The Impact of Information Technologies on Preschool Child Development

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Abstract

The purpose of this paper is to introduce the reader to the impact of information technologies, primarily personal computers, on preschool child development from all aspects: pedagogical, psychological, sociological and medical. Furthermore, the paper discusses some of the main obstacles towards the application of information technologies. The research was conducted with the aim to gather opinions and suggestions from parents and preschool teachers on the (un)warranted use of personal computers in preschool upbringing and education, with particular emphasis on the possibility of computer use in preschools. The research procedure and results are presented in detail. Taking into account all four aspects (pedagogical, psychological, sociological, and medical) of the influence of new information technologies on preschool child development, the authors have concluded that the use of new technologies carries significant advantages, provided the use is adequate, targeted, and only supplementary.

Key words: *computerphilia; e-book; innovation; Instant Messenger Generation; modernization.*

Introduction

The rapid technical and technological advancements bring about numerous changes in all spheres of life today. A study showed that in 68% of American homes at least one parent works such hours that spouses hardly ever meet at home, and 40% of American parents today spend less time with their children, compared to their parents 30 years ago (Fox Cities, 2006). Free time is generally spent within family, watching
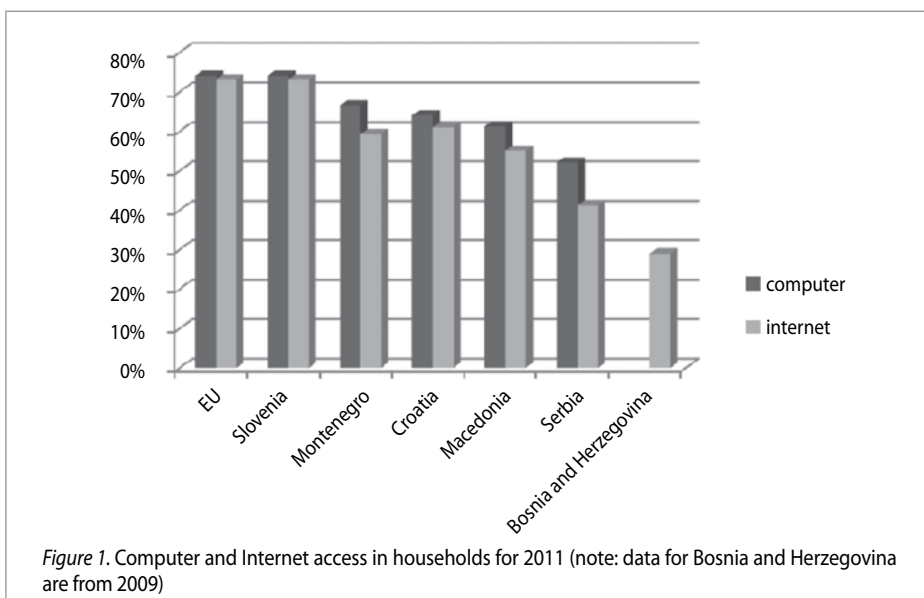
TV or movies. Today, 64% of children return from school to either an empty house or one parent being away at work. Practically, more and more children are being left to their own devices.

Information technologies have crawled into all aspects of everyday life. As far as 80% of families have one parent whose work implies the use of computers (Anđelić, 2005), and their use is also widespread in free time activities. Almost all parents experience this doubt daily: "Should I let my child play computer games, for how long, at what age, what will the effects be?" This paper aims to be if a small contribution towards resolving these and similar issues.

Statistical Data on ICT Usage in Households

In 2011, 74% of households in the EU had a computer, and 73% had Internet access. Holland had the highest rate of households with Internet access (94%), Luxembourg and Sweden 91%, and Denmark 90%, while the lowest were Turkey (43%), Bulgaria (45%), Romania (47%), and Greece (50%)(European Commission - Eurostat, 2012).

As for ex-Yugoslavian countries, according to the 2011 data, Slovenia had the highest number of computer users (74%), while as high as 73% of households in Slovenia had Internet access (The Statistical Office of the Republic of Slovenia, 2011). In Montenegro, 66.5% of households owned a computer, while 59.3% had access to Internet (The Montenergo Agency for Telecommunications and Postal Services, 2011). The next in line was Croatia, with 64% of households with a computer and 61% with Internet access (The Croatian Bureau of Statistics, 2011). A similar situation was registered in Macedonia – 61.2% of households had a computer and 55% used the Internet (The Republic of Macedonia State Statistical Office, 2011) (Figure 1).

Figure 1. Computer and Internet access in households for 2011 (note: data for Bosnia and Herzegovina are from 2009)

The latest research has shown that in Serbia there are 52.1% of households with a computer, which is an increase of 1.7%, compared to 2010. Only 41.2% of households have access to the Internet, which is also an increase of 2.2%, compared to 2010. However, as high as 40.1% of Serbian citizens have never used a computer, and 53% of those surveyed said they had never used the Internet (The Statistical Office of the Republic of Serbia, 2011). At the very end is Bosnia and Herzegovina, with only 29% of households with Internet access (GfK Bosnia, 2009) (This data is for 2009 and new data is not available online).

Education in Modern Society

The above data clearly suggest that there is a steady increase in the number of households who own a computer or have access to the Internet.

Today, the *Instant-Message Generation* (Jukes, McCain, & Crockett, 2010) is redefining today's world. They are brought up to a new, digital environment, having never known a world without computers, mobile phones, video games, Internet, and other digital inventions.

Like other inventions that bring technical progress, a computer is morally neutral, that is in itself it is inherently neither good nor bad. Only through human use it can become good or bad – depending on towards what end it is used. To apply information technology in preschools, it would be to educate and train teachers to transfer their IT skills and knowledge to children, observing their age, as well to use information technology as a didactic tool in teaching and educating children.

"Jarše" and "Viški vrtec" preschools in Ljubljana, and Belgrade preschools ''Leptirić'' and ''Vila'' employ computers, alongside toys, as a device aimed to emulate home atmosphere, replacing teddy bears.

All societies continually strive toward a more efficient, economical and democratic education. The question of the use of information technologies in education, therefore, comes down to the issue of creating a theoretically ideal model for the use of these technologies in education. The paramount task of the modern upbringing and education process is to improve the performance of the existing and find new, more efficient work methods. Today, children have more and more knowledge and information before they start school, so preschool education and upbringing must be *modernized*, to enable children to properly connect the dots between what they see, hear, understand, and remember, that is, to facilitate learning. However, there are many obstacles that hinder the fast modernization of this process in preschools, such as: inadequate space/rooms, lack of modern teaching tools, old habits, fear of change and new teaching methods and tools, large groups, insufficiently trained staff, etc.

Furthermore, lesson plans and content must be updated. Modernization of classes implies a systematic inclusion of elements of modern society into the teaching content, and application of contemporary teaching tools. It also implies introducing *innovations* to the early childhood education system. These innovations entail the

implementation of new educational practices and curriculums, and modern teaching methods, all for the purpose of bringing new and better quality education. Modern-day pedagogy endeavors to change the established learning practices with more efficient methods that would prepare children, with more success and in less time, for active participation in further development of science, technology, and social relations. A very important aspect in the *intensification of teaching* is the use of audio-visual tools, because they serve children to not only expand their knowledge but make that knowledge more permanent. As the old Chinese proverb says: "What I hear I forget, what I see I remember, what I do I understand". In other words, this saying by Xunzi (340-245BC) could be paraphrased as: "Not hearing is not as good as hearing, hearing is not as good as seeing, seeing is not as good as mentally knowing, mentally knowing is not as good as acting; true learning continues up to the point that action comes forth (or, only when a thing produces action can it be said to have been truly learned)"(Bennett, 2007).

With the use of different multimedia, modern educational technologies set conditions that foster the use of all senses in the learning process, development of creativity, and greater overall activity of children in class and during learning. That is why informatics and information technology are the essential components of curriculums on all educational levels. Dale (Dale, 1946, 1954, 1969) and other authors (Chi, Bassok, Lewis, Reimann, & Glaser, 1989) have showed that children and adults remember only 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear (observing demonstration), 70% of what they say and write, or play out, and 90% of what they do.

This and similar research studies have prompted the development of interactive teaching methods that are used in parallel with the traditional didactic methods. Interactive methods are not proposed as an alternative to those traditional ones but as their supplement.

Modern teaching aids include: computers, educational software, multimedia, electronic communication, expert training systems, knowledge base, and so on. To ensure didactic value in the application of teaching aids, their use must be timely, competent, well-thought-out, measured, effective, and combined.

Preschool Children and Computers
Pedagogical Aspect

Information technologies should be used to promote the development of new learning strategies that are focused on children, not teachers. Learning implies multisensory stimulation, as opposed to a stimulation of only one sense, which is specific to the old learning methods.

One example of the use of the said technology and its integration into preschool education is the electronic book, known as "e-book". The production of these books is quite simple, and one of the ways to adapt it for children's use is by means of

the Power Point™ program. The use of e-books is beneficial for several reasons: children can participate in their production, which in turn promotes creativity in children; it motivates different child activities and encourages individual and group learning; e-books can be used, modified and reviewed by children independently and individually; they are easy to reproduce and distribute among children and parents, and easy for safekeeping for future generations. This leads to a conclusion that e-books are quite helpful in reaching targeted educational goals in preschools.

Uninterrupted Internet access now allows and facilitates the use of many new features in child education. The Internet enables children to communicate in real-time with other children, parents, that is their social environment not just locally, but also across the world. It also enables fast and simple search for information children would be interested in, as well as the use of suitable educational software. If a child is interested to find out more about the city of Athens, they can use the Internet to search for photos, history, monuments, museums, events, etc. Once they have information, there are many ways to share, present and exchange this knowledge with other children in the group, using different programs, interactive multimedia, etc.

Teachers are familiar with the activity called "This is me – this is us", used to promote the sense of belonging and self-respect in children. The goal of this activity is to develop in children a sense that they, as individuals with all their specific features, at the same time belong to a group and feel good, know, understand and abide the rules of socially acceptable behavior, while they are also encouraged to be independent and have their own initiative. In addition, through this activity, children develop a sense of understanding other people, their activities, actions and feelings, and respect of the opinions of others. This activity helps children to foster positive emotions in a group of peers, to foster beautiful, comradely partnerships and collaborative relationships, mutual respect and trust. They also gain the ability to adjust their own wants, needs and aims with the desires and goals of others and the group as a whole. This activity can be easily carried out with the use of information technology. For example, we can videotape children, their comments about themselves and their preferences, and transfer the material into an appropriate computer program. This will then allow children to watch, analyze, and enjoy the recorded material in a group or individually. Or, when learning about geometric shapes (cylinder, cone, sphere…), children can be asked to bring different objects in those shapes. After that, we can videotape that, classify the objects and record the names of geometric shapes. The result will be a little presentation of the things they have learned.

However, children must be supervised when using computers, especially preschool-aged children. At this stage, parents' supervision must be constant, allowing no more than 20 minutes of computer use per day (Armstrong, & Casement, 2001). When using a computer, a child spends time indoors, physically inactive (static), their bodies keep the same position, and there are no movements. Parents must play an active part in selecting appropriate video games with positive content (no violence, murders,

blackmail, pornography, etc.), preferably games from which a child can draw a positive message or a lesson. Through the use of various educational games a child can learn without force or pressure, playfully and with a smile. This will help a child enjoy and take pleasure in learning and acquiring the knowledge of a language, math, geography, or other different notions and principles. It will also lead a child toward computer literacy, which is becoming, or has already become, a matter of compulsory education.

Nevertheless, computers do not promote the development of children's imagination. Computer use usually comes down to selecting from a variety or pre-prepared solutions, an action that does not engage children spiritually or emotionally, and takes away the need to use intellect in the search for a solution which a child should later justify.

Psychological and Sociological Aspects

Man's worst enemy created by post-industrial culture, the culture of information technology, is the lack of attention and absentmindedness (Svetogorac, 2003). Russian experts (Korytnikov, 2010) claim that mass use of virtual reality computer games will lead to a considerable increase in the number of psychological disorders, that is the invisible line between the real world and the virtual world will soon be erased. The goal of virtual technologies is to create artificial worlds, but when artificial worlds become a reality in human mind, man will not be able to discern between the two, which may lead to personality disorders and alienation (Allington et al., 2010). Preschool children are even more susceptible because at that age they still do not differentiate reality and fiction.

Creativity, self-confidence, independence, concentration and friendliness, among others, are the long term goals of preschool education and are very important for the development of personality, as well as the morals and social skills (Anđelković, 2008).

Creativity

Creative problem-solving through the use of computers calls attention to the critical role of the approach to the problem at hand. The development of creativity in children can be supported through creative problem-solving using heuristics or brute-force methods. Brute-force method is a set of all possible solutions, and heuristics implies the use of a predefined rule applied in the analysis of past and future steps toward problem solving. The question that arises is how to choose the best method? Different combinations of these methods can be applied, depending on the problem. For example, when playing games with coloring books, there are often two choices for the color, one that involves the use of the offered colors from a predefined palette, and the other that implies that children themselves create their own shade of color by a combination of primary colors. This way, children learn simply and easily the basic elements of the color spectrum, as well as color matching. In addition, chess, Lego and puzzle are only some of the many existing creative games (Rutherford, Bittman, & Biron, 2009).

However, all the above mentioned creativity is put into a relatively narrow scope. That is to say that children can only use pre-defined templates, but do not have the possibility to create their own actions that come out of a listed template.

Self-esteem

Nathaniel Branden defined self-esteem as "...the experience of being competent to cope with the basic challenges of life and being worthy of happiness"(Branden, 1990). Self-esteem is a personal characteristic that children can experience through the use of computers. By solving problems that occur during computer use, children gain the sense of independence in problem solving that can be applied to any situation in life. In real life children often give up at the appearance of the first "serious" obstacles, while when playing games they continue with new steps in order to pass onto another level, even when they "lose a life", ... and so on.

It is often only when they are in the virtual world that children have this type of self-confidence, but that self-confidence partially or completely disappears in contact with others, especially their peers. One of the reasons for this loss is the uncertainty in face-to-face communication with others, because such type of communication is usually not represented in the computer applications, except Skype (and alike), which is, in turn, rarely used by children.

Independence

Independence of children is reflected in many aspects (Kuka, 2008):
- Personal independence in practical matters (child's ability to feed, dress and wash).
- Independence of the need to navigate around (child's ability to move freely, make contact with strangers, make purchase in a store).
- Independence in relation to their peers (the child resists attempts to tyranny). Emotional independence (children are able to entertain themselves in a given period of time, without requiring the presence and attention of adults).
- Intellectual independence (children are able to seek and find their own solutions to problems, still do not believe in the word and think for themselves).
- Independence of creative expression (reflected in the originality, flexibility, creative production).

The feeling of independence appears in children when they realize that they have different information at their disposal. This attitude towards information is inevitable in the information society. Information provided on the Internet can be of existential relevance for an individual present on the Network (Plowman, McPake, & Stephen, 2008).

The feeling of independence that children receive through the application of computers and the Internet is a double-edged sword. Children easily absorb a huge amount of information available on the Internet, which is often untested or frequently completely false, and creates a distorted image that they know everything. Taking into

account the psychological features of the development of this age, one can easily realize bad influence on the further course of their development.

Concentration

Observed from a scientific point of view, concentration is crucial in enabling children to follow and understand events around them. The attention span in preschool children increases gradually, so by the age of 6, a child can be engaged in activities for approximately 63 minutes (Fajgelj, Tubić, & Bala, 2007). However, this is a quality that must be practiced and improved throughout life. Staying focused on information around us can be extremely helpful when dealing with children's problems.

Every parent can easily recognize that the concentration demonstrated by their child when playing on the computer increases significantly in intensity and duration. One should ask oneself whether it is the increased concentration, or the rapture with the colorful virtual world? The false impression of increased concentration is lost when a child leaves the computer and faces real, specific tasks that correspond to their age.

Friendliness

Friendliness is a personal characteristic that is especially developed in children who communicate over the Internet. The network allows children from different continents and cultural backgrounds to communicate between themselves. Using Skype, GoogleTalk, Facebook, email, chat or web pages, they can find information about their friends from across the world without leaving the room. This type of communication promotes sociability. However, the Internet is flooded with photos of kidnapped children and devastated parents pleading for help, and there are many ill-intentioned people who are canvasing the Internet in an attempt to lure children.

Online socializing most frequently creates detached persons in everyday life. In fact, children often think that their Internet friends, with whom they communicate only through a computer, are better and more trusted than the children they see every day and with whom they can play in their schools or in the park.

Medical Aspect

The positive aspects of the use of computers in child development would certainly be the overall speed of reaction (fast reflexes). Still, the list of negative aspects is much longer and more comprehensive. There are many negative effects of the computer use, such as headaches, insomnia, tiredness, blurry vision, obesity, aggressiveness, muscle-skeletal dysfunction (Theodoto, 2010).

Japanese neurologist Dr Joshi Sumo claims that he had found indisputable evidence that people who play video games regularly develop choleric personality. According to him, the brain of a person who spends between two to seven hours daily playing computer games ceases to emit beta waves, which are crucial for the control of emotions (Anđelić, 2005).

Most people do not realize how repetitive their movements become because of a constant use of computers, especially the movements involved when using a keyboard and mouse. These movements cause distress on the joints (especially wrist joint) and muscles, and this fatigue is normally acute but, when accumulated over time, it may give cause for concern. Experts have discovered that excessive repetition of small and short movements may lead to injuries that are in addition due to bad posture and arm position.

The second most common problem is that of the psychological stress, which is also related to computer overuse. Mass use of computers in households created a special type of compulsive disorder called computerphilia (Joksimović, 2004). The treatment of computer addiction is applied only in severe cases, when psychiatric therapy is necessary, which is similar to the therapy used in the treatment of drug addiction.

The main symptoms of depressive disorder are surprisingly widespread among computer users and entail a range of characteristics, such as bad mood, lethargy, sleeping disorder (usually oversleeping), appetite disorder (increased food intake), lack of physical activity, high anxiety that occurs every time a person is away from the computer.

One of the common symptoms of neuropsychological dysfunction is the headache stemming from ocular fatigue, which subdues after rest. It is manifested through a pricking sensation in the eyes, fatigue, migraine headaches, stabbing pains, and sometimes nausea and vomiting. Rarely, visual "aura" appears in the form of light flashes, jagged lights, missing areas of vision (Joksimović, 2004).

Serious psychological disorders stemming from prolonged computer use are very rare. Several research studies conducted in the U.S. and China have shown that people who spend more than 30 hours a week in front of a computer are at a higher risk of developing depressive neurosis. But, there is another, far more serious health issue related to computers, and that is epilepsy. This is a relatively common illness (1 in 200), manifested through an uncontrolled discharge of neurons in both cerebral hemispheres, which, in worst cases, cause "clonic-tonic seizures of skeletal muscles" (Joksimović, 2004).

This disorder is often brought into connection with computers, especially computer games, which can "trigger" epileptic seizures. Sensitivity to visual stimuli is characteristic of another form of this disorder called *photosensitive epilepsy,* where flashes of light that flicker at certain a frequency (TV/monitor), strobe light, etc. can cause seizures. Photosensitive epilepsy is not very common, and only 3% to 5% of the entire world population have been diagnosed with this disorder (Fox Cities, 2006).

International rules and regulations prescribe that all software producers must display a warning on the packaging about the software's potential to trigger seizures.

Radiation Emission

One of the risks associated with the use of computers is the radiation coming from electromagnetic fields in the work area. It is difficult to measure the negative health

effects of the non-ionizing radiation, since humans cannot register the exposure with their senses. Computer users exposed to microwaves produced by computer components and wireless devices usually suffer no adverse effects. However, this varies on the individual basis. Although research studies that have been carried out in previous years do not provide undisputed results, there is a general opinion that weak electromagnetic fields around computer units do not pose risk to human health. Effects of radiation are felt after spending long hours in front of the PC screen. The ideal distance from the monitor is 50cm, but this is still in the radiation zone of CRT (Cathode Ray Tube) monitors, so 10-minute breaks are recommended on the hour (Polarotor, 2009). This is not the case with TFT (Thin-Film Transistor) monitors because electrons are emitted only a few centimeters from the screen, which makes these monitors far more suitable. The fear of ionizing (x and gamma) radiation is completely unjustified, since CRT monitors do not emit such high-frequency waves, and TFT monitors are completely clean of that type of radiation.

Ergonomics

Probably one of the most frequent problems in computer use is the keyboard ergonomics, since keyboards are the most used part of computers. Keyboards are to blame for the majority of disorders related to computer use. When working on standard keyboards, hands must be slightly twisted into positions that are not natural (ergonomic) (Joksimović, 2004), which puts strain on hand wrists. There are keyboards that are ergonomically designed, divided into two parts for easier adjustment, bringing wrists into a neutral position.

Another problem that can cause disorders is the use of arm, elbow or wrist rest when working. Using a rest provides relief but, if used frequently, it increases the risk. When we type, regardless of whether we are using a rest, arms are supported by wrists, causing additional strain. Experts suggest avoiding rests and keeping arms free and relaxed above the keyboard.

There are other aspects that must be observed, aside from keyboards, such as: an unsuitable chair or armchair, bad lighting, a bad position of the monitor, etc. As far as lighting is concerned, no light should be allowed to fall directly onto the monitor because this increases the contrast and monitor light, which causes additional strain on the eyes. The seat should be adjustable, allowing the user to properly set the height and position.

Children are the most vulnerable computer users. The application of ergonomic devices here is a bit more complicated, since children are usually forced to use tools and furniture intended for adults. Bad and inadequate posture/sitting position can cause serious injuries to children's locomotive system, so it is advisable to follow the familiar principles: the chair should be set so as the child's forehead is in line with the upper edge of the monitor, the arms should be bent in the elbows, forming a right angle, the back should be supported (even a rolled-up towel can serve this purpose),
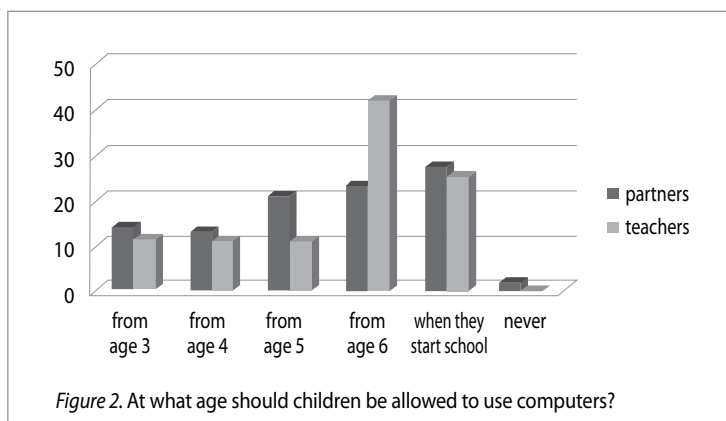
a box should be placed under their feet for support, and the knees must be bent at a right angle. There should be a pause every 15 to 20 minutes, under adult supervision (Joksimović, 2004).

Taking everything into consideration, if computers are used only occasionally, there is no room for concern, but intensive daily use can definitely lead to injuries. The sitting posture and hand positions must be observed at all times and all precautions must be taken.

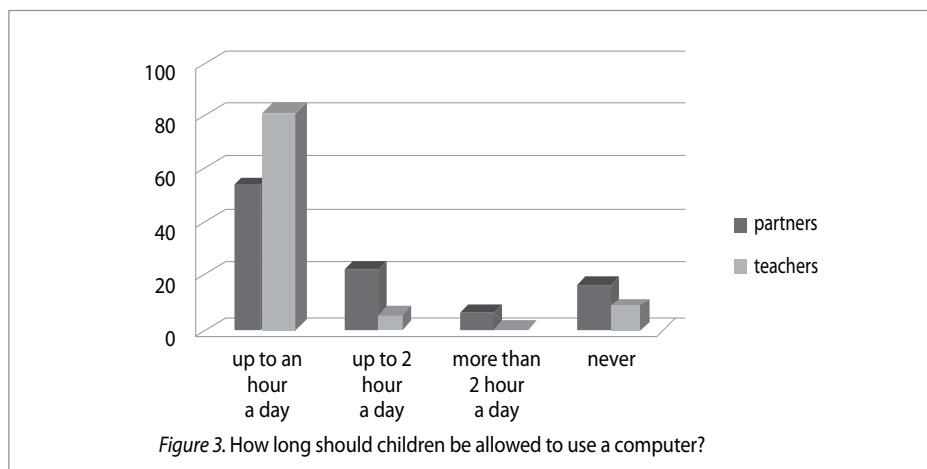## Research Results and Their Analysis

In order to collect opinions from parents and teachers on the use of computers by children, the authors of this paper conducted a study on a sample of 103 parents and 36 teachers in Belgrade, in the preschool facility "11. April". Two surveys were used, one for parents, and one for preschool teachers. The polling was anonymous and consisted of 19 questions, requiring either a descriptive answer or choosing from a multiple choice list. The first four questions concerned the age and education of the subjects, eliciting whether or not they perform duties which are linked to computers, and whether they own a computer at homes. The next seven questions were used to gather the views of parents about whether preschool children should be allowed to work on the computer, how much time per day, and whether they should be introduced in the kindergarten. In this section, the respondents were given two open-ended questions in order to state their opinions about the positive and negative aspects of using computers with preschool children. The rest of the questions were related to the use of the Internet - whether the respondents know what it is, whether they use it, whether they allow their children to use it, and what the advantages and disadvantages are. The very last two questions are related to the introduction of video surveillance in the kindergarten, and the access to its contents via the Internet at any time.

The largest group of parents (27%) feels that children should not be allowed to use computers before starting school, while 23% of them feel that the age of six is the most appropriate (Figure 2).

Figure 2. At what age should children be allowed to use computers?

Teachers have a somewhat different opinion - as high as 42% of them feel that the age of six is the best time to introduce computers to children, while 25% think that this should not occur before children start school. The encouraging information is that there is not a single teacher who feels that children should not be given computers at all. Teachers with twenty years of experience think that parents should wait until their children reach the age of six to introduce them to computers.

Parents and teachers agree that one hour of computer use is sufficient for preschool age children (Figure 3). The Figure shows that the majority of parents allow their children to use computers moderately, while only 6% of them do not allow computer access to children.

Figure 3. How long should children be allowed to use a computer?
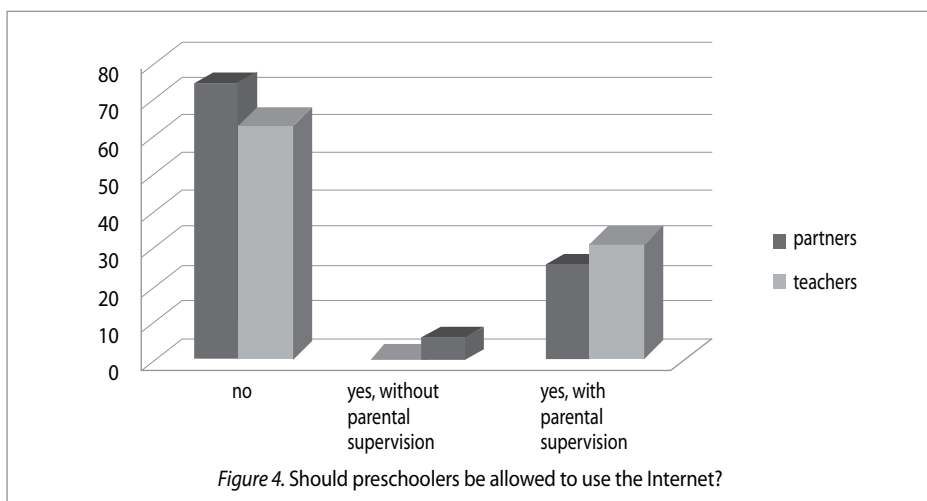
Among those not allowing children computer access, about 60% only have high school diploma, about 20% do not use computers in their work, and about 40% do not have a computer at home (Table 1). Among teachers who object to the use of computers by children, 50% of them are over 50 years of age, while 75% of them are completely computer illiterate.
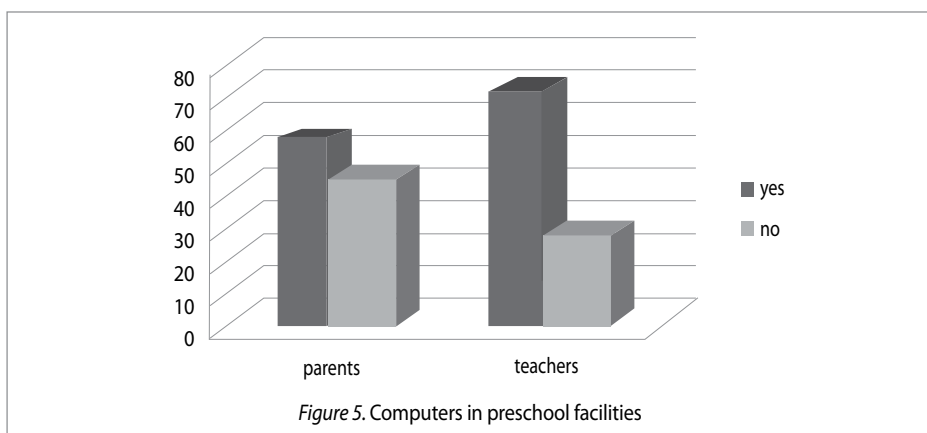
Table 1.

Display of parent replies based on individual characteristics

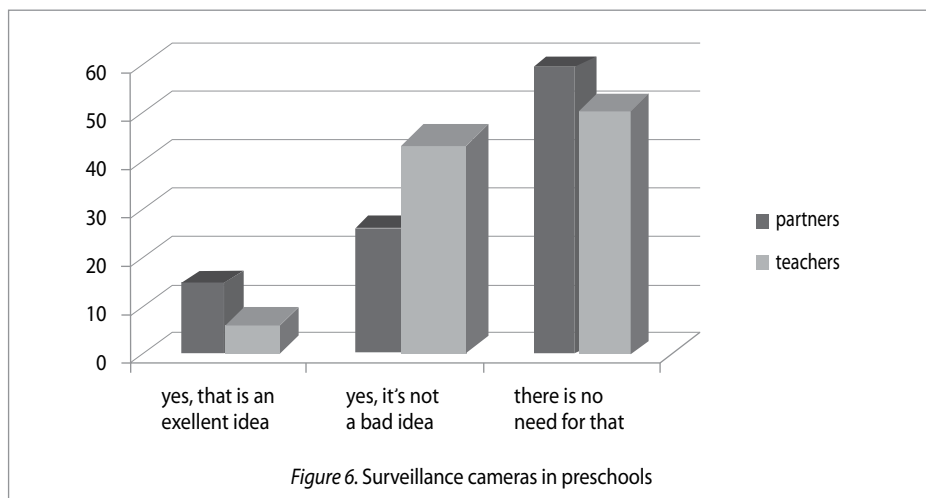| How long should children be allowed to use a computer?				
Characteristics of parents		Up to an hour a day	Up to 2 hours a day	More than 2 hours a day	Never
Level of educational attainment	High school	26	20	2	2
	College or University	27	0	0	5
	Other	3	4	4	10
Use computers in their work	Both parents	25	16	4	4
	One parent	18	3	0	10
	None	13	5	2	3
Have a computer at home	Yes	45	20	5	10
	No	11	4	1	7

The parents' opinions are divided when it comes to allowing preschoolers to use the Internet. Most parents, 74% of them, feel it inappropriate to allow children of that age to use the Internet; 25% think that children should be allowed to use the Internet but under parental supervision (Figure 4). A high percentage of parents who have a university degree, 75.51% of them, do not wish for their children to surf online. 63% of teachers also feel that children should not be allowed to surf online, while 31% of them feel that it is acceptable under parental supervision.

Figure 4. Should preschoolers be allowed to use the Internet?

As far as introducing computers into preschools, 55% of the parents support the idea, while 45% are against it (Figure 5). 87.27% of the parents who support the idea of computers in preschools have a computer at home, which means that a computer is available to their children every day. Almost two thirds of teachers, 72% to be exact, also support this idea, while only 28% of them feel that there is no need for that. It should be noted that mostly teachers who are computer illiterate oppose the idea of having computers in preschools.

Figure 5. Computers in preschool facilities

A surprising result was that as high as 59% of parents stated that there was no need for surveillance cameras in preschools (Figure 6).

Figure 6. Surveillance cameras in preschools

Only 15% of the parents feel that is a good idea, while 20% stated that such surveillance would not be bad. Most of the parents, 80.33% of them, support the idea of surveillance through the Internet, all of them belonging to the group of families where at least one spouse uses a computer every day at work. Since most companies have Internet access, these parents could keep their children under surveillance either at all times, or from time to time. Half of the teachers feel that there is no need for Internet surveillance in preschools, 44% thinks it is not a bad idea, while only 6% thinks it is a great idea.

Analyzing all the above mentioned results, it is easy to recognize that all the respondents, teachers and parents, agree that children aged six years and up should play on the computer under the supervision of adult persons, and that this should last no more than one hour a day. They also agree about the fact that children of this age are still too small to use the Internet. It can be concluded that all, parents and teachers, are aware of the negative consequences that uncontrolled use of computers and the Internet can have on the development of children of this age.

As for the introduction of computers in the kindergarten, most parents and teachers believe that computers should be introduced in the kindergarten. This is slightly unexpected, at least as far as parental attitude, because it was expected that parents should want their children, at least in the kindergarten, to learn to play in the traditional (''old'') way, because when they are at home, their children are mostly surrounded by many modern technical and technological appliances (TVs, computers, phones ...). The teachers' attitude is not surprising, because for most of them it is ''easier'' to put the kids in front of the monitor rather than lead them through other educational games or to teach them using some new cognitions.

Most parents opted for the introduction of surveillance cameras in the kindergarten. This is understandable, given the increased number of cases of violent and reckless

behavior, and even the abuse of children by teachers. The introduction of cameras is also supported by the media, which have paid more attention to such events over the past years. However, it is also understandable that most teachers did not like this option, because none of us has a desire to be filmed all day at their job.

Conclusion

"When we start wondering about the world we live in, we become unsure if this wonderment refers to the actual-tangible reality or a virtual-almost tangible reality. And really, is the line separating them actually clear and dependable?"[1]

(Zindović-Vukadinović, 2000)

Organized implementation of computers in preschools would be a step toward the democratization of computer use. Computer literacy is becoming as important as general literacy. From an early age, children should be introduced to technical devices used in their homes, and one of those is usually the computer. They learn how the computer is switched on, about various commands, how to draw and to color pictures, or how to solve specific problems and situations in games. Children get used to being careful and precise in handling the mouse, the keyboard, the joystick, printer, headset, etc. and to quickly respond to various changes concerning them. They get used to using technical devices to solve different problems with greater speed, search and find information, and communicate online.

On the other hand, what cannot be allowed, and which unfortunately happens to a large extent, is that most preschool children have their computers in their rooms. They can use their computers without limits and access Internet contents that are interesting to them without parental control. All of this can have a devastating impact on the intellectual, psychological, and many other aspects of the development of children of this age, and it can, in addition, lead, to various extents, to deviant behavior in their future lives.

Taking into account all aspects (pedagogical, psychological, sociological, and medical) of the influence of new information technologies on preschool child development, it can be concluded that the use of new technologies carries significant advantages, provided the use is adequate, targeted, and only supplementary. New technologies should by no means replace traditional toys, face-to-face communication, and outdoor activities. Children should stay children, but they should not be kept out of the flow of new developments. The TV was once a miracle of technology, but now it has become a part of home inventory in almost all families. Although it is a source of radiation, and it makes children sit in front of it without moving, and so on, still almost no one thinks about a possibility of a full ban of its use for children.

As is the case with other products of technological progress, the computer is morally neutral, which means that by itself it is neither bad nor good. It can become good or bad through human intention - depending on how and why this "smart" machine is used.

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[1] The quote is the translation of the Serbian original made for this paper.

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Utjecaj informacijskih tehnologija na razvoj predškolske djece

Sažetak

Cilj je ovoga rada upoznati čitatelja s utjecajem informacijskih tehnologija, prije svega osobnih računala, na sve vidove razvoja predškolske djece: pedagoški, psihološki, društveni i zdravstveni. Nadalje, u članku se raspravlja o nekima od glavnih zapreka upotrebi informacijskih tehnologija. Istraživanje je provedeno kako bi se prikupili stavovi i prijedlozi roditelja i odgojitelja o (ne)opravdanoj upotrebi osobnih računala u predškolskom odgoju i obrazovanju, s osobitim naglaskom na upotrebu računala u vrtićima. Metodologija i ishodi istraživanja detaljno su prikazani. Uzimajući u obzir sva četiri vida utjecaja informacijskih tehnologija na predškolsku djecu (pedagoškog, psihološkog, društvenog i zdravstvenog), autori zaključuju da nove tehnologije donose bitne prednosti ako se upotrebljavaju na odgovarajući način, ciljano i kao dodatno sredstvo.

Ključne riječi: *e-knjiga; generacija pošiljatelja izravnih poruka (instant messenger generation); inovacija; modernizacija; zaljubljenost u računala (computerphilia).*

Uvod

Brz tehnički i tehnološki napredak donosi brojne promjene u svim područjima života. Jedno je istraživanje pokazalo da u 68% američkih domova barem jedan od roditelja radi toliko mnogo da se supružnici jedva susreću kod kuće, a 40% današnjih američkih roditelja provodi manje vremena s djecom nego što su ga provodili njihovi roditelji s njima prije trideset godina (Fox Cities, 2006). Slobodno se vrijeme uglavnom provodi s obitelji, u gledanju televizije ili filmova. Danas se 64% djece vraća u praznu kuću ili je jedan roditelj na poslu. Zapravo je sve više djece prepušteno samima sebi.

Informacijske tehnologije ušuljale su se u sve oblike svakodnevnog života. U čak 80% obitelji jedan roditelj ima posao koji uključuje upotrebu računala (Anđelić, 2005), a i u slobodno vrijeme njihova je upotreba raširena. Gotovo si svi roditelji danas svakodnevno postavljaju pitanja: „Trebam li dopustiti svom djetetu da igra računalne igre? Koliko dugo? U kojoj dobi? Kakve će to posljedice imati?" Ovaj članak nastoji dati makar malen doprinos u rješavanju tih i sličnih pitanja.

Statistički podaci o upotrebi informatičkih tehnologija u kućanstvima

U 2011. godini 74% je kućanstava u Europskoj uniji imalo računalo, a 73% je imalo pristup internetu. Nizozemska je imala najvišu stopu kućanstava s pristupom internetu (94%), Luksemburg i Švedska 91%, Danska 90%, dok su na začelju bile Turska (43%), Bugarska (45%), Rumunjska (47%) i Grčka (50%) (Europska komisija – Eurostat, 2012).

Što se tiče bivših jugoslavenskih država, prema podacima iz 2011., Slovenija je imala najveći broj računalnih korisnika (74%), dok je čak 73% slovenskih kućanstava imalo pristup internetu (Ured za statistiku Republike Sovenije, 2011). U Crnoj Gori 66,5% posjedovalo je računalo, dok je 59,3% imalo pristup internetu (Crnogorska agencija za telekomunikacije i poštansku djelatnost, 2011). Sljedeća je po redu bila Hrvatska, sa 64% kućanstava koja posjeduju računalo i 61% onih koji imaju pristup internetu (Republika Hrvatska – Državni zavod za statistiku, 2011). Slična je situacija zabilježena u Makedoniji – 61,2% kućanstava imala su računalo, a 55% se služilo internetom (Državni ured za statistiku Republike Makedonije, 2011).

Slika 1.

Najnovije istraživanje pokazalo je da u Srbiji 52% kućanstava posjeduje računalo. Radi se o porastu od 1,7% u odnosu na 2010. godinu. Samo 41,2% kućanstava imaju pristup internetu, no radi se ipak o porastu od 2,2% u odnosu na 2010. No, čak 40% stanovnika Srbije nije se nikada služilo računalom, a 53% ispitanika nije se nikada služilo internetom (Republički zavod za statistiku Republike Srbije, 2011). Na posljednjem je mjestu Bosna i Hercegovina, u kojoj tek 29% kućanstava ima pristup internetu (Gfk Bosnia, 2009 – novijih podataka od tih nema na internetu).

Obrazovanje u modernom društvu

Navedeni podaci jasno pokazuju da postoji stalan porast u broju kućanstava koja posjeduju računalo ili imaju pristup internetu.

Generacija pošiljatelja izravnih poruka (Jukes, McCain & Crockett, 2010) oslikava današnji svijet. Našli su se u novom, digitalnom okruženju, a nisu nikada ni znali za svijet bez računala, mobilnih telefona, videoigara, interneta i drugih digitalnih izuma.

Poput drugih izuma koji donose tehnički napredak, i računalo je moralno neutralno, nije samo po sebi ni dobro ni loše. Samo ljudskim djelovanjem ono može postati dobro ili loše – ovisno o cilju kojemu služi. Upotreba informacijske tehnologije u vrtićima trebala bi služiti obrazovanju odgojitelja kako bi djeci mogli prenijeti znanje i umijeće vezano uz informatičke tehnologije. Pritom bi trebalo voditi brigu o dobi djece te kako informacijske tehnologije upotrijebiti kao didaktičko sredstvo za poučavanje i obrazovanje djece.

Ljubljanski vrtići „Jarše" i „Viški vrtec", kao i beogradski „Leptirić" i „Vila" upotrebljavaju računala, zajedno s igračkama, kako bi stvorili kućnu atmosferu, a ona ujedno zamjenjuju medvjediće.

Sva društva neprestano teže učinkovitijem, ekonomičnijem i demokratičnijem obrazovanju. Prema tome, pitanje upotrebe informatičkih tehnologija u obrazovanju svodi se na to da se stvori teorijski savršen model za upotrebu tih tehnologija u obrazovanju. Najvažniji je zadatak procesa suvremenog odgoja i obrazovanja da se usavrše postojeće metode rada i pronađu nove. Današnja djeca posjeduju sve više znanja i informacija prije nego što krenu u školu, tako da vrtićki odgoj i obrazovanje moraju biti osuvremenjeni kako bi djeca povezala sve ono što vide, čuju, razumiju i pamte. Drugim riječima, taj odgoj i obrazovanje mora olakšati učenje. Međutim, postoje brojne prepreke na putu modernizacije odgojno-obrazovnog procesa, kao što su: neodgovarajući prostori, nedostatak suvremenih pomagala za poučavanje, stare navike, strah od promjena, novih metoda poučavanja i novih pomagala, velike grupe, nedovoljno obrazovano osoblje itd.

Nadalje, pripreme za nastavu i sadržaj nastave moraju se osuvremeniti. Osuvremenjivanje nastave podrazumijeva sustavno uključivanje elemenata suvremenoga društva u sadržaj poučavanja, kao i uključivanje suvremenih nastavnih pomagala. Ono također uključuje inovacije u sustavu ranog poučavanja. Te inovacije moraju uključiti nove smjerove u obrazovanju i nove kurikule, kao i nove metode poučavanja, a sve s ciljem ostvarivanja novog i boljeg obrazovanja. Suvremena pedagogija trudi se promijeniti uvriježenu praksu poučavanja učinkovitijim metodama koje bi trebale uspješnije i u kraćem vremenu pripremiti djecu na aktivno sudjelovanje u razvoju znanosti, tehnologije i društvenih odnosa. Vrlo važan dio u toj intenzifikaciji poučavanja jest upotreba audiovizualnih pomagala jer ona ne služe samo da bi djeca proširila svoje znanje, već da im to znanje ostane. Stara kineska poslovica kaže: „Što čujem to zaboravim, što vidim to zapamtim, što učinim to i razumijem.“ Ta Xunzieva poslovica (340. – 245. g. prije Krista) mogla bi se tumačiti ovako: „Čuti je bolje nego ne čuti, vidjeti je bolje nego čuti, shvatiti je bolje nego vidjeti, djelovati je bolje nego shvatiti, pravo učenje nastavlja se sve do točke kada djelovanje dolazi u prvi plan (ili, samo kada nas nešto potakne na djelovanje, može se reći da smo to stvarno naučili)“ (Bennett, 2007).

Upotrebom različitih multimedijalnih oblika suvremene tehnologije poučavanja daju mogućnost da se tijekom procesa učenja uključe sva osjetila, da se razvije kreativnost i da se postigne veća aktivnost djece na satu i tijekom učenja. Zbog toga su informatika i informacijska tehnologija osnovni dijelovi kurikula na svim razinama obrazovanja. Dale (Dale, 1946, 1954, 1969) i ostali autori (Chi, Bassok, Lewis, Reimann, i Glaser, 1989) pokazali su da djeca i odrasli pamte tek 10% onoga što čitaju, 20% onoga što čuju, 30% onoga što vide, 50% onoga što vide i čuju (gledaju kako im netko nešto objašnjava), 70% onoga što kažu i napišu, i to u potpunosti, a 90% onoga što učine.

To i slična istraživanja potakla su razvoj interaktivnih metoda poučavanja koje se koriste istodobno s tradicionalnim didaktičkim metodama. Interaktivne metode ne preporučuju se kao zamjena za tradicionalne metode, već kao dodatak.

Suvremena nastavna pomagala jesu: računala, softver namijenjen poučavanju, multimedija, elektronička komunikacija, ekspertni sustavi za usavršavanje, baza

znanja itd. Da bi se osigurala didaktička vrijednost upotrebe pojedinih pomagala, moraju se upotrijebiti u pravo vrijeme, na odgovarajući način, promišljeno, odmjereno, učinkovito i kombinirano.

Predškolska djeca i računala

Pedagoški način

Informacijske tehnologije trebale bi se upotrebljavati s ciljem razvoja novih strategija poučavanja koje se usredotočuju na učenike, a ne na nastavnike. Učenje podrazumijeva poticaj svih osjetila, za razliku od poticaja jednog osjetila, kojim se odlikuju stare metode učenja.

Primjer upotrebe takve tehnologije i njezina uključivanja u predškolsko obrazovanje jest elektronička knjiga, poznata kao „e-knjiga". Takve se knjige mogu vrlo jednostavno proizvesti, a jedan od načina na koji ih se može prilagoditi djeci jest s pomoću programa Power Point. Upotreba e-knjiga korisna je zbog nekoliko razloga: djeca mogu sudjelovati u njihovu stvaranju, što u djece razvija kreativnost. Nadalje, e-knjiga potiče različite aktivnosti, kao i pojedinačno učenje i učenje u skupini. E-knjige mogu djeca sama koristiti, prilagođavati i mijenjati bez pomoći. Te se knjige mogu jednostavno ponovno proizvesti i podijeliti djeci i roditeljima, a jednostavno ih je čuvati za buduće generacije. To sve dovodi do zaključka da e-knjige uvelike pomažu u postizanju željenih ciljeva u vrtiću.

Neprekidna dostupnost interneta danas omogućava i olakšava upotrebu mnogih novih načina obrazovanja djeteta. Internet omogućava djeci da komuniciraju u stvarnom vremenu s drugom djecom, roditeljima, ljudima iz svog društvenog okruženja, ali i s onima po cijelome svijetu. Internet također omogućava brzu i jednostavnu potragu za informacijama koje bi djecu nmogle zanimati, kao i upotrebu odgovarajućeg softvera za poučavanje. Ako dijete želi doznati više o Ateni, može se poslužiti internetom da pronađe fotografije, podatke o povijesti, spomenicima, muzejima, događajima itd. Kada dobije informaciju, tada može na različite načine podijeliti i razmijeniti znanje s drugom djecom, služeći se različitim programima, interaktivnom multimedijom itd.

Odgojitelji poznaju aktivnost „To sam ja – to smo mi", koja služi da bi se u djece razvio osjećaj pripadnosti i samopoštovanja. Cilj je te aktivnosti razviti u djece osjećaj da pojedinačne osobe imaju posebna obilježja, no da istodobno pripadaju nekoj skupini u kojoj se dobro osjećaju i da moraju znati, razumjeti i poštivati pravila društveno prihvatljiva ponašanja, a istodobno ih se potiče da budu neovisni i da imaju inicijativu. Osim toga, preko te aktivnosti u djeci se razvija razumijevanje za druge ljude, za njihove postupke i osjećaje, te poštivanje njihovih stavova. Ta aktivnost doprinosi tome da djeca jedni za druge razviju pozitivne osjećaje, lijepe, kolegijalne, partnerske i suradničke odnose, međusobno poštivanje i povjerenje. Djeca također postižu sposobnost da prilagode svoje želje, potrebe i ciljeve onima koje imaju drugi članovi skupine i skupina kao cjelina. Ta se aktivnost može lako provesti upotrebom

informacijske tehnologije. Na primjer, možemo snimati djecu, ono što govore o sebi i onome što vole, pa onda taj materijal pretvoriti u pravi računalni program. Na taj će način djeca moći gledati, analizirati i uživati u snimljenom materijalu sama ili u skupini. Ili, kada se uče geometrijski likovi (valjak, tuljac, kugla …), od djece se može tražiti da donesu različite predmete tih oblika. Potom možemo snimiti te predmete, razvrstati ih i snimiti imena tih geometrijskih oblika. Rezultat će biti mala prezentacija onoga što su naučili.

Međutim, djecu treba nadgledati dok se služe računalom, posebno predškolsku djecu. Na tom stupnju roditeljska pozornost mora biti neprestana. Djeci se ne smije dopustiti da se služe računalom više od dvadeset minuta na dan (Armstrong i Casement, 2001). Dok se služi računalom, dijete je u kući, fizički nije aktivno (statično je), tijelo mu je neprestano u istom položaju, i nema nikakvih pokreta.

Roditelji se moraju aktivno uključiti u izbor odgovarajućih videoigara, čiji sadržaj treba biti pozitivan (bez nasilja, ubojstava, ucjene, pornografije itd.), po mogućnosti takve igre iz kojih dijete može naučiti nešto pozitivno. Upotrebom poučnih igara dijete može učiti bez sile i pritiska, uz igru i sa smiješkom. Na taj će način dijete uživati u učenju, stjecanju znanja o jeziku, matematici, zemljopisu ili nekim drugim idejama i principima. Dijete će se, osim toga, računalno opismeniti, što postaje, a možda je već i postalo, dio obveznog obrazovanja.

Međutim, računala ne razvijaju dječju maštu. Upotreba računala najčešće ne podrazumijeva ništa drugo do biranja između već pripremljenih rješenja. To je aktivnost koja od djeteta ne zahtijeva ništa na duhovnom ili emocionalnom planu. Ta upotreba također dokida potrebu da se dijete služi inteligencijom kako bi došlo do nekog rješenja koje bi poslije trebalo objasniti.

Psihološki i društveni načini

Čovjekov najgori neprijatelj stvoren u postindustrijskoj kulturi, kulturi informacijske tehnologije, nedostatak je pozornosti i dekoncentracija (Svetogorac, 2003). Ruski stručnjaci (Korytnikov, 2010) tvrde da će masovna upotreba računalnih igara koje se odvijaju u virtualnoj zbilji dovesti do porasta psiholoških poremećaja, što znači da će nevidljiva crta između stvarnog i virtualnog svijeta uskoro biti izbrisana. Cilj je virtualnih tehnologija stvoriti umjetne svjetove, no kada umjetni svjetovi postanu stvarnost u ljudskom umu, tada čovjek neće moći razlikovati ta dva svijeta, što bi moglo dovesti do psihičkih poremećaja i otuđenja (Allington i sur., 2010). Predškolska su djeca posebno osjetljiva budući da u toj dobi ne razlikuju zbilju od izmišljenog.

Kreativnost, samopouzdanje, neovisnost, koncentracija i ljubaznost među ciljevima su predškolskog obrazovanja i vrlo su važni za razvoj osobnosti, kao i za moral i umješnost druženja (Anđelković, 2008).

Kreativnost

Rješavanje problema na kreativan način putem računala ukazuje na to koliko je ključna uloga pristupa problemu kojim se bavimo. Razvoj kreativnosti u djece može se

poduprijeti heurističkim ili sistematičnim metodama. Sistematična metoda uključuje sva moguća rješenja, a heuristička podrazumijeva upotrebu već definiranog pravila koje se koristi u analizi prošlih i budućih koraka prema rješenju problema. Pitanje koje se postavlja jest kako izabrati pravu metodu. Različite kombinacije metoda mogu se primijeniti, ovisno o problemu. Na primjer, kada se igraju igre s bojankama, obično postoje dvije vrste izbora između boja. Jedna je vrsta izbora ona gdje se bira između ponuđenih boja, dok u drugoj djeca stvaraju svoju vlastitu boju služeći se osnovnim bojama. Na taj način djeca jednostavno i bez poteškoća uče o osnovnim elementima spektra boja, kao i o kombiniranju boja. Osim toga, šah, Lego-kocke i slagalice neke su od postojećih kreativnih igara (Rutherford, Bittman, i Biron, 2009).

Međutim, u svim navedenim aktivnostima kreativnost je relativno ograničena. To znači da se djeca mogu poslužiti već postojećim shemama, ali nemaju mogućnost stvoriti nešto novo što proizlazi iz postojeće sheme.

Samopoštovanje

Nathaniel Branden je ovako definirao samopoštovanje: „…biti sposoban suočiti se s osnovnim izazovima života te zaslužiti da budeš sretan" (Branden, 1990). Samopoštovanje je osobina koju djeci može pružiti upotreba računala. Rješavanjem problema koji nastaju dok se služe računalom, djeca dobivaju osjećaj neovisnosti u rješavanju problema, koji se može primijeniti na bilo koju životnu situaciju. U stvarnom životu djeca često odustaju čim se pojave prve „ozbiljne" prepreke, dok u računalnim igrama nastavljaju korak po korak kako bi dostigla sljedeću razinu, čak i ako „izgube život" itd.

Djeca često imaju tu vrstu samosvijesti samo kad su u virtualnom svijetu, a ona djelomično ili potpuno nestaje u kontaktu s drugima, osobito s vršnjacima. Jedan od razloga za to jest nesigurnost u komunikaciji oči u oči zbog toga što ta vrsta komunikacije uglavnom ne postoji na računalu, osim kod Skypea (i sl.), što djeca rijetko koriste.

Neovisnost

Dječja neovisnost očituje se u mnogim oblicima (Kuka, 2008):

- Osobna neovisnost u praktičnim situacijama (djetetova sposobnost da se samo hrani, odijeva i pere).
- Neovisnost potrebe da se kreće (djetetova sposobnost da se slobodno kreće, komunicira s nepoznatima, kupuje u trgovini).
- Neovisnost u odnosu na vršnjake (dijete se opire onima koji ga žele tiranizirati).
- Emocionalna neovisnost (dijete se na određeno vrijeme može samo zabaviti, bez traženja nazočnosti i pozornosti odraslih).
- Intelektualna neovisnost (dijete može tražiti i naći rješenja za probleme, još uvijek ne vjeruje riječima i razmišlja za sebe).
- Neovisnost kreativnog izraza (očituje se u originalnosti, fleksibilnosti, kreativnom stvaranju).

Osjećaj neovisnosti javlja se u djece kada shvate da imaju na raspolaganju različite informacije. Taj odnos prema informacijama neminovan je u informacijskom društvu. Informacije koje pruža internet mogu biti važne za život pojedinca koji je na mreži (Plowman, Mc Pake, i Stephen, 2008).

Osjećaj neovisnosti koju djeca dobivaju upotrebom računala i interneta dvosjekli je mač. Djeca lako usvajaju veliku količinu informacija koje Internet pruža, a koje su često neprovjerene ili potpuno netočne, pa tako o sebi stvaraju lažnu sliku o tome da sve znaju. Kada uzmemo u obzir psihološki razvoj u toj dobi, možemo shvatiti koliko je to loše za budući razvoj.

Koncentracija

S gledišta znanosti, koncentracija je nužna da bi djeca mogla slijediti i razumjeti događaje oko sebe. Trajanje pažnje predškolske djece postupno se povećava, pa tako do šeste godine dijete može biti uključeno u neku aktivnost otprilike 63 minute (Fajgelj, Tubić, i Bala, 2007). Međutim, to je vještina koja se mora vježbati i unapređivati cijeli život. Ako se usredotočimo na informacije oko nas, to nam može uvelike pomoći kada se bavimo dječjim problemima.

Svaki roditelj može lako uočiti intenzitet i duljina koncentracije njegova djeteta znatno rastu dok se igra na računalu. Trebali bismo se zapitati je li to pojačana koncentracija ili zadivljenost šarenim virtualnim svijetom. Lažni dojam pojačane koncentracije nestaje kada se dijete digne od računala i suočava s pravim zadatkom koji odgovara njegovoj dobi.

Druželjubivost

Druželjubivost je osobina koja je posebno razvijena u djece koja komuniciraju putem interneta. Mreža daje mogućnost djeci s različitih kontinenata i iz različitih kultura da međusobno komuniciraju. Služeći se Skypeom, GoogleTalkom, Facebookom, e-mailom, chatom ili raznim mrežnim stranicama, nalaze podatke o svojim prijateljima iz cijeloga svijeta a da ne izlaze iz sobe. Takav način komunikacije potiče društvenost. No, internet je preplavljen fotografijama otete djece i očajnih roditelja koji preklinju da im se pomogne, a mnogi ljudi zlih namjera pregledavaju internet u namjeri da privuku djecu.

Druženje preko interneta najčešće stvara hladne osobe u svakodnevnom životu. Zapravo, djeca često misle da su njihovi internetski prijatelji, s kojima komuniciraju samo putem računala, bolji i da im mogu više vjerovati nego onima koje viđaju svaki dan i s kojima se mogu igrati u školi ili u parku.

Zdravlje

Pozitivna upotreba računala u djetetovu bi razvoju bila svakako brzina reakcija (brzi refleksi). Međutim, popis negativnosti mnogo je duži. Postoje brojne negativne posljedice upotrebe računala, kao što su glavobolje, gubitak sna, umor, zamagljen vid, pretilost, agresivnost, disfunkcija mišića i kostiju (Theodoto, 2010).

Japanski neurolog dr. Joshi Sumo tvrdi da je pronašao neoboriv dokaz da ljudi koji igraju videoigre redovito postaju kolerični. Kako tvrdi, mozak osobe koja provede dva do sedam sati dnevno igrajući računalne igre prestaje odašiljati beta valove, koji su osnovni za kontrolu osjećaja (Anđelić, 2005).

Većina ljudi ne uviđa kako se zbog stalne upotrebe računala njihovi pokreti neprestano ponavljaju, osobito pokreti pri upotrebi tipkovnice i miša. Ti pokreti oštećuju zglobove (posebno zglob šake) i mišiće. Umor je jak, a ako se s vremenom nagomila, postoji razlog za zabrinutost. Stručnjaci su otkrili da prekomjerno ponavljanje malih kratkih pokreta može dovesti do ozljeda koje uzrokuje i loš položaj tijela i ruku.

Po učestalosti drugi je problem psihološki stres, koji je povezan s prekomjernom upotrebom računala. Prekomjerna upotreba računala u kućanstvima stvorila je novu vrstu kompulzivnog poremećaja koji se na engleskom zove computerphilia (zaljubljenost u računala) (Joksimović, 2004). Liječenju ovisnosti o računalima pristupa se samo u teškim slučajevima, kada je potrebno psihijatrijsko liječenje slično liječenju ovisnosti o drogama.

Glavni simptomi depresije začuđujuće su rašireni među korisnicima računala, a oni su različiti. To su npr. loše raspoloženje, letargija, poremećaj sna (obično pretjerano spavanje), poremećaj apetita (pretjerano uzimanje hrane), nedostatak tjelesne aktivnosti, napetost koja se pojavljuje kada se osoba udalji od računala.

Jedan od uobičajenih simptoma neuropsihološke disfunkcije jest glavobolja koju uzrokuje očni umor. Ona se povlači nakon odmora. Tu disfunkciju karakterizira peckanje u očima, umor, migrena, bol kao od uboda nožem, a ponekad mučnina i povraćanje. Rijetko se pojavljuje i vizualna „aura" u obliku jake svjetlosti, oštre svjetlosti, nepotpunog vidnog polja (Joksimović, 2004).

Rijetki su teški psihološki poremećaji uzrokovani dugotrajnom upotrebom računala. Nekoliko istraživanja provedenih u SAD-u i Kini pokazalo je da ljudi koji provedu više od trideset sati tjedno uz računalo pokazuju veću tendenciju depresivnoj neurozi. Međutim, postoji mnogo ozbiljniji zdravstveni problem povezan s računalima, a to je epilepsija. Radi se o relativno čestoj bolesti (1 na 200), koja se očituje u nekontroliranom oslobađanju neurona u objema polutkama mozga i koja, u najgorim slučajevima, dovodi do „toničko-kloničkih napadaja koštanih mišića" (Joksimović, 2004).

Taj poremećaj često se dovodi u vezu s računalima, osobito računalnim igrama, koje mogu biti „okidač" za epileptični napadaj. Osjetljivost na vizualne podražaje karakterizira jedan drugi oblik poremećaja, koji se zove fotosenzibilna epilepsija, kada svjetlo koje trepti pri određenoj frekvenciji (televizija, monitor, svjetlo u diskoklubovima) može uzrokovati napade. Fotosenzitivna epilepsija nije česta – samo 3% do 5% svjetskog stanovništva ima tu dijagnozu (Fox Cities, 2006).

Međunarodna pravila i propisi nalažu da svi proizvođači softvera moraju na omotu proizvoda istaknuti upozorenje u vezi s mogućom opasnošću da određeni softver uzrokuje epileptični napad.

Zračenje

Jedna od opasnosti povezana s upotrebom računala jest zračenje elektromagnetskih polja u radnom prostoru. Teško je izmjeriti negativno djelovanje na zdravlje neionizirajućih zračenja, s obzirom na to da ih ljudska bića ne mogu osjetiti. Korisnici računala izloženi mikrovalovima koje stvaraju računala i bežična pomagala obično nisu izloženi negativnim utjecajima. Međutim, to se razlikuje od osobe do osobe. Premda istraživanja provedena posljednjih godina ne daju nepobitne dokaze, opće je mišljenje da slaba elektromagnetska polja oko računala ne predstavljaju opasnost za ljudsko zdravlje. Posljedice zračenja osjećaju se nakon mnogo vremena provedenog pred ekranom osobnog računala. Savršena udaljenost od ekrana je 50cm, no to je još uvijek unutar zone zračenja kod CRT (Cathode Ray Tube) monitora, tako da se preporučuje desetominutna stanka svakih sat vremena (Polarotor, 2009). To nije slučaj s TFT (Thin-Film Transistor) monitorima, kod kojih elektroni zrače tek nekoliko centimetara od monitora, što te monitore čini znatno boljima. Strah od ionizirajućeg zračenja (x i gama) potpuno je neutemeljen zbog toga što CRT monitori ne zrače tako visokofrekventne valove, a TFT monitori uopće nemaju tu vrstu zračenja.

Ergonomija

Ergonomija tipkovnice možda je jedan od najčešćih problema pri upotrebi računala, s obzirom na to da je tipkovnica dio računala koji se najviše koristi. Za većinu poremećaja vezanih uz upotrebu računala kriva je tipkovnica. Kada radimo na standardnim tipkovnicama, šake moraju biti lagano iskrivljene u položaju koji nije prirodan (ergonomičan) (Joksimović, 2004), što uzrokuje napetost šake i zapešća. Postoje tipkovnice koje su ergonomski oblikovane, koje se sastoje od dvaju dijelova tako da se mogu prilagoditi, pa su onda zglobovi u neutralnom položaju.

Drugi problem koji može dovesti do poremećaja jest upotreba naslona za ruke, naslona za laktove ili zapešće dok radimo. Upotrebom naslona odmaramo se, no ako ga često upotrebljavamo, rizik se povećava. Dok tipkamo, neovisno o tome služimo li se naslonom ili ne, zapešća služe kao oslonac rukama, što dodatno pojačava napetost. Stručnjaci savjetuju da se izbjegava naslon, a da se ruke drže slobodno i opušteno iznad tipkovnice.

Osim tipkovnice u obzir treba uzeti: nepriličan stolac ili naslonjač, loše svjetlo, loš položaj monitora itd. Što se tiče svjetla, ono ne bi smjelo padati izravno na monitor jer se tako pojačava kontrast i svjetlo monitora, što uzrokuje dodatno opterećenje za oči. Sjedalo treba biti prilagodljivo i omogućiti korisniku da odredi visinu i položaj.

Djeca su najosjetljiviji korisnici računala. Upotreba ergonomskih pomagala zamršenija je zbog toga što su djeca obično prisiljena služiti se uređajima i namještajem koji su namijenjeni odraslima. Loš i neprimjeren položaj sjedenja može dovesti do ozbiljnih oštećenja dječjeg lokomotornog sustava, pa je stoga uputno slijediti poznate principe: stolac bi trebao biti takav da djetetovo čelo bude u ravnini gornjeg ruba monitora, ruke bi trebale biti zavinute u laktovima tako da čine pravi kut, leđa treba

poduprijeti (čak i savinut ručnik može poslužiti svrsi), pod noge treba djeci staviti kutiju radi oslonca, a koljena moraju biti podvijena pod pravim kutom. Treba praviti stanke svakih petnaest do dvadeset minuta pod kontrolom odraslih (Joksimović, 2004).

Kad se sve uzme u obzir, ako se računala upotrebljavaju tek povremeno, nema mjesta brizi, no intenzivna dnevna upotreba računala svakako može dovesti do oštećenja. Mora se uvijek paziti na položaj pri sjedenju i položaj ruku, a moraju se poduzeti i sve mjere opreza.

Ishodi istraživanja i njihova analiza

Da bi prikupili mišljenje roditelja i odgojitelja o upotrebi računala među predškolskom djecom, autori ovoga članka proveli su istraživanje na uzorku od 103 roditelja i 36 odgojitelja u Beogradu, u vrtiću „11. April“. Korištene su dvije ankete. Jedna za roditelje, a druga za odgojitelje. Ispitivanje je bilo anonimno i sastojalo se od 19 pitanja, koja su u nekim slučajevima zahtijevala opisne odgovore, a u nekima izbor ponuđenog odgovora. Prva četiri pitanja ticala su se dobi i obrazovanja ispitanika. Osim toga, od ispitanika se tražilo da odgovore služe li se pri obavljanju svog posla računalom i imaju li računalo kod kuće. Sljedećih sedam pitanja ispitivalo je stavove roditelja o tome treba li se predškolskoj djeci dopustiti upotreba računala, koliko vremena dnevno i treba li računala uvesti u vrtiće. U tom su dijelu bila dva otvorena pitanja s pomoću kojih su roditelji iznijeli svoje mišljenje o pozitivnim i negativnim obilježjima upotrebe računala u radu s predškolskom djecom. Ostatak pitanja vezan je uz upotrebu interneta – znaju li ispitanici što je internet, služe li se njime, daju li da se djeca njime služe i koje su njegove dobre, a koje loše strane. Dva posljednja pitanja odnose se na uvođenje videonadzora u vrtić i na stalnu dostupnost snimkama preko interneta.

Najveći broj roditelja (27%) smatra da se djeci ne bi smjelo dopustiti da se služe računalom prije nego što krenu u školu, dok 23% smatra da je dob od šest godina za to najpogodnija (Slika 2).

Odgojitelji imaju ponešto drugačije mišljenje – čak 42% smatra da je dob od šest godina najbolje vrijeme da se djecu upozna s računalom, dok 25% smatra da se to ne bi smjelo dogoditi prije početka školovanja. Ono što ohrabruje jest to da ni jedan odgojitelj ne smatra da se djeci ne bi uopće smjela dopustiti upotreba računala. Odgojitelji koji imaju dvadeset godina iskustva misle da bi roditelji trebali pričekati dok dijete ne navrši šest godina i onda ih upoznati s računalom.

Slika 2.

Roditelji i odgojitelji slažu se u tome da je jedan sat dovoljan za predškolsku djecu (Slika 3). Slika pokazuje da većina roditelja dopušta svojoj umjereno služenje računalom, dok njih 6% djeci uopće ne dopušta pristup računalu.

Slika 3.

Među onima koji ne dopuštaju pristup računalu, otprilike 60% imaju završenu samo srednju školu, oko 20% ne upotrebljava računalo u poslu, a otprilike 40% nema računalo kod kuće (Tablica 1). Među odgojiteljima koji se protive tome da se djeca služe računalom, 50% je starije od pedeset godina, dok je 75% njih potpuno računalno nepismeno.

Tablica 1.

Roditeljsko mišljenje o tome treba li djeci dopustiti da se služe internetom podijeljeno je. Većina roditelja, njih 74%, smatra da nije primjereno dopustiti djeci te dobi da se služe internetom, a 25% misli da bi djeci trebalo dopustiti da se služe internetom pod nadzorom roditelja (Slika 4). Velik postotak roditelja s fakultetskom diplomom, 75,51%, ne želi da djeca surfaju internetom. 63% odgojitelja također smatra da se djeci ne bi smjelo dopustiti da surfaju internetom, a 31% smatra da je to prihvatljivo ako ih roditelji nadziru.

Slika 4.

Što se tiče uvođenja računala u vrtiće, 55% roditelja podržava tu ideju, dok je 45% protiv (Slika 5). 87, 27% roditelja koji podržavaju ideju uvođenja računala u vrtić imaju kod kuće računalo, što znači da je njihovoj djeci svaki dan ono na raspolaganju. Gotovo dvije trećine odgojitelja, točnije 72%, također podržava tu ideju, a samo njih 28% smatra da za to nema potrebe. Treba primijetiti da se ideji uvođenja računala u vrtiće uglavnom protive oni odgojitelji koji su računalno nepismeni.

Slika 5.

Začuđuje podatak da je čak 59% roditelja izjavilo da nema nikakve potrebe za uvođenjem nadzornih kamera u vrtićima (Slika 6).

Slika 6.

Samo 15% roditelja smatra da je to dobra ideja, a 20% njih izjavilo je da takav nadzor ne bi bio loš. Većina roditelja, njih 80,33%, podržava ideju nadzora preko interneta. Svi oni pripadaju skupini obitelji u kojima se barem jedan supružnik svakodnevno služi računalom na poslu. Kako većina tvrtki ima pristup internetu, ti bi roditelji mogli svoju djecu nadzirati neprestano ili povremeno. Pola odgojitelja smatra da nema potrebe za nadzorom u vrtićima, 44% misli da to nije loša ideja, a samo 6% misli da je to odlična ideja.

Na temelju navedenih rezultata lako je zaključiti da se svi ispitanici, i odgojitelji i roditelji, slažu u tome da bi se djeca koja imaju šest ili više godina trebala igrati na računalu uz nadzor odraslih, a da to ne bi trebalo trajati duže od sat vremena na dan. Također se slažu u tome da su djeca u toj dobi premala da bi se služila internetom. Moglo bi se zaključiti da su svi, i roditelji i odgojitelji, svjesni negativnih posljedica koje nekontrolirana upotreba računala i interneta može ostaviti na razvoj djeteta te dobi.

Što se tiče uvođenja računala u vrtić, većina roditelja i odgojitelja vjeruje da računala treba uvesti u vrtić. To je pomalo neočekivano, barem što se tiče roditelja, jer se očekivalo da će roditelji htjeti da se njihova djeca nauče igrati, barem u vrtiću, na tradicionalan („starinski") način, s obzirom na to da su kod kuće okružena suvremenim tehničkim pomagalima (televizorima, računalima, telefonima …). Stav odgojitelja ne začuđuje budući da je većini njih „jednostavnije" postaviti dijete ispred monitora, nego ga voditi kroz edukativne igre ili ga poučavati na neki nov način.

Većina roditelja izjasnila se za uvođenje nadzornih kamera u vrtić. To je razumljivo, s obzirom na povećan broj slučajeva nasilja i nepažnje, čak i slučajeva kada odgojitelji zlostavljaju djecu. Uvođenje kamera podržavaju i mediji, koji su takvim slučajevima posljednjih godina posvetili više pozornosti. No, razumljivo je i to da se većini odgojitelja ta mogućnost nije svidjela jer nitko ne želi da ga se cijeli dan na poslu snima.

Zaključak

„Kad se počnemo čuditi svijetu u kojemu živimo, pitamo se odnosi li se to čuđenje na dodirljivu stvarnost ili na virtualnu, gotovo dodirljivu stvarnost. A zapravo, je li crta koja ih razdvaja stvarno jasna i pouzdana?" (Zindović-Vukadinović, 2000).

Organizirana primjena računala u vrtićima bila bi korak prema demokratizaciji upotrebe računala. Računalna pismenost postaje jednako važna kao i opća pismenost. Od rane dobi djeca bi trebala upoznavati tehnička pomagala koja se koriste u njihovim domovima, a često je jedno od njih računalo. Djeca uče kako se računalo uključuje, uče o pojedinim naredbama, kako nacrtati ili obojati slike ili kako riješiti različite probleme što brže, kako pronaći informacije i komunicirati putem interneta.

S druge strane, ono što se ne smije dopustiti, a što se nažalost u velikoj mjeri događa, jest da većina predškolske djece ima računalo u svojoj sobi. Mogu se njime služiti bez ograničenja i doći do sadržaja koji ih zanimaju bez roditeljskog nadzora. Sve to može imati poguban utjecaj na intelektualni, psihološki i mnoge druge oblike razvoja djeteta te dobi, a može dodatno dovesti do raznih stupnjeva devijantnog ponašanja u životu.

Uzevši u obzir sve oblike (pedagoški, psihološki, društveni i zdravstveni) utjecaja novih informacijskih tehnologija na razvoj predškolskog djeteta, može se zaključiti da upotreba novih tehnologija nudi značajne prednosti ako je primjerena, ciljana i ako je tek dodatak drugim sadržajima. Nove tehnologije ne bi nikako smjele zamijeniti tradicionalne igračke, komunikaciju licem u lice i aktivnosti na svježem zraku. Djeca bi trebala ostati djeca, no ne valja ih ostavljati izvan tokova razvoja. Televizor je nekoć bio čudo tehnike, ali sada je dio namještaja u gotovo svakom domu. I premda je izvor zračenja i sili djecu da sjede pred njim bez micanja itd., ipak nitko ni ne pomišlja na mogućnost da se djeci zabrani gledanje televizije.

Kao i drugi proizvodi koje je donio tehnički napredak, tako je i računalo moralno neutralno. To znači da ono samo po sebi nije ni loše ni dobro. Ono može postati dobro ili loše preko ljudske namjere – ovisno o tome kako se taj „pametni" stroj koristi.