The interest of elementary school students in computer science

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Abstract

The school subject computer science at the elementary level in the Republic of Croatia still isn't a mandatory school subject. That means that there is no obligation for elementary school students to attend this school subject. There are different reasons when some school subject can and must become a mandatory school subject in the Teaching plan and program. The authors have, as one of the basic condition that school subject computer science become a mandatory school subject in elementary school for all elementary school students, assumed the issue of students' interest in computer science. The sample selected for the study were elementary school students from higher grades (from 5th to 8th grade) from three elementary schools in Cakovec (I. elementary school Cakovec, II. elementary school Cakovec, III. elementary school Cakovec). Sample consisted of 363 elementary school students. The basic method used to examine the interest of elementary school students for computer science was the method of the survey. Survey consisted of two parts; the first part of the survey was filled out by all students who participated in the study (363 students), while the second part of the survey involved elementary school students (345 students) who attended the school subject computer science as an optional subject.

Keywords: Elementary school, computer science, optional school subject, students' interest.

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1. Introduction

"The elementary school is compulsory level of education and the main function is to ensure the acquisition of a broad general education" (Ministry of Science, Education and Sports, 2006). Elementary school in the Republic of Croatia is obligatory for all students. Students attend elementary school for eight years. Elementary education starts from the average student's sixth year of life and last until student's age of fifteen (Croatian Constitutional Court, 2014). The fundamental purpose of elementary education is that students acquire the basic knowledge and skills (Ministry of Science, Education and Sports, 2006). Elementary education is realized on the basis of the prescribed Teaching plan and program. Teaching plan and program is prescribed by Ministry of science, education and sports. That document defines the time, place, content, school subjects and the teaching methods (The Legislation Committee of the Croatian parliament, 2003). The school subjects, which belong to the mandatory school subjects, are required to be attended by all of the students. Optional school subject(s) is obligatory just for the students who choose that subject(s) on behalf on their own interest. Additional school subject(s) is organized for gifted students and for the students who need help with regular teaching content. Extracurricular activities take place outside of the regular school hours and students are attending them with regard to their own interest. Extracurricular activities take place outside of the school, and activities include visits, school trips, field trips and school in nature (Ministry of science, education and sports, 2006). The computer science in elementary schools in the Republic of Croatia still does not have the status of a mandatory school subject which should be attended by all pupils. In the lower grades of elementary school (I-IV) the computer science belongs to extracurricular activities with 1 teaching unit per week (35 teaching units per year). In the higher grades (V-VIII) computer science has the status of an optional school subject with 2 teaching units per week (70 teaching units per year). The main goal of the computer science is that students learn how to use a computer and to be acquainted with the information and communication technology (Ministry of Science, Education and Sports, 2006).

"The Teaching plan and program in the field of information and communication technology should enable students to: acquire the art of the use of today's computers and application programs (skills), introduce the basic principles and ideas on which computers and information and communication technology are made of (basic knowledge), develop skills for application information and communication technologies in different application areas (troubleshooting) "(Ministry of Science, Education and Sports, 2006).

All of that shows that the computer science is just an extracurricular activity in the lower grades (I-IV), and an optional school subject in the higher grades (V-VIII). That means that, for example, if the student in the 5th grade is interested in computer science, he can attend computer science. If he chooses to attend computer science, computer science is mandatory school subject for him for that entire school year. But, if the student in the 6th grade decides that he has no more interest in computer science, he is not obliged to attend computer science in the next school year(s) (Ministry of science, education and sports, 2006). All of that means that, if a student doesn't have an interest in computer science at all, he does not have to attend even a single lesson during the elementary educational process.

2. Literature review

Unlike other school subjects, computer science is a specific school subject because students are surrounded with the information and communication technology in their private (non-teaching) time. The phenomenon known as "bedroom culture" means that 82 % of European teenagers between 15 and 16 years old have their own room where they spend half of their time (Livingstone & Bovill, 2001). In their private time, 89 % of elementary school children have access to a computer and they can use information and communication technology (Selwyn, Potter & Cranmer, 2008). The use of computers in their free time elementary school children experience positive (Valentine, Marsh, Pattie & BMRB, 2005). Researches has shown (Mumtaz, 2001, Selwyn et al., 2008) that girls in their private time at home use information and communication technology less than boys. In addition to lower intensity of use of information and communication technology, there is a difference with an attitude towards technology;

girls have a less positive attitude towards technology than boys (Mumtaz, 2001; Meelissen & Drent, 2008), while boys have shown more interest in the use of information and communication technology (Fraillon, Ainley, Schulz, Friedman & Gebhardt, 2013).

3. Methodology

3.1. Participants

The sample selected for the study were elementary school students from higher grades (from 5th to 8th grade) from three elementary schools in Čakovec (I. elementary school Čakovec, II. elementary school Čakovec, III. elementary school Čakovec). Sample consisted of 363 elementary school students.

3.2. Method

The basic method used to examine the interest of elementary school students for computer science was the method of the survey. Survey consisted of two parts; the first part of the survey was filled out by all students who participated in the study (363 students), while the second part of the survey involved elementary school students (345 students) who attended the school subject computer science as an optional subject.

3.3. Results

Table 1. shows that the number of students who participated in the study is almost equal by gender; females (50,138 %) and males (49,862 %).

It is also evident that the 6th grade students participated the most (36,364 %), and the 5th grade students the least (14,601 %).

Table 1. The number of students per grade

Grade	Gender	Percentage (number) of students	The total percentage (number) of students per grade	The total number of students	The total number of students according to the gender
5.	F	7,989 % (29)	14,601 % (53)	363	F 50,138 %
	M	6,612 % (24)			M 49,862 %
6.	F	18,457 % (67)	36,264 % (132)		
	M	17,906 % (65)			
7.	F	9,091 % (33)	22,590 % (82)		
	M	13,499 % (49)			
8.	F	14,601 % (53)	18,182 % (66)		
	M	11,846 % (43)			

Table 2. Age of students when they started using computers

Student's age	The percentage of students
I don't know	5,479 %
1 year	0,685 %
2 years	1,712 %
3 years	6,507 %
4 years	10,616 %
5 years	18,151 %
6 years	13,041 %
7 years	20,548 %
8 years	8,904 %
9 years	5,479 %
10 years	6,507 %
11 years	1,37 %
12 years	0,685 %
13 years	0,342 %

Most students (20,548%) started using computer when they were 7 years old. The assumption is that the most students begin to use computer at this age because they started attending elementary school. The least percentage of students (0,342 %) started using computer when they were 13 years old. The average age at which students start using computer is 6,264 years.

Table 3. A person who is responsible for student's interest to use a computer

A person	The percentage of students
Myself	62,416 %
Mother	3,356 %
Father	11,409 %
A friend	8,389 %
Brother/sister	11,745 %
Grandparents	1,342 %
Grandmother	0,336 %
Cousin	0,336 %
Famous developers	0,336 %
I don't have a great interest in computer	0,336 %

Most students (62,416 %) are interested in computer based on self-interest. Very big impact in student's interest in computer have family members; father (11,409 %) and brother/sister (11,745 %).

Table 4. Using a computer on a daily basis

The answer	The percentage of students
I use a computer every day	72,662 %
I don't use a computer every day	24,46 %
I don't know do I use a computer every day	2,878 %

Most students (72,662 %) use a computer every day.

Table 5. Daily period of time using computer

Daily period of time using computer	The percentage of students
Half an hour	7,246 %
One hour	16,908 %
Two hours	28,502 %
Three hours	21,739 %
Four hours	6,763 %
Five hours	7,246 %
More than five hours	11,594 %

Most students (28,502 %) use a computer for about two hours a day. Very large percentage of students use computer more than five hours (11,594 %) daily and that is something to worry about. The average time spent daily on the computer is 2,112 hours.

Table 6. Owning a computer at home

The answer	The percentage of students
I have a computer at home	98,63 %
I don't have a computer at home	0,342 %
I don't know do I have a computer at home	1,027 %

Most students (98,63 %) have a computer at home.

Table 7. The purpose of using a computer at home

Activities	The percentage of students
Using social networks	29,094 %
Playing computer games	25,146 %
Searching the Internet	20,76 %
Studying	14,327 %
Solving homework in computer science	10,234 %
Programming	0,292 %
Expanding knowledge	0,146 %

Most students (29,094 %) use computer for social networking. The least percentage of students (0,146 %) use computer for expanding their knowledge.

Table 8. The choice of optional school subjects

Optional school subjects	The percentage of students
Catechism	81,818 %
Computer science	79,614 %
German language	66,942 %
English language	44,077 %
Russian language	1,653 %
French language	0 %
None	1,102 %

Most students chose the catechism (81,818 %). A possible explanation for this choice is that the Republic of Croatia is mainly populated by Catholics. In second place is computer science (79,614 %) which shows that the students are interested in computer science. The most interesting part is that the students show more interest in computer science than in foreign languages.

Table 9. The reasons for choosing computer science as an optional school subject

The reasons for choosing computer science	The percentage of students
ICT skills are useful for the future	56,522 %
Interesting topics	9,855 %
Computer science isn't a difficult school subject	8,696 %
My parents suggested that school subject	7,246 %
It is easy to get a good grade	7,246 %
Friends	6,967 %
The teacher is interesting	3,188 %
Because I'm not going to catechism and German language and I found computer science interesting	0,29 %

The most common reason for choosing computer science as an optional school subject is that the students find that having ICT skills is going to be useful for their future (56,522 %). This result shows that the students perceived computer science as very important (optional) school subject. Unfortunately, the influence of teachers on the selection of this optional school subject isn't very significant; only 3,188 % of students select the computer science because of the interesting teacher.

Table 10. Attitude on the status of the computer science

Attitude on the status of the computer science	The percentage of students
Computer science should be mandatory school subject	50,859 %
Computer science shouldn't be mandatory school subject	21,649 %
I don't know	27,491 %

Half (50,859 %) of the surveyed students believe that the computer science should be mandatory school subject in elementary school. The possible reason for that is that today's students are on the daily basis surrounded with information and communication technology on a daily basis and they perceived the technology as an integral part of their lives.

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4. Conclusion

The computer science in elementary schools in the Republic of Croatia still does not have the status of mandatory school subject which should be attended by all pupils. In the lower grades of elementary school (I-IV) the computer science belongs to extracurricular activities, while in the higher grades (V-VIII) has the status of an optional school subject. All of that means that, if a student doesn't have an interest in computer science, he does not have to attend even a single lesson. The survey showed that the average surveyed students started using the computer with 6,264 years. The highest percentage of students (62,416 %) base their interest in the use of computers on self-interest. This can be explained by the fact that today's students are surrounded with information and communication technology on a daily basis. Majority (72,662 %) of the surveyed students use computer every day and on average spend 2,112 hours every day using computer. Very large percentage (98,63 %) of surveyed students have computer at home, but most of them (29,094 %) use it for the purpose of participation in social networks. Given the large students' personal interest in computer science, 79,614 % of the surveyed students selected computer science for their optional school course. The main reason for that decision is that the students (56,522 %) find that the knowledge of the course is going to be useful for their future. In accordance with a great personal interest in computer science, 50,859 % of the surveyed students believe that computer science should become mandatory school subject in elementary schools in the Republic of Croatia.

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