Upbringing children for responsible utilization of information and communication technologies

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Abstract - In the past, the upbringing was primarily function of parents and family. School, with its primary educational function, also has an important role in upbringing of children. However, from those aspects, 21st century brings new challenges and demands. The all-presence of ICT considerably affects social contacts and ways of communication, it changes how certain activities are done, how we inform, learn and entertain ourselves. Children grow up surrounded by ICTs and often they quickly and uncritically accept them. For that reason, parents and information science teachers have the obligation to develop forms of conducts, attitudes and system of values for children's (co)existence in digital world, so the ICT can be used for personal development without violation of established and newly-developed codes of conducts, without vitiation to others or themselves. This paper researches exactly those parents' and information science teachers' upbringing impacts from the aspects of ICT. Our research confirmed that there is a significant difference between parents' and information science teachers' upbringing impacts on children, from the ICT point of view.

I. INTRODUCTION

Upbringing is a complex phenomenon. It can be observed from multiple aspects such as individual, social, familiar or scholastic influences. Even though, family, particularly parents, make the foundation of influences on upbringing of children, school also plays a very important part in it. 21st century leads to new challenges and demands from such perspective.

Social changes, ever growing impacts of electronic media, information and communication technologies, data transfer and communication without time and space boundaries, change the customs and traditions, culture, education, upbringing and families itself [7].

Upbringing problems of children in information age become more intensified because of the fact that since the children are born, they live with digital technologies which they very quickly and uncritically accept, while the adults, who are supposed to lead, guide and tutor them, are considered "digital immigrants"[6].

Utilization of information and communication technologies (ICT) raises questions from the aspect of socialization and its impact on children development which is still not explored enough [13]. Parents are often wondering how to pose themselves towards the children's utilization of computer and Internet, since they consider themselves as not competent enough. However, the educative role of parents can't stop just because children are better at utilization of computers. Parents are obliged to set the rules for the usage of computers, Internet and game consoles of their children, with a demand to obey that rules, because the judgment capabilities and maturity of children are well below the children's competences of ICT utilization [1]. Parents are responsible for the behaviour of children while using the computer or the Internet, just as they are responsible for their behaviour at school, on the street or somewhere else [14].

The upbringing of children in 21st century conveys some new values, attitudes and behaviour patterns. Children need someone who can and know how to direct them towards effective, critical and responsible utilization of ICT. The information science teachers have a vital role and obligation to educate pupils about ICT, but also achieve the upbringing impacts on their pupils so they can be able to identify good and bad sides of ICT, that can use ICT in a constructive and socially acceptable way, for their personal development and in accordance with their interests and needs.

Many researches are conducted about ICT infrastructures in households and educational institutions, the usage frequency of ICT, level of computer literacy of children and parents, their activities on the computer and the Internet, impacts of computer gaming, security, exposure to various dangers on the Internet and undertaken safety precautions. Still, none of these researches have the objective to study the adult's upbringing influences on child's life with all-present ICT.

While the education is of the utmost importance, upbringing impacts that shape the attitudes, value systems, socialization processes and behaviours patterns are very important for responsible, thoughtful, safer, tolerant and more creative utilization of ICT in children. In this regard, this paper represents a small contribution to the field.

II. PROBLEM AND HYPOTHESES

Even though, upbringing and education are largely intertwined and greatly supplement each other, this paper tries to research the upbringing impacts of parents and information science teachers on children as to utilization of ICT, digital content and Internet as the most popular medium of today. Our focus is on the impacts of parents and information science teachers on positive behaviour formation, values and attitudes of children towards ICT, social contacts through ICT and awareness of unacceptable forms of behaviours such as plagiarism, piracy, dissemination of hate and other potential risks such privacy control and malwares are researched at the same time while using the ICT.

Main goal of this paper is to investigate differences between upbringing impacts of parents and information science teachers on children, from the various aspects of ICT. For that reason we propose our main hypothesis.

H1: There is no statistically significant difference between the impacts of parents and information science teachers in upbringing children as to ICT.

Some authors [10; 11; 8; 5] argue that there are differences as to ICT (like attitudes, perception, motivation, expectations, competencies, behaviour) concerning the gender, so some of them mention a "gender gap". According to [10; 11] parents transfer stereotypes concerning gender and ICT utilization, and also, the behaviour of the teacher in class often reflects those stereotypes. Because of that, this research also tries to identify parents' and information science teachers' impacts on children gender based on ICT usage. For that reason we propose the following two hypotheses.

H2a: There is no statistically significant difference in information science teachers' upbringing of children as to ICT, with regard to children's gender.

H2b: There is no statistically significant difference in parents' upbringing of children as to ICT, with regard to children's gender.

III. METHODS

Research was conducted on a pupils sample attending non-obligatory information science classes in elementary schools in Istria region, Croatia. For that purpose, online survey was conducted. Survey consisted of three parts. First part consisted of questions that determined demographic data about questioned pupils (gender, age, years attending class). Second part, consisted of 21 statements from which pupils evaluated upbringing impacts of their parents concerning the ICT utilization. Third part, was substantially the same but instead of parents, information science teachers were evaluated. For every statement, evaluation was done on "3-point" scale (1 - never, 2 - rare or sometimes, 3 - often or very often). Such scale was chosen because it was more adequate to pupil's age and their capabilities to keep the concentration. The following constructs were used to analyse parents' and information science teachers' upbringing influences on children:

- Impacts on construction of positive forms of behaviour while using ICT.
- Impacts on values and attitudes towards ICT and living with ICT (with the emphasis on the Internet)
- Impacts concerning safety and security of children while using ICT.

Information science teachers of six elementary schools were asked to provide the link of online questionnaire to their pupils, and allow them to complete it. On that way, 75 valid and completely filled questionnaires were collected. Descriptive statistics was used for data analysis and Chi-square test to confirm the hypotheses.

IV. RESULTS AND ANALYSIS

Pupils completed 75 questionnaires from which 52% were of male gender and 48% represented female gender. The sample consisted of pupils that attended non-obligatory information science classes, 25% of students attended classes for 2 consecutive years, 44% of them three years and 31% of pupils attended the classes for 4 or more years (Figure 1).

Looking at the arithmetic means over particular statements, information science teachers shows the most frequently impact on the upbringing of children for:

- Information science teacher prohibits violent computer gaming and surfing through the web pages with offending content. (2,9).
- Information science teacher guides us on online privacy issues. (2,8).
- Information science teacher gives us positive examples how to behave while on the computer, and the Internet. (2,7)
- Information science teacher monitors our work on the computer (applications, webpages, games). (2,7)
- Information science teacher warns us that we should not believe or trust all the information that stumble upon. (2,7).

Answers to these questions have a very small standard deviation, which implies uniformity of answers and suggests that often or very often teachers' upbringing impacts are about shape positive behaviour with ICT and precautions over security and privacy of the pupils.

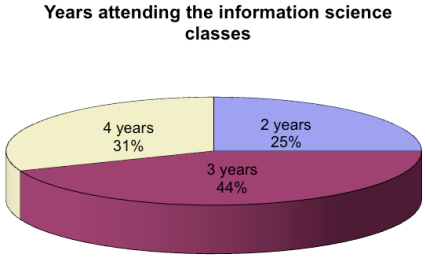

Figure 1. Distribution of surveyed pupils by the number of years attending the information science classes

Least upbringing impacts, by the surveyed pupils, information science teachers achieved at:

- Information science teacher guides us to use open-source, freeware or shareware applications and games instead of pirated ones. (1,9)
- Information science teacher warns us that anonimity on the Internet (like using nickname) doesn't mean we can do whatever comes on mind, without consequences. (2,1)
- Information science teacher points out that it is not acceptable to photograph or record someone without permission and later upload the media on the Internet. (2,2)

Above answers have somewhat bigger deviation from arithmetic mean. These results indicate that there is a need to intensify the dialogue with pupils about taking responsibility for their behaviour online, and to guide them to use alternative applications over pirated ones.

Highest value of arithmetic means at evaluation of parental upbringing of children, on the scale of 1 to 3, comes from the answers of the following statements:

- Parents warn me about the dangers of meeting a stranger who I met on the Internet. (2,7)
- Parents warn me not to trust new friends that I met on the Internet because of the false representation risk. (2,7).

Answers to the previous questions suggest that parents are most active in upbringing when it's about the safety of their children while online, especially at internet communication with unknown persons. There is research indicating that parents' and teachers' perception that Internet can be dangerous is higher than the perception of beneficial aspects of the Internet on children's upbringing" [5].

Least upbringing impact, by the answers of surveyed pupils, parents achieved at:

- Parents warn me that it is not fair to copy-and-paste content and say that I wrote it myself. (1,8)
- Parents warn me not to open e-mail attachments I receive from an unknown person. (1,9)
- Parents define the rules of computer and Internet usage at home. (1,9)
- Parents guide me that it is not acceptable to use pirated applications, games, music or videos. (1,9)

The above results show that the parental upbringing concerning the ICT is not sufficient, when it comes to the talking about plagiarism and piracy. To raise such consciousness about the problem, it takes a wider social/community action. Such problem is of global concern. In 2008, 55% of teenagers considered it is acceptable to cut and paste information from the Internet, for example for the school essay use and most teenagers indeed, see no problem in handling information in that way [2]. Furthermore, children estimated that parents "rarely or sometimes" set the rules for computer and Internet usage, which implicates that they can use the computer and the Internet without supervision, time or content limitations. This raises concerns because some statistics shows that use of the Internet is higher at home than it is in school [15; 2].

V. TESTING THE HYPOTHESES

Main hypothesis (H1) tries to identify if there is statistically significant difference between parents' and teachers' upbringing impacts on children from the aspects of forming the values, attitudes, behaviour, responsible and critical relation towards ICT and its utilisation.

To test the hypothesis, we used Chi-square test that is based on deviation determination of observed frequencies of some events (variables) from the theoretical ones. Observed frequencies of parents' and teachers' upbringing impacts on children as to ICT are shown in the Figure 2.

The value of Chi-square test is 8,12 (χ^2=8,12), so with 4 degrees of freedom (*df=4*) and significance value of 5% (*α=0,05*), we reject the null hypothesis (8,12 > 5,99) and accept the alternative hypothesis which states that there is a statistically significant difference in upbringing children between parents and information science teachers as to ICT. Even though, parents are the cornerstones in children upbringing process since the child is born, the results of this research show that the parental impacts on upbringing children from the ICT aspect are not expressed enough. Often, it is considered that there exists a "digital divide" between children and parents [6], so parents don't know how to rightfully position themselves towards the children's ICT usage and act accordingly in that segment [1]. Otherwise, Information science teachers are qualified and competent persons from the aspect of ICT, who, as we can see from the results, do not disregard the upbringing dimension of their work.

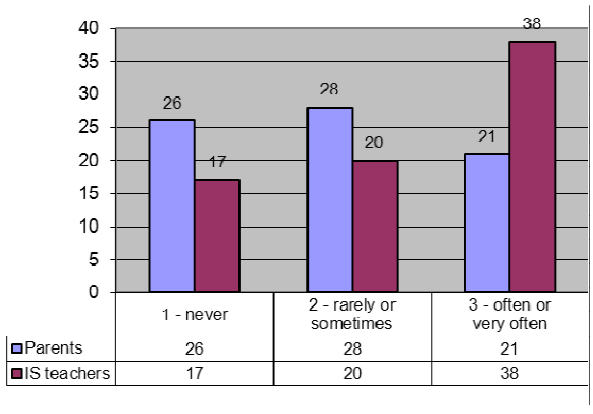

Figure 2. Empirical frequencies of parents' and information science (IS) teachers' upbringing impacts as to ICT

Second hypothesis relates to the gender of the child, as a factor that can impact the parents and teachers upbringing.

Measured upbringing effects of parents as to ICT, with regard to children's gender (H2a), are presented by Figure 3. With the Chi-square test result of 3,54 where df=2 and α =0,05, we accept the null-hypothesis that there is no statistically significant difference (3,54<5,99) in

upbringing impacts of parents as to ICT, with regards to children's gender.

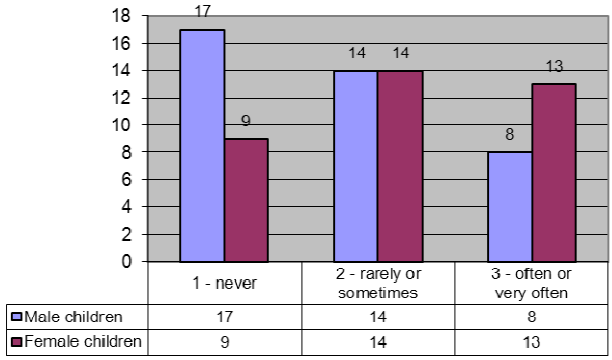

Figure 3. Empirical frequencies of upbringing impacts of parents as to ICT, with regards to children's gender

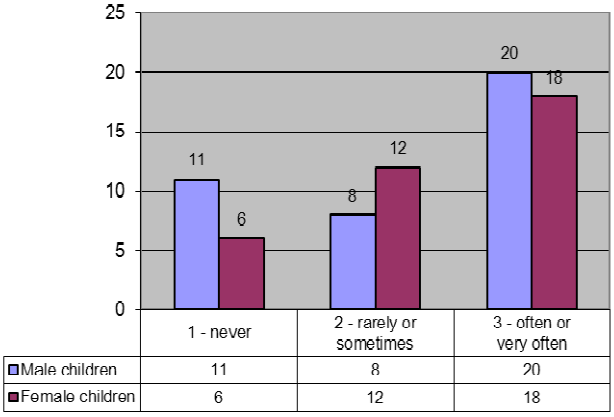

Figure 4. Empirical frequencies of upbringing impacts of information science teachers as to ICT, with regards to children's gender

For information science teachers, measured frequencies of upbringing impacts as to ICT, with regards to gender (H2b), are shown in Figure 4. The result of Chi-square test is 2,26, which is smaller than the parental impacts. So, we also accept the null-hypothesis (2,26 < 5,99) that there is no statistically significant difference in upbringing impacts of information science teachers as to ICT, with regards to children's gender.

VI. CONCLUSION

From their birth, children are affected by the impacts of modern technology and most of the time they unreservedly accept it. They cannot take into consideration all the consequences of their actions in front of the computer and on the Internet. For that purpose, it is extremely important to commit to upbringing and education of children, so that they can embrace the modern technology, ICT to be exact, in a way that they act thoughtful, critical, responsible and socially acceptable, in regards to their interests and needs, with the respect to others. In that case, this will result in prosperous and responsible behaviour as adults in later times. Information science teachers have the advantage because they understand the ICT's interaction with the person, while, most of parents whom ICT is not a primer field of interest and also, some of the parents aren't even computer literate. That can be one of the reasons that this research confirmed that there is a significant difference between parents and teachers upbringing impacts on children, from ICT point of view. For that reason, it would be very important to include all the children in information science classes as early as possible because it isn't just about education but also for the skills and healthy relationship towards ICT and its applications.

It was also shown that the gender of the child did not matter as a statistically important factor that affects the upbringing from teachers nor parents, even though many studies show that this difference exists between boys and girls.

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