

IMPROVING THE COMPETENCE OF FUTURE MATHEMATICS TEACHERS BASED ON AN INTEGRATIVE APPROACH

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Introduction

Adapting the country's education system to the processes of sustainable development and modernization, actively applying innovative ideas, integrated technologies and developments to the educational process, the problem of forming basic and science-related competencies of students is of urgent importance today. For example, systematic measures are being implemented to form and further strengthen the modern material and technical base of educational institutions, and to use it rationally, including equipping them with high-performance educational laboratories, computer equipment and other information and communication equipment.

General secondary education The new generation of state educational standards is based on a competent approach, and in this connection, the problem of how to form the basic and subject-related competences of students, and with what mechanism, is waiting for a practical solution.

Competence does not appear overnight as an innovation in education. For this, not only pedagogues, but also students are required not only to apply knowledge in practice, but also to reveal their unique abilities as individuals, to overcome external and internal obstacles. To implement a convenient strategy, it is necessary to ensure systematicity and integration in all links of the continuous education system. It is up to the students themselves to solve this problem and effectively implement the integration of knowledge.

Materials and methods

Issue of integration of the methodology of teaching mathematics and the analysis of scientific literature in the field of didactics in various fields of modern education is recognized as one of the urgent problems of the pedagogical process. In particular, in the system of general secondary education, it is required to create the mechanisms of integrated teaching of subjects, to determine its pedagogical and didactic bases, and to solve the problems of implementation. That is why, first of all, we found it necessary to dwell on the meaning, essence and definition of the term "integration".

Integration means joining some parts or elements together and becoming a whole.

The word "integration" is derived from the Latin word "integratio" ("integr" - complete, whole, complete), "reconstruction, restoration, filling", "integration" - "development in a connected manner", "integrate" - "one whole". to combine, to make whole" means [1; p. 48].

The concept of "integration" has several definitions. In particular, N.Poddyakova [15; p. 17] describes integration as "a method of composing several subject materials on the basis of their natural subordination to the task and single purpose of the methodology".

"Integration" is relatively new, it has a long history in terms of content and essence. In the universe, in society, in life and production, in education, that is, from the micro world to the macro world, integration is of great importance. Integration is a very broad concept. In particular, the necessity of the integration process in education in the formation of the scientific outlook of the young generation, their mathematical and informational culture is noted by world scientists.

Integrative approach - takes into account knowledge, skills, skills and experiences from different disciplines, relies on, combines and develops competencies[11].

In the sciences of the psychological category, thinking operations characteristic of all people constitute a large number of thinking strategies as an integral part of cognitive activity and combine systems of different levels and descriptions through synthesis. Integration is differentiated as cognitive strategies in terms of synthesizing the parts underlying the cognitive mechanism into a whole, and as a result, the intended goal is achieved.

Of STEAM education in the world, based on the in-depth study of science, technology, engineering, art, and mathematics, the implementation of the competence approach to the process of teaching mathematics, including mathematics, the effective implementation of international assessment programs for the development of mathematical and scientific literacy in students. implementation of "computer education" in the educational practice is the task of integrating pedagogical and information technologies in the teaching of mathematics, implementing an integrative approach in the information-educational environment.

Main part

The importance of using information technologies in teaching mathematics is explained by the fact that computer technologies are an inexhaustible source for raising the learning process of students to a new level. Scientific research on the use of computer technologies in mathematics education by a number of scientists of our republic and the world, including D.N.Ashurova[2], T.Yu.Bakirov[3], S.V.Gordina[8], G.Goyibnazarova[10], scientists such as M.E.Ivanyuk[12], G.K.Izetaeva[13], I.N. Polunina[16], J.B. Ergashev[17], D.I. Yunusova[18] and carried out by researchers.

Integrated technological approaches serve to clarify the general description of all social processes and define their perspectives. In some sources, it is explained that the production technology is a whole stage defined by the period that includes the processes from the selection of raw materials to the delivery of a particular product to the consumer [7]. But technological processes in social life and technologies in the educational process have integrative and differential features. During the research, it became clear that the integrative features of educational technologies depend on several factors. It was necessary to follow the principle of continuity in the mathematics teaching process of general secondary education schools, to integrate pedagogical and information technologies in the organization and conduct of the educational process, as well as to comprehensively analyze that the foundations of this science depend on educational, spiritual, and

universal values. The main content of integrative technological processes in education can be explained as follows, relying on the created scientific sources:

- firstly, traditional teaching relies on written and oral methods, it is necessary to organize traditional teaching based on modern requirements and to create an information-educational environment during the educational process; failure to introduce computer education in general secondary schools is a dangerous situation for the future of our youth;
- secondly, the increasing volume of information, limited time for their use, and some complexity of their sorting and systematization require an approach based on the principles of new media education [9].

In the works of the Russian researcher L.V. Pivovarova, the description of the technological approaches to education of the integrative methodology is described as follows: the main purpose of using the term "integrative methodology" is to identify the main features of the technological approach to education and to develop models for the implementation of the harmonization of pedagogical and information and communication technologies in their use.

The use of integrated technologies in the educational process depends on several didactic, methodical and cognitive factors. The organization of integrative processes between the educational process, its subjects and the object itself requires students to have models based on cognitive categories as a result of learning activities [14].

The thinking of the individual serves as an important basis for the formation of special competences related to the subject and the subject in the students. Thinking is the highest form of human mental activity, intelligence, and conscious behavior. In this process, thoughts, opinions, ideas, hypotheses, etc. are formed in a person and are expressed in his mind in the form of concepts, judgments, and conclusions.

As a result of processing and generalization of the information collected in memory, thinking creates conditions for predicting and predicting the development and improvement of events.

Through an integrative approach in teaching mathematics, in the formation of special competences related to the subject and in the process of mathematical education, in the process of mathematical education, the use of thinking operations in solving problematic educational situations prepares the ground for the development of the scientific worldview, the development of students' mental activity, intelligence, and orientation to conscious behavior.

Case-study, brainstorming, students' mastered knowledge, skills and abilities, test tasks formed in order to evaluate special competences related to science, used in teaching mathematics, summarizing, summarizing, finding solutions to educational problems through information processing, analysis, synthesis, comparison, abstraction. allowed to push.

Synecotics is a generalization of the conceptual features of educational activities carried out in various subjects [14; p. 48]. In some activities, this process is also called "integration". In the study of mathematics, a set of different knowledge is combined into one scientific-cognitive direction. Synectics is the ability to synthesize knowledge of different plans (of different quality and different modalities) into a new quality. It is based on the simultaneous thinking of human abilities in different processes that do not have any common connection (flow of rivers, flow of people, flow

of information, etc.). In psychology, it is used as a mechanism of activation of traditional cognitive activity, active methods of teaching. Integration of educational areas and blocks that are not close to each other is considered as synectic integration of the educational process. Integrated courses of this type are aimed at overcoming knowledge barriers in certain methodological boundaries in traditional field education ("Philosophy for Mathematicians", "Mathematics and Art", etc.).

In the teaching of mathematics, based on the content of the studied subject, natural sciences: physics, chemistry, biology, geography, interrelated natural - scientific ideas, laws and concepts, procedures and methods of scientific knowledge are used. The use of knowledge, skills and competences learned by students in natural sciences in a new situation corresponds to the rules of synectics.

Cognitively placed in a sequence with each other. In the teaching of mathematics, an initial idea is formed about philosophical concepts such as singularity, particularity and generality. It is known that singularity, particularity, and generality represent individual, specific, and general properties of mathematical objects and processes, as well as the connection and relationship between them. In the teaching of mathematics, coherence plays an important role in the formation of students' special competences related to the subject and the subject.

Coherence is the interaction of small systems in the process of stable, orderly creation of structures of new systems. Coherent integration in teaching is currently the most common type of integration in the educational process. The coherent model is presented in integrated courses in general secondary education: chemistry and mathematics, physics and mathematics, physics and chemistry. On the basis of such integration, on the one hand, the formation of integrated ideas about the world of nature, culture and science is achieved, on the other hand, educational time is saved. Such integration allows not only interdisciplinary (vertical), but also interdisciplinary (horizontal) synchronized study of important mathematical-scientific and cultural phenomena, high intensification of the pedagogical process, establishment of meaningful interdisciplinary connections, and no transfer of educational material. The following technologies of implementation of the coherent model are used: an integrated course is created according to the content of subjects included in one educational field. Therefore, the weight that falls on the content of one subject does not fall on the content of another subject and is distributed "equally".

The analysis of integrative didactics showed that this integrative process exists in three directions, in terms of organizational methodology, according to their didactic and methodical requirements. These are available as horizontal, diagonal and vertical integration. In some sources, there are cases where the study of integrative methodology and integrative didactics is equated with the term "harmonization" in our language, and conclusions are drawn based on them. The content and nature of research conducted in developed countries on integrative didactics and integrative methodology is an important factor in the application of integrated technologies of education to the educational process, and the scientific analysis of didactic and methodological integrative models is expected to be carried out based on the goals and objectives of the scientific and methodological work conducted in the school mathematics course.

An integrative approach to the process of mathematics education has led to the need to improve the methodological support for the formation of students' basic and subject-related competencies, and to provide them with resources based on electronic textbooks and information and communication technologies.

At the lower stages of human civilization, the field of activity aimed at educating and educating a person was organized on the basis of very simple requirements, but today, very strict and complex requirements are being imposed on the organization of the educational process. For example, the social need to train a qualified specialist who can work with complex equipment, has the competence to fully understand the essence of the production process, and can positively solve the problems that arise even in emergency situations, requires the organization of the educational process based on an integrative technological approach[16].

From the point of view of socio-technical development, the formation of students' intellectual potential, basic and subject-related competences must be compatible with the improvement of techniques and technological processes in the field of mathematics. Therefore, the noted social demand and social order raise the issue of not only the use of advanced technologies in the production process, but also the improvement of an integrative approach to education based on the demand for personnel training[9].

Before applying information-communication and educational technologies to the educational process in the context of an integrative approach, it is permissible to study the importance of their theoretical and practical features in the "subject-subject" combination. Recently, many articles and scientific resources have been published on the problem of forming basic and subject-related competencies of students through the use of pedagogical and information technologies based on an integrative approach. Applying all of them directly to the educational process may not be highly effective. In order to use pedagogical and information technologies based on an integrative approach in education, the professional skills of the user of this technology should be sufficient [5; p. 15]. Receiving information at a rapid pace, analyzing, processing, theoretically summarizing, summarizing and delivering it to the student is one of the urgent problems facing the educational system.

By applying advanced pedagogical and information technologies to the process of teaching mathematics based on an integrative approach, the formation of basic and science-related competencies of students serves to find a positive solution to the above-mentioned actual problem. So, the issue of an integrative approach to the educational process has a certain generality. Because the integrative approach used in the educational process requires dividing the technologies into pedagogical and information-communication technologies. Although the directions of these integrated technologies are different, they also have common aspects that unite them. It is an important task to study mathematics at school, to research the principles of coherence in determining the optimal (effective) ways of using information and communication technologies based on an integrative approach, and to define their specific criteria.

The normative effect of adaptive learning technology is that it encourages researchers and practitioners to be interested in all aspects of human activity, including the field of education:

- justifies the effectiveness of this process;
- guides to guarantee obtaining the required results from the latest achievements of science and practice;
- forms the competence to build activities on an intensive, highly scientific basis;
- the use of information-educational tools, automation will be established. Media education environment is created [9; p. 12].

Based on the above integrative approach, the formation of basic and subject-related competencies of students and the emergence of integrative processes are the basis for the creation of media education and information-communicative environment.

In particular, the integrative approach poses the problem of introducing "new media" into the educational process. This requires integration of information and communication processes based on new integration in education [1; p. 17].

In other words, integrative technology has become the leading description of human activity, which means raising the efficiency, acceptability, high scientificity of the educational process to a new level of quality [4; 15 p.].

It was noted that integrative technology (as a process) is characterized by the following basic rule. These are:

- division of processes into interdependent stages;
- actions aimed at achieving the set goal are carried out consistently and step by step [1; p. 19].

These are the general principles of technological processes. However, when applying them to specific mathematical education, it was found that there is a need to develop the principles of integration of pedagogical and information-communication technologies based on information-communication principles and to define their effective ways.

Such a variety of description requires the identification of a common feature that represents the essence of teaching technology. Accordingly, research teaching technology implements a scientifically based didactic process project and increases the possibility of achieving a high level of efficiency, reliability and a guaranteed result.

In optimizing the processes of the integrative approach, the criteria of the teacher's activity in this regard are reflected in the following:

- purpose is clearly defined and diagnosed;
- under study to the topic about theoretical and practical issues and him solve method systematic way present to be done
- of topics sequence, logicality, phasedness are ensured;
- study of the process each one stage of participants h in stock methods of operation display name;
- the teacher's the most efficient teaching of means employment is provided;
- a teacher and students activity age of motivation provision of this in process their personal-professional of functions manifestation to be (free choice, creativity, debate and etc.) leads to [6; p. 19].

Therefore, a lot of research has been conducted and didactic resources have been created on integrative learning approaches and their improvement. All of these are aimed at the development

of modern education, but none of these resources is designated as a priority (dominant) for use in the formation of basic and subject-related competencies of students based on an integrative approach in the educational process.

In our republic, as a result of certain works on the organizational, theoretical, scientific and practical improvement of the continuous education process in mathematics, the content of education has been fundamentally updated, and the requirements of DTS based on the formation of students' competence in educational programs and academic subjects have been adopted. This process requires the inclusion of an innovative environment in other components of the educational system: teaching methods, tools and forms.

One of the important tasks of the continuing education system is to create an innovative environment in the educational process. Creating an innovative environment in teaching requires multifaceted research and practical activities from the teacher.

Conclusion

The word "integrative" has the meaning of "unification", "generalization", and the concept of technology is a process consisting of two main blocks, that is, a design block and implementation blocks. Designing the educational process based on integrative approaches requires the correct and clear definition of pedagogical tasks and the careful development of didactic processes. The harmony and proportionality of modern information-communication and pedagogical approaches in terms of content has led to the creation of a new technological environment in which these two areas are interconnected and integrated. This will serve to enrich the content of innovations related to the formation of basic and scientific competences of students on the basis of an integrative approach to the teaching of mathematics. Today, interactive methods of teaching are being formed based on the combination of information, communication and pedagogical technologies in the educational process, which should be interpreted as a need in the educational process to reveal promising directions of innovative methods applied to the educational process. As we noted above, the application of integrative educational approaches based on the combination of modern information and communication technologies to the educational process opens up opportunities for comprehensive, fast and targeted delivery of educational materials to students based on modern pedagogical and methodical requirements in order to create an innovative environment. In this way, students' independent learning and opportunities for creative work will expand, the quality and efficiency of the educational process will seriously increase.

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