

# Application of Modern Information Technologies in The Teaching of Technical Culture in Order to Improve the Teaching Process

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**Abstract** — This paper deals with the application of information technologies in the teaching of technical culture in the elementary school education system. The structure of the problem is the computer literacy of teachers and insufficiently developed IT infrastructure, ie. insufficient equipment of the cabinet of technical culture in regard to information technologies.

The subject of research in this paper is the improvement of the teaching process using modern information technologies in the teaching of technical culture, and the aim of the research is to examine the application of modern information technologies in the teaching of technical culture in order to improve the teaching process.

The paper uses the results of research on the application of modern information technologies in the teaching of technical culture in order to improve the teaching process which showed that the cabinets of technical culture in the majority of elementary schools in Canton Sarajevo are not equipped with IT equipment sufficiently.

The teachers' survey contains a quantitative technique that answers the question of how often modern information technologies are used and also a qualitative technique we used to determine which modern information technologies are applied, why and how. For the scale of the assessment of the opinions of students, a quantitative technique was used for a scale of 1-5 for each assertion made.

The sample includes 114 respondents, 100 of which are students in the eight and ninth grades of elementary schools "Kovačići" and "Grbavica I" in Sarajevo and 14 of which are teachers of technical culture in elementary schools in Sarajevo Canton

**Index Terms**- modern information technologies, technical education, teaching process, application, education.

## I. INTRODUCTION

The term information technology indicates a wide range of tools and techniques that are used in creating, storing and distributing data and information, as well as in the creation of knowledge. (Seen, 2007: 16). The main task of information technology in teaching is to find appropriate solutions, how to do that and how to apply new technologies in the relevant fields of subjects.

Information technology allows the teacher to improve his / her knowledge, or better prepare for teaching On the other hand, the teacher is able to encourage students to do research and learning by directing them with well-designed tasks to

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seek and receive relevant data, to understand and interpret them, discuss them or debate in the classroom. It is especially important that the teacher encourages students to link the collected data together, and then to apply that knowledge creatively in concrete working circumstances. With planned use of benefits which come with the use of IT in teaching, the teaching process becomes more dynamic, more rich in content and more interesting. The quality of teaching depends on the education and motivation of teacher. The great responsibility entrusted to them depends not only on their readiness, but also largely on the economic and political picture of the entire country. In order to make the changes in the educational process more advanced, it is necessary to change the curriculum, make it more flexible and certainly provide the necessary means for the work. It's a fact that the biggest problem is technically unequipped schools and outdated technology in our schools. In previous practice it has been shown that many motivated and ambitious teachers, through their efforts, provide various donations or work with students on certain projects which provide new technologies for more successful teaching.

## II. THE CONCEPT OF INFORMATION TECHNOLOGY AND TECHNICAL CULTURE

Information technology is an increasingly used term when it comes to education and its application in order to improve the teaching process. For the interconnection of microelectronics, computer technology and communication, in the last few years, two common names have been used. One of them is information technology IT, while the other is information and communication technology ICT (Delić, 2008: 6).

According to the definition of the World Bank it is pointed out that: "Information and communication technologies consist of hardware, software, networks and media for the collection, storage, processing, forwarding and presentation of information (voice, data, text and image) (A world bank group strategy, 2012).

Technical culture is a teaching subject that introduces students to the world of technology and enables the understanding of the technical environment of man. Understanding the technique involves knowledge of the welfare and potential hazards for man and the environment, responsible and critical application, and active participation in the creative development of the technology (Delić, 2016: 4).

Teaching is a fundamental part of schoolwork in which the

education of pupils according to the prescribed plan and curriculum is being carried out in a planned and organized manner. The teaching is determined by three main factors (the so-called didactic triangle): teaching content, the student and the teacher. The education program is determined by the teaching content. Students systematically study teaching contents, with the help of teachers and self-study, acquire knowledge (material, cognitive viewpoint of teaching), develop abilities (formal, functional viewpoint of teaching), develop interests, needs, shape attitudes (educational aspect of teaching) (Hrvatska enciklopedija, 2018 ).

Learning and teaching subjects of Technical culture is organized according to the given educational goals and learning outcomes, and teachers have the opportunity to choose different approaches in accordance with the needs, interests and levels of students' knowledge and skills as well as working conditions. Taking into account the set principles of learning and teaching, each Technical Culture teacher can devise the performance of the curriculum in the best interests of his students.

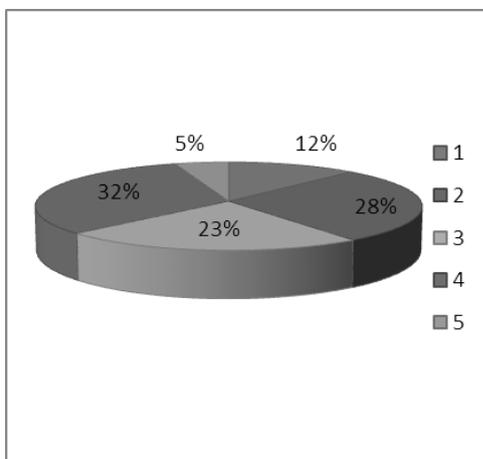
### III. RESEARCH RESULTS AND ANALYSIS OF RESEARCH RESULTS

The research was done according to the research tasks based on the assessment of attitudes of students and teachers. For each task set, hypotheses were tested to help verify the general hypothesis associated with the subject of the research.

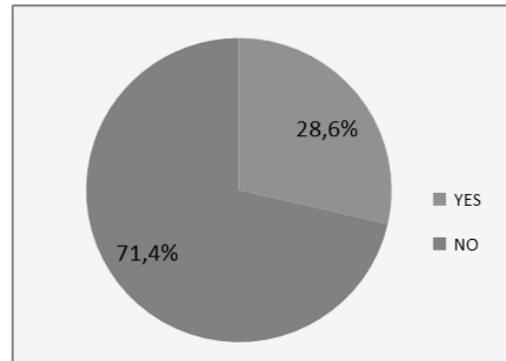
#### 1. HOW EQUIPPED IS THE CABINET OF TECHNICAL CULTURE WITH INFORMATICS EQUIPMENT

Based on the answers given by respondents, pupils and teachers, it can be concluded that the cabinets of technical culture in Sarajevo Canton schools are not equipped with IT equipment sufficiently. The views of respondents, students and teachers are shown in Graph 1 and 2 and Table 1.

**Graph 1.** *Students' attitudes about the state of IT equipment of the technical culture cabinet*



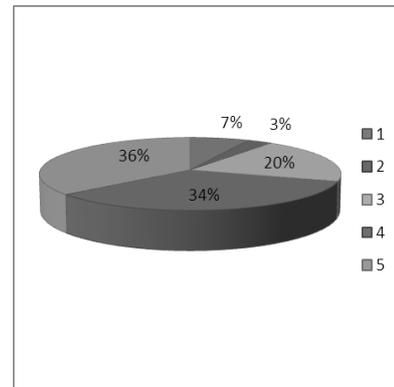
**Graph 2.** *Teachers' attitudes about the state of IT equipment of the technical culture cabinet*



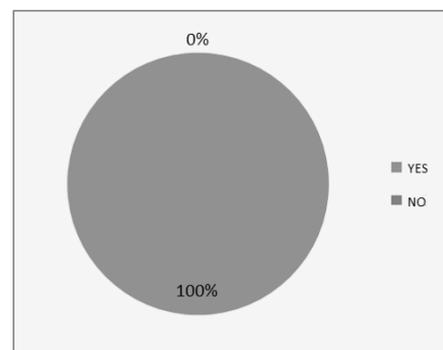
#### 2. MOTIVATION AND BETTER ACQUISITION OF KNOWLEDGE DEPENDING ON THE APPLICATION OF MODERN INFORMATION TECHNOLOGIES

Based on the answers received from the respondents, students and teachers shown in Graph 3 and 4 and Table 1, it can be concluded that the motivation of students for work and acquiring knowledge is greater with the application of modern information technologies.

**Graph 3.** *Students' attitudes about greater motivation for work using modern information technologies*



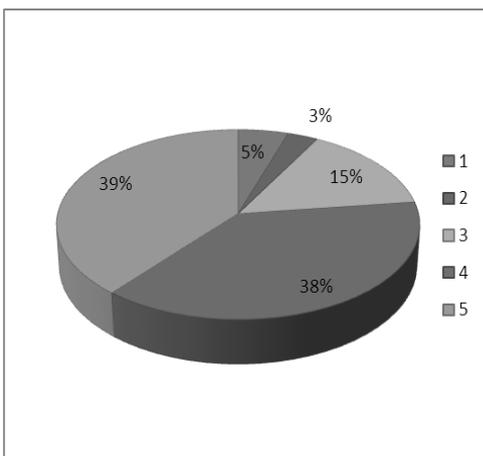
**Graph 4.** *Teachers' attitudes about increasing students' motivation by using modern information technologies*



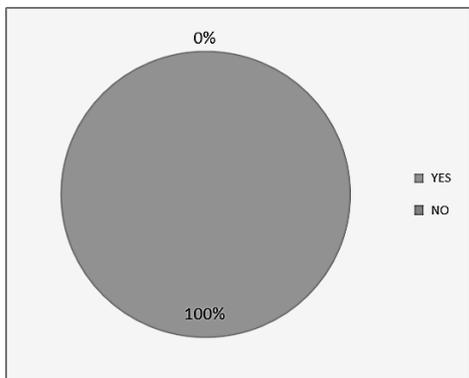
3. EFFICIENCY OF THE TEACHING PROCESS IN DEPENDENCE OF THE USE OF MODERN INFORMATION TECHNOLOGIES

The obtained attitudes of students and teachers shown in Graph 5 and 6 and Table 1 show that the realization of teaching is more effective with the use of modern information technologies.

**Graph 5.** Students' attitudes about the dynamics and interestingness of the teaching process using modern information technologies



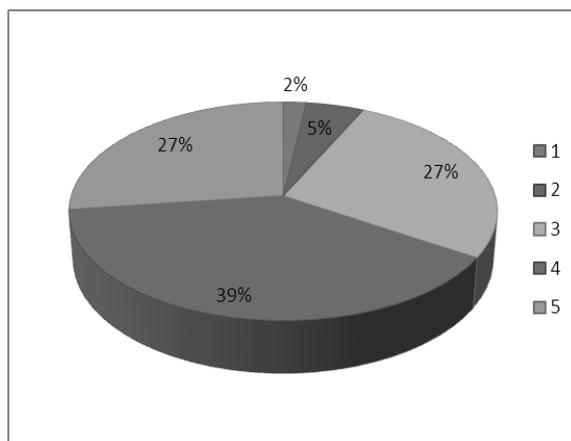
**Graph 6** Teachers' attitudes about the efficiency of teaching realization using modern information technologies



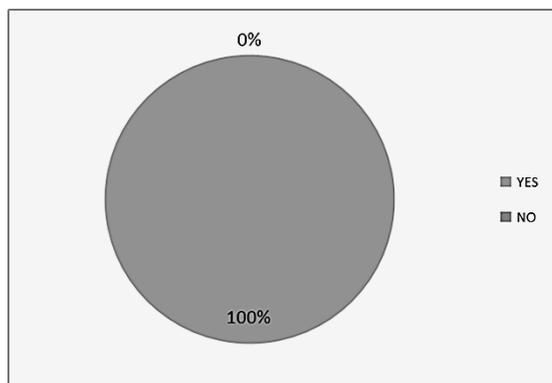
4. THE IMPACT OF THE APPLICATION OF MODERN INFORMATION TECHNOLOGIES IN COMBINATION WITH OTHER MODERN METHODS FOR BETTER RESULTS IN THE TEACHING PROCESS

From Graph 7 and 8 and Table 1 it is evident that the application of information technologies in combination with other modern methods contributes to better results in the realization of the teaching process.

**Graph 7.** Students' attitudes about achieving better results using modern information technologies in combination with modern methods



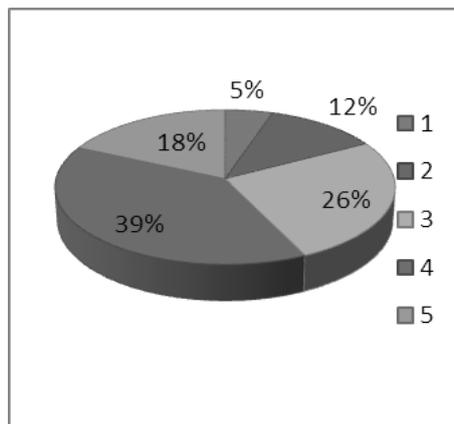
**Graph 8.** Teachers' attitudes about achievements of better results using IT equipment



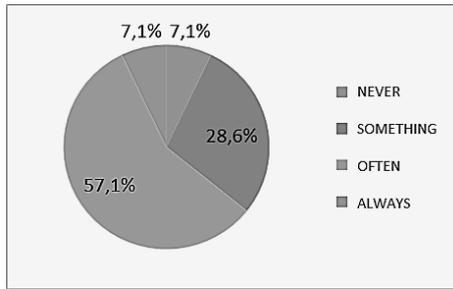
5. LEVEL OF COMPUTER LITERACY OF TEACHERS AND STUDENTS

Based on the opinion of the respondents in Graph 9 and 10, we can conclude that the computer literacy of teachers and pupils in elementary schools is satisfactory. From Graph 11 we see an overview of the types of modern information technologies used in teaching. According to the results, the projector is the most used one.

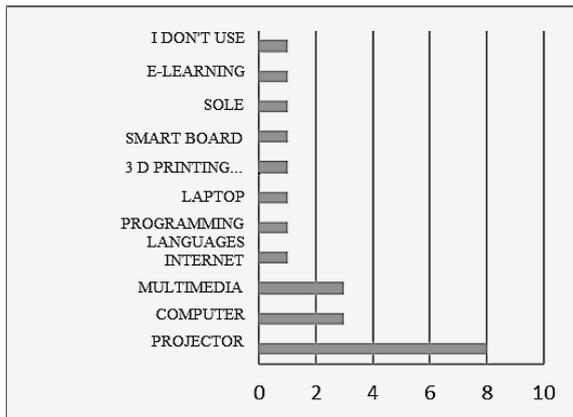
**Graph 9.** Demonstration of students' computer literacy



**Graph 10.** Use of modern information technology in teaching



**Graph 11.** Use of modern information technology in teaching



#### IV. CONCLUSION

Numerous research shows that modern information technologies in education significantly transform the way in which teachers work, collaborate, prepare, create and think. Apart from being a powerful motivation tool, the use of modern information technologies promotes the development of attitudes in students such as: sense of responsibility, pride for a good job, discipline, rigor, and the ability to organize and present activities through creativity which enables students to enjoy the success of well done work. Although most teachers still oppose the introduction of new technologies in education, the European Commission survey (2013) in which 31 countries participated shows that more than 75% of European teachers use technology in their work for more than 6 years, while only 13% of teachers use technology less than 1 year. In order to be effective and productive with the help of new technologies, the teacher is the one who must possess the necessary information technology competencies and be able to choose the type of technology and the most appropriate IT tools. In the teaching of technical culture, computers and projectors are the most used ones, also a smaller percentage of 3D printers, and

drawing and smartboards. The paper introduces the systematization and analysis of individual IT tools and applications used in the teaching of technical culture and the necessary information technology competencies for their use, such as computer literacy. The empirical aspect refers to the establishment of the application of modern information technologies in the teaching of technical culture in order to improve the teaching process.

The most common contemporary methods that teachers combine are: research, programmed, problematic, a somewhat smaller percentage shows that they do not combine at all.

It was found that the motivation of students for work and acquiring knowledge, as well as the realization of the teaching process is greater with the use of modern information technologies. The application of information technologies in combination with other modern methods contributes to better results in the realization of the teaching process and that the computer literacy of teachers and pupils in elementary schools is satisfactory.

The total obtained results within the five set tasks of the research confirmed that the active application of modern information technologies in the teaching of technical culture achieve better results of work and better cooperation between pupils and teachers.

The results and conclusions of this paper will contribute to determining the benefits of using modern information technologies in the teaching of technical culture on better results of knowledge acquisition.

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**Table 1** Student attitudes on the application of information technologies in the teaching of technical culture

Ordinal number	Claim	Strongly disagree	Disagree	I do not agree nor disagree	Agree	Strongly agree
1.	The technical culture cabinet is sufficiently equipped with IT equipment	12 12,00	28 28,00	23 23,00	32 32,00	5 5,00
2.	Motivation is greater through the use of modern information technology in teaching	7 7,00	3 3,00	20 20,00	34 34,00	36 36,00
3.	Lessons are more dynamic and interesting with the use of IT equipment	5 5,00	3 3,00	15 15,00	38 38,00	39 39,00
4.	I achieve better results using IT equipment in combination with other modern teaching methods	2 2,00	5 5,00	27 27,00	39 39,00	27 27,00
5.	Students have sufficient knowledge of IT equipment	5 5,00	12 12,00	26 26,00	39 39,00	18 18,00
6.	I apply IT equipment on lessons of technical culture	28 28,00	21 21,00	28 28,00	13 13,00	10 10,00
7.	Students learn better when using information technologies in lessons	1 1,00	7 7,00	29 29,00	31 31,00	32 32,00