one of the forms of implementation of which is the conduct of integrated lessons, we can conclude that this problem is quite relevant and versatile, the study of which in practice makes it possible to approach the construction in a new way educational process, to the design of learning content.

Mathematics education is the driving force behind the integration of science and production, and is the backbone of Uzbekistan's economy. Globalization in the field of economy, transformation of social and cultural changes, improvement of quality indicators in personnel training, increasing the status and prestige of mathematics education, creating an atmosphere of creativity among students and youth, "Identifying talented students and youth", district , is carried out by forming a system of organizing the selection of intellectually mature students-youth on the regional and republican scale.

This system:

- Performed by students in the information environment of an educational institution creating conditions for recording projects and their results;
- Open presentations (including specialized portals and social networks), presenting innovative projects to students through contests; - famous scientists, businessmen to popularize mathematics education conducting regular competitions with participation;
- Mathematical modeling and design at all stages of education organization of republican competitions on;
- The basis of division of labor for competitions, the principles of team work, organization in forms that allow interpersonal relationships.

The main goal of the innovative development strategy of the Republic of Uzbekistan is the development of

human capital. In this document, by 2030, one of the main tasks is to include Uzbekistan among the 50 advanced countries of the world in the ranking of the Global Innovation Index.

Human capital will not develop in Uzbekistan until a layer of experts who think in a new way emerges. The following activities are carried out on personnel training and effective use of human potential:

- Education programs related to mathematics, technology and engineering, economics, natural sciences, educational programs for the bachelor's degree, preschool, general secondary and secondary special, professional and higher education systems, state education radical renewal based on standards and curriculum;
- Development and implementation of distance and mixed-method integrated training and retraining programs for teachers teaching academic subjects within the framework of mathematics education;
- Education for participation in national, international and regional exhibitions in order to identify the high potential levels of graduates of pre-school and general secondary education systems in modern technologies, to support it, to realize their talent development of a grant-based support program for institutions;

In reality, the subject-by-subject division of educational material does not always achieve the stated goals of its study. For example, discovering an inclination for mathematics and the inability to correctly construct a sentence, the Russian language as an academic subject turns into torture for the student; Children repeat the same signs of the appearance of spring from lesson to lesson in reading, natural history, drawing, and music. Is this necessary? Integration of the content of education is a new step in its renewal and instilling interest in the subjects being studied.

This work is theoretical in nature. Summarizing the experience of foreign and domestic schools, she gives a complete analysis of the problem of integration in general and integrated lessons as a form of its manifestation. Knowledge of the theoretical foundations will help in practice to creatively approach the implementation of this topic.

Research work directly in practice has shown real opportunities for the integration of educational subjects already in elementary school, confirming the theoretical provisions on the subordination of the functions of individual academic disciplines, on the strengthening and concentration of educational material, on the elimination of duplication in its study, on the availability of a sufficient volume of educational material that can be studied on the basis of other disciplines.

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