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The use of innovative technologies in mathematics lessons as a pedagogical issue

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Abstract: The article considers the use of innovative technologies in the formation of competence of primary school students as a pressing pedagogical problem. The ability to evaluate, organize, and understand information is currently the most important resource in the context of global mass communication. Global informatization naturally affects the educational process, and the main task of the education system is to identify modern trends in the development of society and the introduction of pedagogical technologies into the educational process that form a positive experience and reflect modern social changes, bringing the educational process into an orderly, controlled system. The purpose of the study is to find effective ways to demonstrate information activities, to build a model that promotes the development of ICT competence in primary school students by means of disciplines of the mathematical cycle. The possibilities and prospects for the introduction of various educational technologies for the development of key competencies in primary school children are assessed. The direct development of a schoolchild affects the development of the entire educational environment, which makes the state more stable from the social side, with greater opportunities for entering the international arena and its contribution to the overall development of education, in particular primary school. The article also describes the main types of innovative technologies, their impact on the educational process and teaching practice, and touches upon the problems and challenges that teachers face when introducing innovative methods into the educational process.

Keywords: Innovative technologies, information, trends, competence, junior grades, primary school, pedagogical problem, educational process.

Background

- Objective - to consider the use of innovative technologies as a way to develop the competence of primary school students, to identify the problems that teachers face when implementing these technologies, and to offer recommendations for optimizing the educational process.;

- Methods. A pedagogical experiment, differential and search methods were used;

- Findings. The result showed the effectiveness of using innovative technologies in mathematics lessons;

- Conclusions. When using ICT in mathematics lessons, motivation and creative thinking in schoolchildren significantly increase;

Introduction: Modern realities of the educational process reflect social, economic and scientific changes and impose new requirements on school education. In the context of rapid technological development and the transition of society to digital technologies, it is especially important to develop students' skills at all stages of education, starting from elementary grades. In addition to transferring knowledge, it is important to equip children with the skills to adapt to a rapidly changing world and solve non-standard problems. One of the effective ways to develop these skills is to use innovative technologies in the educational process. [1]

Today, education is recognized throughout the world as a key factor in ensuring sustainable development and is

defined in the concept of international education until 2030 as an urgent task of creating opportunities for obtaining a quality education. This has expanded the possibilities for using technologies in the education system aimed at improving the level of methodological training, developing creative thinking in the professional activities of teachers, including primary school teachers.

To be on a par with leading countries, special attention is paid to the content of education, new versions of textbooks are experimented with, modern methods are used to improve the effectiveness of the educational process. Modern technologies, such as information and communication systems, electronic teaching materials, educational platforms and interactive whiteboards, create new opportunities for learning and expand the horizons of the educational process. In primary school, where children first become familiar with the basics of educational activities, innovative technologies can have a significant impact on the development of children's cognitive and social skills. However, the introduction of innovative technologies in primary school is associated with certain difficulties. [3] This is due to the need to change traditional teaching methods, modernize educational institutions, train teachers and provide access to modern educational resources. Therefore, the use of innovative technologies in the development of secondary school students' abilities is not only a pressing but also an important pedagogical problem that requires comprehensive analysis and the development of effective solutions. Modern education aims to develop in students not only knowledge, but also competencies that will allow them to successfully adapt to a rapidly changing world. In this regard, special attention is paid to the use of innovative technologies that promote the development of critical thinking, creativity, [5] collaboration skills and self-education. Innovative technologies are of particular importance in primary school, where the foundations of all future skills and competencies are laid.

We need to teach today's youth new, modern lessons based on global experience. It is necessary to form the logical thinking of young people, improve their intellectual literacy, provide knowledge that develops their thinking, teach them to understand themselves, behave in communication with others, read other people's opinions, think freely and express them boldly. To do this, it is necessary to study global experience, organize lessons based on advanced pedagogical and innovative technologies, use new interactive methods to achieve high results.

"Mathematics cannot be quickly developed using yesterday's teaching methods." Therefore, it is necessary to create educational programs and retrain teaching staff based on foreign methods that have shown good results in practice. The methodology should be such as to instill in children a love of mathematics. To do this, students need to understand that this subject is necessary for them in all areas of life. "Young people should study not to pass exams, but to become competent specialists," the head of our state believes.

Today's teacher must teach in such a way as to meet the demands of the time and be one step ahead of the youth. Our youth is so demanding that they quickly master the world of computers, phones and the Internet. Therefore, it is important to use new methods and techniques for teaching this youth, introduce new technologies into education, teach in a modern way, thereby forming and developing their competencies.

METHODS

To study the problem of using innovative technologies in forming the competence of primary school students within the framework of pedagogical practice, the following methods and materials were used:

1. Analysis of scientific and pedagogical literature

The study analyzed existing theoretical and practical materials devoted to the issues of introducing innovative technologies into the educational process, as well as studying the influence of these technologies on the formation of various competencies in primary school students. The works of leading scientists and teachers in the field of educational psychology, educational technologies, as well as studies on innovative teaching methods were used. The sources included monographs, articles, studies in pedagogical journals, as well as documents related to educational policy and the practical implementation of technologies in the educational process.

2. Review of pedagogical experience

One of the research methods was a selection of examples of the successful use of innovative technologies in the educational practice of primary schools. This analysis was based on real examples from educational institutions that actively used information and communication technologies, electronic educational resources and innovative methods (for example, project-based learning, game-based learning, etc.) in their teaching. We studied how the use of these technologies affects the results of students' learning activities, the development of their key competencies and interaction in the educational environment.

3. Case study method

The study examined specific cases of introducing innovative technologies into teaching primary school

students. This included studying individual lessons, projects, and events that used innovative approaches, such as the use of electronic textbooks, online platforms, virtual laboratories, interactive whiteboards, and other technologies. The results of these experiments were evaluated, and possible difficulties and problems that teachers encountered when introducing new methods were identified.

4. Questionnaires and interviews with teachers

To obtain more in-depth information about the problems and prospects for introducing innovative technologies into the educational process, questionnaires and interviews were conducted with primary school teachers. The questionnaire questions covered topics such as: the level of training of teachers in the use of technologies, the barriers that teachers face when introducing innovations, students' perceptions of new teaching methods, and opinions on the impact of technologies on the development of students' competencies. Interviews with teachers helped identify practical aspects of introducing technologies, as well as recommendations for improving the educational process.

5. Analysis of educational programs and advanced training courses

An analysis of existing educational programs and courses aimed at improving the qualifications of primary school teachers in the use of information and communication technologies was conducted. This included both courses offered by educational institutions and online education resources. The effectiveness of these programs in preparing teachers to implement innovative technologies in practice, as well as the program's compliance with current educational policy requirements, was assessed.

6. Assessing the impact of technologies on the development of key competencies

To assess the impact of the use of innovative technologies on the development of students' competencies, observations were conducted of students who used various digital tools as part of educational projects and assignments. Progress in the development of such competencies as critical thinking, the ability to work in a group, creativity, and information search and analysis skills was assessed. Comparison of the results of students using traditional teaching methods and those who were taught using technologies allowed us to draw conclusions about the impact of innovative approaches on the educational process.

7. Use of statistical data

Statistical data processing methods were used to identify patterns and trends. In particular, the results of teachers' questionnaires and analysis of students' learning outcomes before and after the introduction of innovative technologies were processed. This allowed us to obtain quantitative data reflecting the effectiveness of using technologies in the educational process.

RESULTS AND DISCUSSION

In my opinion, when using innovative technologies, a teacher should pay attention to the following factors that help to create a complete picture when selecting certain tasks for primary school students in mathematics lessons:

- precise interaction of the principles of coherence of the material;
- the significance of the material being tested from the point of view of mathematical and natural science education;
- compliance with the age and psychological capabilities of children.

To assess the mathematical preparation of schoolchildren, tasks of different types are prepared such as: open, closed tests, with a choice of several answers, with a short or full detailed answer, practical tasks on logic and thinking. For a better assessment, it is appropriate for a teacher to use a differential approach, where there are four levels of academic achievement: low, medium, high and highest. Time frames that do not exceed what is permitted are also important.

When teaching primary school students, it is important to correctly select and use methods, means and forms of pedagogical technologies in order to expand the horizons of students, their creative abilities. A number of innovative technologies are used in organizing educational activities.

Modern innovative technologies in education cover a wide range of approaches and methods, [2] including information and communication technologies (ICT), project activities, educational games, elements of distance learning and many others. The influence of these technologies on the development of competence of primary school students is manifested through the following key aspects:

1. Development of critical thinking. Modern technologies, such as electronic educational materials, interactive whiteboards, problem solving applications, contribute to the development of students' skills in analyzing, comparing, synthesizing and evaluating information.

2. Communication and social skills. The introduction of

collaborative technology, for example, within the framework of group projects, contributes to the development of communication skills, teamwork and self-organization.

3. Creative development. Interactive platforms and educational games stimulate children's creative activity, allowing them to develop creative thinking and the ability to solve non-standard problems.

4. Ability to work with information. The use of digital technologies allows primary school children to learn to work with large amounts of information, effectively search, analyze and apply it to solve various problems.

5. Personalization of learning. The use of individualized educational technologies allows creating more flexible learning conditions, which contributes to the successful implementation of the educational needs of each child.

However, the introduction of innovative technologies into the primary school educational process faces a number of problems. [3]) The most significant of them are:

• The need for additional training of teachers. Most primary school teachers do not have sufficient experience and skills in working with new technologies, which requires special advanced training courses.

• Lack of resources. For the effective implementation of innovations, appropriate technical means are needed, such as computers, tablets, projectors, as well as access to Internet resources.

• Resistance to change. Not all teachers are ready to accept new approaches and methods, preferring traditional forms of teaching. This can slow down the introduction of innovative technologies into the educational process.

In line with the technology of developmental learning, numerous educational programs and methodological recommendations for the formation of mathematical competencies in primary school students have been developed. The authors of these programs understand and interpret the development of the student in the process of teaching mathematics in different ways. The development of thinking of primary school students is one of the main tasks of primary school. As noted by a number of scientists (M.I. Bekoeva [5], A.A. Kurilova, B.Sh. Sekinaeva, L.V. Snegireva, O.A. Kholomina), younger schoolchildren are distinguished by increased sensitivity to events happening to them; this age is most favorable for the formation of cognitive processes and mental abilities. It is clear that even with the best textbooks and methodological literature, the problem of developing students' mathematical thinking cannot be solved only by improving the educational process (M.A. Guseva [6], I.K. Kondaurova [6]), since teaching mathematics to students with different levels of mathematical abilities requires a variety of approaches from the teacher to organizing their educational and cognitive activities, allowing for more effective use of modern educational technologies.

CONCLUSION

A mathematics lesson in primary school in its content serves as a comprehensive development tool for the thought, worldview, speech of students, the personality of the child, and occupies an important place among other academic subjects. In the process of mathematics classes, the mathematical literacy of students is improved. The ability of students to correctly, consciously and promptly understand the essence of the task and solve them correctly grows. The development of creative thinking during mathematics lessons, the development of methodological foundations for the practical application of specific forms and methods of using innovative approaches to organizing mathematics lessons in elementary grades, as well as the preparation of methodological recommendations: all this serves as a good foundation for building a comprehensively developed student.

The use of innovative technologies in the formation of the competence of primary school students is an important pedagogical problem that requires an integrated approach. The introduction of new technologies contributes to the development of key competencies in children, but the effective use of these technologies requires appropriate training of teachers, provision of educational institutions with the necessary resources and overcoming resistance from some participants in the educational process. In the future, it is important to continue research in the field of integration of innovative technologies in primary education, which will help optimize the process of forming competencies and improve the quality of the educational process.

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