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USING DIFFERENT INTERACTIVE METHODS IN TEACHING MATHEMATICS

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Annotation. The article discusses the possibilities and advantages of using interactive methods in mathematics lessons. Moreover, there is given several methods where we can use computer in contemporaneousness schools. The essence of some interactive methods used in mathematics lessons and ways of using them are described.

Keywords: training, interactive, method, Cluster method, «Smart» method, Charkhpalak method, «intellectual attack» method, polyphony, dialogue, mental activity, meaning creation, freedom of choice, reflection, creative tasks.

Аннотация. В статье рассматриваются возможности и преимущества использования интерактивных методов на уроках математики. Кроме того, дается несколько методов, где мы можем использовать компьютер в современных школах. Описана сущность некоторых интерактивных методов, используемых на уроках математики, и способы их использования.

Ключевые слова: обучение, интерактивный, метод, Кластерный метод, метод «Умный», метод «Чархпалак», метод «интеллектуальной атаки», многоголосье, диалог, мыследеятельность, смыслотворчество, свобода выбора, рефлексия, творческие задачи.

Annotatsiya. Maqolada matematika darslarida interaktiv usullardan foydalanish imkoniyatlari va afzalliklari ko'rib chiqiladi. Bundan tashqari, zamonaviy maktablarda kompyuterdan foydalanib matematika darslarini qiziqarli, oson va tez yetkazib berish uchun qanday foydalanish usullarini ham yoritib berilgan. Matematika darslarida ishlatiladigan ba'zi interaktiv usullarning mohiyati va ulardan foydalanish usullari tavsiflanadi.

Kalit so'zlar: ta'lim, interaktiv, uslub, Klaster metodi, «aqlli» metodi, «Charxpalak» metodi, «intellektual hujum» metodi, ko'p ovozli, muloqot, fikrlash faoliyati, ma'no-mazmun, tanlov erkinligi, aks ettirish, ijodiy vazifalar.

Interactive method («inter» is mutual, «act» is to act) means to interact, to be in a conversation mode, a dialogue with someone or something. Interactive methods and techniques are focused on the wide interaction of students not only with the teacher and with each other, but also with a computer, interactive whiteboard and other interactive tools.

The term «interactive methods» is associated, as a rule, with two groups of interrelated methods: the first group is training based on communication with a computer and through a computer, and the second group is non-computer - specially organized educational interaction between students.

The use of interactive technologies in the process of teaching mathematics allows you to overcome the difficulties that arise in the learning process. Learning by «turning to oneself» is the path of individual development, since such a path becomes the basis for an independent true existence.

The use of interactive learning lies in the fact that the teacher organizes the cognitive and educational activities of the student in such a way that the student, relying on his potential and already acquired knowledge, independently resolves certain situations, problems in the process of interaction «student - information», «student - situation», «student - knowledge», «student - problems», «student - student», «student - group», etc. [1].

The main functions of interactive learning: cognitive - educational and correctional - developing. Focusing on one of them, or reducing the specific weight of one or the other, leads to the devaluation of this method and causes disappointment among teachers, as it does not give the expected result. It is important that the enthusiasm for the form without observing the didactic conditions for the implementation of the method also does not give results.

Depending on the coverage of students, interactive learning technologies are divided into the following forms of organization of activities:

- in pairs (the work of the student in a pair with the student, teacher, etc.);
- frontal (the teacher teaches a group of students or the whole class at the same time);
- group or cooperative (all students actively teach each other);
– individual (independent work of students).

When using each of the listed forms of education, didactic conditions have their own characteristics, depending on the goal. For example, the group form of organizing interactive learning should be preceded by individual interactive preparatory tasks, and work in a group should be the obligatory presence of a common goal. The product of individual labor is used in the work of the group to make adjustments, meaningful additions, clarifications, formulate a common opinion, conclusions, etc.

Interactive activity in the classroom involves the organization and development of dialogue communication, which leads to mutual understanding, interaction, to the joint solution of common, but significant tasks for each participant. Interactive methods exclude the dominance of either one speaker or one opinion over another. During interactive learning, students learn to think critically, solve complex problems based on the analysis of circumstances and relevant information, weigh alternative opinions, make thoughtful decisions, participate in discussions, communicate with other people. To do this, individual, pair and group work is organized in the lessons, research projects, role-playing games are used, work is underway with documents and various sources of information, and creative work is used. The place of the teacher in interactive lessons is reduced to the direction of students' activities to achieve the goals of the lesson.

Interactive teaching methods require compliance with the following rules: criticism of the put forward ideas and intermediate critical assessments of statements are prohibited; judgments about the unsolvability of the problem are not allowed; the more proposals put forward, the greater the likelihood of a new and valuable idea; during the «brainstorming» the improvement and development of the proposed ideas is welcomed; when solving an intractable problem, it is divided into its component parts; the presence of roles; friendly, creative atmosphere; active interaction of all participants in the game; imitation of a real process in the game with the help of a model; distribution of roles between the participants of the game, their interaction with each other; differences in interests among the participants in the game and the emergence of conflict situations; the presence of a common game goal of all participants, against which private conflicts and contradictions develop; taking into account the probabilistic nature of the results of activities, due to the incompleteness of information and the impossibility of foreseeing all the consequences of decisions made; implementation of a «chain of decisions», each of which depends on the previous one, as well as on the decisions made by other participants in the game; using a flexible time scale; application of a system for evaluating the performance of each participant and game teams, as well as an incentive system [2].

Interactive learning tools are the means by which a dialogue occurs, that is, an active exchange of messages between the participants in the educational process or between the user and the information system in real time.

Interactive teaching aids include: printed textbooks and printed manuals by the type of intellectual tutorial; multimedia textbooks; multimedia educational programs; a computer; interactive whiteboards (panels, tablets); mediavisor; means of telecommunication, including e-mail, teleconferences, local and regional communication networks, data exchange networks; electronic libraries.

The introduction of new technical means in the educational process expands the possibilities of visual teaching aids. In modern conditions, special attention is paid to the use of such a visual aid as a computer. The use of computers in the educational process increases the amount of information communicated to the student in the lesson, activates, in comparison with ordinary lessons, the organization of students' cognitive activity.

The skillful use of various computer technologies is of national importance today, and one of the most important tasks of the school is to equip students with the knowledge and skills to

use modern computer technologies.

With the computerization of education all over the world, there are hopes to increase the effectiveness of the educational process, to reduce the gap between the requirements that society imposes on the younger generation and what the school really gives.

Thanks to the computer, the teacher gains greater control over the learning process, which reduces the degree of instructive introduction to learning situations and the need to replace passive illustrations with examples.

The use of computer software in the classroom can allow the teacher to: make thinking - visual, namely, to increase the level of visibility in teaching mathematics; increase the individualization of learning; facilitate the verification and analysis of various verification works; increase the interest and cognitive activity of students.

The leading goal of using multimedia equipment in the classroom is to achieve a deeper memorization of educational material through figurative perception, enhancing its emotional impact, providing «immersion» in a specific socio-cultural environment. This happens through the use of a multimedia projector, an interactive whiteboard and a computer that provides Internet access. Due to the size of the interactive whiteboard, the images are visible to the whole class, and this, in turn, is a way to focus and hold the attention of schoolchildren whose processes of excitation and inhibition are not balanced.

The interactive whiteboard will allow diversifying the frontal form of work and combining it with individual work within the framework of the traditional class-lesson system. She helps me get the message across to everyone in the class. This visual resource helps present new material in a very lively and engaging way.

Using the ability to move objects on the board, their grouping according to certain characteristics and in mathematics lessons, familiarization with the outside world. Recordings, color highlighting can be done directly on slides, on scanned documents. When conducting mathematical dictations “Test Yourself”, it is possible to use a timer from the menu of the board with a fixed time to complete the task, since students must learn to organize their activities in accordance with the regulations.

Role-playing games are actively used in interactive teaching methods. D. N. Kavtaradze identifies several types of role-playing games: a role-playing game in the form of a discussion and a special role-playing game, for which it is necessary to formulate and understand the meaning of the situation. Principles of role-playing game as a method of interaction between participants in the educational process. Firstly, the role-playing game provides for the participants to assume certain roles, the implementation of which requires them to have additional knowledge related to the adopted role. Unlike a business game, participants in a role-playing game have different goals and perform different roles that contribute to the formation of skills and abilities that help solve problems of professional self-determination. Secondly, the role-playing game involves the imitation of its participants in reality in verbal and non-verbal behavior. Thirdly, the interaction of the participants in the game is not only based on dialogue and polylogue , the presence of cooperation and partnership between the participants.

The organization of expedient interaction as a result of a role-playing game is considered impossible without observing its certain rules: the presence of roles; friendly, creative atmosphere; active interaction of all participants in the game.

Thus, in preparation for the game, cognitive skills to analyze, compare, draw conclusions, and the ability to work independently with additional literature are improved.

The main purpose of the business game is to model a certain managerial, economic, psychological, pedagogical situation and to formulate the ability to analyze them and make optimal decisions.

An analysis of the definitions of the concept of «business game» showed that in the pedagogical, psychological, sociological encyclopedic literature this concept is defined in exactly the same way and is a form of recreating the subject and social content of professional activity, modeling the systems of relations characteristic of this type of practice. Moreover, depending on what type of human practice is recreated in the game and what are the goals of the

participants, there are educational, research, managerial, certification business games. I would especially like to note the fact that only a sociological dictionary classifies a business game as an active learning method.

Discussion as an interactive teaching method, translated from lat. “discussion» means research or analysis. An educational discussion is a purposeful, collective discussion of a specific problem, accompanied by an exchange of ideas, judgments, and opinions in a group.

The effectiveness of using an educational discussion as a teaching method is determined by a number of factors: the relevance of the chosen problem; comparison of different positions of the participants in the discussion; awareness, competence and scientific correctness of the debaters; the teacher’s possession of the methodology of the discussion procedure; compliance with rules and regulations, etc.

Each discussion usually goes through three stages: orientation, evaluation and consolidation. Sequential consideration of each stage made it possible to identify the following features. The orientation stage involves the adaptation of the participants in the discussion to the problem itself, to each other, which makes it possible to formulate the problem, the goals of the discussion; set the rules for the discussion. In the assessment stage, the discussion participants speak, their answers to emerging questions, the collection of the maximum amount of ideas, proposals, the suppression by the teacher of personal ambitions of deviations from the topic of discussion. The consolidation stage consists in the analysis of the results of the discussion, the coordination of opinions and positions, the joint formulation of decisions and their adoption.

Another of the interactive teaching methods is the case study method. Students are presented with a situation related to the educational material on this topic and requiring a decision on a certain system of behavior in these conditions. E. S. Zair-Bek calls this method situational games. Several groups can participate in them, each of which develops its own version of the solution. When discussing decisions, preliminary reviewing, public defense of decisions, various ways of evaluating the results are possible. Depending on the purpose of use in the educational process, situations can be of a different nature: illustration situations, exercise situations, evaluation situations, problem situations, prognostic situations.

For students, periodic meetings at the “round table” with scientists, economists, artists, representatives of public organizations, educational and cultural institutions, government agencies, etc. are extremely useful and informative. Before each such meeting, the teacher invites students to put forward an interesting their topic and formulate questions for discussion. Selected questions are transferred to the guest of the «round table» for preparation for the presentation and answers. At the same time, several specialists involved in the study of this problem can be invited to the «round table». In order for the round table meeting to be active and interested, it is necessary to encourage the audience to exchange views and maintain an atmosphere of free discussion.

Signs of the use of interactive learning are also the following methods and techniques:

- Polyphony. This is an opportunity for each participant in the pedagogical process to have their own individual point of view on any issue under consideration.

-Dialog. The dialogical nature of communication between the teacher and students implies their ability to listen and hear each other, to be attentive to each other, to assist in the formation of their vision of the problem, their own way of solving the problem.

- Thinking activity . It consists in organizing the active mental activity of the teacher and students. Not the teacher’s translation of ready-made knowledge into the minds of students, but the organization of their independent cognitive activity.

- Meaningfulness . This is the process of conscious creation by students and the teacher of new meanings for themselves on the problem under study. This is an expression of one’s individual attitude to the phenomena and objects of life.

-Freedom of choice.

- Creating a situation of success. The leading conditions for creating a situation of success are positive and optimistic assessment of students.

- Reflection. This is self-analysis, self-assessment by the participants of the pedagogical

process of their activities, interaction.

- Creative tasks.

The inclusion of methods and techniques of interactive learning in the mathematics lessons helps to switch students' attention to the right moments, redirect their activities in a different direction, and focus students' attention on general relevant conclusions [3, 4].

There are also a number of problems in the implementation of education using computer technology, namely: technical problems, since many schools lack modern technology (portable computer classes); methodological problems, since there is not enough suitable training programs; resource problems, since most programs are only a technical tool; temporary programs, since the methodology has not yet been developed, it takes much more time to prepare for the lesson.

From the foregoing, it follows that in order to use computer technology in the classroom, it is necessary to overcome various difficulties, and before introducing any training programs, all the pros and cons of their use should be assessed.

Now let's look at other interactive methods applicable to the non-computer discipline in specific topics.

1. Round table (group discussions)

1.1. Matrices and determinants of the 2nd and 3rd orders (2 hours). Introductory speech of the teacher about the course of the lesson (5 min.), A group of students reports the main question (20 min.). Students are divided into subgroups (4–6 people) and they are invited to put forward for discussion the main methods for calculating the determinants of the 2nd and 3rd orders, to identify their pros and cons (10 min.). The teacher forms a number of questions for discussion and sums up (10 min.). There is a discussion of issues related to the rationality of each of the methods, the groups present their arguments (30 min.). The teacher simultaneously with the students asks questions and, observing the discussion, evaluates the students' activity, their knowledge of the methods for calculating determinants and the soundness of the arguments. The teacher sums up, arguing his conclusions (15 min.). Previously, a class of equations of a special form with a function of two variables was studied. These techniques were also transferred to systems of equations.

1.2. Systems of linear equations (2 hours) Introductory speech of the teacher about the course of the lesson (5 min.). Distribution of cards for grading groups. Three groups of students report the main question (5 min.). Groups are invited to prepare for a pre-announced question, based on the methods of Cramer , Gauss (matrix at the choice of students). The group brings to the discussion the main positive aspects of the proposed methods. Students evaluate the performance of competitors on a 10-point system. Group discussion lasts 15 minutes, 5 minutes each. after the performance of each group. Your group is not evaluated. The teacher forms a bank of questions for discussion and sums up (10 min.). There is a discussion of issues that have given a positive experience, each of the groups gives its own arguments. The teacher simultaneously with the students asks questions and, watching the discussion, evaluates the activity of students, their creativity and reasoning. The teacher sums up, arguing his conclusions (15 min.).

2. Business game

2.1. On the topic: «Complex numbers» (2 hours)

Work on the Internet (during the CPC process, a task is performed related to the identification of the main forms of complex numbers, their main properties and operations on them are determined). Preparation of presentations is carried out on 3 forms of complex numbers. A group of students highlights the main issue (20 minutes each). After the presentation of each group, the rest of the students and the teacher ask questions (5 minutes each). The teacher summarizes by making comments and arguing his conclusions (10 min.).

2.2. On the topic: «Equations of a straight line on a plane» (2 hours)

Work on the Internet (in the process, a task is performed related to the identification of various types of equations of a straight line on a plane and their derivation). Conducting presentations on various forms of writing equations of a straight line on a plane, a group of students covers the main issue (10 minutes each). After the presentation of each group, the rest of the students and the teacher ask questions (5 minutes each). The teacher summarizes by making

comments and arguing his conclusions (10 min.).

3. Case-study (analysis of specific situations, situational analysis)

3.1. On the topic: «Calculation of derivatives of complex functions» (2 hours)

The teacher talks about the procedure for calculating the derivatives of complex functions (20 min.), And then clearly demonstrates how such functions are calculated (15 min.). Students are divided into groups (4–6 people each), each group performs a task on calculating derivatives of complex functions (30 min.), Groups report on the work done (20 min.). The teacher summarizes by making comments and arguing his conclusions (5 min.).

3.2. On the topic: «Power-exponential functions and their differentiation» (2 hours)

The teacher formulates the task and gives explanations (15 min.). The teacher demonstrates that with the help of logarithmic differentiation it is possible to differentiate not only exponential functions, but also complex ones. The teacher gives handouts with tasks for calculating the derivatives of the above functions. Students are divided into groups (4–6 people each) and each group independently performs tasks (40 minutes), groups cover their calculation results (5 minutes each). The teacher organizes a discussion of students about the correctness of the calculations (10 min.).

REFERENCES

1. Georgopoulos P. Looking Inside the Brain: The Power of Neuroimaging. Princeton (New Jersey), Princeton University Press, 2015.

2. Malygina O.A. Formation of the foundations of professional mobility in the process of teaching higher mathematics // O.A. Malygina. URSS, 2010. 368 p.

3. Talyzina N.F. Management of the process of assimilation of knowledge // N.F. Talyzina. Moscow University Press, 1984. 345 p.

4. Tikhomirov V.M. Mathematics and its teaching at school, college and university // Functional spaces. Differential operators. General topology. Problems of mathematical education. RUDN, 2008. p. 94.