PEDAGOGICAL TECHNOLOGIES AND INNOVATIONS AT THE LESSONS IN MATHEMATICS OF ELEMENTARY SCHOOL

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The article runs about questions about the latest approaches to organization of teaching – pedagogical technologies and innovations being now mastered in elementary schools of Ukraine. It covers significance and necessity of using innovative technologies at the lessons in mathematics in elementary school. There are determined educative value and advantages of using information and communication technologies in the works of a teacher while giving a modern lesson.

Key words: pedagogical technologies, innovative technologies, lesson in mathematics, education, pupil.

Problem and its connection with significant academic and practical tasks. In the Concept of General Secondary Education it's highlighted, that education of 21 century is the education for a human. The humanistic values of education turned the authoritarian-disciplinary model of teaching into personally oriented one. That is why, teaching and education of personality that is based on the principles of individualization,

creation of conditions for self-development and self-education, meaningful determination of their capabilities and life's purpose, are relevant. The public standard of basic and senior secondary education determines the importance of mathematical education for the life sustaining activity of the personality in modern society. It states: «...The quality of the mathematical preparation of the younger generation is an indicator of the society's readiness for social and economic development, the mobility of the personality in the development and implementation of new technologies, understanding of the principles of the composition and the correct use of modern technology, perception of scientific and technical ideas» [5]. That is, the scientific, technological, technologic, economic and defense potential of the state depends on the quality of mathematical education.»

Tendencies in the development of modern society lay down new requirements to the educational process. According to the Law of Ukraine «On Education», the purpose of the education area declares «the all-round development of man as a personality and the highest value of the society, the development of their talents, mental and physical abilities, enriching of the intellectual, creative, cultural potential of the people, providing the national economy with skilled workers, specialists» [1]. On the one hand, the content of education changes – academic load on the student increases, on the other – there is a need for qualitatively new teaching methods, which would allow not only to connect various knowledge into a consistent system, but also to develop in children the competences, necessary for life in the modern world.

Now in schooling there is a tendency of decreasing the students' interest in studying. This is due to high informative value of subjects and a tight time, allocated to their study. There is a need for the use of effective educational technologies that would provide understanding and adoption of this large amount of information without losing interest in the subject.

Analysis of publication (highlighting of unsolved problems). The analysis of modern pedagogical literature shows that changes are impossible without using pedagogical technologies and innovations at the lessons, which are based on dialogue, modeling of choice situation, free exchange of ideas, etc. Modern educational technologies are focused on individualization, distance and variability of the educational process, academic mobility of pupils, regardless of age and education level. The school presents a wide range of educational pedagogical technologies and innovations, which are used in the educational process.

The personal approach to the teaching and educational process involves a certain refocusing of the teacher’s consciousness, a take on the personality of the student and of one as a value and inherent worth. Then the teaching and educational process will acquire a personal orientation. And all changes in the system of education should be considered in the context of an improved lesson, teaching at which should comply not with informing of material and checking of knowledge, but with the finding out pupils' experiences in relation to the information provided by the teacher.

The lesson was and remains the main element of the learning process, so the teacher faces the main task: to involve each child in class activities, that is, to make each student feel

at the lesson «successful». The modern lesson of mathematics should be the result of creativity not only of the teacher, but also of the students. This goal can be achieved with the help of the implementation of modern pedagogical technologies and innovations into the educational process.

However, the implementation of modern pedagogical and innovative technologies does not mean that they will completely replace the traditional teaching methodology, but will be an integral part of it. Since pedagogical technology is a set of methods, methodological techniques, organization forms of learning activities, which are based on the theory of teaching and provide for planned results. It is very difficult for a teacher to overcome the stereotypes of giving a lesson that have been formed over the years. There is a tremendous desire to come to pupil and correct mistakes or suggest a ready answer. The problem is faced also by pupils: it's unusual for them to see a teacher as an assistant, organizer of cognitive activity. Modern educational system gives a teacher an opportunity to choose among many innovative methods his «own», a new look at his work experience. Today, to give modern lesson successfully, one is to understand a new way of own position, to understand why and for what changes are necessary and, above all, to change the person itself.

The timeliness of the topic is connected with the current tendencies and involves requirement of high use of productive innovative technologies at the lessons in mathematics and extra-curricular time, which allow achieving the goals of mathematical education faster, thriftier and more qualitative.

The purpose of the article (formulation of the problem). The purpose of the article is to identify the positive aspects when

using innovative technologies at the lessons in mathematics and in extra-curricular time.

Statement of basic materials, grounding of the research results. Analyzing native psychological and pedagogical literature, one can find out that the concept of «technology» as a pedagogical category was not present in such famous pedagogical textbooks of the 80's as «Pedagogics», edited by A. Aleksiuk, Y. Babanskyi, I. Kharlamov, M. Yarmachenko. And only since latter half 90's, this concept has been gradually becoming more and more widespread in scientific researches, textbooks, pedagogical periodicals and, of course, in pedagogical practice. The closest to our understanding of the definitions of the concepts under consideration are the views of I. Dychkivska, T. Nazarova, O. Piekhota, S. Vitvytska. These scientists consider educational technologies as a reflection of the general strategy of education development, the only educational system of the state.

Modern pedagogical technologies cover a range of theoretical and practical issues of management, organization of educational process, methods and means of teaching. The concept of «pedagogical technology» now has more than three hundred definitions, depending on how scholars imagine the structure and components of the teaching and educational process. Technology – is the Greek word, originally (tehne – «art», «craft», «science». Logos – «notion», «doctrine») – a form of realization of human intelligence, focused on solving essential problems of being [3: 6].

The concept of «technology» in pedagogy can be used in four notional aspects:

– pedagogical technology, which includes all means of pedagogical interaction;

– learning technology – a system of methods, techniques and actions of the teacher and pupils in the teaching process;
– technology of education – a system of methods, techniques and actions of the teacher and pupils in the joint venture, the content of which includes the development of norms, values and relationships;
– teaching technology – information technology that can be used to organize the learning process.

Any technology cannot be used blindly in full at any lesson. Each teacher must clearly understand the purpose and tasks to be execute at the lesson before using it. Technology should be geared to the teacher, pupils of the class, the level of material adoption by students, the facilities and resources of the school. Let's consider the most common modern educational technologies or their elements.

In modern society, according to the concept of mathematical education, its important goal is «the intellectual formation of pupils, the formation of the qualities of thinking, peculiar to mathematical activity and useful to a person for a productive life in society» [2].

Nowadays, actual is the variability principle, that allows teaching stuff to construct educational process, using author`s developments. Under such circumstances the lecturer needs not only to be familiar with a wide range of innovative technologies, ideas, tendencies but also, having properly learned them, not reinventing the wheel, use them in practice.

Traditional ways of teaching are gradually losing their positions, for there is a necessity in specialists, who possess not only knowledge but also the ability and skills to acquire it.

So, the old education paradigm «teacher → textbook → pupil» needs to be replaced with a new one «pupil → textbook → teacher».

And the teacher's task is to organize effective learning activity of pupils, teach them to acquire additional knowledge by themselves to successfully master the subject. Special attention deserves the quality rise of natural and mathematical education, which in modern environment should teach to apply the knowledge acquired at school to everyday life, orient in surrounding world. Mathematical knowledge is necessary in almost all professions, i. e. necessary to prepare for future profession.

The term «innovation» is defined as novation, growth that promotes qualitative change of educational environment.

As the result of innovative activity a transition of the system from one state to another allowing the improvement of education quality is considered.

Introduction of new technologies brings radical changes to the education system: before now its center was a lecturer, now it is a pupil. It gives every pupil an opportunity to learn at the suitable for him pace and at the level, corresponding to his abilities. In practice, at the lessons in mathematics elementary school teachers often use such modern educational technologies or their elements:

– Information and communications technology (ICT).
– Technologies of linear differentiation and individualization.
– Interactive technologies (project method that includes problem-based learning and research activity).
– Gaming technologies.

– Person-oriented education technologies.
– Testing technologies.
– Health-saving technologies.

Nowadays, information and communications technologies obtain more and more place in educational process. The main advantage of these technologies is demonstrativeness, since a great deal of information is learned through visual memory and influencing it is vital in teaching. Information technologies help make the learning process creative and pupil oriented.

The use of ICT at the lessons in mathematics helps make the learning process more interesting, bright, and exciting owing to wide range of multimedia possibilities; effectively solve education demonstrativeness problem; expand opportunities for visualization of educational material, making it more understandable and comprehensible for pupils.

It is reported that pupils show great interest to the topic, when during the explanation of new material presentations are used. Even passive pupils involve in work with great desire.

Lessons, conducted with the help of computer technologies not only enliven educational process but also increase motivation for studying. It is hard to imagine a modern lesson without information computer technologies.

Information computer technologies can be used at any stage of the lesson:

1. To state the topic of the lesson.

2. At the beginning of the lesson, with the help of questions related to the topic learned, creating problem situation.

3. As an accompaniment to teacher's explanation (presentations, formulas, diagrams, images, video clips etc.).

4. To control knowledge.

5. To reinforce and repeat material learned.

The main educational educative value of information technologies is the ability to create brighter interactive learning environment with unlimited opportunities, which can be used both by a lecturer and a pupil.

The advantages of information computer technologies in comparison to traditional ones are various. Apart from more illustrative, demonstrative presentation of the material, effective knowledge checking and everything else, we can add a variety of organizational forms for pupils' work, methodological techniques for lecturers' work.

If a pupil has difficulties with one or another question, at any moment he can go back to the theory and learn the material one more time.

Still, it should be noted that the bright image on the screen is only a way of presenting the material. It is a one way movement. What is most important at the lesson is live interaction between a teacher and a pupil, constant information exchange between them. That is why a blackboard is an integral attribute of any classroom. A blackboard is not only a piece of surface for both an adult and a kid to write on but a field of information exchange between a teacher and a pupil. Of course, we cannot say for sure, that pupils' results will improve when using Interactive whiteboard, but my observations have shown that pupils became more interested in the lesson.

They actively discuss new topics, strive to get involved in work, more quickly learn the material. Thus, the use of interactive whiteboard helps provide pupils with strong motivation for learning, increase their cognitive activity. These observations relate to new computer technologies in general.

Thus, the use of information technologies helps the teacher to increase pupils' motivation for learning the subject and leads to a number of positive consequences:

– psychological softening of the material adoption process by pupils;
– stimulation of lively interest to the subject of knowledge;
– broadening of children's mind;
– increased usage of demonstrativeness at lessons
– better adoption of theoretical material;
– pupils master the skill of acquiring information from different sources, process it with the help of computer technologies;
– forming the ability to shortly and clearly state their opinion;
– increasing work productivity of the teacher and the pupils at a lesson.

Undoubtedly, in a modern school the computer doesn't solve all problems, it remains only a multi functional technical means of learning. Not least important are modern pedagogical technologies and innovations in educational process, which allow not only «putting» a fund of knowledge in every pupil but, first of all, creating environment for revealing pupils' cognitive activity. Informational technologies together with properly chosen (or created) learning technologies create necessary level of quality, variability, differentiation and individualization of teaching and educating [4].

Slide presentations are effective at different stages of the lesson. Visual perception of objects under study allows perceiving the material more quickly and more deeply. There is a possibility to emotionally and figuratively present the material, when using information and communication technologies.

The use of these technologies allows equally dividing different types of tasks during a lesson, alternating between

mental activities, choosing the time to present the complicated educational material, allocate time to conduct self-study and test that gives positive results in studying.

When preparing and giving a lesson one should consider: proportioning of study load; creating a lesson considering dynamism of pupils, their working ability; compliance with hygienic requirements (fresh air, proper light, cleanliness); kind emotional mood; prevention of stress (work in pairs, groups, pupils stimulation); recreational moments and alternation between different types of activities at the lesson, that help to overcome weariness, sadness, dissatisfaction; learning workspace management (blackboard preparation, clear notes on the blackboard, use of ICT).

Conclusion. To release pupil's cognitive and creative activity in the educational process modern pedagogical technologies are used. They allow increasing education quality, more effective use of learning time and decreasing the amount of reproductive activity by means of shortening the time allocated for home assignments. Thus, implementation of modern pedagogical technologies and innovations at the lessons in mathematics of elementary school provides the child with an opportunity to work creatively, promotes the development of curiosity, increases activity, brings joy, forms the desire to learn in the child and, therefore, the quality of knowledge of subjects, mathematics in particular, improves.

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Педагогічні технології та інновації на уроках математики у початковій школі

У статті розглядається питання новітніх підходів до організації навчання – педагогічних технології та інновацій, що нині упроваджуються у практиці початкової школи України. Висвітлено необхідність використання інноваційних технологій на уроках математики у початковій школі. Визначено освітню цінність та переваги застосування інформаційно-комунікаційних технологій в роботі учителя під час проведення сучасного уроку.

Ключові слова: педагогічні технології, інноваційні технології, урок математики, освіта, учень.