CONTEMPORARY TEACHING AIDS IN TEACHING MATHEMATICS

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ABSTRACT

In this research, the application of contemporary teaching aids in Mathematics teaching in elementary school was analyzed from the aspect of teachers, students and parents. The application of contemporary teaching aids in Mathematics teaching was analyzed through a sample of 100 students, and attitudes about the aids were examined from the points of view of students, teachers and parents.
In this research, descriptive method, questionnaire and test were used. Results of the research are shown graphically and tabular, with description and discussion.
In the conclusion, the benefits of applying contemporary teaching aids in Mathematics teaching are specified and explained.
Key words: *Mathematics, teaching aids, teaching, teacher, student, parent, computer, projector*

INTRODUCTION

Recently, among the many acquisitions of dynamic movements in contemporary society, the problem of application of contemporary teaching aids has become very pronounced. It is especially emphasized and characteristic, in all the various forms of its manifestations, in highly developed industrial countries, as well as in those countries which are in a process of rapid industrialization and technological growth. According to Poljak (1985), teaching aids are considered as didactically shaped and reconditioned original reality. Contemporary teaching aids are applied more than ever in Mathematics teaching and they are greatly significant. Experiences based on empirical research of this layered, very complex problem, point to numerous unanswered questions regarding application of teaching aids in Mathematics teaching, which oftentimes reflect on conducting the teaching process and leave a deep impression.

Technical, technological and scientific progress which has taken place, significantly affected the changes in the very teaching process, as well. Changes occurred in organization of educational content, but also in implementing and application of new procedures, methods, techniques and aids. Contemporary education technologies have become a part of the teaching process, with tendency not only to advance it, but also to change it.

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In our environment today, visual, as well as auditory and visual-auditory aids are employed. Contemporary teaching aids include a computer, projector, electronic board. Unfortunately, electronic board is not very commonly used in our schools. Using visual teaching aids is based on the fact that they are less abstract than words. Adequate use of visual aids positively affects the quantity, quality, permanence of knowledge and development of students' abilities.

Within the past several years, due to mass implementation of computers in schools, conditions have been created for quality innovations in education technology. Teaching with multimedia content has existed in practice for a longer time.

This paper consists of an introductory chapter, where the problem and its significance is presented; then follows the first chapter where terminology related to this topic is put forward and explained. In the paper, methodological approach, which sheds light on the significance of the problem and the very research on this topic, is elaborated on. Upon gathering results, analysis and results interpretation is presented, textually, as well as graphically and tabular. At the end of the paper, conclusions drawn from the research and acquired results are presented.

THEORETICAL TOPIC ELABORATION

Defining basic terminology

Within the framework of this research paper, and in accordance with the chosen subject, follow the definitions of terminology which characterizes it: Mathematics, teaching aids, teaching process, teacher, student, parent, computer, projector.

Mathematics is an ancient natural science. Mathematics came to life from practice, from the very human practice to improve one's living conditions. It has evolved in time parallel with society's development (Rešić, 2013).

Mathematics teaching methodology is a very important factor in Mathematics teaching process. Mathematics teaching methodology signifies a scientific discipline which deals with studying socialization and education in Mathematics teaching and other socialization-education processes where those processes are realized on the basis of and with the help of mathematical content (Tomić, 2009).

Poljak (1985) claims that teaching aids are considered as didactically shaped and reconditioned original reality. Application of teaching aids depends on students' age, quality and level of intellectual developments of students. Using teaching aids contributes to directing attention toward the subject matter, transferring excess energy onto further research, reading broader literature, discussions, experimenting about a problem, etc. Teaching aids stimulate motivation in students. They also stimulate emotionality and excitement, as well as motivational activities in students.

Teaching process

Teaching is a special didactically organized simultaneous socialization-education work, which is realized in special institutions and where it is obligatory for both teacher and students to participate. What makes teaching a special didactic category and emancipates it into a relatively individual modality of human work is its purpose, tasks, organizational structure, medium and methodology specificities and specificity of end results of the teaching process (Grandić i Karić, 2009).

Teacher is a competent person with high working, educational and ethical qualities, educated for working in kindergarten, primary/secondary school or for teaching a particular subject at university. They must fulfill an array of specific demands, such as: conscious professional motivation, more integral system of general and expert knowledge, high intellectual abilities, character traits adequate foot the value system in society (Tomić, Osmić i Karić, 2006).

Student is a participant in didactic-communicational creative activities, which are aimed at his/her education, socialization, integration in the social community and building individual, free and critical personality. Student is a regular or part-time attendee in a certain form of educational institution. In contemporary didactics, student comes as a subject in the teaching process in all its stages (from planning, through realization, to evaluation) (Tomić, Osmić i Karić 2006).

Parents are partners in the school. One of teachers' assignments is cooperation with parents. It is very important to know how much parents take care of their children, which significantly mirrors students' success at school. Cooperation between school and parents is also important – the better cooperation, the better students' results are (Osmić i Tomić, 2008).

Computer is a complex machine, which serves to complete mathematical operations or control operations which can be expressed in numerical or logical form. Computers are made of parts that complete simpler, clearly defined functions. Complex interaction between these parts results in the capability of the computer to process information (Tomić, 2009).

Video projector is a machine which transfers an image through a light beam onto a surface (usually canvas or bare wall). Within this machine electrical impulse is transformed into basic colors, which are mixed together depending on the colors of recorded object (Tomić, 2009).

RESEARCH METHODOLOGY

Research subject

The subject of this research is the manner in which teaching content for Mathematics is processed. Hence, the subject of this research is to ascertain how students, teachers and parents react to contemporary teaching aids in Mathematics teaching.

Research aim

Considering the significance of the research problem, the aim of this research is to explore, analyze, confirm and interpret the influence of contemporary teaching aids on Mathematics teaching.

Research tasks

Based on the defined research problem and set aim, in this research certain tasks are set so as to examine the influence of contemporary teaching aids on Mathematics teaching process:

1. Examine which contemporary teaching aids are most widely used in Mathematics teaching;
2. Examine teachers' attitudes toward application of contemporary teaching aids in Mathematics teaching;
3. Examine students' attitudes toward application of contemporary teaching aids in Mathematics teaching;
4. Examine parents' attitudes toward application of contemporary teaching aids in Mathematics teaching;
5. Examine and compare adopted subject matter while teaching a unit with contemporary teaching aids and without them.

Research hypothesis

Contemporary teaching aids contribute to easier and more quality oriented adoption of subject matter in Mathematics.

Research sub-hypotheses

1. Computers and projectors are often applied in teaching Mathematics;
2. Teachers have positive attitudes toward applying contemporary teaching aids in Mathematics teaching;
3. Students have positive attitudes toward applying contemporary teaching aids in Mathematics teaching;
4. Parents have positive attitudes toward applying contemporary teaching aids in Mathematics teaching;
5. Higher level of adopted subject matter when teaching new subject units with application of contemporary teaching aids.

Population and sample

Deliberate sample consists of examinees from IX Secondary school in Maoča, Brčko District, Bosnia and Herzegovina. The sample encompassed 100 students, of which 43 are male and 57 female, aged 9-10, as well as 10 grade school teachers in IX Secondary school in Maoča, Brčko District, Bosnia and Herzegovina, and 100 parents of students from the same school.

Research methods

In this research, descriptive method, questionnaire and test were used. The research was anonymous. Test was used to gain feedback information from students after new subject unit was elaborated with and without using contemporary teaching aids.

Research calendar

Research was conducted in the period from March 2013 to May 2013.

ANALYSIS AND INTERPRETATION OF RESULTS

In this chapter, results acquired from researching the above-mentioned topic, are analyzed and interpreted. Data is represented graphically, tabular and textually in the form of explanations. The research encompassed 210 examinees, of which 100 are students, 100 are students' parents and 10 are teachers.

Application of computers and projectors in teaching

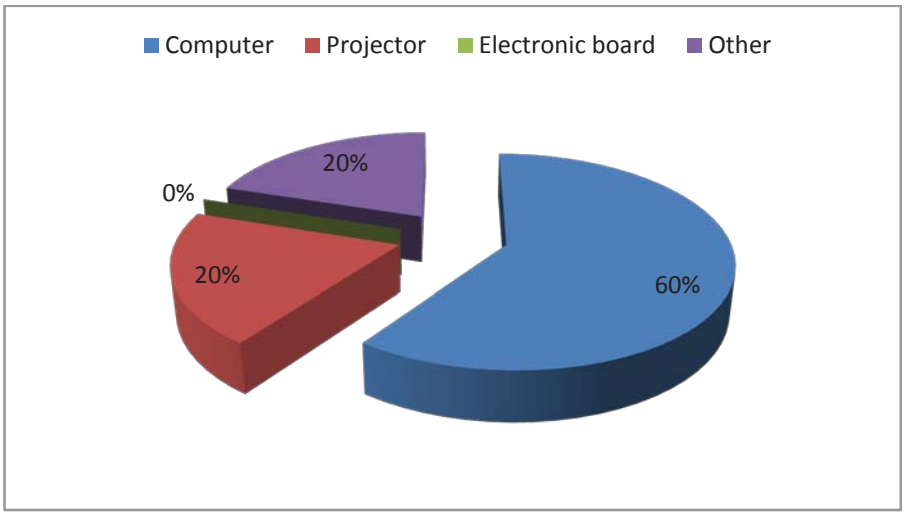
It is assumed that computers and projectors are often used in Mathematics teaching. In this task of the research, teachers were asked which contemporary teaching aids they mostly use in Mathematics teaching. Results show the following:

Table 1.

Which contemporary teaching aids do you use the most in class?		
Computer	6	60%
Projector	2	20%
Electronic board	0	0%
Other	2	20%

Table 1 shows the number and percentages of the result in the first questionnaire given to teachers. Out of 10 teachers, 6 or 60% replied that they use a computer, 2 or 20% replied that they use a projector, while 0 or 0% of teachers use electronic board, and 2 or 20% use some other teaching aid.

Graphically, this is what it looks like:



Graph 1. clearly shows how examinees responded to the posed question.

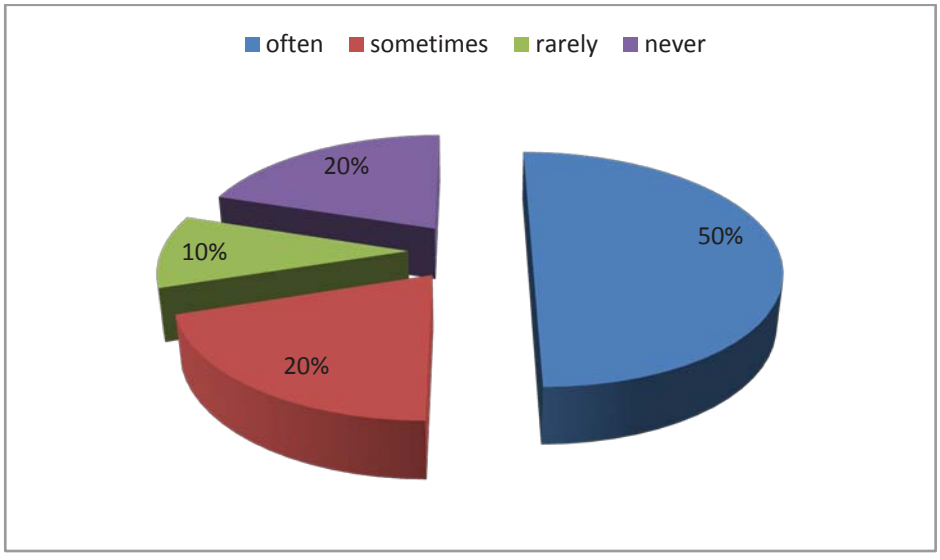
Teachers' attitudes toward application of contemporary aids in Mathematics teaching

It is presupposed that teachers have positive attitudes regarding application of contemporary teaching aids in Mathematics teaching. In this task, teachers were asked about their attitudes regarding application of contemporary teaching aids in Mathematics teaching. Results show the following:

Table 2.

How often do you use contemporary teaching aids in Mathematics teaching process?		
Often	5	50%
Sometimes	2	20%
Rarely	1	10%
Never	2	20%

Table 2 provides information regarding how often teachers use contemporary teaching aids in Mathematics teaching. 50% of teachers use contemporary teaching aids often during classes, 20% of them sometimes, 10% rarely and 20% never use contemporary teaching aids in Mathematics teaching. Graphically, this is how the results look:

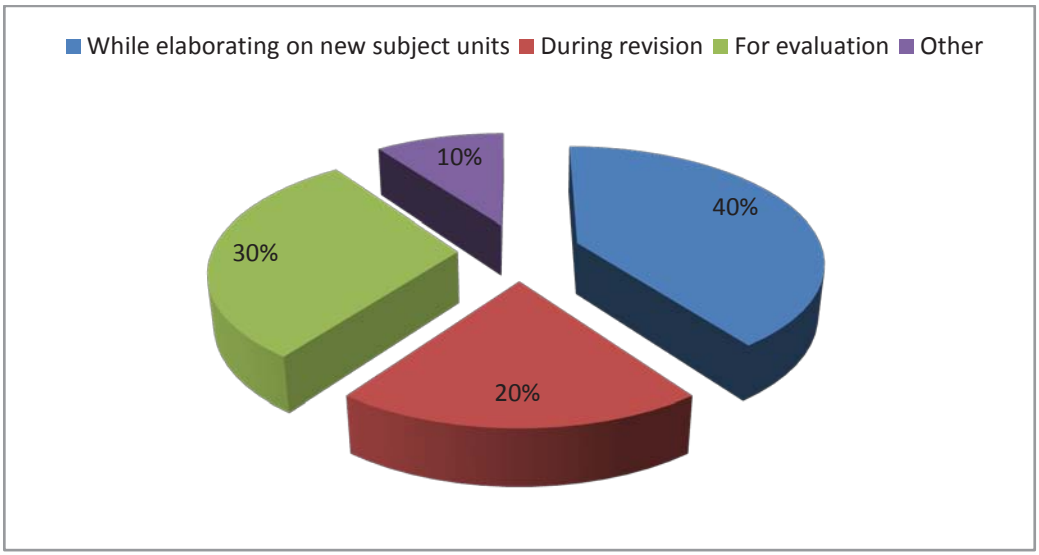


Graph 2.

Table 3.

When do you most frequently use contemporary teaching aids in Mathematics teaching?		
While elaborating on new subject units	4	40%
During revision	2	20%
For evaluation	3	30%
Other	1	10%

Table 3 shows the answers to question: 'When do you most frequently use contemporary teaching aids in Mathematics teaching?' 40% of teachers use contemporary teaching aids while elaborating on new subject units, 20% for revision, 30% for evaluation and 10% in other situations.
Graphically, this is the result:

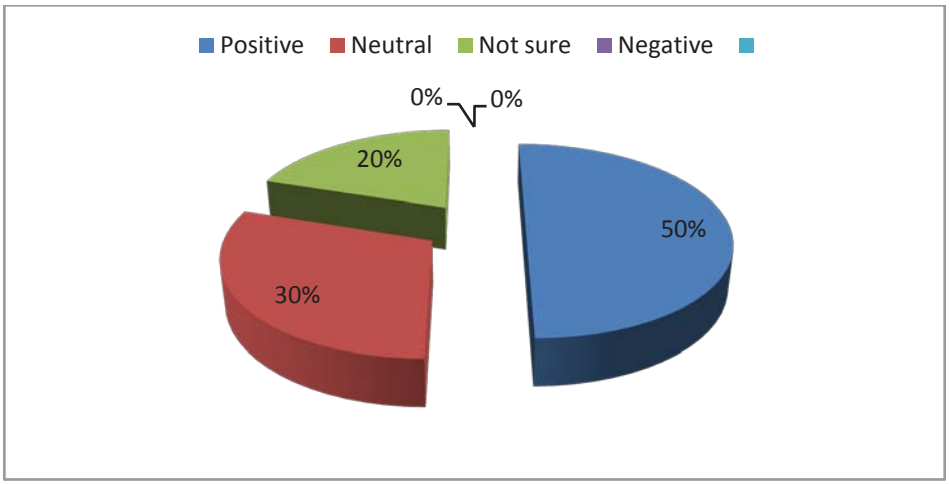


Graph 3.

Table 4.

How do students react to application of contemporary teaching aids in Mathematics teaching?		
Positive	5	50%
Neutral	3	30%
Not sure	2	20%
Negative	0	0%

Table 4 shows how students react to application od contemporary teaching aids in Mathematics teaching. 50% of all students react positively to application of contemporary teaching aids, 30% are neutral, 20% are not sure, while 0% of students have a negative reaction to contemporary teaching aids in Mathematics teaching.
Graphically:

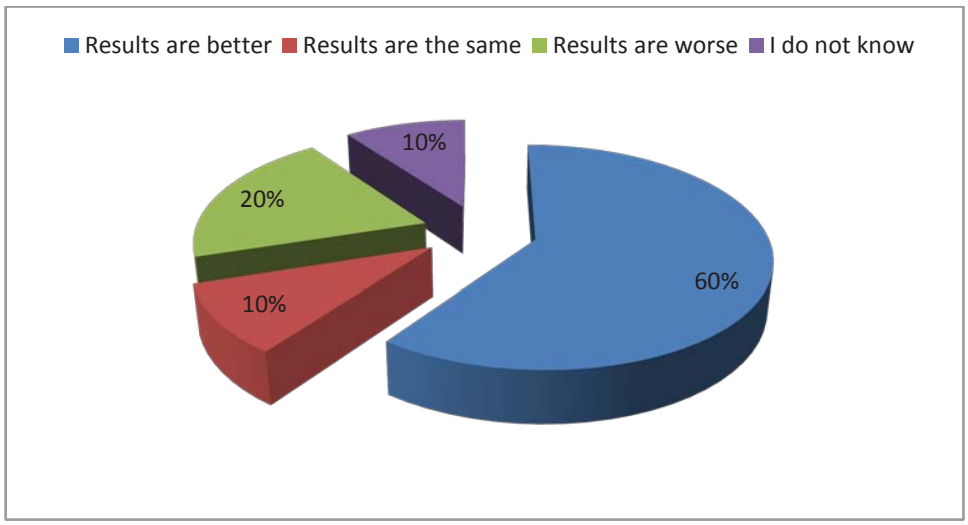


Graph 4.

Table 5.

What are the results students achieve since you have been using contemporary teaching aids?		
Results are better	6	60%
Results are the same	1	10%
Results are worse	2	20%
I do not know	1	10%

Table 5 shows the results students achieve in Mathematics since teachers started applying contemporary teaching aids. It can be seen from the table that the results are better. 60% of teachers said that students' results are better, 10% that they are the same, 20% registered worse results, while 10% of teachers do not know.
Graphically:



The graph shows more clearly that the students' results are better for 60% since teachers started applying contemporary teaching aids in Mathematics teaching.

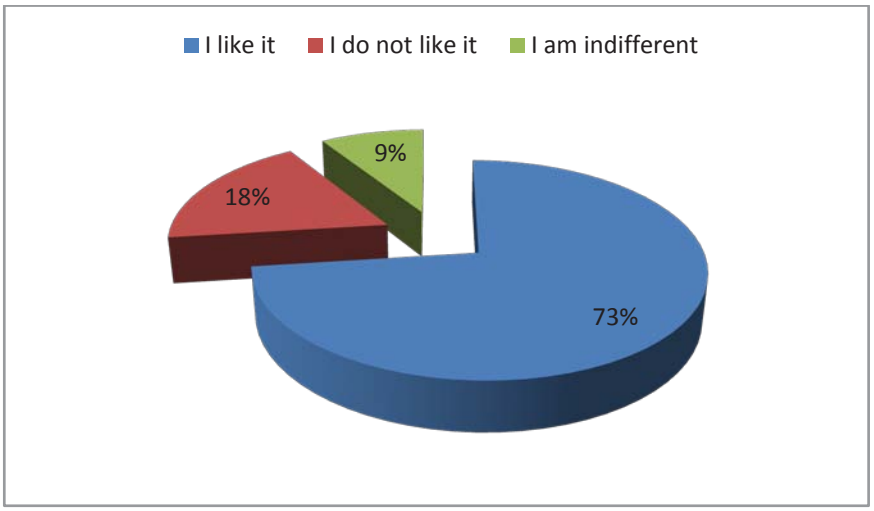
Students' attitudes about application of contemporary teaching aids in Mathematics teaching

It is supposed that students have positive attitudes toward application of contemporary teaching aids in Mathematics teaching. In the following task, students were asked about their attitudes regarding application of contemporary teaching aids in Mathematics teaching.

Table 6.

How much do you like the use of computers, projectors and other contemporary teaching aids in MT?		
I like it	73	73%
I do not like it	18	18%
I am indifferent	9	9%

Table 6 shows the following results: 73% of the students said they like the use of computers, projectors and other contemporary teaching aids in Mathematics teaching, 18% do not like it, while 9% are indifferent. Graphic representation:

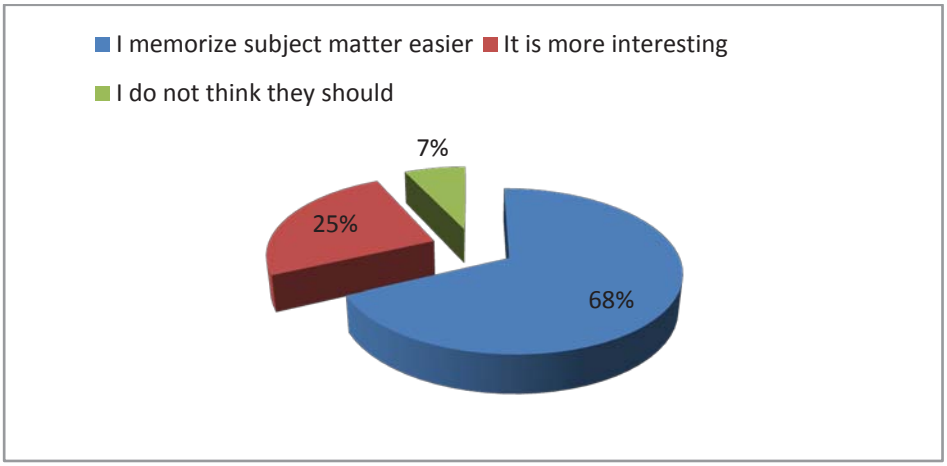


Graph 6.

Table 7.

Why do you think teachers should continue applying contemporary teaching aids?		
I memorize subject matter easier	68	68%
It is more interesting	25	25%
I do not think they should	7	7%

Table 7 shows the opinions of students about application od contemporary teaching aids in Mathematics teaching. 68% of the students said that teachers should continue using contemporary teaching aids because they memorize subject matter easier, 25% think that classes are more interesting, while 7% do not think teachers should continue using contemporary teaching aids. Graphically:

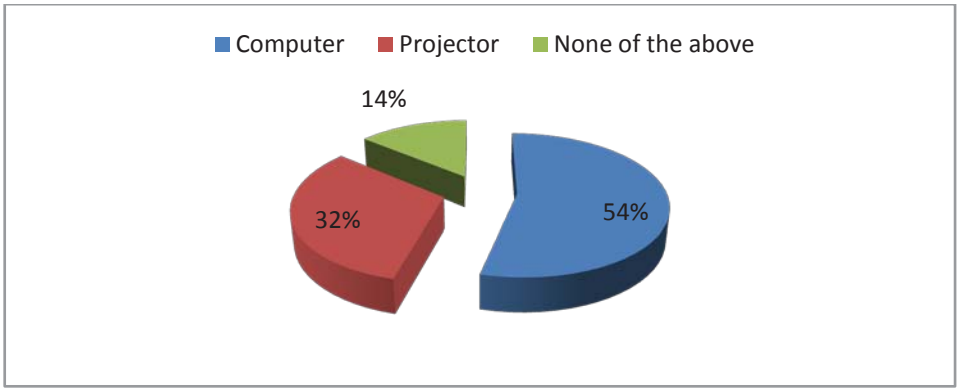


Graph 7.

Table 8.

Which contemporary teaching aids helps you learn the most?		
Computer	54	54%
Projector	32	32%
None of the above	14	14%

Table 8 shows data which let us know which contemporary teaching aids helps children learn the most. 54% of students said that they learn best with the help of computer, 32% opted for projector, while 14% said that none of the mentioned contemporary teaching aids helps them learn. Graphically:



Graph 8.

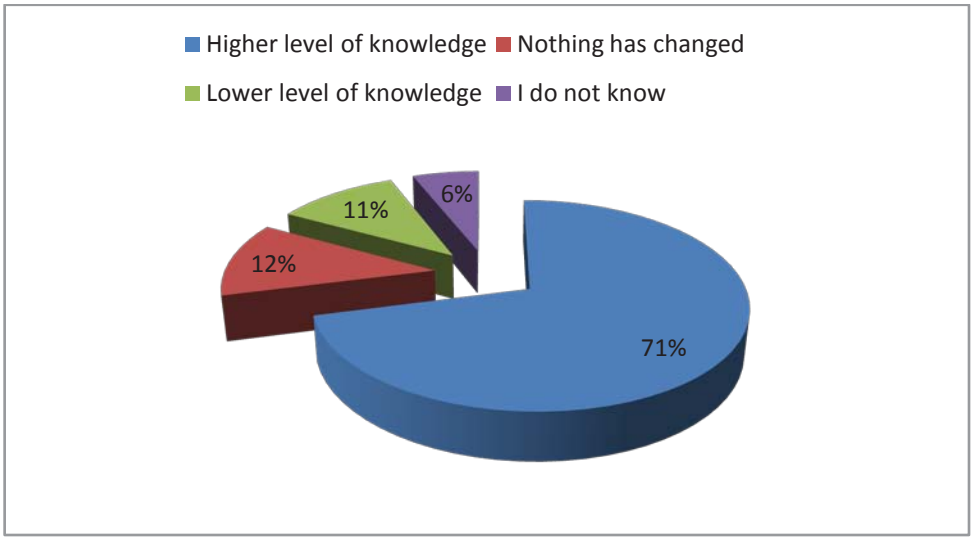
Parents' attitudes regarding application of contemporary teaching aids in Mathematics teaching

The presupposition is that parents have positive attitudes toward application of contemporary teaching aids in Mathematics teaching. In this task, parents were asked about their attitudes when it comes to application of contemporary teaching aids in Mathematics teaching.

Table 9.

In your opinion, what is the level of knowledge of your child since teachers started applying contemporary teaching aids in Mathematics teaching?		
Higher level of knowledge	71	71%
Nothing has changed	12	12%
Lower level of knowledge	11	11%
I do not know	6	6%

Table 9 shows that out of 100 parents who answered the questions, 17% believe that the level of knowledge of their child is higher since teachers started using contemporary teaching aids, 12% think that nothing has changed, 11% believe that knowledge is on a lower level, and 6% do not know.
Graphic presentation:



Graph 9.

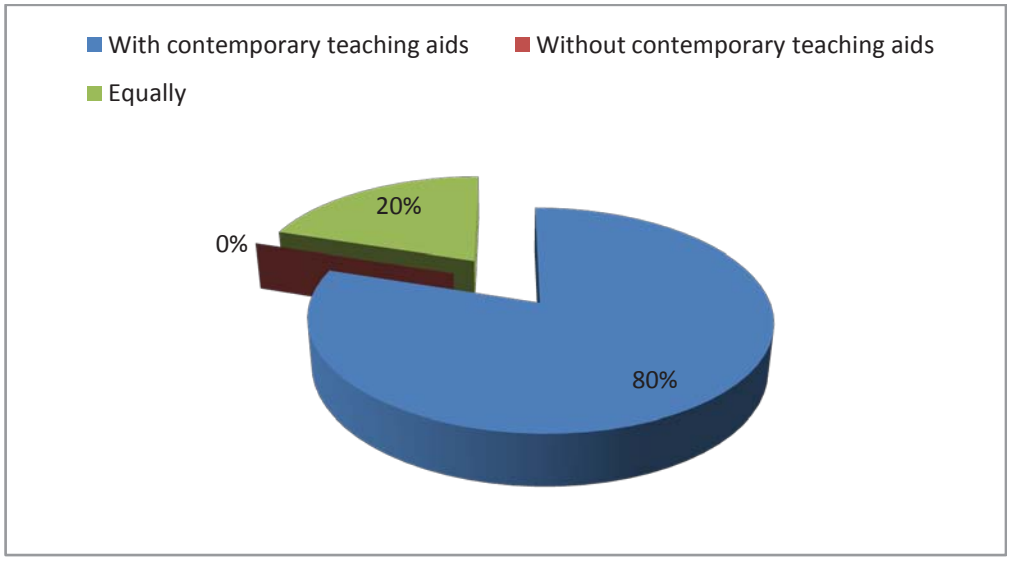
Level of adoption of subject matter while applying contemporary teaching aids and without them

The presupposition is that the level of adoption of subject matter while elaboration on a new subject unit is higher when using contemporary teaching aids than without them. Ten teachers from IX Secondary school in Maoča, Brčko District, Bosnia and Herzegovina elaborated on new subject with and without using contemporary teaching aids.

Five teachers elaborated on subject unit 'Numbers in the second ten' in the second grade, five other teachers elaborated on subject unit 'Geometrical bodies – parallepiped', also in the second grade. Both groups of teachers elaborated on new subject units with and without using contemporary teaching aids. After the subject units were elaborated, teachers' conclusions are as follows:

In your opinion regarding acquisition of new subject matter, students showed better results:		
When you used contemporary teaching aids	8	80 %
Not using contemporary teaching aids	0	0 %
Equally	2	20 %

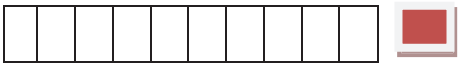
Table 10 Teachers' opinions show that students acquired new subject matter better when contemporary teaching aids were used, according to 80% of them. 0% of the teachers said that results were better when contemporary teaching aids were not used, 20% of teachers believe that results are equal with or without using contemporary teaching aids in their class. Graphically:



Graph 10.

The graph shows clearly that acquisition of subject matter is higher when teachers use contemporary teaching aids, which makes the teaching quality better.

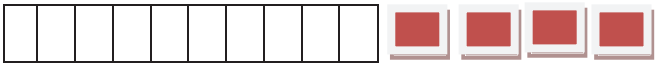
Examples of tasks done during class where numbers of the second ten were elaborated:



10+1=11 ELEVEN

10+2=12 TWELVE

10+3=13 THIRTEEN



10+4=14 FOURTEEN

10+5=15 FIFTEEN

10+6=16 SIXTEEN

10+7=17 SEVENTEEN

10+8=18 EIGHTEEN

10+9=19 NINETEEN

10+10=TWENTY

How many balloons are there?

and

10+4=14 FOURTEEN

Read the numbers in the table!

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Read and write in your notebook numbers in letters! Start from top to bottom!

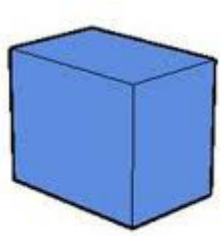
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20

ONE, FIVE, NINE, THIRTEEN, SEVENTEEN, TWO, SIX, TEN, FOURTEEN, EIGHTEEN, THREE, SEVEN, ELEVEN, FIFTEEN, NINETEEN, FOUR, EIGHT, TWELVE, SIXTEEN, TWENTY.

Examples of tasks in the class where geometrical body – PARALLEPIPED was elaborated:

PARALLELEPIPED

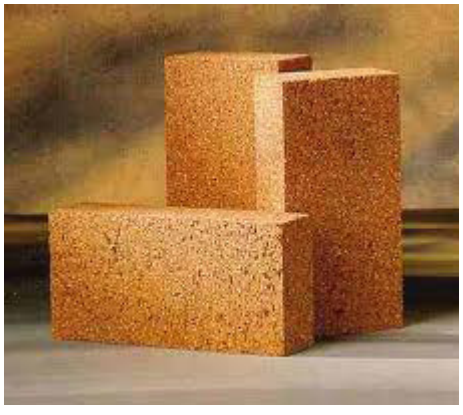
Object in the shape of a parallelepiped:



Which object are and which are not in the shape of a parallelepiped!

How many parallelepipeds are there in the pictures?

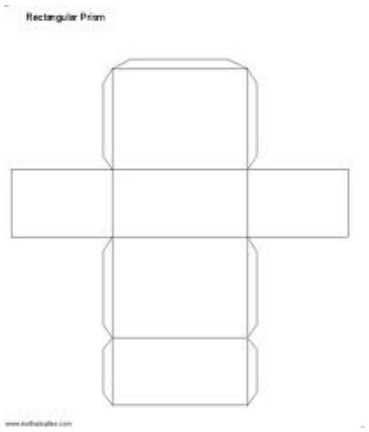
3 PARALLELEPIPEDS



3 PARALLELEPIPEDS

19

I am making a parallelepiped model together with the students!



CONCLUSION

Through the analysis of acquired results, it can be said that the research hypothesis is confirmed. Contemporary teaching aids contribute to easier and more quality comprehension of Mathematics subject matter.

Most examinees, whether they are teachers, students or parents, agree that using contemporary teaching aids in Mathematics teaching contributes to better, more successful, easier and more interesting process of bringing mathematical problems closer to students. It can be claimed that these are the greatest benefits of applying contemporary teaching aids in Mathematics teaching.

Over 50% of teachers said that they often use contemporary teaching aids in the teaching process, especially while elaborating on new subject units; that computers are the most commonly used contemporary teaching aids; that student have appositive reaction to application of contemporary teaching aids and they achieve better results since contemporary teaching aids have been implemented in Mathematics teaching.

Over 60% of students said that they like application of contemporary teaching aids in Mathematics teaching, that they help them learn better and Mathematics classes are more interesting.

Parents, as many as 70% of them, also agreed that the level of knowledge of their children is higher since teachers implemented contemporary teaching aids in Mathematics teaching.

From the examples provided while elaborating a new subject unit, it can be clearly seen, according to the opinion of over 80% of teachers, that students acquire subject matter better, and that it remains memorized for a longer time.

REFERENCES

Grandić, R., Karić, E. (2009). *Pedagogija*, Tuzla: Book.

Osmić, I., i Tomić, R. (2008). *Didaktika*, Srebrenik: Selimpex.

Poljak, V. (1985). *Didaktika*, Školska knjiga: Zagreb.

Rešić, S. (2013). *Matematike i metodika početne nastave,* Tuzla: Papir karton.

Tomić, R., Osmić, I. i Karić, E. (2006). *Pedagogija,* Tuzla: Danfas

Tomić, R. (2009). *Metodika nastave matematike,* Tuzla: OFF-SET.