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THE ROLE OF MODERN INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING LESSONS IN MATHEMATICS AND COMPUTER SCIENCE

Abstract: this article describes software tools: training programs, training programs, monitoring programs, test programs, information and reference programs, their characteristic features and the appropriateness of use at various stages of teaching mathematics and computer science. The possibilities of using a computer in mathematics lessons are revealed.

Key words: software, methodology, stages of teaching mathematics, computer science, and computer.

Аннотация: в данной статье описываются программные средства: обучающие программы, программы-тренажеры, контролирующие

программы, программы-тесты, информационно-справочные программы, их характерные особенности и целесообразность использования на различных этапах обучения математике и информатике. Раскрываются возможности использования компьютера на уроках математики.

Ключевые слова: программные средства, методика, этапы обучения математике, информатика, компьютер.

In the third millennium, the role of information activity, and within it, the active, independent processing of information by a person, making creative, new decisions in various situations using technological means, is unusually increasing. This circumstance makes significant changes to the education system of secondary schools. One of the changes is related to the need to develop information and communication competence in schoolchildren. An effective means of developing this type of competence in students is the use of pedagogical software by the teacher in the learning process.

Pedagogical software tools (PPS) are training programs, demo programs, games, various kinds of tests, sets of tasks according to difficulty levels in the form of text files, etc.

For rational use, it is useful for the teacher to have printouts of the teaching staff catalog with annotations in the mathematics classroom; For storage, it is advisable to have an archive of originals and first copies of programs on floppy disks. When developing teaching staff, one should be guided by the main requirement - they must form a single program-didactic whole with educational information that is available in textbooks, teaching aids, and meet state educational standards in the subject.

Let us characterize and describe the methodology for working with certain types of teaching staff when teaching mathematics in secondary schools.

Training programs. They serve the purpose of presenting students with any new information and organizing the process of assimilating it. The program must

take into account the initial level of knowledge, skills and abilities of students. The structure of such a training program usually includes the following blocks: registration of entry into the program, initial control, presentation of the material in small doses with exercises and step-by-step control of assimilation, final control, statistics block

In mathematics lessons, the teaching program can be used by students when learning new material, at the stages of primary consolidation and training repetition. It should be noted that at the stage of training repetition, the teacher usually uses training programs in working with low-performing students or with those who have gaps in the material under consideration for some reason.

Training programs. Their goal is to practice one (or a small number) of skills on a fairly large set of tasks of the same type with limited time working with the program. Program structure: registration of entry into the program, initial control, stage-by-stage presentation of exercises (with systematic control of correct execution), intermediate and final control, statistics block.

Such programs are used in skills development lessons and at the stage of generalizing and systematizing repetition. It is necessary to highlight the requirements for this type of program: they must evaluate the result and, in case of an incorrect answer, demonstrate the correct answer; give a final assessment with a comment and, if possible, give the material a playful character, especially in mathematics lessons in primary school.

Monitoring programs – their goal is to check the results of students' assimilation of certain material. As a rule, the student is given a task (a list of questions, a system of tasks), each answer is evaluated by displaying a response on the screen; if the student makes a mistake, the program allows you to enter a new answer; after the second error, the correct answer is displayed on the screen and the transition to the next question occurs. Based on the results of the work, generalized information is displayed: the total number of questions, the number of correct answers, assessment and recommendations for the student.

Control programs are used at the stage of corrective repetition, as well as for intermediate control.

Test programs. The class of programs is quite wide. These programs are used with great success by teachers of specialized schools at the stage of career guidance.

Finding the correct answer when working with such programs requires students to be able to systematize material and search for patterns from a limited set of data, which is undoubtedly important when teaching mathematics. The greatest value of tests lies in the formation of certain creative skills. When compiling test programs in mathematics, the goal most often is to develop and determine the level of generalized knowledge in solving basic basic as well as non-standard problems.

The structure of the test program is similar to the structure of the simulator program, however, the degree of correctness control here is stricter (the answer is entered only once).

Information and reference programs have become a necessary companion for a student in a 21st century school, the purpose of which is to store a large amount of information and provide quick access to its individual units. When teaching mathematics, such programs can replace explanatory dictionaries, reference books, encyclopedias, etc. This is especially true at the stage of generalizing and systematizing repetition, when material studied by students over several years is considered. In this regard, the ability to connect school computers to powerful data banks and obtain hard copies is very promising. Widespread use of such programs is possible at all stages of schoolchildren's education.

Simulation programs. The goal is, using a computer, to reproduce the course of physical, chemical, biological, technical experiments in the form of computer simulation, to explore the properties of a certain mathematical model obtained as a result of the formalization of an educational task.

Such programs can be used when studying new material (applied problems are demonstrated, showing the feasibility of introducing new mathematical concepts), at the stages of deepening and generalizing-systematizing repetition. When working with modeling programs, it is important that the student can control the progress of computer modeling by changing the process parameters. This contributes to the development of students' research skills and encourages them to make independent decisions when working with creative problems.

Software tools. They ensure the execution of operations that arise in educational practice, for example, compiling tables, word processing.

In elective mathematics classes, you can use the program for finding prime numbers given by V.S. Malakhovsky in his book [1]. The problem of finding prime numbers has been of interest to humanity since the time of the school of Pythagoras, and interest in it continues today. Since 1957, computers have come to the aid of people in solving this problem; by demonstrating a program for finding prime numbers, the teacher has the opportunity to introduce students to the history of solving this problem, which is of great educational importance.

Game programs

1. Trainers, their goal is to teach some knowledge, skills, and ways to solve problems. They can be used in any lesson if the didactic goal of the game program corresponds to the didactic goal of the lesson.

2. Entertaining. They are used outside of school hours to fill students' leisure time.

Currently, the process of teaching mathematics is not complete without the use of a computer.

Naturally, a computer cannot replace a live teacher. But it will help make his work easier, interest students, and provide a more visual, completely new perception of the material, so a modern mathematics teacher needs to master the methodology of using a computer in the process of teaching mathematics.

We will show the possibilities of using a computer at different stages of learning mathematics.

1. When learning new material.

A). The computer can be used as a part of the lesson after the teacher's lecture to provide feedback on the mastery of the material.

b). Independent work of students to study new material using a computer:

– the teacher informs the topic of the lesson, the goal (what the student must learn), dictates the questions that the students must answer after mastering the material;

– students, 1-2 people each, work with the training program and independently study the topic;

– the teacher conducts an initial reinforcement repetition of the material (frontal survey, final interview, oral test).

V). Deepening knowledge on a new topic:

– the teacher explains new material;

- independent work of students with a computer into which the educational program is loaded, i.e. there is a secondary repetition of new material in order to understand it more deeply and remember it.

G). Differentiated learning.

The teacher prepares in advance pedagogical software (PPS), containing various options for systematized tasks. If some of the students approached learning a new topic earlier, while others are not yet ready for this, then a program teaching the new topic is loaded into the computer, and the strong students move forward, and the weak ones work with the teacher on the old material.

2. Testing knowledge, skills and abilities.

Along with the method of oral questioning (traditionally), a condensed survey is used (using computer technology (CT)). Control programs are compiled in accordance with educational standards. Students complete the exercises in a

notebook, only the answer is entered into the computer. The teacher needs the records to identify gaps and errors .

Checking homework: first, the teacher finds out from the front what results have been obtained, then, using CT, he organizes the individual work of students to complete tasks similar to homework. Such work in a mathematics lesson has a double effect:

- the teacher has the opportunity to check the independence of doing homework;

- students repeat the material and improve their skills.

Controlled independent work using CT allows the teacher to take an individual approach to students and free them up in the lesson, freeing up time for individual work, as a rule, with low-performing students.

3. Consolidation of knowledge and skills.

At this stage, it is advisable to use training programs, monitoring programs, and test programs. The following organization of work in a mathematics lesson is possible:

A). Each student solves a problem on a given topic and chooses the level of difficulty. Then those who completed the first task correctly receive the next one, the rest, together with the teacher, sort out the mistakes made.

b). Training “in twos” – weak and strong, the program is designed for the average, but the strong are given an additional task.

V). The teacher has three programs: for average, weak, strong. The class is divided into three groups. The weak and average work on the board with a teacher, and the strong work on the computer. Then the average ones switch to computers, and the strong ones are offered a creative task. Later, the weak take a place at the computer. It should be noted that such organization of the teacher’s work will require great skill from him.

From the above we can conclude that the use of computer technology in the process of teaching mathematics:

- arouses the interest of students;
- brings variety and emotional coloring to the lesson;
- develops students' attention and intelligence;
- promotes intensification of learning;
- allows the teacher to carry out differentiated teaching.

With the help of information and communication technologies, the path to a new world of knowledge is opened, and the opportunities for self-development and self-education are expanded. As part of improving independent work skills, schoolchildren prepare reports, abstracts, and presentations on a given topic; develop group projects

It has become relevant to hold electronic conferences of various types: real-time conferences; teleconferences – time-delayed discussions.

Thus, the use of computer teaching technologies makes it possible to modify the entire teaching process, implement a model of student-centered learning, intensify classes, improve students' self-training, thereby preparing students for further self-education.

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