IMPACT OF DIGITAL DEVICES AND MOBILE APPLICATIONS ON CHILD DEVELOPMENT

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Abstract

The presence of multimedia in the upbringing of children is an inexhaustible subject for various debates and research, but regardless of the results that can be reached, it is impossible to isolate today's children from the screens it comes across every day. In the modern-day world in which it is difficult to function without digital devices, it is necessary to point the child towards such behaviour that will bring out the best in them, and keep track of the time the child spends interacting with such devices. The development of the child's personality, mental function and physical skills is affected by a number of actions that the child performs when playing, without even being aware of that, and therefore it cannot know how and to what extent its interaction with digital devices affects its physical and mental development. This is where the role of adults, especially parents, is important – they have to strive to form individuals who will have a good upbringing in the digital era without becoming addicts. Mobile applications available on digital devices are designed to stimulate the child's development in a certain way and to serve as an educational tool for the development of specific skills, whereupon it is the parents' task to guide the child and offer the child the best possible content, because a child naturally accepts new things and is open towards new and different games and ways to have fun.

Keywords: *child, play, digital devices, mobile applications*

JEL Classification: J1, J13, M15

1. INTRODUCTION

One of the basic human needs is the need for self-expression. A child expresses itself through playing and thus improves its perception, observation of spatial relationships and reasoning. As such, playing has a great impact on the child's development, cognition, feelings and growing up in general. Therefore, it is very important with which items and how the child plays, and which processes are stimulated or set back by such activities. The awareness of the importance of playing becomes increasingly pronounced, and therefore greater attention is given to what the child uses in such activities. A toy is considered to be the material item of a child's play, but the question is what do modern-day children consider a toy? Since children usually behave in a way which is based on their parents as a model and often role-play, it is not surprising that they spend ever more time using some of the digital devices that adults find irreplaceable in their everyday lives. This is why smartphones and tablets are increasingly becoming children's favourite toys. The aim of this paper is to show how such devices and their content impact the child's development.

# 2. ROLE OF DIGITAL DEVICES IN THE UPBRINGING OF A CHILD

Children are a product of the society in which they grow and develop, so it is impossible to isolate them from the digital devices that surround us. It is very often discussed about how the frequent use of such devices in playing affects the child, and, although results generally indicate a negative context, properly selected and limited use can have an ultimately beneficial effect on the upbringing of a child. It is necessary to monitor the contents the child is exposed to when using such devices, whereupon they need to include educational elements and in no way set back the child's development or compromise its integrity. The goal of using digital devices in one's childhood age is also to develop the child's media literacy, which is nowadays considered to be the basis of the communication society.

In recent years, digital devices have evolved beyond all expectations. For example, when mobile devices first appeared, they represented a possibility to stay in touch when on the go, but then they became personal organisers, digital cam-

eras… Nowadays they are portable entertainment devices and they are increasingly designed to be used by children as well.

There are several reasons why parents increasingly often choose a digital device instead of a classic toy. One reason is that not every toy suits every child, which is something that can be observed only after the child has played with it for a certain time, and there are not many toys that "grow" together with the child. In addition, children can choose between a wide range of different toys nowadays, so they often do not want to use the same toy for a long time and soon want another one. Since it is almost impossible to fulfil such wishes and buy new toys every day or every week, digital devices are the ideal choice. Almost every parent owns such a device and downloading applications for it is simpler and more cost-effective than buying new toys that the child will use only for a limited time, regardless whether it has lost interest in the toy or the toy does not fit the child's age anymore. Nowadays, children get to have their own digital devices at a very early age, which can be seen in Chart 1.

Chart 1. Possession of a digital device in children under 8 years of age in the USA in 2011 and 2013
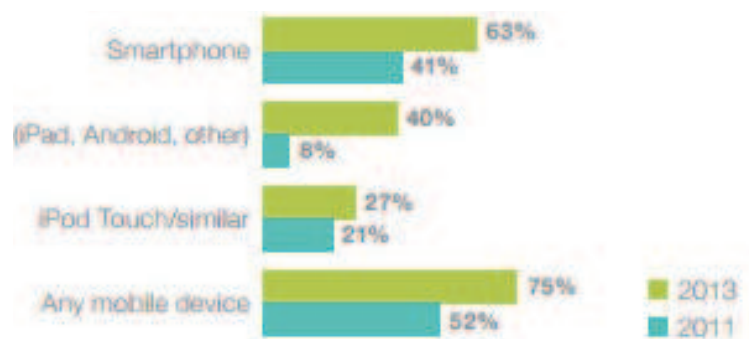
Source: A Common Sense Media Research Study - Zero to Eight Children's Media Use in America, 2013

Still, a question often asked by parents but also by professionals, is the question at which age a child can and should start using mobile applications, but also digital devices in general. The American Academy of Paediatrics, whose guidelines and recommendations are followed by paediatricians in many developed countries, including Croatia, recommends that children of up to 2 years of age be completely isolated from screens of any digital device. Due to the physical and not only mental development of the child up to 2 years of age, it is almost impossible for the child not to hurt itself while using such a device

or not to damage the device. A child at that age explores play by touching the item, observing it, turning it over, knocking object against object, putting it into its mouth, pushing it over the floor or table etc. This is why activities on digital devices do not support the sensorimotor and physical development of the child that is crucial at that age. Despite the recommendations, children under 2 years of age often use some sort of device, which can be seen in Table 1.

Table 1. Screen Media Activities Ever Engaged in by Children Under 2

	2011	2013
Watched TV	66%	66%
Watched DVDs	52%	46%
Used a mobile device (smartphone, iPod Touch, tablet)	10%[a]	38%[b]
Used a computer	4%[a]	10%[b]
Played video games (console)	3%	4%
Played video games (handheld player)	NA*	6%

* Not asked in 2011

Source: A Common Sense Media Research Study - Zero to Eight Children's Media Use in America, 2013

For several years now, the organisation for family counselling Common Sense Media has been conducting research on the impact of media and digital devices on lives of children of up to two years of age in the USA. This year they have noted a drastic increase in the use of smartphones and tablets in precisely that age group. As much as 38 percent of children up to two years of age use digital devices for playing, watching videos and for various other applications, which represents an increase of 28 percent compared to the year 2011. This data is reason for concern, taking into account the warning of psychologists who claim that children under two years of age should be completely isolated from any sort of digital devices, for several reasons, among which they mention the fact that children of that age are not able to follow consecutive changing of images on screens. The mentioned result can be interpreted by the widespread use of gadgets among the population, but also by their increasing significance in the lives of users, among which are also families with small children. As much as 72 percent of children under the age of 8 use smartphones and tablets every day, thus proving that the time of the digital generation has come.

For comparison, 66 percent of children younger than two years of age have watched TV, ten percent of them have used a computer and 46 percent have used DVD devices. These figures are large, but they are stagnating, which is not the case with smartphones and mobile phones. Not only is the number of children using mobile devices increasing, but also the time of usage - today it averages 15 minutes a day, while two years ago it was only 5 minutes.[1]

3. PSYCHO-PEDAGOGICAL POINT OF VIEW ON THE INTERACTION OF CHILDREN AND DIGITAL DEVICES

Various studies show that high quality content available on digital devices have educational benefits for children who use them, provided that the child is older than 2 years of age. A child who uses educational contents of such devices can have improved social skills, acquire foreign languages more easily or be, to a greater extent, more emotionally ready to start school. However, in order for such educational materials to have a positive effect on the child's development, it has to fully understand the content it is using and the content has to be appropriate for the child in terms of the child's age and stage of development.

Educators and psychologists nevertheless point out that using digital devices in the childhood can have negative effects as well, which is mainly related to using those devices without any time limit. This way, a child who spends more time than it should using digital devices consequently spends less time playing creative games or interacting with its parents, siblings or peers, and certainly spends less time playing in the outdoors. Unlimited use of new age devices can often be associated with problems such as obesity, aggressive or destructive behaviour as well as attention deficit. Apart from the actual time the child spends in front of the screen, the time of day this occurs in is also important. Although there are many mobile applications that facilitate falling asleep, some have the opposite effect and keep the child awake, delaying falling asleep at the foreseen time, shortening the time of sleep and causing anxiety. Such poor sleeping habits have a negative effect on the child's mood, its behaviour and learning.

Except the aforementioned health effects that may lead to anxiety or depression in a child, uncontrolled interaction with digital devices can also have

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[1] file:///C:/Users/Zorislav/Downloads/zerotoeightfinal2011%20(1).pdf

consequences on the child's overall development and emotions. Some of them are delayed speech development or pronounced language barriers, restrained imagination or insensitivity towards people around it.

Nevertheless, there is one potential problem of the modern-day world that receives special attention. This is the extreme form of unlimited use of digital devices and addiction to them. A study was conducted in September 2014 in Southeast Asia and its aim was to better understand such disorders and try to treat them. The study pointed out the fact that this sort of behaviour is considered an addiction when the following elements are combined:

- Neglecting of one's basic needs such as sleep or food

- Expressing anger or sadness when the digital device shuts down

- Having no limit in increasingly frequent and prolonged use of a digital device

- Deliberate concealing of negative consequences (e.g. readiness to enter into conflict with family members) [2]

4. MOBILE APPLICATIONS FOR CHILDREN AND THEIR POTENTIAL

Mobile applications have become tools without which we find it difficult to function normally, relying on them completely when performing everyday routine tasks. Consequently, it is not surprising that children increasingly use them, too. Older children who have their own smartphones or tablets are mostly able to choose the applications they want to have and to use them unassisted, while for smaller children it is the adults who decide for them by choosing the applications on one of their own digital devices. Children are in many ways a very specific segment of the population, including the consumer society. One of the reasons for this is the fact that the consumer and the end-user are not the same person. Just as in any other purchase, the situation is the same in purchasing i.e. choosing mobile applications. Taking into account the pace of technological advancement and the availability of mobile applications, it is not surprising that the "modern day toys" are precisely digital devices. Most parents do not categorize such devices as classic toys, but many believe that they playing with them is

[2] http://cmch.tv/are-kids-addicted-to-their-cell-phones-mp3-players-and-portable-videogames/

good. Still, there is a large number of children who mostly use musical or other applications, which do not have an obvious educational value.

A team of media researchers in the USA has conducted a study on the playing habits of children. The survey included 350 parents and the questions were related to the playing habits of their children under the age of 12. Smartphones and tablets were the most prevalent answer in the survey. As much as 60 percent of the children of the surveyed parents often play using different applications, while 38 percent of them play very often. According to the survey, digital devices dominated the children's interest when compared to classic toys.[3] A study conducted in Southeast Asia in 2014 showed that children most often use applications at home, while traveling or when in a public place such as a restaurant.

Speaking of mobile applications for children, it is necessary to point out that they are not entirely what they are expected to be, so some of them collect personal data about their users without them being aware of that, allow children to spend real money or contain advertisements or links to social networks. Therefore, it is important to fully read the description of the applications before downloading them. Parents can also choose special security settings on their devices, turn off Wi-Fi or put the phone in airplane mode so that the children cannot access the Internet when the parents are not there.

5. MOBILE APPLICATIONS FOR CHILDREN ACCORDING TO THEIR INDIVIDUAL REQUIREMENTS

In the multitude of mobile applications, it is possible to find the appropriate one for each child, based on various criteria. In this process, one can use existing reviews of individual applications or one's own, personal evaluation. One of the first criteria is whether the application is free or not.

Regardless of that, one of the most important factors when selecting an application is the age of the child who will use it and the purpose the application is used for. Most frequently, gameplay applications and musical applications are mentioned, but there are also applications that, for example, promote a healthy lifestyle or religious values. Applications intended for parents that serve for a

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[3] http://www.klinfo.hr/izlog/aplikacije-za-djecu/pametni-telefoni-i-tableti-polagano-istiskuju-klasicne-igracke-iz-djecjih-soba/

better understanding of their children or applications that the parents use, for example when they are putting their child to sleep, regardless whether those are lullabies or fairy tales that parents read, belong to a special group.

A very popular classification of applications among children is by characters that appear in them. This criterion is mostly used by younger children who base their choice on their favourite cartoon characters. Manufacturers of children's toys and production companies have made good use of this fact and offered their branded applications. They offer interactions with the company or its products through the game and this way create an emotional bond that motivates the purchase of their products.

To make sure the application is accepted by as many users as possible, a large number of applications are not limited to a particular language area or offer several languages, while some are even used for learning foreign languages. Such applications have an educational role and belong to the group of educational applications that in preschool children enable the acquisition of various skills and knowledge, mainly through games, while those meant for school children mostly vary according to specific areas of the child's interest or by school subjects. Apart from their intended use to facilitate the child's mastering of school subjects more easily, such applications are also used as tools for easier dealing with homework. There are also e-book applications intended for schoolchildren, which allow them to read compulsory school reading materials on their mobile phone or tablet. Applications that are quite often used by schoolchildren and the youth are social networks. Their using of such applications requires caution and a certain level of control by parents, because there are frequent violations of the rights and privacy of users, as well as increasingly frequent virtual abuse of children on various levels.

The table below shows what kind of applications children use most often, depending on their age.

Table 2. Types of Mobile Apps Used by Age (0 to 8 year old)

|	Among all	Child age		
		0-1	2-4	5-8
Educational games	43%	13%	52%	51%
Games that are just for fun	42%	15%	43%	55%
Creative apps*	38%	19%	45%	43%
Apps based on a TV character	28%	13%	39%	29%
Other types of apps	18%	11%	15%	25%

* For things like drawing, making music, or creating videos

Source: A Common Sense Media Research Study - Zero to Eight Children's Media Use in America, 2013

A special segment that needs to be emphasized are applications that have a specific target group, children with special needs. Although, as already mentioned, some believe that using applications in childhood has negative effects on the child's development, experts believe that this is not the case and that using digital devices may stimulate the child's creativity and help children with special needs. Educators, speech-language pathologists and therapists believe such applications to be ideal for facilitating communication in children with autism, cerebral palsy and other disabilities. They allow the therapist to establish better communication with the child and to achieve greater progress in a shorter time.

Although mobile applications are available every day to a large number of children that use them, it is necessary to mention the so called "app gap", i.e. the gap between children which is based on their parents' income. This pertains to access to mobile applications, which means that children from families with lower income have less or no access to applications, as opposed to children from families with higher income. One of the first phenomena similar to this one is the "digital divide", which occurred back in the 1990s and was mainly related to unequal internet access. Apart from the "app gap", another gap was noted as a phenomenon connected with mobile applications for children and young adults, and this is the difference between what the parents want and think the children to be using and what children actually use.

Chart 2. Comparison of parents' expectations and actual usage of applications
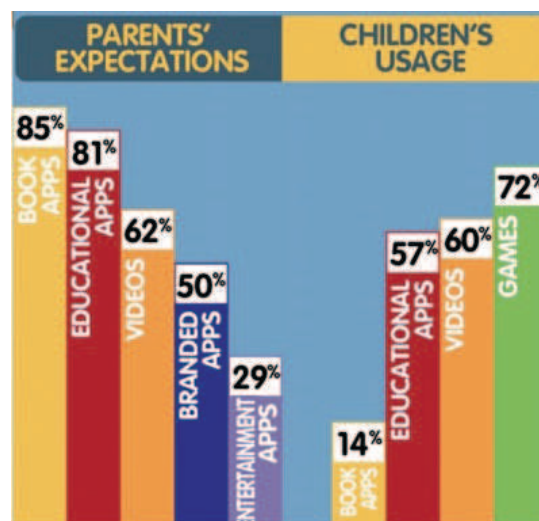
Source: A Southeast Asia Study - Mobile Device Usage Among Young Kids, Commissioned by Samsung Kidstime, November 2014

6. TREND OF MOBILE APPLICATIONS IN THE REPUBLIC OF CROATIA

For the purpose of the author's writing of her final paper at the postgraduate specialist study, a primary research was conducted in 2014, the aim of which was to compare the multimedia presence in children growing up in developed countries across the world (for which data are available) with the situation in the Republic of Croatia. The data obtained in the survey showed that children in Croatia are no different from children in the aforementioned countries when it comes to the habits and ways of using mobile applications. Data pertaining to the use of mobile applications will be presented here in short. The research was conducted on a sample of 200 subjects from a kindergarten and two elementary schools in the area of Osijek. The questionnaire was composed of open-ended and closed-ended questions for three different age groups. Those were children of 3 to 4, 8 to 9 and 13 to 14 years of age. The youngest age group filled in the questionnaires with the help of educators. As much as 76 percent of subjects said that they use their parents' mobile devices, while 71 percent said that they use them to play games. Still, they were not able to name the applications but they rather described them. In the 8-9 age group, as much as 91 percent of the subjects said that they own a mobile device and 78 percent said that they use different applications on them. The open-ended question "What kind of appli-

cations are they?" showed that some of the subjects cannot differentiate between an application and the actual content of the mobile phone, but most of them were still able to name some applications. Among the subjects of the oldest age group, only 11 percent of them do not own a mobile device and as much as 78 percent of those who own a mobile device said that they have a smartphone. They often use different applications but only 11 percent of the subjects actually buy applications, while others download those that are free. This age group uses social networks more than gameplay applications.

Not only do the trends among application users not differ from global trends, but also the same applies to applications created in Croatia. A great example of following of global trends is the project of the University of Zagreb, in which the Faculty of Electrical Engineering and Computing, the Faculty of Education and Rehabilitation, the Faculty of Graphic Arts and the Department of Psychology of the Faculty of Humanities and Social Sciences created three interesting and useful applications for iPad. Those are applications for children with special needs that the parents and therapists working with those children can download for free and use at the Faculty of Electrical Engineering and Computing in Zagreb.[4]

A positive example of an educational application designed and created in Croatia is "Baby Board". The application is intended for children of very young age and it is an excellent example of a high-quality didactic application created by a team of child educators and psychologists, parents and by the children themselves. Its aim is proper development of cognitive abilities of children in carefully determined age groups. The application is designed so that in the hands of a child it becomes a game for developing cognitive skills. It uses the best combination of techniques that facilitate the child's learning by playing, as well as faster development of its abilities. It is designed as the first application through which the child gets to know the world of colours and shapes at a very early age, and it encourages the child's curiosity and stimulates its creativity. By playing with geometrical shapes, the child's fine motor skills are developed and coordination of movement is improved.[5]

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[4] http://www.vecernji.hr/hrvatska/terapija-na-ipadu-djeca-mogu-vjezbati-matematiku-465295

[5] http://markojovanovac.com/other/BabyBoard/

7. CONCLUSION

As is usually the case, novelties brought by new and advanced technologies have both positive and negative sides and so does the "multimedialisation of childhood". Although the aim of the content available on digital devices, which are a part of the children's everyday life, is to have a positive effect on their psychological, physical and social development, the situation becomes contradictory when the duration of the child's interaction with such devices is not limited. If a child spends more time using a digital device than it is recommended for its age, the device is no longer an educational tool, but rather an instrument that can cause health issues and problems in the child's development. Children of up to two years of age should be isolated from such devices entirely, while those a bit older than that should be limited to the recommended time of daily use, i.e. no longer than one or two hours. Schoolchildren and teenagers who also use digital devices for school and not only leisure activities need to have clearly set rules concerning the manner and time of usage of such devices. An increasingly important issue today are the extremes caused by non-compliance with such rules, those being addiction or social maladjustment.

In a time when children grow up faster, in which they are more direct and more informed about the world around them, they have easy access to contents obtained via digital devices, such as mobile applications. Just like with the choice of classic toys, it is very important to choose an adequate application that is appropriate for the child's age, its level of development but also the potential affinities of each individual child. In certain life stages, the child has different needs, abilities, knowledge and skills. It is very important that the mobile application is appropriate for the child's age, for several reasons. A too complex application, one that is beyond the child's capabilities, will have a detrimental effect on its confidence, whereas an application that is too simple will be boring and useless for the child. Both situations will cause the child to be tense and dissatisfied, which could potentially result in serious problems, the solving of which will require professional help.

Taking into consideration the growing distribution and usage of mobile applications among children of all age groups, but also taking into account how much children like them, the question is whether mobile applications will cause traditional toys to fade into oblivion? When it comes to this relatively new trend

among parents and children, time will show to which extent the ubiquitous digital technology will affect children and their development.

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