



COMPUTER SOFTWARE FOR MATH EDUCATION IN THE FIRST GRADES OF SECONDARY SCHOOLS IN AZERBAIJAN

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Abstract

The article deals with the “Mathematic-1” computer software for math education in the first grades of the secondary schools in Azerbaijan. It widely focuses on the computer-aid teaching programs and its specificities. The software is envisaged for the first grades of secondary schools and bases on the books recommended by the Education Ministry. Along with the Azerbaijani schools, the program is recommended also to be used in the schools of Pamukkale, Diyarbakır, Tatvan and Van provinces.

Keywords: mathematics, computer education, program, method

Introduction

Main changes in the education system in the USA coincide with the 60s of the past century. The reforms in the US education system took place just in this year and the academic education plan was changed in accordance with the tastes and interests of the students. It was decided to experiment in the secondary schools: in the school education it was organized teaching of the subjects chosen by the students themselves on the bases of necessity of acquisition of three skills as “reading”, “writing” and “calculating”. However, the results of the tests showed that during this experiment the students are indifferent to acquisition of knowledge on many other subjects and it becomes impossible to obtain complete knowledge. This aroused great concern in America. In then mid-70s of past century, therefore, from the previous experiments they returned to the based education system. Humanitarian and technical subjects were recommended to be taught necessarily. Since 1980, the number of subjects for the secondary school students was increased, and along with that, the students were taught the computers and other computing machinery. This subject is called “computer sciences” and is an important subject in all American schools, as a person studying in any field cannot gain progress and career without the knowledge of computer sciences [5].

The experimental e-mail and tele-conference project implemented in 1987-1990s in the University of Virginia State, involved 80 percent of the University professors, over 50 percent of the students and 60 percent of the regional school grades. In 1988, analogous experiment was conducted in the city of Vancouver of British Columbia. In the same year, the experiment (on exchange project) realized in Canada brought together 3200 participants, of them, 1300 participants took part at the experiment through computer network. The advantage of participation in the experiment through the computer network installed in classrooms was obvious, as all the lectures, talks, remarks and other links took place synchronically [6], [7].

In the United States, a lot was done also in introduction of the educational computer systems [1], [2], [3], [4]. An example is the PLATO –IV computer system prepared by CDC Company. In April 1977, the system was connected to 15 large computers and their 950 graphic displays and was successfully used in education [2], [3].

After regaining state independence, Azerbaijan has reached great successes also in the education field. Firstly, all the secondary schools were provided with modern computer labs. Teaching programs for all grades were changed. Education of all subjects through computers was defined as key goal. The subject “Informatics” earlier taught perfunctory and only within 2 hours, now was taught beginning from the first grade and on a new program.

Materials and Methods

Taking into account that in the first grades of secondary schools the informatics was taught and there was no computer software for education and also to improve education of mathematics, involve the students in mathematics knowledge and ease teachers’ labor we have prepared interesting computer software. This computer software, “Mathematics - 1”, has been prepared almost completely on the basis of the modern mathematics textbook for the first grades and covers 80 percent of the textbook. The software opens as shown below (Fig. 1).



Fig. 1. First page of mathematics software "Mathematics - 1"



Fig. 2. Second page of mathematics software "Mathematics - 1"

The program's first page includes "Start", "Creators" and "Exit" buttons. After pressing the "Start" button you open the second page (Fig. 2).

The second page of the program includes contents covering the topics from the textbook. The contents cover the following topics:

Contents

1. Numbers 1 – 10
2. Test 1 (Solving math sums)
3. The number zero and addition
4. Test 2 (Addition)
5. Operation of subtraction
6. Test 3 (subtraction)
7. Test 4 (Addition and subtraction)
8. Test 5 (Mixed operations)
9. Description of numbers
10. Test 6 (Mixed operations)
11. The numbers 11-20
12. Test 8 (Operations on 20)
13. Expedient computation methods
14. Test 7 (Difficult sums)

It is possible to use the program without any sequence of topics in the contents. But, however, the teachers are recommended to teach these topics consecutively. And taking into account the students' skill of perception they should have at least 2 hours for each topic. On the small frame with the words "Numbers 1 - 10" by clicking the mouse there appears a new page designed as a game (Fig. 3). Here, in the left side of page the students saw 10 cars described one on another and gaze with interest. Below, there is the figure "10" which is the number of cars. In the right side of page, there is a zero number which means absence of any car. The teacher directs the topics through the projector onto the screen and asks: "If to send two of the cars to the right side, then, how many cars will remain in the left side?" The students answer differently.

The teacher clicks on the left button of mouse and sends separately those two cars to the right side to refine the students' answer. As soon as the cars reach the right side they stop there with their front sides to the left. And then, in the right side below the page there appears the number "2". In the left side, they see the number "8". The students rejoice.

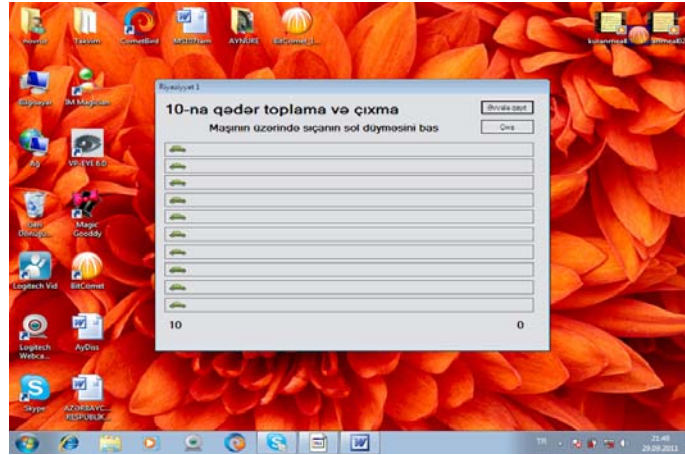


Fig. 3. Presentation of the first topic of “mathematics software “Mathematics - 1”

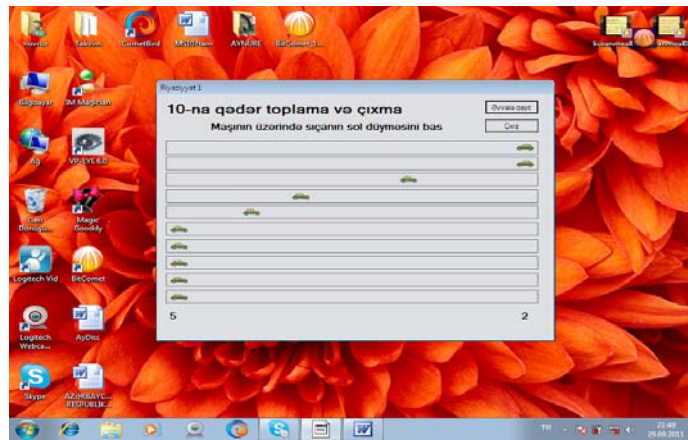


Fig. 4. Solution of the operation for $8-3=5$ within the program

Then, the teacher asks again: “If to send 3 more cars of the 8 to the right side, how many cars will remain in the left side? The students perhaps will again have different answers. Some even find difficulty to reply. The teacher sends those 3 cars to the right side (Fig. 4).

By clicking on the cars in the left side they can also be sent to the right side. The teacher, making any combination, thus, can teach computation around the number “10” in the form of a game and in an interesting manner.

If it was selected the topic in the contents “Test 1 (Solving math sums), the screen displays the page with Fig. 5. The student’s name is written on the top of page. Then it follows the number of school and classroom the student studies. There are green squares under this line to show that the student’s answer is true, and red squares to show that the answer is wrong.

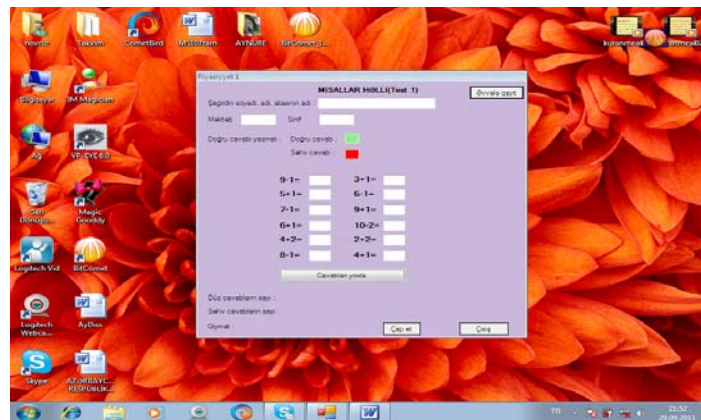


Fig. 5. “Test 1 - Solving math sums” page of mathematics software “Mathematics - 1”

After the student writes the answers to the sums in the page he (she) clicks the button “Check your answers”. Before the true answers there appear green squares, and before the wrong answers - red squares. Below, it is shown number of true and wrong answers, and also the grade the student was given. The teacher (or, the student) clicks the button “Print” in the page bottom and the page is printed. The teacher signs the page, returns it to the student to take home to show his parents. The received grade is registered in the class register. Thus, the lesson becomes interesting, the students and their parents see the mistakes in solution of sums, the teacher can grade all the students’ knowledge, and finally, the teacher and parents gain close connections.



After 3-4 lessons on computer, the students with the help of teacher can freely and separately work with computer and solve the next tests and also check up their knowledge. In this case, each student should have personal computer. Thus, the students can both study mathematics and learn to work on computer, what arouses interest in scientific work.

Other topics of the program and tests to them very interesting for students, parents and teachers gradually become more difficult. It is possible to print the result of each test and send to the parents.

While the teacher explains the topic "Description of numbers", the screen shows three different descriptions of the number "10" (Fig. 6). The teacher explains that the number "10" can be obtained through different ways. Four of them are shown in the page "Description of numbers". They are: $10=2+2+6$, $10=3+3+4$, $10=5+5$ və $10=5+2+3$. The teacher asks: "By addition of smaller numbers how can we get the number 10 in other ways?" The little children think very much around this question. And then, some of them find such answers as $10=6+4$, $10=8+2$, $10=7+3$, $10=1+1+1+7$, etc. The teacher helps to find other answers. If the class is strong, the teacher can explain the description of number "10" through subtraction as well. For example: $10=12-2$, $10=15-5$, etc.

Though the next topics are more difficult, they are also taught in an interesting manner through computer.

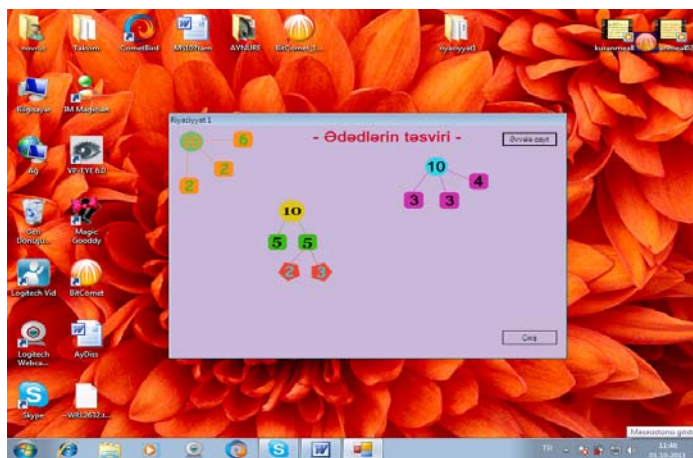


Fig. 6. The page "Description of numbers" in the mathematics software "Mathematics - 1"

Results and Discussions

Apparently, the program has positive influence on the development of thinking skill of the students. Teaching of other topics is also interesting. The program was experimented in the parallel classes of the Baku schools with the participation of teachers on mathematics and informatics. Both the students and the teachers on math and also parents were satisfied with the application of this computer program. Later, the Education Department of the city of Baku allowed using this program also in other schools of Baku.

Using the program does not bore younger students, on the contrary, arouses interest to science and in particular, the discipline of mathematics. This computer program is useful also for the teachers, as they have lessons basing on the principle of use of visual methods and interesting computer games. The exe. file of the Program was obtained and replicated and distributed among the county's schools.

Conclusion

The students of secondary schools should be taught not only mathematics, but other subjects, too, through computer. Computer-based education improves quality in education, eases much the hard work of teachers, deepens students' interest in science and raises their ability to work, enabling them to obtain knowledge visually in short time. Simultaneously, the computer-based education also enables the students to deeper learn along with other sciences, the computer itself. And this enables them to attain all-sided knowledge through internet and continue their education further without the help of teacher.

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