Implementation of Information and Communication Technologies in Primary Schools

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Abstract:- Implementation of modern media and information technology in primary schools has been increasing. The use of ICT in education process brings better results: teaching is better, clearer and gives the opportunity to every student to be actively involved. After having applied Microsoft tools in many projects, we saw the benefits of them in preparation, organization and in the teaching process itself as well as in the fast but high-quality feedback – students' knowledge. The most important conclusions are economy of time and proper guidance of students in use of ICT and the constant training of teachers for lifelong learning. ICT in classroom helps students to use the Internet - to find teaching materials, to store them and sort them into their own documents on their computers, by themselves or with the help of their parents. Nowadays, teachers and students have changed their roles. Teachers: guide students towards the goal by choosing teaching materials and by giving the instructions during the working process, they form and develop the teaching materials of the interactive content, they can use materails from other teachers, if there is a permission from them, there is the possibilty of the individual approach to every student, they often check briefly the acquisition of the teaching content through quizzes, presentations and finally, there is the possibilty of extracurricular communication with students (via e-mail, facebook, twiter, SkyDrive, GeoGebra, Geometric Scatch Pade).

Keywords:- ICT (information and communication technologies), Microsoft tools, GeoGebra, the organization of teaching.

" If a teacher constantly uses the same strategies, and a student is constantly unsuccessful, which one of them is actually a slow learner? "

(Eric Jensen)

I. INTRODUCTION

"In the whole history of teaching no media caused such changes in terms of the efficiency of learning and learning methods as well as in the terms of the position and role of students and teachers in the learning process, nor contributed to the realization of permanent current aspirations of a student to become the subject of the learning process, (Rodek, 1982) as computer did. "[1]

Modernization of teaching and learning implies improving the work in the education process, based on the implementation of education in the technological environment of the information society. The use of computers as a medium for learning with precisely defined steps, information removal phase, asking questions, and exercise testing, represent a significant advance in technology education. The use of computers in the

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[1]Pejić Marinko, Teorijske osnove primjene programiranog učenja uz pomoć kompjutora, Petrinja, 2004.

educational process indicates a change in the way students learn. There is a higher level of motivation by using computer while learning and learning goes faster. The key element of any multimedia application is embedded interactivity. It prevents users from being passive by including them in the process of learning and encouraging them to find a growing number of information. This ensures a high-quality learning process. A computer and its programs offer a teacher the following: rich multimedia presentations (illustrations, animations, simulations, movies, 3D models...), and qualitative computational tasks to check what has been learned as well as a high-quality feedback (auditory, text, image, graded and flexible feedback...), and finally it offers a guide through the learning process as well as it gives motivational examples explained in animation tasks for solving.

The use of ICT in the teaching process has always been a challenge for teachers, as we strive to make it easy for students to acquire certain knowledge as well as we strive to facilitate the teaching process in classroom.

"Education is required to be open and able to monitor and provide answers to the scientific, social, technological and economic changes – it means that it should create changes that will be in the service of a human, of their full development and release."[2]

This paper concentrates on two examples of the use of ICT in classroom through the implementation of two projects, titled: "Water is the source of life" and "GeoGebra".

II.   THE IMPLEMENTATION OF THE PROJECTS IN OUR PRIMARY SCHOOL
EXAMPLE 1:

As for the project "Water is the source of life," we decided to point out to our students both the importance and the significance of this necessary and important constituent element in life of humankind. The students expressed curiosity for exploring phenomena in the world around them, and therefore they were interested in water as an essential, everyday need.

The aim of the project: **The students will be both able to systematize knowledge and to draw individual conclusions based on their own researches and tests as well as they will pass on their knowledge to other students; they will also facilitate the realization and understanding of the importance of water for life of living beings (people, plants and animals), and finally they will raise the awareness among other students about storing and saving water from any kind of pollution.**

The project "Water is the source of life" is realized through the third grade primary school curriculum content program at Aleksa Šantić Primary School in Sarajevo as well as through the Ecology project. The realization of the program content was within the integrated teaching, because it was planned that the subject about **WATER** should be implemented in all school subjects.

Worksheets for groupwork were prepared in Microsoft Office Word. The illustrations with the work assignments on are handled with the tools in Microsoft Office Word and CorelDRAW Graphics Suite 12.
The first group: Find the differences between these two drawings. Write how people can save water. As a reward for your answer – you can color the drawing.
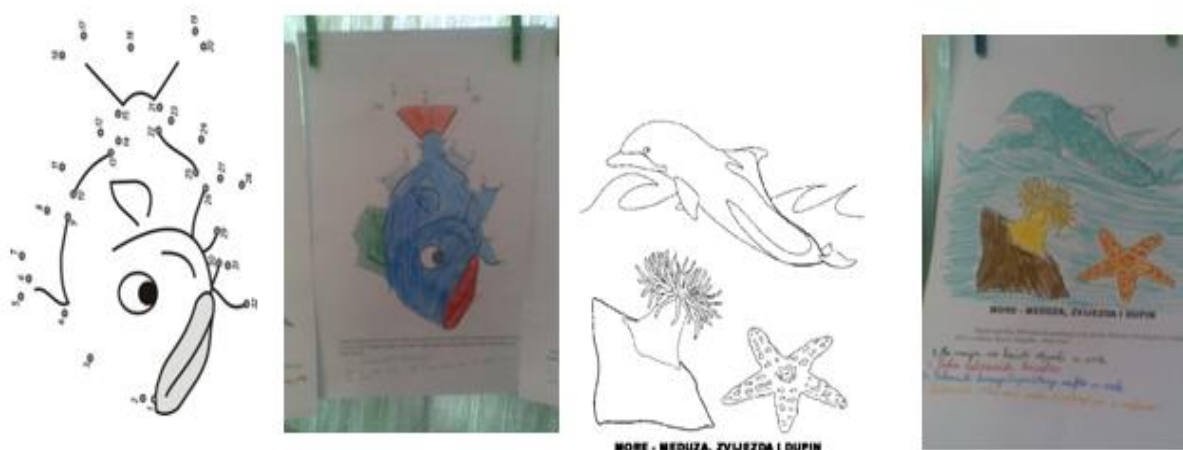

The second group: Draw a line connecting the numbers given from 1, 2, 3 and so on. In how many ways can people use water and for which purpose is it used? Do not forget to colour the drawing.

The third group: Draw a line connecting the numbers given from 1, 2, 3 and so on. You have recognized the numbers very well. Write how you would help the fish to live in clean water. Do you know any kinds of fish? Write their names. Finally, the little fish will be happy when you colour it!

The fourth group: Write a few ECO rules of human behavior towards the wildlife that live in the waters. As a reward for your answer – you can color the drawing.

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[2]Mandić Danimir, Imperativi obrazovanja informacione ere, Sarajevo, 2001.

MORE - MEDUZA, ZVIJEZDA I DUPIN

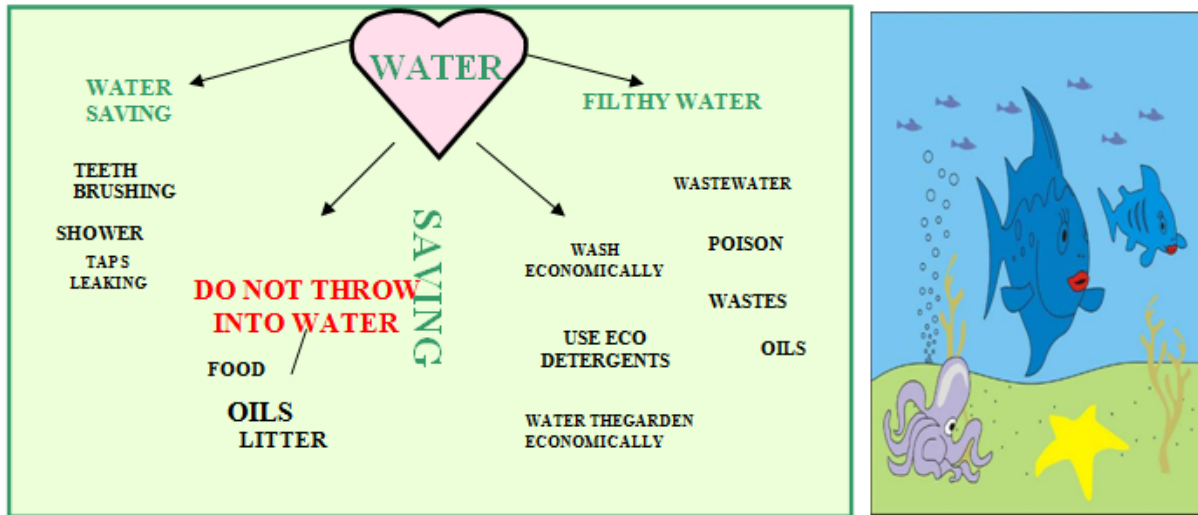***Use of the Internet – an interesting thing:*** <u>*How does water affect our health?*</u>

We can be considered fortunate to have an access to clean drinking water that is safe to use, which is not often the case in poor countries. In Africa and Asia, nearly three-quarters of the population does not have clean drinking water. Approximately 5 million people die each year from diseases transmitted by filthy water. Approximately 80% of all diseases appear due to impure drinking water. We have to keep our sources of drinking water clean - not only because of the protection of our environment, but also because of our health protection!

There was a video clip found on YouTube, and the students watched it by using CyberLink Power DVD.

The students watched a short video clip with music on about the planet Earth (they saw the position of the Earth in the universe as well as they saw the layer (the so-called "blue planet", and plants and animals).

There was a multimedia presentation on marine animals (found on the Internet and processed in Microsoft PowerPoint) - the multimedia presentation (enlarged images of marine animals that students did not have the opportunity to see in person), ***puzzle (the image found on the Internet and processed in Microsoft Office Picture Manager).***

A mind map found on the Internet and processed in Microsoft Office Word and Microsoft Clip Organizer

The students learned to deal with some research activities such as discovering any news and contents about water on the Internet with the help of their parents. (Artistic and literary works, posters, drawings, newspaper articles are put on the school notice board).

Overview of the students' assignments and papers

      Overview of the students' activities - photos (individual work – homework research: news and contents about water, posters, group work on Science and Art classes; imitation of animals on Physical Education classes, and finally class notice board with the students' posters and drawings on it).
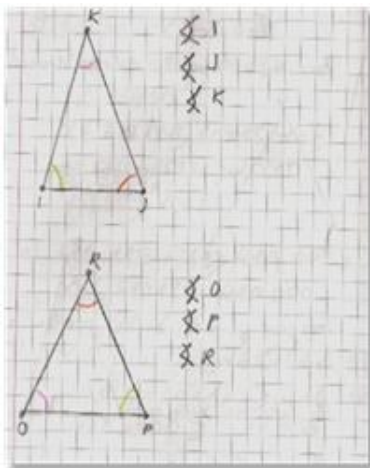
After each class finished, we talked with the students about their activities. The students considered very important every feedback they got from their teachers such as: an oral feedback (praise, conversation), a descriptive grade and writing (filling in papers on their work and analysis of the students' evaluation of their research activities, a cooperation with others as well as the realization of their activities). The students saw their activities in the form of multimedia presentations. In the end, as a reward for our work done, we took a trip to the spring of the Bosna River, where students were able to see the true nature of water and to apply the acquired knowledge.

EXAMPLE 2:
Project: Triangle in GeoGebra (the 4th & the 5th grade students)
The project idea was born during a math class, where students tried to draw, and measure the structure of a triangle by using ruler and other devices such as a pair of calipers.
Students' work results: Amila Isanović (the fifth-grade student) and Ilma Sačić (the fourth-grade student), the fourth-grade-students' classroom

During the classes when the main topic was triangle, we used all the possibly available teaching resources that could help students better appreciate and understand the fact, that every triangle has three sides, three peaks and three angles. It actually got its name 'triangle' according to these properties that have just been mentioned. In this project, there were used: a multimedia presentation, a geometric body of a pyramid, an instructional placard about triangle, posters with tangram puzzles on them, and the students put together the tans in order to form various shapes. We realized that the implementation of the dynamic geometry program would give much better results.

The implementation of ICT in the teaching process: "Triangle in GeoGebra"
During the classes that followed, the students were instructed how to take software GeoGebra. We gave them instructions on how to work and except for the aforementioned teaching materials, we also used GeoGebra software, to supplement understanding of the triangle and its properties. Using this program as well as using the instructions that the teachers gave them, the students worked practically during the whole class, and they found out all the possible ways of the implementation of this interesting software. Working in groups, they drew many different types of triangles as well as they read algebraic expressions and had very precise drawings.

In math teaching, computers have enabled an enhanced presentation of a content as well as they have also enabled the implementation of completely new methods of education, especially in this movable geometry software such as:

Introduction of audio and video clips, use of animations, use of complex graphics (eg. 3D representation of a model and structure), multimedia display (the display of a content with a combination of different media: a combination of animation, sound and image), simulation models, interactive approach, electronic interactive part of the contents of geometry and so on.

The whole process of teaching using GeoGebra actually takes place in a form of conversation between computers and students, and not in that kind of conversation in which the computers asks questions and the students only answers them, but rather in a such one that resembles a real conversation between teachers and students. It is a strategy in which a student is an active participant in class. If students in math class use GeoGebra, they can make steps by their own request, but they can also go a step back if such a step is not essential for a problem solving. In these math classes within the project, the students' works are considered very interesting in GeoGebra software, such as drawing a given triangle, with a description of its structure, dimensions, angles as well as with the possibility of description inside and outside of the circle. Each group of students (there were five groups) had a laptop with a previously recorded GeoGebra software on and after having been given precise instructions, they started working in accordance with them – they drew a triangle (equilateral, isosceles, scalene, rectangular and dull) noticing its peaks, its angles, and its dimensions in math class as well as in computer science class. The teacher had the role of an observer as well as of an assistant and of an adviser to students in that working process. After having been given precise instructions, the students realized that they could undo every step they made as well as they could both determine the accuracy of, and save the triangle made on screen.

In this project and in its realization, the repetition of previous knowledge of the triangle was combined with drawing a triangle in GeoGebra, and with reading the description of its structure. The students were motivated to do researches, to learn more about GeoGebra and finally, to master the skills of drawing a triangle in this program.

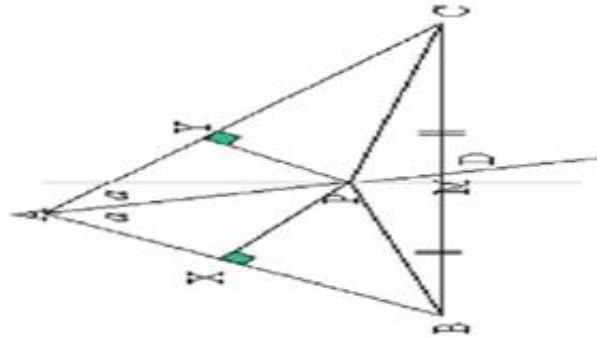### III.   USED GEO GEBRA SOFTWARE

In math teaching at primary school, what is of great significance is a dialogue which must be clear and visual, because it allows students to experience their own ways and means of solving math problems, spotting their mistakes in reasoning. Students who study math at primary school, can be puzzled, if they are left to their own thoughts, because at a certain point you do not know what to pay special attention. With the teacher's successful guide in primary math education as well as at higher levels, what is raised is students' willingness to learn math as well as their self-confidence.

"The dialogue and cooperation between teachers and students, directly or via a computer educational program, represent the foundation of successful math learning as well as a satisfactory math achievement." (Pejic, 2004)

The software of dynamic geometry is the "royal road" which leads into using computers in teaching math. (Šuljić, 2001) All mathematical programs can be very useful in offering teachers a lot in their school carrier, eg. as an effective tool in breaking the monotony of exclusive use of chalk and boards in the process of learning and teaching math.
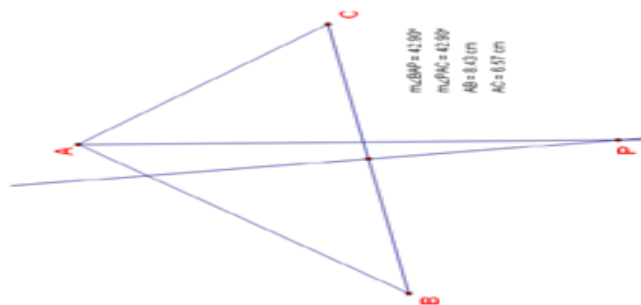
Being a simple way both to implement and use, these programs can be very helpful to students for their individual study and research in this area of math, ie. these programs can affect the way of students' thinking and learning. Students are happy to use this way of learning math, especially when it comes to solving math problems. What students like most about this program is that they can check quickly the results of the math tasks by clicking on a mouse, instead of looking for them in their math books. In addition, teacher like this way

of learning math as well, because by using computer, they can get rid of their daily routine duties, such as preparing and solving the math tasks.

Eg. Task: In this arbitrary triangle ΔABC, the point P represents the intersection of the centerline angle ∠A and of the centerline side BC (see picture). Prove that the triangle is isosceles (AB = AC).

The same example in dynamic geometry

Contrary to the previous case, in dynamic geometry, drawings cannot be incorrect, unless they are edited to be incorrect.

The aim of the project "Triangle in GeoGebra": by using this GeoGebra software program, students can raise the knowledge about triangle in general, they can apply practically what they learnt about GeoGebra software and finally, they can draw, move and calculate accurately the dimensions of the sides of any triangle using the peaks and angles of it.

Once the forth- and the fifth-grade students are educated to use GeoGebra math software that joins geometry, algebra and analysis, they will be able to use this math software which would help them to study more effectively, and will also pass their knowledge on to the next generation of students. Thus, this program will become a reality in everyday teaching practice.
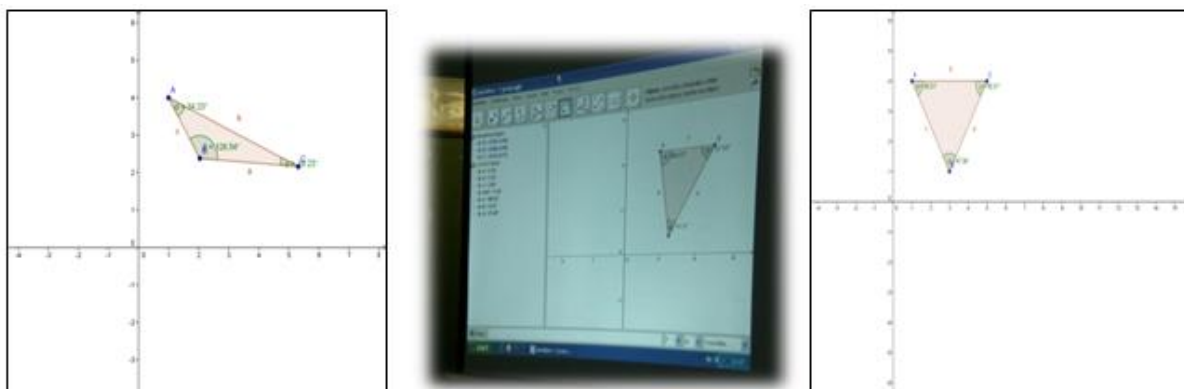
At our school, it is available to our teachers to use a multimedia cabinet (which is equipped with a smart board, computers), projectors and laptops which they can use during classes. It is the open access to the Internet that ICT provides, whose use can be helpful in learning and selecting useful programs.

In this project, it is shown that ICT motivated students to think positively about math, thus making it an interesting subject. The program of GeoGebra dynamic software allows students to repeat every step as well as to notice very accurately straight lines, rays, geometric shapes, bodies and structures. The project was implemented within the framework of classes as well as within extra-curricular arrangements with students.

The following photos represent the activities that have been done at our school:

Students' works:

IV.   CONCLUSION

Time in class is very important. With the use of ICT in teaching, we get a lot more time for organizing and implementing activities in order to meet students' needs. The use of different methods and techniques of data, content and images processing with the help of this program, says enough about the ease and the speed of preparation as well as of its efficiency and quality. We have combined different types of methods that could not be use without ICT. Preparing for this project without ICT would have certainly lasted much longer, and would have been less "rich" in content, images and all of the above mentioned components.

Given that we have chosen the field of "Water in our country", new technologies have enabled students to see and understand more easily the concept of water. Multimedia presentations offer a plenty of images and colours that are enlarged and therefore, students are motivated to be actively involved in teaching. The computer has replaced TV, DVD, a CD player, an overhead projector, chalk, a blackboard, pictures, educational posters, applications, didactic materials as well as it has provided a better quality of both teaching and studying.

During these projects, our students were highly motivated for learning. They were active participants and researchers. They connected experience with the use of ICT. Not only did they develop the interest to expand the knowledge on water but they also learnt how to use ICT alone at home. Building such habits is of great importance in future studies in subject teaching. It can be said that students have developed a special relationship with both computer technology and the Internet – they see it as a "magic box" which offers answers to many of their questions.

Watching a movie by using the projector, provides students with a more comfortable experience than watching the same movie displayed on a TV screen, because the images are larger, the colour is more vivid and so on. This way of learning encourages students to read more and to educate themselves more effectively, which is certainly an integral part of every school in future. Not only are the effect of learning higher, but it also makes students look forward to see or hear something new by using ICT.

While working on this project, the teachers were both the organizers and the guides of the students' working process. Due to the variety of activities, the students participated actively in the work according to their personal abilities.

In the project on Geo Gebra, the cooperation between the students and their teachers as well as the cooperation among students themselves were achieved at a higher level due to their original approach to drawing a triangle, marking its sides, peaks and angles.

The knowledge acquired in this way of work is far more durable and more applicable in practice. Students learn to link the knowledge acquired from different fields of science to what they have already known, so they are encouraged to research more, and the possibility to use laptop is of a great help to them.

The technology which is implemented in both math classes and individual work of students who use laptops, has contributed to complete mastering of the offered educational content as well as to a successful class realization.

Teaching without using ICT is considered very demanding and "limited". Not only are teachers forced to use textbooks, manuals, encyclopedia, but they are also forced to invest a lot more time and effort browsing through the pages in order to find some interesting content. Copying to transparency devices, making teaching posters also requires a lot of teacher's energy and time, and when the school year finishes, the posters turns yellow and are no longer in use. The content that has been recorded on CDs, DVDs or USBs is more convenient and applicable so many times in future.

The implementation of ICT in subject teaching is considered absolutely necessary when it comes to putting school education on a higher level of quality.

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