Using the computer as a tool in teaching mathematics in school

Manal Alamry

Review of the Literature

The thesis is devoted to the using the computer as a tool in teaching mathematical systems in school. The paper considers the possibility of computer mathematical systems, identifies didactic principles of application of computer mathematical systems in teaching mathematics, particularly the process of teaching mathematics with their application. Over the past few years, personal computers have become firmly part of our daily lives. In our country, as well as throughout the world, there is a crowding out "manual" mental work computer. The result is a change in the situation on the labor market. One of the main requirements in employment becomes the ability to use a computer. Such a demand is made, and the secretary and accountant, and the editor, and all other professionals. In this regard, the development of computer technology comes to school in order to graduate soon could decide in life.

In order to effectively use a computer, it is necessary to have practical computer skills, must be able to hold effective ready-made programs that allow solving very different problems. The use of computer technology in the teaching of mathematics concerned with the many teachers today. Despite the unfolding in recent years, "computer boom", opening up before us as the prospects for the application of computer technology, and the difficulties associated with this issue. There are different opinions about the feasibility of teachers of computer technology in teaching mathematics. In addition, the school used mainly class-lesson and lecture and seminary form of education that exists in virtually unchanged for a long time. And the learning process and even the assimilation of educational material at the same time are influenced by the professional and personal qualities of the teacher.

According to Bai, Pan, Hirumi, & Kebritchi (2012), children prefer to work at a computer with a friend, rather than alone. There are more spontaneous assistance and training provided by peers. Indeed, we believe that it has some reason, but we have to see both sides. It is true that it is easier for young students to get out of any problem with the help of a friend. Therefore the fact of working in pairs allows students' help one and other and be discovering new things. A student can learn from the other and vice versa. That's why the fact of working together is beneficial to create social relations, but also to be able to provide assistance. Furthermore, the fact of working with a friend can also cause the effect of excitement and spillover of the workshop.

Bai, Pan, Hirumi, & Kebritchi also believe that the choice of software greatly influences social relationships: open software, allowing for example the construction of forms geographies, encourages collaboration while video games with aggressive content lead the competition and aggression. He experienced educational software ADIBOU when we were in preschool and, indeed, collaboration is required. We could easily play two or three and it was done very well. We each answered our turn to questions or riddles and the mouse was happening for years. We also were helping our peers make a successful turn. In addition, the software environment is very important since young may be influenced by the latter. For example, in ADIBOU, the environment is the immediate living environment of children and shows no darker side of life. While in a war game; violence, wickedness and evil are demonstrated. What we want to say is that the software can influence the social development of children since these are placed face a situation they believe appropriate. Bai, Pan, Hirumi, & Kebritchi said that the physical environment also affects social relations; placing computers near the other promotes the exchange of ideas and collaboration. This can also make sharing strategies that much key competence: build understanding of the world (. In short, the use of the computer in a preschool class promotes social development of children through its interactions with peers, exchanging ideas, sharing strategies and collaborative purpose.

Second, the study of the effects of computer use on cognitive and metacognitive development of the child has two aspects: it is, firstly, to examine the learning made possible regardless of the software used and, secondly, to clarify the usefulness of the computer as a tool. According Wachira, & Keengwe (2011), the effects of the computer on the development of children would do better in the following areas: - manual dexterity; - Verbal and non-verbal skills; - problem solving; - Abstraction; - Ability to conceptualize; - Communication skills and cooperation. Children learning lie more easily in above contexts. Indeed, when the child uses the computer, he needs his hands to type; let the mouse, which is developing the manual dexterity. Verbal and non-verbal skills are also developed when the student communicates with the computer or when talking with peers. Communication and cooperation are also part since the user of the tool discusses with his teammates, with people who are on the same set of network, etc. There is also the problem solving that is affected with respect to software provided for this purpose. The child may develop abstraction, when using the computer, since it focuses on what product or what he plays.

The conceptualization also worked on the computer because the student is taken to build, in order to produce, a realization or to complete a project. These are elements affecting cognitive and metacognitive aspects that can develop through the proper use of the computer. Other research shows that children who have used the computer gains in terms of self-esteem, feelings of competence and attitude towards learning (Wachira, & Keengwe , 2011). Indeed, the fact of feeling powerful in the use of the tool allows students to feel confident. The student may feel more comfortable learning using the computer. This may also encourage a taste for learning. The computer as a tool allows students to enhance their learning. As in the case of reading, the computer turns used in teaching and learning situations (Wachira, & Keengwe , 2011).

The computer can use as a tool promoting the integration software Logo, with commands such an advance, RECULE, RIGHT and LEFT, to visualize different concepts. This tool also allows writing texts and creating graphics. This allows, in our view, to develop children written language concepts and the concepts related to language. As for knowledge related to cognitive development, the student can use the computer; run the arts using a drawing program, for example. In terms of mathematics, several software programs are available to encourage the learning of number games, enumeration, associations, geometric shapes, comparison, clustering, and classification. The point of view of science and technology, computer games to experiment may be available without forgetting that the use of the computer itself is an activity related to science and technology (Cox, 2013). The concepts of time, space and quantity can be operated using various computerized educational games.

Today, there is a number of software packages designed for performing calculations on the PC and focused on the use of appropriate mathematical methods. The numerical calculations, depending on the class of tasks dealing consuming and requires a good mathematical training, so these packages are of great interest to the users. Their main advantage is the ability to choose not only the pre-programmed algorithm and method of solution which allows good way to control algorithm solutions or move to another depending on the initial data of the problem.

Wilensky, & Stroup, (2013, April), summarized his experience with the computer to stimulate students' interest in the study of mathematics, enhance their cognitive activity in the classroom in terms of increasing mental workload. According to the authors, it is advisable to use the computer in the following cases: diagnostic testing quality learning material; in the training mode to practice basic skills after studying the topic; in the training mode; when working with slow learners; self-learning mode; mode graphics illustrate the material being studied.

Beatty, (2013) writes about the stages of the application of information and communication technologies in their work, among them - the preparation using a computer simple teaching materials, lesson plans, calendar and thematic planning, etc. Beatty writes that such lessons are becoming more intense, effective and provide an opportunity to develop students' interest in the subject, cognitive activity, and creativity (Beatty, 2013). Beatty emphasizes: that lesson using computer presentations constantly evoked interest among students, improved the quality of knowledge, it is necessary to comply with the requirements for the creation of presentations.

L. Naumov, focusing on the relationship purposes of the application of multimedia tools and teaching methods, reveals the features of the use of multimedia tools for problem presentation, partially exploratory research and teaching methods. In addition, it highlighted the problem of clarity, in particular, possession of teacher skill to determine the need for and adequacy of visual aids in the classroom to achieve the goals of education.

Trouche, Drijvers, Gueudet, & Sacristan, (2013), show that university professors have been reported among the advantages of the use of computers in teaching higher mathematics the opportunity to visualize the image data, the speed and accuracy of calculations, a variety of methods of presentation of educational information, improvement of information culture of students, a wider range of applied learning tasks, increasing interest in the study of mathematics, increased self-activity of students. Among the difficulties in using a computer in teaching higher mathematics the most significant, according to the interviewed teachers, is insufficient scientific and methodological developments and programs in mathematics with a computer, computer literacy of teachers and the quality of training programs.

The emergence of integrated software tools with the ability to automate management of the learning process allows us to introduce new forms of learning and knowledge control, combining traditional teaching methods with the advantages of using computers (Tsuei, 2012). However, to address the implementation of computer-based training is necessary to address issues of educational institutions equip computer hardware and software, as well as the problems of developing methods of using software tools in the learning process. Most of educational software designed for computer support courses of various subjects, including mathematics course, is highly specialized in nature and therefore not widespread.

In recent years, the use of computer technology has undergone significant changes, the main outcome of which can be regarded as an approximation to the end-user computer. The appearance of the application software of a new generation allows for a new approach to the interaction between user and computer, which does not require the intervention of intermediaries in the face of a system analyst and programmer, formerly made up the two intermediate link in the chain of human computer; disappears the difference between software developers and methodological support and its users (teachers and students of mathematics). In other words, every teacher a real opportunity to develop its educational software products, adapted to the specific learning task.

In particular, this group of software is universal mathematical packages symbolic and numerical computation (computer mathematical systems): MathCad, MathLab, Mathematica, Maple, Derive and others. Direction associated with their use in the process of teaching mathematics, it seems quite promising (Nickerson, & Zodhiates, 2013). Using computer mathematical systems, characterized by high levels of computational and graphical tools (as well as means of programming a new type) and has a high adaptability to the level of preparedness of the user in the field of computer, allows to expand the area of application of information technology in the learning process, to extend methodological horizons of teaching mathematics in schools and teacher high school, solve a number of problems encountered in traditional training.

Consider the five major teaching functions of the computer in the teaching of mathematics.

1. Exercising when students are offered sorted by the difficulty setting.
2. Electronic board, the use of multimedia - projector in math class.
3. Simulation.
4. The study, when the number of proposed options for a student chooses, arguing its own decision.
5. Mathematical calculations in the course of other disciplines.

Of course, the implementation of all these functions requires a great work as teachers, engineers and programmers.

1 INTRODUCTION

Using a computer in mathematics lessons promotes vigorous activity of students. Internal PC formality, strictness in complying with the "rules of the game" with the fundamental knows ability of these rules contributes to greater awareness of the educational process; increase its intellectual and logical level. The computer is both an assistant and supervisor at the stage of training exercises. A huge variety of roles in the educational process of the computer is basically a combination of three main functions: the computer as a tool, the computer as a partner computer as a source for the formation of the situation. It helps to a large extent to the teacher during the lesson, making his relationship with his students more human.

First, the computer locks up most of the control functions and responses to student errors. Errors mercilessly recorded by computer, are largely private affair of the student. The teacher is freed from the need to identify weaknesses in students' knowledge, his attitude towards children become more positive. Secondly, a computer with a student entering into partnerships, frees teachers from the need to maintain the pace and tone of each student. In this way the teacher gets more opportunities to see the situation in the class as a whole or to pay attention to individual students. All this is done only in cases where the lesson is well equipped technically and methodically provided and the teacher, not by constraint, and is fluent in the general skills of the computer. Use of new technologies makes it possible to make the teacher in the educational process a variety of new forms and methods of making the lesson more interesting. However, to prepare the lesson using computer technology, it spent a lot of time and effort to do so.

Information technologies allow students to give students the opportunity to themselves in the process, regardless of the teacher to learn a new concept to notice a pattern, put forward his own hypothesis to feel like there are mathematical questions. Students in mathematics lessons analyze the condition of the problem, and then solve it. However, a similar problem to "control" the class many

students cannot solve. And this is understandable: in the classroom, they relied on the guidance of the teacher, and to organize their own actions cannot be enrolled. And if the traditional teaching a teacher has the ability to judge the correctness of each of the students in the class primarily by the final result, after the work of students assembled and tested. So when using computer technology teacher has the ability to control each step of each of the students in the class. For example, when working with the program "Mathematician" (Cyril and Methodius) can be in the "Training" and "Tasks" to create "bookmarks", breaking all the issues and challenges on topics essential to the teacher in this class, at this stage of the study Themes and for each student individually, which is a great advantage of this program. This program is designed for the individual characteristics of students, allows Started - thief in your own pace each student. Independence and activity helps students self-learning opportunities work on the screen. The teacher can model the problem of mathematics for the "weak" and "strong" students during independent work, dividing the tasks for the different variants of complexity.

2 METHODOLOGY

The methodology of using computer mathematical systems in the learning process should be based on information modeling. Information model is an analog circuit structure symbolic system of a particular component of the cultural, social and natural reality created by the informatics. At the heart of any conception of the use of information models in the learning process is the use of specific software; when teaching mathematics is the most effective use of computer systems as mathematical software, the most integrated with math. Methodically learning process is proposed to build the traditional lectures, seminars, laboratory work. The lectures are used computer demonstrations and computer problem solving. The workshops used a computer problem solving, best - based on the ready-programmed in computer mathematical systems advance solutions supporting tasks on this topic.

Ferguson, (2014) developed methodological training model of higher mathematics in the first year university course and technical profile with computer mathematical systems. In this model, the study of higher mathematics course basic theoretical knowledge of the student receives a lecture. They are in the nature of general and show the structure of the material being studied. Laboratory work using computer mathematical systems help indicate the general formulas for solving a certain class, help set the general properties of the objects under study, and so on. At the workshops are considered special cases specified individual properties, solved some examples are considered separate tasks within a common method of solving tasks of the topic. Thus, the students begin to study with the general, and then proceed to the consideration of individual cases. As the results of studies Ferguson, (2014), if laboratory work on the basis of computer mathematical systems as a link between the relevant lectures and practical training material to the higher mathematics course in high school rises to a higher level of quality. According to Ferguson, (2014), without mastering the skills of using computer mathematical systems is impossible to solve math problems using a computer; at the same time, it is impossible to acquire computer mathematical systems, not knowing basic mathematics. Thus, there is need for a parallel study of computer mathematical systems and higher mathematics course.

Meerbaum-Salant, Armoni, & Ben-Ari, (2013) set forth requirements for the content of training with computer mathematical systems, to the activity of the teacher and student; reformulated didactic principles for the process of learning higher mathematics with computer mathematical systems.

Meerbaum-Salant, Armoni, & Ben-Ari, (2013) notes that the lack of familiarity with the systems of symbolic mathematics professors leads to an incorrect assessment of the significance of such systems: some teachers believe that the system of symbolic mathematics wean pupils and students from the analysis of the mathematical nature of the problem, but this opinion is not sufficient due to a deep familiarity with the opportunities and principles of computer mathematical systems.

At the same time, as shown by analysis of the literature, teachers using computer mathematical systems in teaching mathematics, note improvement of mathematical preparation of students compared to teaching mathematics without the use of computers; differences in the level of mathematical preparation of students using different technologies in teaching mathematics computer mathematical systems analyzed. However, there are a number of contradictions related to the mathematical training of future teachers in mathematics, among which the following are essential:

- Between the rate of development of information technology and the state of mathematics teaching in the modern pedagogical high school;

- Between the possibilities of using computer mathematical systems in teaching mathematics and insufficient scientific and methodological developments (Lee, Waxman, Wu, Michko, & Lin, 2013).

- Between the need to develop computational skills of the students and the students practice the use of computer mathematical systems at independent problem solving;

- Between the need to develop the students' ability to build algorithmic models for solving a mathematical problem and a significant amount of computing that impede the realization of the model structure.

Goldsmith, Doerr, & Lewis, (2014) explains the classification of computer-oriented tasks, proposed the implementation of an optional course with Derive environment for solving mathematical problems in high school.

Goldsmith, Doerr, & Lewis, (2014) the methodical bases of use of Mathematical in the teaching of mathematical disciplines (for example, a course of differential geometry) in pedagogical high school. Goldsmith, Doerr, & Lewis, (2014) identifies three areas of the learning process associated with the use of computer mathematical systems in the educational process on physical and mathematical faculties of pedagogical high schools:

1) Preparation of system users;

2) application of the system in the disciplines of physics and mathematics cycle during lectures, practical and laboratory studies, as well as for the organization of independent work of students;

3) Application of the system in the process of teaching and research, and the research work of students in the preparation of projects and dissertations, as well as in the work of students' scientific circles and problem groups.

Methodically learning process is proposed to build the traditional lectures, seminars, laboratory work. The lectures are used computer demonstrations and computer problem solving. The workshops used a computer problem solving, best - based on the ready-programmed in mathematical system advance solutions supporting tasks on this topic.

The terms of methodological and pedagogical problems that can be solved by a computer, various. Computer - a universal media - GUSTs, it can be used as a calculator, simulator, controls and assessment and modeling tools, besides it - the perfect electronic board. An important methodological problem in terms of the use of the computer is to teach - of the tasks, as well as some of the basic mathematical algorithms (Gibson, Stringer, Cotten, Simoni, O'neal, & Howell-Moroney, 2014).

Mathematics teachers are able to use at various stages of a lesson with a commercially available program. However, the disadvantage of these programs is that there is no manual, and as no guidelines (Howson, A.G. et al. (1986). It can be concluded that using information models enables the teacher to:

- ☐ to dismantle the material, using the clues and text ano - Nicky, to expand knowledge of the directories;
- ☐ carry out the control students;

make an individual training program for each student.

learn to use effectively prepares programs allow to solve very different problems.

Consider some of the types of lessons learned from the use of information technology. For our PC in the classroom mathematics can be used in demo mode, individually and in remote mode, individual mode.

1. Using your computer in demo mode:

at oral account, when at the beginning of the lesson through a multimedia projector solution held various jobs;

in explaining the new material when the teacher demonstrated through multimedia projector new material;

checking homework, through multimedia projector;

When working on the bugs, etc.

2. Using your computer in an individual mode:

at oral, individual account;

when fixing;

during training;

when developing Zun;

the repetition;

in control, etc.

3. Use your computer remotely, individual mode:

in research activities;

in design activity of students;

checking homework;

checking the control work, etc.

You can bring the minimized Table 1 based on the use of information technologies at different stages of a lesson of mathematics

TABLE 1

MAIN BLOCKS STEPS LESSON	1	2	3	4	5	6
Start lesson	The mathematical-cue dictation	cue poll	Interpretation by using a computer	Discussion perform	Inter-poll	"Yes, Netcom"
Explain - of the new material	Problem dialogue with a computer	Attractive Nye goal	Amaze	Practicality theory	Report	Catch Error!
Fixed - set, training, skills	Catch error! using a computer	Working off skills in dealing with examples and problems	Train. work with computer	Interpreting programmable poll	using compute	Game Training with use. PC
Repeat-set	Repeat with the control	Poll-up with a computer	Talk	"Yes, Netcom"	Repeat with extension	His examples
Control	Poll chain	Nye is independent work with a computer	"Yes, Netcom" using the computer	Mathematical. dictation using the PC	Training test	Selective control with using of a computer
Homework	Specifying an array	Three levels of d / s	Creation It works for the future	Extraordinary ordinary	Particular reference	The perfect job
End of lesson	Poll-up	Talk d / s	Summing up	Play-up	The role of psychologist	Delayed

3 GENE. A. METHODS OF TEACHING TECHNIQUES.

Thus, from the table we can see that almost every step possible to apply the lesson of mathematics teaching programs and computer technology.

The null hypothesis for the Spearman rank correlation will be that there is significant correlation between using the computer as a tool in teaching mathematics in school. The more the students use the computer as a tool in teaching mathematics, the more student gets good grades. The alternative hypothesis is that there is no significant relationship between the computers and mathematics, therefore after testing it is not proved.

Null hypothesis is approved in this experiment. With the experiment, it is found there is a great importance of computers in the field of mathematics. The reliability and validity of the results of the study provided support for the main provisions of the methodological, psycho-pedagogical and scientific-methodological research agreement between the theoretical and empirical methods goals and objectives of the study, a combination of qualitative and quantitative of the data analysis, the results of experimental verification of the hypothesis on the basis of application of methods mathematical statistics (Kilpatrick, 2014).

Consider the use of computers in the classroom algebra and analysis in 11 classes on the topic.

Stage 1; Organization of group work class and individual work of students at the same time.

One student at the blackboard Resch l own the card, two students work at a computer as if m and cards. The rest of the guys were working in the group on schedule.

Stage 2: Verification work

Team leader followed the work of the group, helps teachers evaluate students' work.

Stage 3: Conclusions.

Summed up the work of the children in each group, work individually and those students who worked individually at the computer on the cards. Work on the computer showed some graphics functions they succeed and the results of finding the area of a curvilinear trapezoid.

Work student, working on a computer on the card №1.

Calculate the area of the figure bounded by the graph of y = x 2 + 1, y = 5, x = 0, x = 2.

y = x 2 + 1 - the graph is a parabola, the branches are directed upwards, a> 0.

y = 5 - // line Ox.

y = x 2 1 y = 5: The area of the curvilinear trapezoid is equal to (kv.ed.).

Work student, working on a computer on the card №2.

Find the area of the figure bounded by the x-axis and the parabola y = 1 - x 2.

y = 1 - x 2 - graph is a parabola, the branches are directed downwards, and <0.

At this stage of the lesson students had to apply existing knowledge to work with the computer and the ability to find the area of a curvilinear trapezoid. Students should be able to work with the program of the Microsoft Excel, plot functions, to make the conversion. Mathematical problems of a creative nature, different ways of their solution, and develop mathematical intuition. Solution of various problems, not only gives you the opportunity to develop the knowledge, skills, but also a learning experience research (Kay, & Kletskin, 2012)..

Teaching mathematics at secondary schools with the computer provides the basic concepts:

modeling and the study of geometric objects;

automation graphic works;

develop students creative thinking and forms a new type of thinking aimed at selection of optimal solutions;

prepares students to practice;

Generates skills in the use of information technology.

School math teacher applies the lessons of the new information technologies, on the issue seminars, methodical association of teachers. Teachers exchange experience on the use of computer technology in mathematics lessons. Open lessons were given in 9 class on "quadratic functions" in the 7th grade on "Formulas of abridged multiplication." In the 9th grade teacher Orlich, Harder, Callahan, Trevisan, M., & Brown has demonstrated the use of computers by repeating the theme "The quadratic function." At the beginning of the lesson the class offered by electronic textbooks repeats the theme "The quadratic function" (quadratic function: definition, recording formulas, properties, graphs, quadratic inequalities definition graphics solution of inequalities). Individual work was shown two female students at the computer where the student is plotted in the program of the Microsoft Excel. At the end of each lesson was learning assessment on this topic, answering the test questions on a computer.

Thus, in the open lessons it has shown the use of computer technology in the beginning of the lesson at oral account, by repeating the covered material. It demonstrates how to use the computer while fixing new material during the test. Students possess great computer skills, answer questions and receive test scores for an answer. Use of new technologies makes it possible to make the teacher in the educational process a variety of new forms and methods of making the lesson more interesting.

Consider a table that shows the types of training situation, the basic concepts, and the level of understanding of the methods of teaching the doctrine, how much time a teacher with Petersburg school. Lesson algebra using computer technology on "Square roots" Grade 8;

Number	While	Types of learning situation	Basic Concepts	The level of understanding	Methods of teaching exercises
1	1 min.	Organizational aspects,	Greeting	Perception	Briefing
2	2 minutes.	Ad targets, themes and structure of the lesson	Computer testing.Square roots.	Memorization	Visual aids on the board and the computer. Conversation.
3	1 min.	Motivation exercises	Individual and group competition.	Understanding	Conversation.
4	1 min.	Message Homework	Individual formed independently.	Understanding	Oral instruction and active listening.
5	7 min.	Update of the support of knowledge	Reference to the main formulas and definitions.	The ability and understanding	Front with a computer directory.
6	2 minutes.	Motivation exercises	The study of mathematics is necessary in life.	Understanding	Testing. Justification of the chosen answer.
7	10 min.	Application of knowledge in standard situations.	Test - an alternative answer.	Ability	Reasoning and decision-making.
8	1 min.	Understanding the content and consistency of action.	Independent selection of the level of complexity of tasks testing.	Understanding	Reasoning and decision-making.
9	15 min.	Separate performance of tasks under the supervision and with the help of a teacher.	Application of knowledge and skills relating to the work at the computer.	Skill and knowledge transfer	Computer testing - to select the correct answer. Technical assistance of the teacher.
10	1 min.	A report on the results of pupils	Computer scoring and exposure assessment.	Ability	Displaying its evaluation and the number of points.
eleven	1 min.	Collection of assignments	The summary table ranking point of all students	Perception	Tabulation of results.
12	3 min.	Summarizing.	Revealing the winner of the group.	Perception	Award winners

Students have the opportunity to correct the error in the process, not tinkering with it again. To carry out the lessons of mathematics, algebra, geometry, or at a higher level with the use of information technology requires precise organization of each phase of the lesson. Such an organization can be achieved by using algorithms on the lessons of each step the job as students when working with a computer environment can not immediately remember the entire commands menu (Goldsmith, Doerr, & Lewis, 2014). Algorithms developed by the teacher and distributed at the beginning of the lesson. Use of information technologies applied to the elective classes in mathematics, students in research activities. Children create designs in algebra and geometry. Projects provide an opportunity to develop logical, creative thinking, spatial imagination of students. Students themselves an opportunity to create shapes, convert them to construct various objects (Tsuei, 2012).

A special form of virtual design is a presentation of the project. During the presentations of lessons attention is drawn to the development of students' abilities: to formulate problems, think and talk about their actions and to evaluate them, pose the problem yourself, clearly and concisely explain the essence of the activity, to draw conclusions on the results of the work done. To maintain interest in the subject of mathematics, for the development of cognitive abilities is advisable to use material related to the history of mathematics (Feurzeig, & Roberts, 2012).

4 ANALYSIS

Educational programs as part of the formation of knowledge and skills of student. Educational computer program is implementing one of the most promising applications of new information technologies in teaching and learning mathematics. They allow you to give illustrate important concepts of the mathematics at a level ensuring qualitative advantages over traditional methods of learning. They are based laid a substantial increase visibility; enhance the cognitive activity of the student, a combination of mechanisms verbal - logical and creative thinking. Traditional knowledge of the requirements for training (remember, to be able to reproduce) is gradually transformed into requirements to basic skills such as information search of knowledge (know how to find and apply in solving certain classes of problems) (Meerbaum-Salant, Armoni, & Ben-Ari, 2013). As we have already found that computer programs can be used at any stage of learning activities: the study of new material, fastening on summarizing lessons and repetition. The task of the teacher is to organize the work.

For example, we know how hard are the first lessons of solid geometry in the 10th grade, as most guys are not formed spatial imagination, they "do not see" the spatial properties of geometric figures. At this stage, it is the first lesson provides invaluable help, tutorial on geometry "Stereometry. Open Mathematics "(Physicon): This program helps to visualize spatial figures, which can determine the properties of the shape. It gives vision of the figures as geometric objects, is a model that can be moved in the space, watching the interaction of all the elements that make up this geometric body (Gibson, et.al, 2014). Formal concepts and design geometry are filled with factual and descriptive content. Less use of this program is that it does not operate on the network. Therefore, it can be used in the classroom, as a variant of individual jobs, especially in the study of one of the most difficult topics: "The combination of geometric shapes" for weak student's by-step solution for strong by control task.

Teacher secondary school №.4 held an open lesson in grade 10 on the topic: "The angles between the straight lines and planes." In the explanation of a new material class Natalia was performed using a computer program which is used 'TeachPro Mathematics" for pupils and students (Lee, Y. H., Waxman, H., Wu, J. Y., Michko, G., & Lin, G. (2013). The multimedia course is on CD - ROM. Before viewing the lecture material, followed by the dynamic illustrations of teacher directs students to the fact that after watching the fragments they have to answer the following questions:

1. What is called a dihedral angle?

2. What elements of the dihedral angle, you know?

3. What is called the measure of the dihedral angle?

4. How to build a linear dihedral angle?

This program allows students to get acquainted with the new material, to see and hear answers to teacher questions. When working with the program the student have to repeatedly move from one level of geometric thinking to another, for example, from the visual to the descriptive, or vice versa. When these transitions student shows and develops their understanding of geometric and "vision".

In the study of new material to explain some portion of the lecture material, after clarification of the teacher, students can begin to work independently with the program "Algebra 7-11" (Kudits) by selecting the desired topic. Great visual material, clarity, clarity, varied

layout of the text on the screen - all this increases the effectiveness perception. The color corresponds to the color of the program its functional purposes. However, a large set of commands to use the complexity of the keys may impede independent educational FAD; the program requires preliminary work by the disk data entry from the keyboard, and some experience. But that does not stop the kids enthusiastic and avoid routine solutions of examples in your notebook.

In studying the topic "trigonometric conversion," you can use the "not Trigonometry Honors" when the student after meeting with the theory begins to disassemble the tests. If necessary, it can test the response, or to read the theory, see diagram or decision. Each student works at own pace, and only mastered one task, will move to the next (Ke, 2013). Form of training for this "program" is an individual work with varying degree of autonomy. The program is easy to use. The student is familiar with the technology; working on the computer can work without a teacher, because the program has a large amount of tips.

Kay, & Kletskin, (2012) states teacher shares her experience on the use of computer technology in mathematics lessons. The main task that the teacher put in front of him was: "to show students the opportunity to use the computer as a means of learning and development." Kay, & Kletskin, (2012) writes: "The teachers of our school have gained considerable experience in the use of information technology in the mathematics classroom. By decision of the scientific-practical conference "Informatics-1999" announced a pilot school for the implementation of IT in mathematics. The opening of the school on the basis of our experimental methodological platform gave us the opportunity to expand cooperation with methodologist's teachers of mathematics and computer science teachers GMTSIT our school to research and develop the theoretical and practical bases of effective use of computers in educational activities. The most effective use of our math teacher PC motivating the introduction of a new concept; demonstrations; simulation; working out specific skills; control of knowledge; the organization of research activity of pupils; Integration of subjects of natural-mathematical cycle. Teachers at the school are using different types of lessons using information technologies: lessons, discussions with the computer as the visual aids; Lessons productions and research; Lessons of practical work; Lessons-credits; integrated lessons, etc (Dörfler, 1993).

The publication, "From the experience of the pilot school №28 teachers on the use of information technology in math class," which presents the detailed design of various types and kinds of lessons using computer programs. The teachers of the school have participated in scientific conferences which we talked about his work on the application of information technology. In order to determine the effectiveness of the use of computers in teaching each year we monitor the quality of education, a survey that allows you to make the appropriate conclusions. "

Leask, M., & Pachler, N. (2013) is a teacher of secondary school classes with gymnasia, number 1126, Moscow shares the experience of teaching mathematics in grade 6 with computer support. "In math class training with the involvement of software begins with the sixth grade. We are working with the program "Live geometry" that is installed on computers Macintosh LS.

One of the main advantages of this program - the possibility of continuous change of geometrical objects while preserving the mathematical relationships between them. The program allows you to simulate a variety of mathematical situations, to analyze and make the "discovery" based on a sufficiently large number of experiments independently by each student. Under the program, expected to 5:00 mathematics per week, total 170 hours. In the study of geometrical material (scale, circumference and area of a circle, the coordinates on the plane) is given 18 - 20 hours in 3 - 4 quarters. The material requires an analysis of a large number of tasks, which usually is not enough time in the classroom. These problems help to solve the program "Live geometry". You can learn the basic material of 4 hours per week, and 1 hour per week to study the geometrical material with use of the program "Living Geometry" (the class is divided into sub-groups). In the first quarter is familiar with the program. The third - quarter studied geometric material. In the second quarter, you can improve the ability of children to use the program, and you can do with the program - Trainers "Fractions".

The second option - the first half of the work is carried out as usual, but in the second half - with computer support. There is a third option. Training takes place in the traditional manner, and the mastery of the program takes place in extra time (from the school component). At school there is plan for each option. If necessary, the teacher can create your own plan, based on the specific situation. "

Leask, & Pachler, (2013) said, "The use of modern computer technology allows the teacher to improve learning efficiency, efficient use of study time. The most acceptable program that can master the secondary school students, the program is "Living Geometry". At this point, a program of the course geometry for 7 - 9 classes using the medium "Live geometry" computer class Macintosh LS. Lessons geometry in grades 7-9 is computer-supported. The study of the geometry of the material can be as follows:

1. on ready drawings developed by a teacher,

2. Self-modeling geometric objects students.

5 CONCLUSION

The paper considered the possibility of computer mathematical systems, identifies didactic principles of application of computer mathematical systems in teaching mathematics, particularly the process of teaching mathematics with their application.

It is concluded that the education system in our country as well as highly qualified teachers, are always highly appreciated. But now we are in a situation that the teacher having high qualification, a great expert in the field of mathematics, but not owning information technology is a step below the young specialist, fluent computer. The main thing in this situation is a teacher training with the latest computer technologies. Training courses in information technology teachers teach basic computer skills, as well as the use of your computer in the preparation and carrying out lessons. Familiar with the training programs on the subject, the use of Internet resources. But, back to school, not every teacher begins to use the knowledge gained and lessons learned is still the belief that education is the best means of chalk and board. Why is this happening?

There are several reasons:

- The school does not need technology;

- school one computer lab, and the possibility of its use subject teachers, is minimal

- there is no need to train the software;

- preparing lessons using IT takes a very long time;

- teacher insecure and afraid of the technical problems that may arise in the classroom;

However, the inclusion of information technology makes the learning process more technologically and productively. Yes, along the way there are difficulties, there are mistakes, not to avoid them in the future. But there is a major uspeh- burning eyes of students, their willingness to be creative, the need to obtain new knowledge and a sense of independence. The computer allows you to do homework, do not like each other, it contributes to the interest of scientists

Thus, the results of the study led to the conclusion that the application of computer mathematical system in conducting workshops for solving mathematical problems of our proposed technology improves the efficiency of training activities, as a result of the application of the system of our proposed increases the technology performance of students in the mathematical disciplines, including on subjects in the study who did not use mathematical computer systems. The main conclusion of the experiment is that the workshops on solving mathematical problems as described technology allows us to better address the problems, expanding the range of tasks that are available to students deepen their knowledge in the subject areas, which confirms the hypothesis of this study .

Theoretical and practical research was aimed at improving the learning process of higher mathematics through the application of computer mathematical systems. Scientific analysis of the content and practical implementation of technology use of computer mathematical system in conducting workshops on solving mathematical problems leads to the following conclusions and formulate the main results:

1. Investigation of computer mathematical systems from an educational point of view has shown that these systems meet the requirements of educational software, and therefore allowed to be used during workshops on solving mathematical problems.

2. As a result of studies of the structure, features and specifications of various computer mathematical systems chosen are system as the primary means of computer workshops on problem solving.

The study identified: Didactic conditions for the implementation of computer workshop to address the challenges in the framework of discipline "Elements of abstract and computer algebra." The study shows that the holding of workshops on problem solving using the proposed technology allows you to nominate and confirm the hypothesis about the effectiveness of the use of computer systems in mathematical teaching mathematics in high school. Experimental studies have confirmed the methodological soundness and efficiency of the technology of computer mathematical systems in conducting workshops on solving mathematical problems.

References

[1] Bai, H., Pan, W., Hirumi, A., & Kebritchi, M. (2012). Assessing the effectiveness of a 3-D instructional game on improving mathematics achievement and motivation of middle school students. British Journal of Educational Technology, 43(6), 993-1003.
[2] Beatty, K. (2013). Teaching & researching: Computer-assisted language learning. Routledge.
[3] Cox, M. J. (2013). Formal to informal learning with IT: research challenges and issues for e-learning. Journal of Computer Assisted Learning, 29(1), 85-105.
[4] Dörfler, W., (1993). Computer use and views of the mind. In Learning from computers: Mathematics Education and Technology. Keitel, C. and K. Ruthven (Eds.). Berlin: Springer-Verlag.
[5] Ferguson, T. L. K. (2014). Mathematics Achievement With Digital Game-Based Learning in High School Algebra 1 Classes (Doctoral dissertation, Liberty University).
[6] Feurzeig, W., & Roberts, N. (Eds.). (2012). Modeling and simulation in science and mathematics education. Springer Science & Business Media.
[7] Gibson, P. A., Stringer, K., Cotten, S. R., Simoni, Z., O'neal, L. J., & Howell-Moroney, M. (2014). Changing teachers, changing students? The impact of a teacher-focused intervention on students' computer usage, attitudes, and anxiety. Computers & Education, 71, 165-174.
[8] Goldsmith, L. T., Doerr, H. M., & Lewis, C. C. (2014). Mathematics teachers' learning: A conceptual framework and synthesis of research. Journal of Mathematics Teacher Education, 17(1), 5-36.
[9] Howson, A.G. et al. (1986). The Influence of Computers and Informatics on Mathematics and Its Teaching, ICMI Study Series, Cambridge Univ.Press.
[10] Hürlimann, T. (2013). Mathematical modeling and optimization: An essay for the design of computer-based modeling tools (Vol. 31). Springer Science & Business Media.
[11] Huang, T. H., Liu, Y. C., & Chang, H. C. (2012). Learning achievement in solving word-based mathematical questions through a computer-assisted learning system. Journal of Educational Technology & Society, 15(1), 248-259.
[12] Kilpatrick, J. (2014). History of research in mathematics education. In Encyclopedia of mathematics education (pp. 267-272). Springer Netherlands.
[13] Ke, F. (2013). Computer-game-based tutoring of mathematics. Computers & Education, 60(1), 448-457.
[14] Ke, F. (2014). An implementation of design-based learning through creating educational computer games: A case study on mathematics learning during design and computing. Computers & Education, 73, 26-39.
[15] Kay, R., & Kletskin, I. (2012). Evaluating the use of problem-based video podcasts to teach mathematics in higher education. Computers & Education, 59(2), 619-627.
[16] Keitel-Kreidt, C., & Ruthven, K. (Eds.). (2012). Learning from computers: Mathematics education and technology (Vol. 121). Springer Science & Business Media.
[17] Leask, M., & Pachler, N. (2013). Learning to teach using ICT in the secondary school: A companion to school experience. Routledge.
[18] Lee, Y. H., Waxman, H., Wu, J. Y., Michko, G., & Lin, G. (2013). Revisit the effect of teaching and learning with technology. Journal of Educational Technology & Society, 16(1), 133-146.
[19] Orlich, D., Harder, R., Callahan, R., Trevisan, M., & Brown, A. (2012). Teaching strategies: A guide to effective instruction. Cengage Learning.
[20] Meerbaum-Salant, O., Armoni, M., & Ben-Ari, M. (2013). Learning computer science concepts with scratch. Computer Science Education, 23(3), 239-264.
[21] Nickerson, R. S., & Zodhiates, P. P. (Eds.). (2013). Technology in education: Looking toward 2020. Routledge.
[22] Tsuei, M. (2012). Using synchronous peer tutoring system to promote elementary students' learning in mathematics. Computers & Education, 58(4), 1171-1182.
[23] Trouche, L., Drijvers, P., Gueudet, G., & Sacristan, A. I. (2013). Technology-driven developments and policy implications for mathematics education. In Third international handbook of mathematics education (pp. 753-789). Springer New York.
[24] Wilensky, U., & Stroup, W. M. (2013, April). Networked gridlock: Students enacting complex dynamic phenomena with the HubNet architecture. In Proceedings of the fourth annual international conference of the learning sciences (pp. 282-289).
[25] Wachira, P., & Keengwe, J. (2011). Technology integration barriers: Urban school mathematics teachers perspectives. Journal of Science Education and Technology, 20(1), 17-25.

-Manal Alamry

-Concord.84@hotmail.com