Young Children (0-8) and Digital technology

A qualitative exploratory study - National report - CROATIA

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2015

November 2015

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Executive summary

Ten Croatian families from Osijek and its surroundings, having at least one child aged 6 to 7, were chosen to examine young children's and their families' experiences with new technologies. We wanted to find out what devices children at that age used, what they were using them for, what they thought and how they felt about using such devices and why that was. Furthermore, we wanted to find out what their parents thought about their engagement with digital technology – what were their perceptions of risks and opportunities, how much time they allowed their children to use the devices, to what end and why that was so.

In order to achieve this objective, we chose 10 families with at least one child 6 to 7 years old – the target child; we visited them at their home and asked them all the questions we were interested in. The target children differ in how often they use digital devices during a typical week, so we have children who represent "low users" (they use a digital device at least once a week), "medium users" (they use a digital device at least two or three times a week) and "high users" (they use a digital device at least once a day). The families also differ with regard to family income and family composition (target children's younger or older sibling). By including a diverse set of families in the sample we wanted to make sure the answers given to our questions were not uniformed and caused by a single common factor. Most of the data collected from the parents is based on their answering the questions from the Protocol of Observation during the interview. Data collected from the children is mostly based on observations and the interviews conducted with the help of a card game and an activity book. The interviews took place between July and October 2015.

The result of this study provided us with an insight into young children's and their families' everyday life and how, in this context, they engage with new (online) technologies.

Results show that digital technology is an integral part of lives of the families included in the sample, but it doesn't dominate their daily routines. The children enjoy using digital technology and would probably gladly welcome more screen time if they were allowed, but at the same time they also enjoy doing a lot of outdoor activities and playing with their toys.

Children use a limited range of digital devices, which often include a computer and smart phones or tablets. We asked them what devices they personally owned, and found out that three children had their own tablets, one had his own personal computer, and four children had mobile phones but not always including a SIM card. For Croatian families in the sample, when compared to the previously mentioned devices, the most dominant form of interaction with digital technology involves watching television. Every family owns a television set, and in every family, children are allowed to watch it at least on some occasions. Also, when we asked families about the activity they did together that involved a digital device, the only thing they all reported was watching television.

As for the content that children access using digital devices, most of them use the devices to watch cartoons on television or a computer, to play simple free games and watch video clips on You Tube, using a computer, a smart phone or a tablet.

Children have a vague understanding of the difference between on-line and off-line activities, and are in this regard very vulnerable. When it comes to digital skills, they are all on the level of a basic user at best and they obtained those skills mostly through observation and limited instruction. Children can play a game that has been downloaded for them, or in some cases they can download and install it by themselves. Some of them can look for interesting video clips on the Internet, but only if the clips have simple names – because of their limited reading

and writing skills. Most of them can take photos with smart phones, but none of them know how to edit or share such photos on purpose. However, since they have a vague understanding of on-line and off-line activities, there is a possibility, for example, that if the device has some accounts for sharing photos and the owner of the device (a parent or an older sibling) is logged in the account, there is a chance that a child may accidentally share some content.

The children prefer using digital devices on their own and with the purpose of having fun, relaxing and enjoying themselves. Therefore, for them to choose a game, video clip or an application, it needs to be fun, or at least they need to assume it is fun when they choose it.

As for the risks and opportunities related to digital technology, the children in the sample are only beginning to grasp them.

Parents usually first emphasize the negative effects of digital technology: addictive behavior, aggressive behavior, consequences for the eyesight and posture and the fact that other areas of life might get neglected if children have too much screen time. As positive implications, parents mention acquiring digital literacy skills and the help of digital technology in acquiring various other skills. Their mediation strategies differ in terms of time and content, with most children having strict time limitations and more freedom when it comes to the content they watch.

It is our opinion that parents do not fully understand the scope of digital literacy skills. Although that does not pose a problem at this time, as their children get older, they will need a lot more support in finding the relevant information about positive and negative sides of children's engagement with digital technology, in order to set reasonable boundaries regarding both time and content. We recommend that Policy-makers make sure there are such information available, and that parents can easily access them when needed. This is especially important in Croatia since there is no special attention being given to digital literacy skills in the kindergarten curriculum, so parents are the only providers of education in this area before children start school. If they feel they do not have adequate knowledge, the children are often left to find the answers themselves, and this might be dangerous for a number of reasons.

From the perspective of Industries, it is interesting that all the parents in the sample allow their children to use only free games and applications – none of the parents have ever purposely bought them.

Key findings

- For all the families in the sample, digital technology is an integral part of their lives, but it hardly dominates their daily routines. This means that even though the children love to use digital devices, they also enjoy doing a lot of outdoor activities or playing with their toys, and in most of the families these activities take up far more time than engaging with digital technology.
- Children use a limited range of digital devices, which often include computers and smart phones or tablets. Still, compared to those devices, the most dominant form of interaction with digital technology involves watching television, which is still the most available medium, and the most present in the lives of children in the sample.
- Tablets are not as widespread as expected. Only a half of the families own a tablet and in only four of them children are allowed to use it. One of those families obtained a tablet only a few weeks prior to the interview. The reasons for this are not quite clear, but

probably involve financial reasons, because most of the families that don't have a tablet are of a lower socio-economic status. What is also interesting is that in two of the families that do have a tablet it is not the device children most often use.

- As for personal ownership, three of the children have their own tablets, one child has his own personal computer, and four children have mobile phones but not always including a SIM card.
- Most children use digital devices to watch cartoons on TV or a computer. Also, they play simple free games and watch video clips on You Tube, using a computer, a smartphone or a tablet.
- Most of them use the Internet search engine to find some interesting information, but almost exclusively with the help of their parents or older siblings. That activity is something that happens only occasionally, and it is not part of their regular interaction with digital devices. More often they use the search engine to find some interesting content regarding cartoons or characters they like.
- They mostly use the devices on individual basis and for the purpose of having fun, to relax and enjoy themselves.
- Children find it difficult to understand the difference between on-line and off-line practices. They are instructed to react to pop-ups by calling their parents, or just pressing "no", but they do not know the difference between playing a game on-line or off-line.
- In general, their digital literacy skills are low. They have a limited grasp of the device and game navigation – they can play a game that has been downloaded for them, or in some cases they can download it and install it by themselves. Some of them can look for interesting video clips on the Internet, but only if they have simple names because of their limited reading and writing skills. Most of them can take photos with smartphones, but none of them know how to edit or share such photos.
- They obtained those skills mostly through observation and limited instruction.
- They do not fully understand the opportunities and risks of digital technology use. Positive perception of the technology includes the idea that the devices are entertaining, and the negative that it can hurt your eyes and make you "act goofy".
- Parents emphasize the negative effects of digital technology, but later have difficulty explaining what precisely they think is bad.
- As negative consequences, they mention health implications – addictive behavior, aggressive behavior, consequences for the eyesight and posture and the fact that other areas of life might get neglected if children have too much screen time. They are worried about the effect of social networks once children gain access to them. As for the fear of children being contacted by strangers, this is something they relate to children's future use of digital technology.
- Positive implications are related to acquiring digital literacy skills. They emphasize the ability of digital technology to help children acquire and improve the skills they would otherwise have no chance of observing. Also, they find that with digital technology it is easier to gain access to information in various forms, which helps children learn any kind of material. Another positive implication is that some logical games and apps can help children's cognitive development.
- Parental mediation strategies are quite diverse. There are different strategies involved regarding time and content, with most children having strict time limitations and more freedom when it comes to the content they watch. Still, there are families with practically no limitation whatsoever.
- Parents allow their children to use only free games and applications – none of the parents have ever purposely bought them.

Recommendations

1. Recommendations to Policy-makers

Based on the key finding in this report, we would recommend that policy-makers pay more attention to digital literacy skills of young children and develop national programs that would first of all educate parents, as well as teachers, about what digital skills to include beyond the skills such as downloading games. Also, this program should include more precise information about the positive and negative effects of digital technology on children and youth, as well as the recommendations regarding the time and content children of different ages should be exposed to while engaged with digital technology. We believe that policy-makers should allocate more concrete and clearer age restriction ratings both to films and series, as well as to video games children are exposed to. Additionally, we think that each such rating should also be accompanied by a clarification of the restriction in terms of what is the concrete negative influence a game might have on children under the recommended age.

In this regard it would be good to have a web site managed by an unbiased public entity, where parents could find information about the time and content recommendations pertaining to digital technology use for each age group. The web site could also include a list of specific programs, games and applications with short descriptions and even a possibility for parents to rate and comment them.

2. Recommendations to Industries

We recommend that more attention be given to precise description of digital content and more elaborated ratings about the age appropriate content. This would make it easier for parents to find different games and applications appropriate for their children. Along the same lines, it would be good to have a special web site that would give parents an overview of the available games and applications that are considered appropriate for each age group.

3. Recommendations to Parents and carers

We recommend paying more attention to age restriction ratings. Another recommendation is for the parents and carers to be better informed and educated about digital literacy skills, what these include and how they can be improved in their children, but in accordance with their age.

4. Recommendations to School, libraries, Museums …

We recommend that these institutions be at the forefront of the above mentioned educational program of digital literacy. These institutions could have information points where leaflets would be distributed with information about the positive and negative effects of digital technology on children of different age, and recommendations regarding time and content of such use.

1. Introduction

This study focuses on young children and their interactions with digital technology in Croatia. It is a part of the framework of the JRC's Project ECIT, Empowering Citizen's Rights in emerging ICT (Project no.572). ECIT tries to identify possible threats to children that emerge besides the use of social networks and to give recommendations that aim at empowering children's rights in this domain.

So far, the research on this topic has mainly focused on older children and teens (Olafsson et al., 2013). This age gap in research is especially evident in smaller countries like Croatia. The research shows that children go online at an increasingly younger age, and the younger they are, the more vulnerable they are to the effects of digital technology (Livingstone et al., 2011). That is precisely what makes the research on digital practices of small children imperative. This research should address the benefits as well as risks of such engagement.

Based on the experience from the 2014 Pilot study (Chaudron et al., 2015), this research aims to address the digital practices of children aged 0 to 8 through four topics or dimensions: use, perception/attitudes, individual context and family context, as follows:

	INDIVIDUAL CONTEXT	FAMILY CONTEXT
USE	RQ 1 : Individual Use: children/parents	RQ 3: Family Use/Dynamics/Practices
PERCEPTIONS/ATTITUDES	RQ 2 : Awareness to risks/opportunities of the children of the parents	RQ 4: Parental Mediation Passive/active Restrictive/permissive Implicit/explicit Reverse mediation

The sample included ten families, diverse in terms of children's age and gender, family composition and income. Furthermore, the sample included families with children 6-7 years old who represent "low users" (uses a digital device at least once a week), "medium users" (uses a digital device at least two or three times a week) and "high users" (uses a digital device at least once a day). Most of the data collected from the parents is based on their answering the questions during the interview. The data collected from the children is mostly based on observations and the interviews conducted with the help of a card game and an activity book.

The study is done in collaboration with a selected group of academic partners in different European countries (Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Finland, Germany, Italy, Latvia, Portugal, Romania, Slovenia, Spain, The Netherlands and the United Kingdom).

This report presents the key findings obtained by the Croatian research team, recommendations for policy-makers, industries, parents, carers, schools, etc. It also describes the methodology used, the families in the sample, and gives a more detailed account of the results obtained.

2. Family Portrait Gallery

Family HR 01

Osijek, Croatia

Family members

- Father, HR01m36, medium digital media user
- Mother, HR01f36, medium digital media user
- **Oldest boy, HR01b6, kindergarten, medium digital media user**
- Middle boy, HR01b4, medium digital media user
- Youngest boy, HR01b1, low digital media user

Narrative

> "If there is any kind of inappropriate behavior the punishment is restriction of digital devices, with great joy on behalf of parents", the mother, 36 (HR01f36) says.

The family lives in a huge, nice apartment in the city. It is a family of five members – parents and three sons, aged 6, 4 and 1. Both parents are 36 years old and have a university degree. They are employed. The mother works half time (until the youngest boy turns seven) and she uses digital technology at her work place almost all the time. The father works as a teacher and uses this technology for preparing for classes, but not during classes. They were both present during the interview. Two older boys are in half-day kindergarten program, and the youngest one spends time with the grandparents while the parents work. Both parents are very involved in children's lives and share all the childcare responsibilities evenly. The family owns a television set, two smart phones and a laptop computer. The children have access to television and computer only when parents are near, and only for a restricted period. Only the target child shows interest in the computer, while the two youngest boys don't use it. They only watch cartoons on TV. They are family who prefer outdoor activities whenever the weather allows. They enjoy cycling, football and playing with their friends on the playground. They spend a few hours at the playground every day. The two older boys have gymnastics classes two times a week, and both parents do many sports (jogging, cycling and hiking). The target child also attends English lessons twice a week. When the children are indoors, they play with different toys, such as Lego bricks, cars; they draw a lot with crayons and play with Play-Doh plasticine. They also read a lot of books and magazines (especially before going to sleep) and they like going to the library. The children rarely play computer games or watch TV. In the spring, summer and autumn they watch cartoons and movies only sporadically.

The parents have high control over the children's use of digital technology. As a family, they spend a lot of time together, and are engaged in joint activities. The children use digital technology no more than half an hour a day, and the parents always know what they watch and what kind of games they play. Most often they watch "Peppa Pig" and "Transformers" cartoons. The target child plays Lego games and Transformer game on computer and once a week, or once every two weeks (while he is at his uncle's) he plays "Angry Birds" on his uncle's tablet.

The target child has limited digital skills, because he only plays games that his parents download, or watches cartoons on the television or computer. He can conduct a simple search on the web, to find video clips related to cartoons with characters he likes.

At this point, the rules for using digital technology apply only for the target child, but they will also be applied for all the children when they get older and show more interest in digital technology. At the time their interest is in their oldest brother and what he does, but as they get older they will probably demand more screen time on their own. Digital devices are also used as the system of punishment and reward for the target child. If he exhibits any form of inappropriate behavior, as a punishment he is usually forbidden to use any digital devices. It functions very well, because the child tries very hard to improve his behavior in order to once again have the privilege of using the devices.

The parents recognize both positive and negative influence digital technology has on child development. They are afraid that high level of technology use could interfere with child socialization and development of certain skills. For example, instead of learning to play tennis outside, children learn to play tennis on a computer. Another negative side is the fact that whenever a family member uses any kind of digital technology, he does not communicate with the rest of the family. Also, they are worried about the negative influence of aggressive video games and cartoons on the children's behavior and level of attention. As an advantage of digital technology, the parents point out learning the alphabet and foreign language, as well as practice in using the technology itself – which is very important because digital technology is definitely going to be inevitable part of their lives.

Family HR 02

Osijek, Croatia

Family members

- Father, HR02m31, medium digital media user
- Mother, HR02f34, high digital media user
- **Older girl, HR02g6, kindergarten, medium digital media user**
- Younger girl, HR02g2, low media user

Narrative

> "You don't like games, you find them childish", the father (HR02m31) says to his wife. "I did like them when I had more time, but now my activities are oriented to children", she (HR02f34) replies.

A family of four, mother, father and two daughters, live an active life filled with outdoor activities. They live in a nice house with a beautiful backyard in the city. The mother and father are both quite involved in raising the girls, and were both present during the interview. Their typical day includes taking the children to kindergarten and then going to work. They are both employed. The mother uses digital technology at work all the time, while the father only on occasions. At home, the father is more prone to digital technology and enjoys playing Sony play station on occasions, while mother feels she has no time for that. After the family returns home, they have lunch and usually head out to ride bicycles, roller skate, or just play in the back yard. If they stay at home, which is usually due to bad weather, the girls play with their toys. The target girl likes to play with characters from Frozen and her younger sister accompanies her.

The family owns a TV, a tablet, a computer, Sony play station and three smartphones – one belongs to the father and the other two belong to the mother – one private and one company phone. The children have access to everything except the play station and the mother's company phone. However, their access is quite restricted. They usually interact with digital technology for 15 to 20 minutes after kindergarten, while parents have lunch, and not on daily basis. Also, such time is restricted because, as the mother reports: "*She can't have it for longer because if we didn't limit it, she could go on for hours*". The older girl spends this time playing games on her new tablet, which she got less than a month ago for her sixth birthday, or watching a cartoon with her sister on the family computer. She says she likes to watch cartoons on the computer because then she and her little sister can watch them together. Sometimes, she plays simple games, such as Memory, which her parents downloaded on her tablet. They try to download some educational games for her, but only the ones that can be downloaded for free. This is not her first contact with tablets – she did get a chance to play similar games on her grandfather's tablet on a few occasions. Another occasion when the girls are allowed to watch cartoons is before going to bed, i.e. during dinner. They both sit in front of the computer and get their dinner while watching. This time is also restricted to 15 to 20 minutes and they watch short cartoons, e.g. Peppa Pig, which is the favorite of the younger sister. They prefer to watch the cartoons on computer rather than on TV, because this way they can choose what they want to watch and also, as the mother (HR02f34) reports: "*She doesn't understand that*

she can't press "pause" on TV while she goes to the toilet". There are also days in the week when digital technology isn't used, because, as the parents (HR02f34) say: "*there is no time for it*" or "*sometimes they (the girls) don't even remember they could watch something*".

When they have friends over they usually play with dolls and other traditional toys, so there is no digital technology involved. The target girl says she likes playing with characters from Frozen, which is her favorite cartoon at the moment. She also dressed up as Elsa (character from Frozen) for Halloween. Other toys include puzzles, dolls, Barbie dolls and Lego blocks.

The target girl is semi-independent in her use of digital devices. She can turn on the TV and the computer. When on the computer, she can go online and find in the folder with her name in "Favorites", which has her favorite websites saved. These include websites like "Dora the Explorer" and "Fungooms". She is allowed to turn on the computer on her own after her parents give her the permission. She uses it in the living room, with her parents nearby so although they do not sit with her while she uses it, they think this is enough for them to feel comfortable that nothing bad can happen while she is online. If she wants something else, her parents usually find it for her and check the website before they let her enjoy it. When she plays a game on her tablet, she plays games that her parents downloaded for her, because they try to choose educational games and they feel "she doesn't know how (to download)". She now plays Dragon City and Angry Birds. Also, they taught her that when new windows pop up in a game she is to klick "no" because it usually means that something is offered for purchase. They taught her this after, on one occasion, a pop-up appeared while she was playing, she clicked something and apparently accidently made a purchase.

Both parents feel that their parenting style would be no different if there was no digital technology, but they agree that the currently available technology makes their lives a little easier, by providing them with time "*to have lunch in peace*" (Hr02f34). The parents feel that occasional use of digital technology is acceptable and can even be good for the children – it teaches them digital literacy skills which they will certainly need in future life. Also, they feel that simple educational games and apps can help the children learn shapes, colors and foreign languages. On the other hand, they worry that too much interaction with digital devices at an early age could harm their vision and body posture.

Family HR 03

Tenja, Croatia

Family members

- Father, HR03m40, high digital media user
- Mother, HR03f38, high digital media user
- **Boy, HR03b6, kindergarten, high media user**

Narrative

The family lives in a big, spacious, new house in the country. It is a family of three – mother, father and a son aged six. The parents work and the boy is in half-day kindergarten program, after which he spends time with his grandmother until the parents come home from work. Both parents use digital technology both at work and at home. The family owns a television set, two computers, a set of smart phones and a tablet. The child has access to all the digital devices on a daily basis, and owns his own tablet and a computer, but he spends a lot of time doing various other activities. The boy plays the drums and is a really talented player. He has drum lessons twice a week and practices on his own every day. He also does karate three times a week, and spends quite a lot of time doing outdoor activities, such as cycling, playing with his friends, go carting and helping his parents in the garden. When he is indoors, he most often plays with Lego bricks and toy cars.

> "His computer does not have a web cam, and the one on the laptop has been taped over because we found out how hackers can see you through web cams at any time, regardless whether you are online or not." (HR03f38)

The parents have high control over the child's use of digital technology. They have very strict rules about what exactly he is permitted to do on each device. For example, the tablet may contain only one game at a time. If he wishes to play another one, the previous game is deleted. When it comes to computer, he is allowed access only to the "Friv" website, while all the other web sites are blocked. He is allowed to use the laptop only together with his father when they watch only educational video clips on drum playing techniques and karate moves. The boy often takes his Mother's or Father's smart phone and takes photos, watches video clips and photos of himself when he was younger, texts his cousins and sends them photos on Viber and plays "Street Race" game. On TV, he is allowed to watch only children's cartoon channels. He uses the tablet most often because he can go to bed with it and play games before going to sleep. It's important to point out that prior to using any device he must ask for permission and the time limit. He has been told that whenever a pop-up window appears on the screen, he must inform the parents about it and let them check it. In addition, his computer does not have a web cam, and the one on the laptop has been taped over because the parents found out how hackers can see you through web cams at any time, regardless whether you are online or not. The boy's favorite games are "Street Race" and "Lego". Most of the day, the boy uses all the different devices for listening to music. The parents estimate that approximately 60% of the boys free time is spent using digital devices and about 40% of his free time is spent in other activities.

The boy is quite independent in his use of digital media, but his skills are still quite limited in range.

The parents feel that although digital technology has its negative sides, they can be minimized through strict parental control. They believe there are more positive than negative sides, such as improving the boy's skills through watching online music tutorials. Also, skilled use of digital devices is, in their opinion, important for the boy's future. Another positive side is fast and unlimited access to information, which can be helpful for learning in the future. The parents do not single out any of the devices as being especially positive or especially negative; they consider them all the same. They believe that digital technology is omnipresent nowadays and the children cannot be shielded from it. However, the contents children use must be restricted and, after all, the children should definitely be encouraged to spend more time outdoors.

Family HR 04

Osijek, Croatia

Family members

- Father, HR04m40, high digital media user
- Mother, HR04f37, high digital media user
- Older girl, HR04g9, high digital media user
- **Younger girl, HR04g6, 1st grade of primary school, high digital media user**

Narrative

> "At the end of the day, what is literacy today? Is it defined by signing one's name or being able to obtain information from the available media?" (Hr04f37)

The family has four members, and they were all present during the interview. They live in a two-bedroom apartment. The parents work and both use digital technology intensively at work; they even say they "*live of digital technology*" (HR04m40). The girls, aged nine and six, go to primary school. The target child is in the first grade and her sister is in the third grade. The family has a television set, four smart phones (only the target child has no Internet access on her phone), two tablets and two computers which the children are not allowed to use. The target child watches children's channels on TV – "RTL Kockica" and "Nickelodeon", as well as some Croatian entertainment programs and series. Her favorite cartoons are "SpongeBob Square Pants", "Frozen", "Monster High" and "Winx Club". Both girls got their mobile phones when they started school, in order for them to be able to call their parents if necessary. The target child also carries her phone with her when she plays outside because she can't tell time, so the parents set an alarm for her when it's time to go home. Most often, she uses a tablet. She finds it the most interesting device because of the games she has downloaded herself. Her favorite game is the "Subway Surfers". Also, she has Internet access on the tablet. She usually uses the Internet to go to YouTube, where she plays songs, watches cartoons and educational clips (how to draw something or hot to make something out of paper or plasticine). The girls spend quite a lot of time outdoors, playing with friends. They train sports twice a week (the target child does gymnastics and her older sister trains track and field). The family often takes trips together. The girls are allowed to use their devices during traveling.

When it comes to using digital devices, the children have very few restrictions, and it is interesting that the parents are not in fact worried about that. They are not allowed to use the devices only when doing homework or when they have friends over. They also don't have any filters when accessing the Internet – the parents say they regularly check browsing history for any inappropriate content, after the children use their devices. The parents also say they warn the child and talk to her about the inappropriate content online and possible contact with strangers.

Both girls are quite independent in their use of digital devices they have available. Still, the skills of the younger girl do not go far beyond downloading something and installing it, or conducting a simple search on You Tube. She only started the first grade one month prior to the interview so she still has limited reading and writing skills which make it difficult for her

to conduct a more elaborate search using any search engines. If there is something she is interested in, she needs the help of parents or older sister to achieve it.

The parents feel digital technology has more advantages than disadvantages. They believe that digital technology is a trend that cannot be avoided. Children nowadays just have to keep up with the technology because the technology is linked with their development. As the parents say, "*At the end of the day, what is literacy today? Is it defined by signing one's name or being able to obtain information from the available media?*" (HR04f37). Also, according to the parents, digital technology improves one's communication, reading and writing skills, improves drawing and plasticine modeling. They believe that high level of exposure to digital technology is extremely good for the children. The children learn very fast, get a great deal of information, learn much faster than their parents when they were the same age and they connect to the whole world. Digital technology makes learning easier, because it provides video tutorials along with texts and photos. They feel that digital technology makes it easier for the parents who are not creative to suggest their children what they can do with different materials and ideas. Despite all the advantages of digital technology, the parents do recognize potential drawbacks. For example, fear of inappropriate and aggressive content and contact with strangers. They also recognize that the use of digital technology adversely affects family interaction, but they think it is a syndrome of modern times and there's nothing they can do about it. They say that we would all like to take a break from digital technology once in a while, but it's just not possible to do that because if you don't keep up with the technology, you are not trendy and you fall behind.

Family HR 05

Bockovac, Croatia

Family members

- Father, HR05m36, low digital media user
- **Girl, HR05g6, kindergarten, low media user**

Narrative

The family lives in an old house, in a village near a small town. This is a family of two – father and a daughter aged 6. The mother passed away two years ago. The family used to live in a rented apartment in the town, but after the mother's passing they had to move to the village due to financial difficulties. The father is unemployed and at home he rarely uses digital technology. He has a laptop but uses it once a week. It is on those occasions that the girl watches cartoons on the computer. Those cartoons were downloaded while the family lived in different circumstances. The father helps his parents on a dairy farm and has low income from selling milk and beef. He is 36 years old and he completed vocational high school (occupation: turner). The child is in kindergarten for half a day and the other half she spends with her father, doing everything together with him. The family owns a television set and a laptop. The child has access to television when she is at home, but shows no special interest in it. She sporadically watches cartoons on TV, on "RTL Kockica" channel. She doesn't watch TV every day, but when she does, she watches it for about an hour a day. Most often, she watches the "Winx" cartoon. The father almost always knows exactly what she watches. She has limited access to the laptop and she doesn't play any video games, she just watches cartoons. The girl prefers to do different outdoor activities, such as cycling, playing with her friends on the street and helping her father around the farm. When she is indoors, she plays with different toys such as dolls, stickers and similar toys that are typical for girls. She enjoys drawing a lot and likes it when her father reads books to her.

> "They stare at it, become addictive, they spoil their eye sight that makes no sense." (HR05m36)

The father has low control over the child's use of digital technology, but the child shows no special interest in it, anyway. There are no specific rules concerning the use of digital technology. The father only protests if the girl watches cartoons before breakfast, which happens quite rarely. As a family, they spend a lot of time together and engage in joint activities. The child generally uses digital technology no more than once a week and has poor digital literacy skills.

The father feels that the influence of digital technology on child development is negative. First of all, he says, too much digital technology is not good for the children's eyesight. However, it seems most of his worries stem from the child's use of the Internet. He worries about inappropriate content online, such as sexual content. He is also afraid of the child becoming addicted to digital technology devices, because he heard that some children in primary and secondary school exhibit various behavior problems and learning difficulties, and that such problems and difficulties are correlated with frequent technology use. Another negative side, in his opinion, is the fact that most children nowadays have their own Facebook profiles and

may be exposed to communication with various types of people, for example pedophiles. He also thinks that there is no need for his daughter to use computer or other digital devices before learning IT at school. Finally, he concludes that because of being involved in various outdoor activities, his daughter is happier and more mature than the children who stare at TV and computer screens all day long.

Family HR 06

Osijek, Croatia

Family members

- Father, HR06m43, high digital media user
- Mother, HR06f41, high digital media user
- **Younger girl, HR06g7, 2nd grade of primary school, low digital media user**
- Older girl, HR06g12, medium digital media user

Narrative

The family lives in a nice, big house in the city. They have a big back yard, where the father's sister and her family live in their own detached house. The mother works from home, and the father works as a computer programmer. Digital technology is the basis of their work, and the mother feels their family life is also quite influenced by digital technology. Still, their daughter's use of digital technology is quite limited and it can hardly be described as something that dominates their lives. They are oriented to outdoor activities, play traditional family games, and they spend a lot of time reading and talking about everyday things.

> "It (digital technology) doesn't interfere with our family life. It is here somewhere, but it doesn't control our lives. … We don't argue any more or less because of it, and we don't love each other any more or less because of it." (HR06f41)

The family has one computer, Nintendo Wii, a tablet, and four smartphones – one for each family member. However, the younger girl doesn't have a SIM card in her smartphone and uses it only at home when in Wi-Fi range. The girls can use all the devices but have a restricted access to them. During the week, they can watch television or use their smartphones to go online, but only after they are done with other school-related activities, and the computer and tablet are reserved for weekends only. The rules are the same for both girls but they were made primarily for the older daughter, since the younger one has no real interest in digital technology and never used it to the extent that they had to restrict her interaction with devices. During the week, she sometimes watches a short cartoon before going to school for a few minutes – e.g. Masha and the Bear. After she comes home from school, during her free time she is allowed to occasionally use the smartphone to go to YouTube and play some music videos during which she sings along and dances. She has no games or applications installed on her smartphone. In the evening if there is time, she sometimes watches a short cartoon or two. At weekends, she is allowed to use the computer or tablet if she wants, but on many occasions she gives priority to other activities, such as playing with friends outside or doing something with the family. The mother describes her as hypersensitive, which presented a problem while watching many cartoons, because the girl would get too upset if something bad happened to the characters, even in the most age-appropriate cartoons, e.g. PeppaPig . When playing games on the computer, she still prefers very basic games on "Friv" website, which involve coloring, dressing up characters or taking care of pets. She is independent in her use of digital technology and she learned a lot about it through simple observation of her older sister and parents. The mother (HR06f41) describes this by saying: "*She just saw it. She would start a You Tube video and it just came naturally, I don't even know how. If I could go back and say*

how she learned it – I just wouldn't know what to say." The girl also has no direct parental involvement while using the technology, because the computer is situated in a common study room, so everyone can see what she is doing. While she uses her smartphone, she only visits YouTube and plays the songs loudly enough for everyone in the house to hear. The TV is also situated in the living room. The older daughter has similar restrictions but she also uses her smartphone for contacting her friends. During the week, she is allowed to use the computer if she needs to do something for school, otherwise she uses it just during the weekends. From time to time, the family enjoys watching children's movies or cartoons together.

The target girl is independent using digital devices available to her. She can search the YouTube for music she likes, play simple games on her smartphone, or on the computer or tablet, and conduct a simple search for some relevant information using the search engine. She is in the second grade of primary school, so she has good reading and writing skills that enable her to do her search independently.

The mother describes the possible interference of digital technology with their family life saying: "*It (digital technology) doesn't interfere with our family life. It is here somewhere, but it doesn't control our lives. Our jobs are such that we have to use it. But we don't argue any more or less because of it, and we don't love each other any more or less because of it"* (HR06f41).

The mother is more worried about the future, when the children become active on social networks, in terms of how their experiences with such networks might affect their emotional lives. She also feels that in general children today should spend more time communicating face to face instead of hiding behind their digital devices.

Family HR 07

Osijek, Croatia

Family members

- Father, HR07m47, low digital media user
- Mother, HR07f46, medium digital media user
- Oldest girl, HR07g20, medium digital media user
- Middle boy, HR07b17, medium digital media user
- **Younger girl, HR07g6, kindergarten, medium digital media user**

Narrative

> "Everything is limited and everything is under control" (HR07f46).

This is an artistic family of five, who lives in a small modest house in the suburbs. The oldest daughter just went away to college, to study singing, and the middle child, a boy, is in high school. The youngest child, the target girl, goes to kindergarten. Both parents have secondary school degrees and both are employed. The mother works as an opera singer in the theatre, and the father works in delivery service, but also plays in a band. Neither of them uses digital technology for work, but they both use it at home to pursuit their hobbies and interests. They all like to sing and all of them, except for the youngest daughter, play an instrument. The youngest girl only likes to pretend to play the piano by pressing the keys and playing with them – she cannot produce any real music at the moment. The family lives in a small house with only one bedroom which is shared by the siblings. The parents sleep in the living room. This is also the only room in the house where all the digital devices are stationed. They have one TV and one computer. Also, the parents and two older children have smartphones.

The family owns a medium size garden around the house and they grow their own vegetables, so they have a lot of work outside the house on a daily basis. They do such work together and they enjoy this time as quality family time – they talk, make jokes and often sing. Gardening and their jobs keep the parents occupied for most of the day. The target girl is in the half-day kindergarten program. When she gets home, she often watches cartoons on TV while her mother finishes lunch. After lunch, she goes to sleep for an hour. She spends her afternoons playing outside or helping her mother in the garden. If the weather is bad she sometimes watches cartoons on TV or on the computer.

Her parents are very careful about what she watches on TV or on the computer. She knows how to turn on the computer, but, according to her mother, she never does it alone or without asking. Also, she never goes to the Internet without her parents or one of the siblings present. The only websites she visits are YouTube, where she watches cartoons, music videos and video clips of children playing with Play Dough plasticine, and Google, where she sometimes searches for information together with her mother or siblings. The mother says that the girl is very strictly controlled and she is not allowed to watch several short cartoons one after another unless she asks for permission for every single one. The mother says that although it may seem a little exaggerated, she takes great pride in the fact that she controls her child's interactions

with digital technology in such a way. Also, she reports that even if she is outside in the garden and the girl wants to watch something on TV she always comes out to ask for permission, and then the mother goes back inside to turn on the computer or TV.

She has no access to any of the family members' smartphones. The mother feels that there is no need for her to use them, but that in case she was allowed to use them, she would master this in no time. This is an interesting assumption since at the moment the girl has poor digital literacy skills. However, the mother often speaks of her youngest daughter by emphasizing her maturity, which is, in the opinion of the researchers, a little exaggerated. Her older siblings are very well mannered, diligent, modest and good students. Their parents take great pride in them, and at the same time in their own parental skills.

The girl has no experience with apps and games and so far she hasn't been introduced to them, even by kindergarten or other friends. She plays a lot with traditional toys and likes to play outside. If there are some things that interest her, the mother or older siblings sometimes guide her to use the Internet and search for pictures of e.g. the town they are planning to visit, etc.

When asked about the potential risks of digital technology use, the mother fears that the child will change in puberty and that she will become more influenced by her peers in this regard. However, the family has two older children who went through puberty without any specific problems, so the mother hopes the youngest daughter will have the same experience. She explains that, as a family, they are used to talking to each other about everything and she feels it is precisely these conversations that can help them solve any problems they might encounter in the future.

Family HR 08

Osijek, Croatia

Family members

- Father, HR08m30, medium digital media user
- Mother, HR08f28, medium digital media user
- **Youngest boy, HR08b6, kindergarten, high digital media user**
- Middle boy, HR08b9, high digital media user
- Oldest boy, HR08b10, high digital media user

Narrative

This is a family of five, although the father is more absent than present. At the time of the interview, he was in jail, so he is again absent for a longer period of time. At the moment, the mother lives alone with three boys in public housing, and has no income other than social aid and child supplement. She is 28 years old, and has only primary school education. She is a warm, caring mother. So far, she has had a hard life, and she is trying to raise her sons the best way she knows how.

> "I don't have Internet access, so I don't have anything to worry about", the mother (HR08f28) says.

She is quite unaware of the positive or negative potential that interactions with digital technology might have on her children and she hasn't given it much thought. Her sons are kind and well-mannered boys, who were very excited by our visit. The two older boys are in primary school and the youngest, the target child, is at home with his mother all day. Compared to his older brothers, he is emotionally quite immature. He was very difficult to interview in the beginning because he didn't want to answer any questions directly and needed a long time to relax and stop goofing around. The family owns a television set and five smartphones – one for each member of the family (the father doesn't use his phone at the moment). One week prior to the interview they obtained a computer. Before that, they didn't have a computer for a few months because their old one was broken. The children are allowed to use all the devices, and have, in fact, no rules regarding the use of digital technology. They have no internet connection available in their home. The children tend to watch television or play games on the computer quite a lot, but they also tend to spend a lot of time playing outside. They enjoy roller-skating, basketball and football. They also play hide and seek with their friends from the neighborhood. They are often accompanied by their mother during such activities. When indoors, they play with different toys – plastic guns, cars and similar toys. The mother says they have a lot of toys, but the fact is that those toys are very limited and of poor quality. The oldest son likes making origami so he sometimes engages the entire family in this activity. He used to watch video clips of origami folding on YouTube on his smart phone, since, for a short period of time, he was able to connect to the neighbor's Wi-Fi network. Otherwise, the family is most oriented to watching television. The only book the boys reported having in their home is a Windows 98 manual, for which the oldest boy claims to be his favorite book.

The mother has very loose control over the children's use of digital technology. She feels she doesn't need to enforce any strict rules concerning the amount of time they spend using digital

devices because they don't use them much anyway. In fact, she underestimates the amount of time her children are engaged with technology. Also, she has no control over what they watch or what games they play. At the moment, the range of games the boys play is very limited, but in the past, when the family lived in a different town and had internet access, the boys played different violent games with their older relatives. The parents had no control over that and although they didn't like it, they had no intention to stop it until one of the boys started having nightmares. It was only then that the mother stopped them from playing such games. She also speaks of the time when the children were in their relative's house and accessed sexual content together with a few older boys because they used the Wi-Fi connection on their smartphones without supervision. She learned about the incident only later, when her sons told her about it, and she was worried. At the moment, the children have a few basic games on the mother's smartphone – she wasn't able to name them, but she describes them as nice games which involve coloring and grooming pets. They also have one video game on the computer they just got, and the target child most often gets to see his brothers play. He plays games mostly on his smartphone which he got for this purpose. The games had been downloaded to his phone by his brothers while they had Internet connection. The TV channels the children watch are the ones that are available free of charge from Croatian broadcasting networks. These offer a range of cartoons in the morning and afternoon. The target child watches Mr. Bean and Pink Panther, and the mother proudly announces how he likes to imitate these characters. He has very limited digital literacy skills.

Both parents are medium media users, but their use is limited to watching television or, at times when they have a working computer, to watching something with their children on the computer. In fact, the parents have no experience with doing anything on the computer other than watch their children play games and listen to music. Although the mother has little control over the children's use of digital technology, she feels the influence of such technology is negative. When asked to explain her attitude, she finds it difficult to elaborate. It seems most of her worries come from the children's engagement with the Internet. She worries they might come across some inappropriate content online, such us sexual content, and she explains she is worried that children nowadays show too much interest in such content, too early for their age. But since, for some time now, the family has had no Internet access, the mother feels that digital technology poses no real threat for her children. "*I don't have Internet access, so I don't have anything to worry about*" she (HR08f28) says. She also points out that she liked it, when she was a child, when people would gather in each other's houses and play cards. She feels people today socialize through Facebook and text messages and don't have the need to meet in person and spend time and enjoy each other's company. As a good side of digital technology, she points out that she heard some high school students say that it helps them with learning process.

Family HR 09

Osijek, Croatia

Family members

- Father, HR09m38, medium digital media user
- Mother, HR09f36, high digital media user
- **Boy, HR9b6, kindergarten, medium digital media user**
- Girl,HR9g2, medium digital media user

Narrative

The family lives in a lovely detached house. They occupy the first floor of the house, while the father's mother occupies the ground floor. When the interview started, only the mother was present, but the father joined in later, after he came home after a couple of weeks of field work. The mother has a university degree in economics and works for a large private company in Osijek, interacting with digital technology on a daily basis. The father has secondary school education and has a very dangerous job as a deminer. He doesn't use digital technology for his work, but he is a medium user at home. His job also keeps him away from home quite often, while working away. During this time, all the child care responsibilities are transferred to the mother. They have two children, a girl who is two and a half years old and a boy who is six. The girl doesn't go to kindergarten and is cared for by both grandmothers in her own home. The boy is in the half-day program in kindergarten. The grandmother picks him up from kindergarten and takes him home where she looks after him and his sister until the mother comes home from work. This period of time is also when it is most likely that both children will be engaged with digital technology, mostly television. When she does come, they usually have something to eat and head outside. They are a very active family that enjoys a lot of outdoor activities like riding bikes, going swimming in the summer and in general spending a lot of time outside. Also, the children have their activities during the week – the boy does gymnastics twice a week and has drama classes once a week, and the girl also does gymnastics twice a week. This schedule leaves the family with only one free afternoon a week. Also, because of certain speech problems, which occurred as a result of hearing impediment in early years of his life, the boy practices narration and pronunciation with his mother for half an hour each day. In the evening, the children are allowed to watch television together while the mother does housework. They usually watch something that is more appropriate for the younger sibling, e.g. Maja the Bee, and the older boy adjusts to that. Occasionally, when they can't agree on what to watch, one of them watches television and the other one watches cartoons on the computer. The mother is dissatisfied with this fact, but reports she often has no other way to keep them calm while she takes a shower.

> "Too much TV and computer can make you crazy", the boy (HR09b6) says.

The family owns a laptop, a television set, a tablet and two smart phones. The children are allowed to watch television and use the computer. The boy sometimes asks his parents to "google" a question he finds interesting and they don't have an answer to. Due to his limited reading and writing skills he can conduct only simple search on his own and it is mainly related to finding interesting videos and clips on the YouTube. Until a few months ago, the boy was

allowed to use the tablet as well. He used it to play games that he mostly downloaded by himself. The parents saw nothing worrying about it at the time. But then they saw an interesting drawing he made in kindergarten which depicted a man being sawed in half with blood coming out. The father was stunned by the drawing and asked the child what it meant. He answered that it was from an animated video clip he was watching – "Dumb Ways to Die". Both parents later recalled that they had heard about this video from their son and even memorized the lyrics from a song that accompanied it, but they didn't really perceive it as troubling because it was simple and funny. It was only later that they realized how it affected their son. This revelation was followed by a ban on all future tablet use for the child. Their decision was further strengthened by the boy's later confession that he would, on occasions, wake up during the night and go to the living room, turn on the tablet and play a game or two before going back to bed. This is something his parents knew nothing about at the time.

He now has more restricted time for watching and more restrictions regarding the content he watches. Still, the mother feels that altogether he still gets a lot of screen time. He occasionally gets to play a game on his mother's Facebook profile and is aware that Facebook is her favorite website. In the afternoon, if they are at home, he enjoys watching children's programs on RTL Kockica that involve educational content, as well as semi-educational cartoons like Jake and the Neverland Pirates. He is an independent user of digital devices he has access to, although only in the range of activities for which he uses them.

The parents are worried about the children's use of digital technology, mainly because they feel it affects the children's behavior, e.g. it might make them more aggressive. But they also emphasize the positive sides – the children learn a lot of things – for example, the boy learned the alphabet with the help of an application when he was only two years old, they can find different information they need, etc.

Family HR 10

Osijek, Croatia

Family members

- Father, HR10m45, low digital media user
- Mother, HR10f34, low digital media user
- Grand-Father, HR10m76, low digital media user
- **Older boy, HR10b7, 1st grade primary school, low digital media user**
- Younger boy, HR10b1, daycare, low digital media user

Narrative

> "What children see, children do", the boy (HR10b7) says regarding restrictions on some cartoons he used to watch in

The family lives in a medium-size, modest apartment. The mother was present during the interview and the father was working. Both parents have jobs that require no use of digital technology. They both have secondary school degree. The mother works as a sales person in a store, and the father works as an electrician for a telecommunications company. They live with the father's father, who is retired. He has a hearing problem, so the family is used to talking very loudly and often repeating what has been said. The grandfather has one room in the apartment for himself. They have two boys. One is seven years old and is in the first grade of primary school, and the other one is just one year old and is in daycare. The boys have a room of their own, and the parents sleep in the living room.

They have a somewhat limited range of digital devices available, but still, the boy used to be a high digital user until approximately half a year ago – if we consider the use of television. They own three television sets, one in the grandfather's room, one in the living room and one in the children's room. Apart from that, they own two smartphones – one for each parent and an old cell phone for the older child. The child uses the cell phone only at home and he doesn't take it outside or to school. He has the phone so he can contact his parents if something happens to the grandfather while the two of them are home alone or so he can call his mother and let her know he came home from school safely. They have no Internet connection in the apartment and they don't have a computer or a tablet. They do have Internet access on the parents' smart phones. The boy is occasionally allowed to use his mother's smartphone to play simple games that involve taking care of a pet.

As noted above, up until half a year ago the boy was a high digital media user if we consider watching television, which was quite often – "*almost the entire day*" as the mother (HR10f34) reports. The parents were very permissive in this regard. When asked about why he was allowed to have a television set in his own room, the mother (HR10f34) responds "*for us to have some peace and quiet*". There were no or very limited restrictions regarding the time and the choice of content the child was allowed to watch. In this regard the family was very permissive and very low demanding. He did watch children's channels, but not really age-appropriate content on them. He would watch Cartoon Network and Nickelodeon channel and cartoons such as Avatar which involve a lot of violence. The mother reports that he would become very

nervous, impatient and disobedient and would stop talking and answering questions when she talked to him. Instead, he would roar what he wanted and insisted he got it right away. Still, the parents didn't do anything to limit his screen time. The situation culminated when he went for a sleepover to his friend's house, whose parents were also the friends of the family. The friend's mother called the target boy's mother to come and pick him up in the middle of the night because she said she couldn't handle his behavior – he had demanded some milk in a very rude way, insisted he got it right away and started yelling at her. The boy's mother was very upset by this incident and decided that something needed to be done. She made a decision to punish him by taking away all the digital technology for an entire week and then later restricted his television time to a minimum. When asked how he reacted and what he did with his time during that week, she said he was angry and upset in the beginning, but later came to peace with it and spent more time playing, without asking for digital content. Later on, he was again allowed to watch cartoons on television, but with restrictions regarding the channels he can watch. Now, he mainly watches "RTL Kockica" or "Boomerang" channel. Also, now that he is in school and has other obligations as well, he has less free time. He does karate two or three times a week.

All things considered, if we disregard watching TV, the boy has poor digital literacy skills and is considered a low media user.

The younger boy now spends his mornings in daycare, and the afternoons with his parents. Since the above mentioned incident happened at the time the younger boy had just started to watch television, the restrictions applied to him too, so he has had very limited experience with digital technology. He hasn't been allowed to use the parents' smart phones.

The mother feels digital technology has a negative effect on children, but at the same time she feels this does not apply to her children because they do not use the computer or have Internet access. She also feels they will not need to have a computer for a few more years. She feels there is no need for them to have a computer or Internet access even for school-related activities. Both parents have Internet access through their smart phones and use it to read the news and find some information they might need.

Table 1. Some characteristics of the sample and codes of each family

Family code	Member Code	Low – medium – high family income		Ethnicity		Sex	Age	Year school/ max level of education		Profession of the parents
HR1	HR1f36	High	*	Croatian	**	F	36	Tertiary	*	Croatian language teacher
HR1	HR1m36	High	*	Croatian	**	M	36	Tertiary	*	Geography teacher
HR1	HR1b6	High	*	Croatian	**	M	6	Kindergarten	*	
HR1	HR1b4	High	*	Croatian	**	M	4	Kindergarten	*	
HR1	HR1b1	High	*	Croatian	**	M	1	Kindergarten	*	
HR2	HR2m31	Medium	*	Croatian	**	M	31	Secondary	*	Administrator/Delivery
HR2	HR2f34	Medium	*	Croatian	**	F	34	Tertiary	*	Lawyer
HR2	HR2g6	Medium	*	Croatian	**	F	6	Kindergarten	*	
HR2	HR2g2	Medium	*	Croatian	**	F	2	Kindergarten	*	
HR3	HR3m40	High	*	Croatian	**	M	40	Secondary	*	Electrician
HR3	HR3f38	High	*	Croatian	**	F	38	Secondary	*	Nurse
HR3	HR3b6	High	*	Croatian	**	M	36	Kindergarten	*	
HR4	HR4m40	Medium	*	Croatian	**	M	40	Secondary	*	Electrician
HR4	HR4f37	Medium	*	Croatian	**	F	37	Secondary	*	Administrator
HR4	HR4g6	Medium	*	Croatian	**	F	6	1st Primary	*	
HR4	HR4g9	Medium	*	Croatian	**	F	9	2nd Primary	*	
HR5	HR5m36	Low	*	Croatian	**	M	36	Secondary	*	Turner
HR5	HR5g6	Low	*	Croatian	**	F	6	Kindergarten	*	
HR6	HR6m43	High	*	Croatian	**	N	43	University	*	Programmer
HR6	HR6f41	High	*	Croatian	**	F	41	University	*	Self-employed accountant
HR6	HR6g7	High	*	Croatian	**	F	7	2nd Primary	*	
HR6	HR6g12	High	*	Croatian	**	F	12	6nd Primary	*	
HR7	HR7f46	Low	*	Croatian	**	F	46	Secondary	*	Singer
HR7	HR7m47	Low	*	Croatian	**	M	47	Secondary	*	Deliverer
HR7	HR7g6	Low	*	Croatian	**	F	6	Kindergarten	*	
HR7	HR7b17	Low	*	Croatian	**	M	17	3th Secondary	*	
HR7	HR7g20	Low	*	Croatian	**	M	20	Student	*	
HR8	HR8m30	Low	*	Croatian	**	M	30	Primary	*	Unemployed
HR8	HR8f28	Low	*	Croatian	**	F	28	Primary	*	Unemployed
HR8	HR8b6	Low	*	Croatian	**	M	6	Kindergarten	*	
HR8	HR8b9	Low	*	Croatian	**	M	9	3rd Primary	*	
HR8	HR8b10	Low	*	Croatian	**	M	10	4th Primary	*	
HR9	HR9f36	Medium	*	Croatian	**	F	36	Tertiary	*	Economist
HR9	HR9m38	Medium	*	Croatian	**	M	38	Secondary	*	Deminer
HR9	HR9b6	Medium	*	Croatian	**	M	6	Kindergarten	*	
HR9	HR9g2	Medium	*	Croatian	**	F	2	Kindergarten	*	
HR10	HR10m45	Low	*	Croatian	**	M	45	Secondary	*	Electrician
HR10	HR10f34	Low	*	Croatian	**	F	34	Secondary	*	Saleswomen
HR10	HR10b7	Low	*	Croatian	**	M	7	1st Primary	*	
HR10	HR10b1	Low	*	Croatia	**	M	1	Kindergarten	*	
HR10	HR10m76	Low	*	Croatian	**	M	76	Secondary	*	Retired

Legend for the Table 1:

* data provided by the family
** researcher evaluation
*** family self-evaluation

3. Findings

3.1 How do children under the age of 8 engage with new (online) technologies?

All the children enjoy using digital technology in their homes. Still they tend to use a limited range of devices and for a limited period of time. Apart from television that is owned by all families, almost all families have smartphones, and those are usually available for children to use on some occasions. Four children, and those are in principle children who go to school, have their own mobile phone. Also, all families, but one have a computer, usually just one – either a desktop computer or a laptop and it is a device that all members of the family use, including children. This means that it is usually situated in a common space. Only half of the families interviewed have tablets. In one of those five families a child has no access to tablet at all, three families allow children to use the tablet but for a restricted period of time, and only one child has no restriction as for time and type of usage. Only two families have other playing devices – one family has a Sony play station, but children do not have access to it, and another family has Nintendo wii, which is sometimes played by the children as well.

For most of the children digital technology does not interfere with other daily activities. All of them, except for the two children from really low income families, have some kind of afternoon activities which often include sports like gymnastics, karate or dancing and swimming.

Although it was not in the main focus of this study, we feel we need to address children's experiences with television, because it came up in conversations with parents quite often, and it turns out that television is far more present in children's lives than any other digital device. In fact, the only thing all the children in the sample have in common is watching cartoons on television - sometimes on the program and sometimes on DVD player. They often watch simple cartoons (Peppa pig, Sponge Bob, Dora the explorer, Masha and the bear, Maja the bee). While younger children tend to watch channels like RTL kockica, Nova TV, MINI TV (all Croatian children's channels) and Boomerang, the older children in the sample have a tendency to watch channels like Nickelodeon, which for the younger ones are often not allowed by the parents. They find them inappropriate for their age, but it seems that children who attend school have a permission to watch this channel. Only few children sometimes watch the Animal channel or National geographic, Croatian music channel or they follow Croatian TV series on Croatian broadcasting channels.

Two thirds of children in the sample use a computer, and it is in most cases to watch cartoons they would otherwise watch on television. Other activities include playing free games or watching videos on You Tube. On rare occasions that they need to search for information they use the computer to find what they need by Google or You Tube. It is interesting that children often report an overlap of activities on computer and smartphones, with one exception that they don't use smartphones to watch cartoons. This means that smartphones are most often used for playing games and those are usually the same games that children play while using the computer. Most children play simple games that involve memory, labyrinths, coloring, cooking, dressing up, and grooming pets, racing or something similar. Parents download them exclusively free games and apps, and some of them try to find some educational ones. The most often mentioned games is Angry birds, the only game that all children who engaged in game playing mentioned. Other games that children or parents mentioned by name are Dora the

explorer, Fungoons, Talking Tom, Candy crash saga, Lego, Transformers, Streetrace, Adventure Pig game, Jetpach Joyride, Subway surfer, Nebulous, Assassin, Spore, Zoo etc. Just as with computers, children often use smartphones to go to You tube and watch music videos or some other video clips.

Tablets are not as widespread in use as other devices, and are usually used for the same purposes that children use smartphones. The difference is that, although they would prefer to use tablets because they have a bigger screen, smartphones are more available. Here is no clear reason for that. Only half of the families even own a tablet, and those who do not are usually families with lower income, so financial factor could be taken in to consideration. Also, parents report they don't have the need for a tablet. One family has a tablet but it is strictly forbidden for the child to use, because prior over excessive use. Other families that have a tablet make children choose between a tablet or smartphone at a given time, and it appears that parent's smartphones often have "better games" installed, so the choice is obvious. The two children that are the only ones who report regular use of tablet say they prefer it because they can use it in the bed while laying down.

All the children have fairly good mastery of the digital devices they use, but are not proficient users, and can be described as independent users in a limited range of skills. All of them that have access to a computer, know how to turn it on and start the game they want to play or go the internet and find video clips or cartoons they are interested in. Those that are allowed to do so, can easily download a game or an application to a smartphone or a tablet. When it comes to searching for information they usually seek help, because most of them still have no reading and writing skills. Only three children from the sample go to school, and only one of them has at the moment fair reading and writing skills. Others have some letter recognition knowledge, which is sometimes enough to conduct a simple search, but not in a case when they want to find some more specific information. Children who play games, prefer touchscreens to computer mouse. None of them have more sophisticated digital literacy skills. Also, when something goes wrong – the game isn't working for example, the cartoon won't start or they can't find something, they ask their parents or sometime older siblings for help.

Most parents report that their children learned how to operate a device by watching them or older siblings if they had older siblings. The later method of learning was by just exploring the options, using the try and error method:

"*He would just click, and sometimes it was wrong and sometimes it came out right*" (HR09f36).

The situations in which they would most often ask for help is when they have a new game or application installed and they don't know how to play it. Other situations are when children want to search for some specific video clips or a cartoon on the Internet and they have difficulty typing its name in the search engine. Still, most children are not allowed to download anything by themselves, or even to use the device unsupervised, so it is difficult to estimate their level of mastery in this domain. Children gain most of their skills in home environment. Most kindergartens in Croatia have no digital devices except for television, and sometimes a computer which is then used for watching cartoons. Since the kindergarten groups in Croatia are quite large, counting up to 30 children, they are usually not allowed to operate TV or a computer by themselves, so they can only watch together what the teacher puts on. In primary schools situation is somewhat different, but that depends on each individual school. Those activities that children do at home using digital devices, are not the same as those that they perform in schools.

Characters and themes from cartoons and video games that children watch or play, often overlap with their off line activities. They frequently report playing with toys that represent

characters from cartoons in a manner seen in the cartoon. The parents also report that children often ask for toys representing cartoon characters, or even clothes, stickers or other items with the same characters.

Younger sibling sometimes have different interests than their older brothers or sisters. These sometimes include a lack of interest in the digital technology in general, as two families report. This is a good thing for those families because they have no trouble when it comes to choosing a content to be watched – the older child chooses, and the younger one either joins in or does something else. If the younger sibling also wants to watch parents say that children often find a way to reach an agreement as to what to watch without asking them to resolve the conflict. On some occasions parents need to step in to solve the problem and then it usually ends in a way that the older child gets a different device, or he/she adapts to younger sibling's wisher first and then gets his own way later:

"*If they can't agree, we say let it first be two Peppas and then you can watch something you want*" (HR02f34).

Analyses of the ICT charts made by parents for children in each family allowed us to better understand differences in the onset and quantity of use of different devices by different children in the family. As mentioned before, television is still the dominant digital device in Croatian families and all the children included in the sample started using TV at a very early age (when they were approximately one year old) and later, gradually, all other available devices. More than half of the children started using another digital device, such as mobile phone, tablet or a computer, at the age of two. In six out of seven families with more children it has been observed that younger children started using digital technology significantly earlier than their older siblings. Only in one family both the older child (six years old) and the younger one (one year old) started using mobile phones and the computer at the same age (when they were approximately one and a half years old). In two thirds of the families, irrespective of the number of children they have, we can observe that the amount of time spent using digital technology increases proportionally with children's age. Such tendency has not been observed in two of the families while in one family the increase in the amount of time the child spent using digital technology increased suddenly an dramatically, which resulted in numerous negative consequences and subsequent ban of certain digital devices.

3.2 How are new (online) technologies perceived by the different family members?

Children enjoy using digital devices, without much consideration for the positive or negative effect it might have on them. When asked specifically about the negative sides of digital technology they usually repeat what they heard parents or other significant adults tell them about it: that it is bad for your eyes, that violent games are not good for children and can give you nightmares (one boy (HR01b6) proudly reported: "*I watched Transformers and I didn't have nightmares*"), and that you can interact with strangers which might be dangerous. But they do not fully understand what that means. One of the girls (HR06g7) said: "*There are dangerous websites, where someone can steal you*", but she could not explain what that means. So when further prompted to think about the down sides of digital technology children give answers such as: "*some of the games are hard to play*" (HR01b6). This shows that their thinking about digital technology is obviously related to specific activities they are involved in and that they do not jet grasp the bigger picture. When considering positive effect of digital devices they often report it is fun and they like it:

"*There are a lot of fun things*" (HR09b6).

Educational opportunities are something they do not jet recognize, and even if parents report there have been such effects (children would learn colors and shapes), the children are generally not aware of them.

Children also do not have a clear distinction between different devices and their potential different influence. For example, one boy said:

"*The mobile phone can be unsafe because you can press something by accident, that you shouldn't have, and then there are problems*." (HR06g7)

This can be true for other devices as well, as long as they are connected to the Internet, but he doesn't perceive it that way. Similarly, they do not have a clear distinction between on-line and off-line practices.

Parents offer a lot more elaborated worries about the digital technology, but also clearly emphasize its positive sides.

There are five areas that parents feel can benefit from the use of digital devices. First of all, most of them clearly state that **digital literacy** is of major concern in contemporary society, and that children's interactions with digital devices in early age are beneficial in this manner. One mother (HR02f34) states that "*for every job today you need to know how to use technology and you can't work without it".* Parents think that through interactions with digital technology children can benefit from the current learning material, but also from the fact that they are learning it through digital media:

"*He's learning the alphabet in a foreign language as well as practicing using the digital technology itself – which is very important because digital technology is definitively going to be inevitable part of their lives*" (HR09f36).

Another parent (HR09f36) states:

"At the end of the day, what is literacy today? *Is it defined by signing one's name or being able to obtain information from the available media*?" and "*Skilled use of digital devices is very important for his future.*"

Another positive aspect of digital technology that often comes up is **the opportunity for children to observe, learn and improve many of the skills unrelated to digital technology**. For example, the boy who plays drums often watches short video clips of other people playing drums and his parents say this helps him master his skills. Other positive examples that parents mentioned are learning dance steps, modeling plasticine, improving drawing skills, origami folding skills etc. But it's not just the motor skills that parent feel can be improved - they mention that educational content in some cartoons can teach them good manners, or how to be a good friend, how to recognize when someone is feeling down etc.

In addition, parents mention the **positive effect of digital technology on cognitive development**:

"*Games for logical thinking develop some forms of intelligence*" (HR09f36).

In this regard, some parents also tend to think that digital technology aids children in the learning process, regardless of the material they are learning, because it helps them visualize something through pictures and animations for example.

There is also one interesting observation and that is that **digital technology helps children learn foreign languages**. Why this is interesting is that actually none of the parents or

children reported having any specific application or program for foreign language learning. But for all the families the mother tongue is Croatian and children often play games based on English language and watch cartoons that are in English (not all cartoons in Croatia are synchronized), and it is through this exposure to a second language that they begin to acquire it. If they didn't engage in digital technology use, their exposure to foreign language would probably be lower and the aforementioned effect would be missing.

Jet another positive aspect of digital technology that most parent emphasize is **the ease of information seeking** provided by digital technology. One mother (HR07f46) says:

"*The flow of information (is positive), you can find out something much faster and you can find out more about it than 20 years ago. Those days a person would need to invest a lot more time to find a piece of information he needed*."

Far more often than the possible positive effects of digital technology, parents mention the negative ones. It is interesting though that when asked how they feel about the digital technology they often say that they think it bad, but then have some difficulty elaborating their opinion. They in fact need some time to elaborate what they thing is the negative effect of digital technology on children. When they talk about it with their children, they most often say it's just not healthy to have a lot of screen time.

The most often mentioned negative effect is the possibility that **children can develop an addiction to some device** or digital content:

"*I don't think there is anything positive, it just spoils your eyes and makes you addictive. I have a cousin who let his kids play video games from early on and now in high school they have a lot of problems – they don't study and they don't want to do their homework if they didn't play their game first.*" (HR05m36)

Still, this concern is expressed by only one third of parents in the sample.

In the same line, some parents report they are concerned with the fact that their **children overreact when the device is taken away**. Sometimes it was in a manner of aggressive behavior – yelling, refusing to communicate and throwing toys without any idea how to continue playing without the digital device, and sometimes it was in a manner of cranky, unsatisfied whining.

Other worries that parents report can be divided as those concerning the use of digital devices in general, and those that concern a specific content.

As for the general use of digital devices, parents fear that they **take away children's time that they would otherwise spend outside or playing with traditional toys and other children**. It is interesting that these concerns often come from parents whose children have fair restrictions on the time they use digital technology. In the same regard parents mention that they fear digital technology might take away a natural way for children to acquire skill:

"*They learn how to play tennis in a stimulator instead going outside and playing*." (HR01f36)

Also, some of them **fear that using digital technology alienates children from one and other**:

"*They should spend more time hanging out with each other, in the street, talk to each other more, laugh more, fool around more, and not hide behind their own screen.*" (HR06f41)

Another point that one third of the parents mentioned is **the bad influence digital devices have on the children's eye sight and their body posture**. Again these worries were expressed by those parents that limit their children's screen time.

Other possible negative effects that parents mention have to do with the influence of specific content that children engage in while using digital technology. For example, one third of them mentioned that **playing aggressive games and watching violent content can influence children so they become more aggressive themselves**. In fact two families report such effect in their children. Both families restricted screen time after such experience and report less inappropriate behavior after that. It is possible that other things, besides experience with violent content, have had an influence on the children's behavior at that period, because one can only wonder why children were allowed to watch it at the time, but still, parents feel it was this content that made their children fell and act in a more aggressive manner.

Also, parent fear that their **children might be influenced by things happening at the social networks**, although none of the children in the sample are allowed to use those networks, and don't have access to them, except for one boy. One mother says:

"*I fear the influence of Twitter and Facebook. I am afraid that children could be made fun of, and that they will feel ashamed to ask or help, that they will not ask for help, that's what I fear the most.*" (HR06f41)

Another mother says she fears that seeing nice pictures of things and travel adventures that other people post on-line might emotionally affect children who do not jet have the ability to think about those nice things and events as only parts of live in general, and who might feel sad that they do not have those things themselves. Parents are also worried that children could be contacted by strangers, but it is a fear related to the children's future use of digital technology, not a fear that they have for the current state of things.

Since in our sample we had a fair amount of children with older sibling we were interested in their perspective on the use of digital technology as well. Actually only one girl offered her opinion saying she enjoys using digital technology to have fun and to contact her friends. She is 12 years old and still not allowed to use social networks. Her mother states that this interest appeared only recently. The girl speaks of possible negative effect of such networks: "*If you post something and don't get many 'likes' you can feel bad*", and of the school rules regarding behavior on such media. This is an interesting fact because children in her school are not allowed to use digital devices during school time, jet in the school's book of regulations, which they have recently been read to, it clearly states that creating groups on social media such as Facebook that mock or bully a particular person are regarded as a serious offence. Other older sibling reported no other worries that what their younger brothers or sisters had mentioned – it can spoil your eyesight etc.

3.3 How do parents manage their younger children's use of (online) technologies?

Parental mediation strategies are quite diverse. There are different strategies involved regarding time and content. Also, it is important to highlight that having straightforward and clear rules about the time restrictions does not in fact mean that children spend less time in front of a screen when compared to some families who have very loose rules. The rules are set mostly on the fly and they change as new situations and circumstances appear. They also

depend on the interests of children. For example, although they all say they enjoy using digital technology, some of them use it so little that their parents have no need to set time limitations.

Most parent highlight that they restrict time spent with digital devices, regardless of the specific content being watched or played. It means that children choose what they do during this time and what content they watch. It may seem careless on their side, but those are also the parents whose children by default do not watch or play content that is not inappropriate, and are rarely using digital devices unsupervised. For example, one family reported that they let their children watch cartoons or play simple games no more than half an hour, but that their children decide what they want to watch and since the parents are always around they are not worried that the content could be inappropriate of harmful in any way. In fact their children watch Peppa pig, Maja the bee and Lego movies. They also fell that this will change in the near future as children get older and that they will soon need more elaborate rules about the use of digital technology. These will also include more conversation with the children about the effect of digital technology. This is because at some point their children wanted to watch Transformers, and although at first they let them watch it, they soon realized it was not a good idea because children started to copy the aggressive behavior from this cartoon. So the parents decided not to allow it anymore, and it involved explaining their children why this happened. These parents are not passive in their mediation strategies as it may seem. They often help their children with a specific device or content if needed, and they spontaneously set limitation to the type of content they find appropriate, so even though it is the children who choose at a given moment, they in fact choose from a previously defined set of activities.

Still, other families first consider what children are doing will less consideration about setting a strict time limit. For example one family that had a problem with their child's aggressive behavior after watching too much television (he was watching Nickelodeon channel), restricted what he is allowed to watch, and in fact restricted the time he was allowed to watch a little, but they still let him watch television for quite a long time. The similar situation happened in another family that reported negative effects of digital technology, but this time it was tablet use. Parents restricted the boy's use of the device that he used to watch the inappropriate content, but he is still allowed quite a lot of screen time using other devices, and on those devices he can still find a way to watch some of the things he is now forbidden to watch, although it is not as easy as it was before. In fact, the family situation is such that the mother needs to allow her children to use digital devices more then she would like to, in order to get some spare time to do other thing around the house without them disturbing her, because the father is often away for business.

There are also families who in fact have very limited if any restrictions regarding time or content when it comes to their children's interactions with digital technology. One of those families believes digital technology is something predominantly positive and inevitable in contemporary life. They say:

"*Once the homework is done, you can do what you want*". (HR04f37)

They allow their children to use digital devices for a long period of time and mostly unsupervised. Also, they have no parental control installed on any of the digital devices. The only way they feel they control what their children do using those devices is by checking the history afterwards. They reported that they never found any content that they would find to be inappropriate. The question remains if this is really the case, because if a child spends a few hours a day using her tablet to go on-line, it would probably take quite a long time for a parent to go through all the history and check the content of each visited webpage, especially considering that it would have to be done daily. Another family that reported very loose

restrictions on time and content is a family that has no Internet access, so the mother feels she has no reason to be concerned about what the child watches. However, in the past when they did have Internet connection, the mother had a very limited insight in what the child was watching and doing with digital devices. To sum up this section, parents who are very permissive and passive when it comes to their children's engagement with digital technology, actually have very few worries about the possible negative effect of this technology.

On the other hand one family reported very strict time and content limitations. From his personal computer the child can access only Friv, and nothing else, because everything else is blocked. If he wants to watch any other content it needs to be educational in nature, and he can only watch it together with his father on his father's computer. He also has restricted time – each time he wants to use any of the devices he needs to ask for permission and the duration of use.

Almost all families, with the exception of one, report that punishments for misbehavior sometimes include taking away digital devices or limited screen time. Still, in none of the families this is not a prevalent way of structuring children's behavior and maintaining discipline. It is more as one mother said:

"*Yes, sometimes we punish her with no smartphone time, but it's really rare*." (HR06f41)

On the other hand, none of the families reported rewarding their children with extra screen time or a new device. In fact, even when in spontaneous talk we asked some of the children what they wanted for the next birthday or Christmas present, children never referred to digital devices or games, but rather traditional toys. But these toys are often related to the content of cartoons or games they watch and play, e.g. new Star Wars Lego set or the dress that Elsa wore in Frozen.

3.4 What role do these new (online) technologies play in the children's and parents' lives?

It is difficult to estimate the role of digital technology in family's lives based only on the parental reports. For example, one family reported that they feel their parenting practices are under the influence of digital technology because it is all around them and they as person are affected by it, but at the same time, they do not feel that it dominates their lives in any way, their children have a restricted access to digital devices and all the joint family practices and rituals do not include digital devices. On the other hand, families that allow their children a lot more screen time, sometimes feel they are not influenced by digital technology, nor do they feel it affects their parenting style. But the question remains what their children would do with their time and how parents would moderate their activities if there were no digital devices present.

One thing that all the families in the sample have in common is that they all put a great emphasis on the outdoor activities and physical, active play. In fact, all the children except for two of them are engaged in training a sport (gymnastics, karate or swimming) or some similar activity like dance or ballet. Those activities are scheduled two or three times a week, and take about one hour each time. Besides that, they all say they like riding bikes, playing with friend on the playground, playing hide and seek, playing football or basketball and in the summer going to the beach. Osijek is a town based on river Drava, and it has many sand beaches in near proximity to the town so many families with small children spend their summer

afternoons there because it is very relaxing. And naturally, all families report a lot less screen time during summer when compared to winter months.

Some parents spoke of the differences between their own childhood with very low presence of digital technology and their children's childhood today. HR09f36 mother mentions the trend seen in the media that idealizes those times when there was no television and when children spent all their days outside or just playing with friends. She feels times have changed, but she disagrees that it is in a predominantly bad way:

"*Everybody is talking how everything was great when we were kids, and playing, and seeing each other, and it was great, but we have to live in accordance with this time, what technology puts on us, and this technology can be very very useful.*" (HR09f36)

Indeed for most parents in the sample digital technology is viewed as something that helps them through the day because it occupies their children for some time so they can do something else, e.g. have lunch in peace, take a shower. It also helps their children develop some skills they would otherwise probably take longer to attain. They mostly see it as something that compliments their way of life and makes it easier to cope with children and their other obligations in some situations.

At the same time, some of the parents would rather if their children used it even less, but they have no plans or strategies to achieve that. When asked if there are less family interactions because of the use of digital technology, the HR06f41 mother says that there is:

"*It is absolutely so, I think that the time she spends with her phone could be better used for walking, telling stories, but she has her time when that is what she does and however short that is, it still steals away time*". (Hr06f41)

Other parents also feel technology limits family interactions, but they don't find it worrying:

"*It distances us, there are less family interactions and everyone is in their own personal world, but that is the syndrome of modern times, we talk less, it's how things have to be*". (HR04m40)

The same parents say that technology today is something that cannot be avoided and that if you do not allow you children to use it they will "*fall behind*" (HR04m40). So both parents and children in this family use it regularly and for longer periods of time. They feel that is the way thing should be – that everything evolves around the technology, and not the other way around:

"*I think it's trendy and cannot be excluded. In this age, a child needs to follow it. We all had walkmans and walked around with it listening to music, today they have all this*." (HR04f37)

Most of the parents in the sample say their children still play a lot more often with traditional toys – dolls, puzzles, Lego bricks, cars, animals, figures from cartoons, etc. They also play social games, 'Don't be angry' for example. It is the impression of the researchers that children are Ok with this and that they indeed enjoy playing with their toys and their friends or siblings, but on the other hand they would gladly welcome more screen time if they were allowed.

Only one family sad that the child spends time playing with digital devices when he has friends over or goes to other friend's house. Others say that those times are dominated with traditional toys, with only occasional cartoon, most probably at the end of the play date when children take a break from playing. At those times children are often passively watching cartoons, not playing games or using apps.

As for joint family activities, they rarely involve digital technology. First of all, most of the activities that include all family members are oriented to outdoor activities. When the family

is spending time together inside, they often read books, talk and play simple games. Activities involving digital technology that include all member of the family are limited to watching television, watching movies and cartoon or in case of one family, listening to songs from You Tube together. Sometimes, children ask parents to look something up on the Internet or to download a game or application, but those activities usually include one child and one parent, not the entire family.

3.5 Surprising findings

There are few surprising findings that have come out of this research project.

The first one is that in cases where parents reported negative effects of the use of digital technology, even after changing the rules and setting time limitations, their children are still allowed to use the devices (including television) for quite a long time when compared to other families in the sample, and at the same time those parents consider their rules as now being very restrictive.

Another surprising finding pertains to low level of tablet use reported by parents in this study, when compared to other countries. For example, the Ofcom survey (2014) found that in the UK, 54% of children aged from 5 to 7 years use tablets. In our sample only four families allow their children to use tablets.

The families with lower socio-economic status do not always have fewer devices. For example, the family HR08 with no income other than social welfare has, in fact, five smart-phones – one for each member of the family, including the 6-year old boy. He doesn't have a SIM card in his phone, but he does have some simple games installed and is allowed to play them.

Most parents have profiles on social networks, and with the exception of one boy who sometimes plays a game on his mother's Facebook profile, they do not let their children use them, but occasionally show them photos of friends and relatives. Yet, when thinking about the good sides of technology use, they didn't mention this aspect of communicating with friends. At the same time, they expressed concerns regarding their children's future encounters with social networks.

4. DIGCOMP framework

DIGCOMP framework refers to the framework for developing and understanding digital competence of all citizens. The importance of digital competence in contemporary life was recognized even within the 2006 European Recommendations on Key Competences (Official Journal L394 of 30.12.2006). In an analysis of this framework, Ferrari (2012, p.3) defines digital competence as "the confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society". The report lists 21 digital competences and then gives their descriptions in terms of knowledge, skills and attitudes. There are five areas of digital competence: information, communication, content-creation, safety and problem-solving and the report outlines each of them.

The question remains whether the same framework can be applied to children, and if not, what modifications are necessary. We tried to apply the grid to evaluate children's digital skills. However, since this was not a primary aim of this project, some of the skills listed in the table were not investigated during the interviews. Therefore, we do not know whether the children we interviewed have some of the skills listed and can only report on what we know considering the data we collected. To present the data we have, we coded each individual child against the grid, as presented in Table 2 below.

Table 2. Descriptions of different levels of proficiency for each digital literacy skill from the DIGCOMP framework

Basic user		**Independent user**		**Proficient user**	
I can look for information online using a search engine.	1BU	I can use different search engines to find information. I use some filters when searching (e.g. searching only images, videos, maps).	1IU	I can use advanced search strategies (e.g. using search operators) to find reliable information on the internet. I can use web feeds (like RSS) to be updated with content I am interested in.	1PU
I know not all online information is reliable.	2BU	I compare different sources to assess the reliability of the information I find.	2IU	I can assess the validity and credibility of information using a range of criteria. I am aware of new advances in information search, storage and retrieval.	2PU
I can save or store files or content (e.g. text, pictures, music, videos, web pages) and retrieve them once saved or stored.	3 BU	I classify the information in a methodical way using files and folders to locate these easier. I do backups of information or files I have stored.	3IU	I can save information found on the internet in different formats. I can use cloud information storage services.	3PU

I can communicate with others using mobile phone, Voice over IP (e.g. Skype) e-mail or chat – using basic features (e.g. voice messaging, SMS, send and receive e-mails, text exchange).	4 BU	I can use advanced features of several communication tools (e.g. using Voice over IP and sharing files).	4IU	I actively use a wide range of communication tools (e-mail, chat, SMS, instant messaging, blogs, micro-blogs, social networks) for online communication.	4PU
I can share files and content using simple tools.	5 BU	I can use collaboration tools and contribute to e.g. shared documents/files someone else has created.	5IU	I can create and manage content with collaboration tools (e.g. electronic calendars, project management systems, online proofing, online spreadsheets).	5PU
I know I can use digital technologies to interact with services (as governments, banks, hospitals).	6 BU	I can use some features of online services (e.g. public services, e-banking, online shopping).	6IU	I actively participate in online spaces and use several online services (e.g. public services, e-banking, online shopping).	6PU
I am aware of social networking sites and online collaboration tools.	7 BU	I pass on or share knowledge with others online (e.g. through social networking tools or in online communities).	7IU	I can use advanced features of communication tools (e.g. video conferencing, data sharing, application sharing).	7PU
I am aware that when using digital tools, certain communication rules apply (e.g. when commenting, sharing personal information).	8 BU	I am aware of and use the rules of online communication ("netiquette").	8IU		8PU
I can produce simple digital content (e.g. text, tables, images, audio files) in at least one format using digital tools.	9 BU	I can produce complex digital content in different formats (e.g. text, tables, images, audio files). I can use tools/editors for creating web page or blog using templates (e.g. WordPress).	9IU	I can produce or modify complex, multimedia content in different formats, using a variety of digital platforms, tools and environments.	9PU
I can make basic editing to content produced by others.	10 BU	I can apply basic formatting (e.g. insert footnotes, charts, tables) to the content I or others have produced.	10IU	I can create a website using a programming language.	10PU
I know that content can be covered by copyright.	11BU	I know how to reference and reuse content covered by copyright.	11IU	I can use advanced formatting functions of different tools (e.g. mail merge, merging documents of different formats, using advanced formulas, macros).	11PU
I can apply and modify simple functions and settings of software and applications that I use (e.g. change default settings).	12 BU	I know the basics of one programming language.	12IU	I know how to apply licenses and copyrights.	12PU
	13 BU		13IU	I can use several programming languages. I know how to design, create and modify databases with a computer tool.	13PU

I can take basic steps to protect my devices (e.g. using anti-viruses and passwords). I know that not all online information is reliable.	14 BU	I have installed security programs on the device(s) that I use to access the Internet (e.g. antivirus, firewall). I run these programs on a regular basis and I update them regularly.	14IU	I frequently check the security configuration and systems of my devices and/or of the applications I use.	14PU
I am aware that my credentials (username and password) can be stolen. I know I should not reveal private information online.	15 BU	I use different passwords to access equipment, devices and digital services and I modify them on a periodic basis.	15IU	I know how to react if my computer is infected by a virus.	15PU
I know that using digital technology too extensively can affect my health.	16 BU	I can identify the websites or e-mail messages which might be used to scam. I can identify a phishing e-mail.	16IU	I can configure or modify the firewall and security settings of my digital devices.	16PU
I take basic measures to save energy.	17 BU	I can shape my online digital identity and keep track of my digital footprint.	17IU	I know how to encrypt e-mails or files.	17PU
	18 BU	I understand the health risks associated with the use of digital technology (e.g. ergonomy, risk of addiction).	18IU	I can apply filters to spam e-mails.	18PU
	19 BU	I understand the positive and negative impact of technology on the environment.	19IU	To avoid health problems (physical and psychological), I make reasonable use of information and communication technology.	19PU
	20 BU		20IU	I have an informed stance on the impact of digital technologies on everyday life, online consumption, and the environment.	20PU
I can find support and assistance when a technical problem occurs or when using a new device, program or application.	21 BU	I can solve most of the more frequent problems that arise when using digital technologies.	21IU	I can solve almost all problems that arise when using digital technology.	21PU
I know how to solve some routine problems (e.g. close program, re-start computer, re-install/update program, check internet connection).	22 BU	I can use digital technologies to solve (non-technical) problems. I can select a digital tool that suits my needs and assess its effectiveness.	22IU	I can choose the right tool, device, application, software or service to solve (non-technical) problems.	22PU
I know that digital tools can help me in solving problems. I am also aware that they have their limitations.	23 BU	I can solve technological problems by exploring the settings and options of programs or tools.	23IU	I am aware of new technological developments. I understand how new tools work.	23PU
When confronted with a technological or non-technological problem, I can use the digital tools I know to solve it.	24 BU	I regularly update my digital skills. I am aware of my limits and try to fill my gaps.	24IU	I frequently update my digital skills.	24PU
I am aware that I need to update my digital skills regularly.	25 BU		25IU		25PU

4.1 Based on the interviews and observations what are the digital skills interviewed children as described in the DIGCOMP framework?

Table 3. Digital skills of the interviewed children across the DIGCOMP framework

	Family 1	Family 2	Family 3	Family 4	Family 5	Family6	Family 7	Family 8	Family 9	Family 10
Interviewed Child	HR01b6	HR02g6	HR3b6	HR4g6	HR5g6	HR6g7	HR7g6	HR8b6	HR9b6	HR10b7
DGCOMP Skills										
1	**BU****	**BU****	**BU****	**BU****	NTY**	**BU****	**BU****	NS**	**BU****	NS**
2	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
3	NTY***	NTY***	NTY***	NTY***	NTY***	**BU****	NTY***	NTY***	**BU****	NTY***
4		**BU****	**BU****	**BU****	NTY**	**BU****	NTY**		**BU****	**BU****
5	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
6	NTY***	NTY***	NTY***		NTY***		NTY***	NTY***	NTY***	NTY***
7	NTY***	**BU****	**BU****	**BU****	NTY***	**BU****	**BU****		**BU****	
8	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
9	**BU****	**BU****	**BU****	**BU****	NTY***	**BU****	**BU****		**BU****	
10	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
11	NTY***	NTY***			NTY***		NTY***	NTY***	NTY***	NTY***
12	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
13	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
14	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
15	NTY***	NTY***	NTY***		NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
16	**BU****	**BU****	**BU****			**BU****	**BU****	NTY**	**BU****	**BU****
17	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
18	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
19	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
20	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
21	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
22	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
23	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
24	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***
25	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***	NTY***

Legend for Table 3:

BU = basic user

IU = independent user

PU = proficient user

NTY = not there yet

Blank spaces = no such information known

* = observed

** = self evaluation or reported by another member of the family

*** = researcher evaluation

4.2 Discussion of the categorization of young children's skills with DIGCOMP?

Applying the DIGICOMP framework for developing and understanding digital literacy in adults to evaluate children's digital literacy skills was not an easy task, mainly because many of the skills described are too sophisticated for children aged 6 to 7 years. From a perspective of the results of the Croatian team, there are only few skills that can be evaluated in children in this sample, and even for those skills children are at best described as basic users.

The first skill regards the ability of children to look form information online using a search engine. Some of the children in the sample report, or their parents report that they can use Google to find some simple information. Most often they look for a cartoon or a game including their favorite characters. When they search for other types of information, e.g. the data about a specific event or topic, they use the search engine with the help of their parents because of their limited reading and writing skills. Also, most children in the sample that go on-line alone, can search for cartoons and videos on You Tube. However, they have no knowledge regarding the use of filters etc.

The other skill that we were able to identify in the children in the sample is saving or storing files and content and then retrieving it later, but this is something only two of the children can do.

The next skill that can be found in our target children is regarding communication with others using mobile phone, Voice over IP, e – mail or chat. However, their skills are limited to the use of mobile phones.

Some children in the sample are aware of the social networking sites and online collaboration tools, but they do not use them themselves. They know of them through their parents, but they do not have access to them. In fact, considering their age, they are not legally allowed to use some of the most popular social networks.

Also, some of the children can produce simple digital content in at least one format using digital tools, but this mainly refers to taking photos with their parent's smart phones or perhaps with tablets if they have one available.

And in the end, regarding health concerns, some children are aware that too much technology use can harm their health, because that is the message they receive from their parents.

For most of the other skills it is the evaluation of researchers that children do not yet possess those abilities. This conclusion in based on other observations and information given by children and parents. For example if a child has no access to a computer and Internet it is easy to evaluate that he or she has no skills regarding those tools.

Some of the skills in the DIGICOMP framework could be accessed in children after modifications. For example the skill that for basic user level says he or she is "aware that their credentials (username and password) can be stolen and he or she should not reveal private information online". Children in our sample do not fully understand that in our opinion, but some of them have heard of passwords and know that their parents have passwords on some of the devices. It would be interesting to see when and how they become aware of such protection practices and how they understand them.

The DIGICOPM framework had an additional problem in regards to being applied to evaluate children's digital literacy skills – it doesn't address some of the things that are important for children. For example it doesn't address their game playing and how skilled they are in this

matter. Some of the children can play a simple game on a tablet or smartphone, some of them could perhaps use a computer with a mouse or a gaming console. Also, some children could find and download the games by themselves, while other children need the help of adults.

Furthermore, children can use digital technology in the learning process, and this is something that is also not addressed in the DIGICOMP framework – the possibility to use digital technology to learn some skills or learning material that goes beyond the use of such technology for finding information through search engine. It is our opinion that children can differ in how aware they are of this opportunity and how well they can use it.

For even smaller children, preschoolers and younger, it would be interesting to see how much they know about different digital devices on basic level – how to turn them on and off, how to charge them if they need to be charged, how to manipulate them, what they can be used for and what they cannot be used for etc.

It is our opinion that DIGICOMP framework for developing and understanding digital competence of adults presents a good starting point for creating a similar framework for children, but could not be applied directly without a fair amount of adaptation. Also, different age groups of children would also acquire adaptation of the DICICOMP framework, because children's cognitive and motoric abilities are developing in a fast pace during the first years of life, allowing children different actions at different age.

5. Method

5.1 Procedure

The Croatian research was based on a collaboration agreement between JRC of the European Commission and two Croatian researchers – one from the Institute of Social Sciences Ivo Pilar, and one from the Clinical Hospital Centre Osijek.

After receiving the research materials in English, the researchers first translated all the documents into Croatian. After that, we applied for the approval of the Ethical Committee from both the Institute of Social Sciences Ivo Pilar, and Clinical Hospital Centre Osijek. The requests included all the necessary information pertaining to the aim of the research project, the sampling procedure, the research procedure and questions, possible risks and benefits as well as confidentiality of data. After both Ethics Committees approved the research proposal, we started looking for the families for the sample and doing the interviews. The JRC colleagues sent us ten goodie bags to distribute to the families involved in the research. Also, we received 10 activity books which were used at the beginning of each interview as an ice-breaking activity. For each interview we prepared the protocols of observation, personalized consent forms, an activity book, a goodie bag, a set of cards with pictures of different digital devices and traditional toys that were also used to ease the conversation with children and parents, as well as pictures of different apps and games. We also took our recording devices.

Interviews took place between July and October 2015. Transcribing and preliminary coding was done after each individual interview. The final analyses and report writing took place in November 2015.

5.1.1. The sampling procedure

The participants were recruited through personal contacts, with the application of the snowball procedure and help of social services. We started with personal contacts because both members of the Croatian team have children that are the same age as the target children in this research project, so they both have contacts with families of this type. Once a family decided to join in, they would recommend another family who they felt would also be a good addition to the research. Such personal recommendations proved to be a good thing because people felt more at ease when contacted if their friend or acquaintance had already given them some information about the project beforehand. At some point, a lot more families volunteered than were in fact needed, but the problem was that they were all too similar to each other. For example, they all had too high income. At that point, we contacted the social services in Osijek to try to find families with low income. It was with their help that we managed to contact a few families who then agreed to participate in the research.

The families were recruited based on a combination of criteria. The first criterion was that the families had a six or seven year old child, whereby we also tried to balance the children's gender. The next criterion pertained to family composition – we wanted to find families with one child, single parent families and families with sibling either younger or older than the target child. We also tried to balance the sample according to the income, i.e. to include families with low, medium and high income, and to include families with employed and unemployed parents.

A very important criterion was that we had to find families whose target children were either "low users" of digital technology (use digital technology at least once a week), "medium users" (use a digital device at least two or three times a week), or "high users" (children who use a digital device at least once a day).

Additionally, we tried to find families who live in the city, as well as those who live in the country or less urban areas.

Participants were not compensated for their participation in the research in any way other than with a small bag of goodies provided to us by the JRC colleagues. They were given this bag after the interview ended. In addition, the children were allowed to keep the activity book with which each interview started.

5.1.2. The sample

As mentioned above, the families were recruited based on a combination of criteria. The final sample included 5 boys and 5 girls as target children. Eight of them were 6, and two were 7 years old. Only three of them go to school, and the others attend kindergarten. As for family composition, we have two single child families, one of which is also a single parent family, four families with siblings who are younger than the target child and four families with siblings older than the target child. Considering the income factor, we have three families with high income, three with medium and four with low income.

The biggest problem was to find families that are diverse in terms of the criterion of digital technology use frequency. In fact, we had trouble finding the children who could be described as "low users" of digital technology. Such children would have to deal with digital technology at least once a week. We have three such families in the sample. "Medium users" are described as the ones who use a digital device at least two or three times a week, and in the sample we have four such families, while "high users" are children who use a digital device at least once a day. There are three such families in the sample.

As for ethnicity, all the families in the sample are Croatian.

5.1.3. Implementation of the protocol of observations

All the families were very excited and enthusiastic to participate in the research. The parents were more than willing to share their view of the influence of digital technology on contemporary life and children in general.

Most interviews were conducted by both researchers coming to the family's home. After the initial part and the ice-breaking activity, which included both researchers and all the family members who were present, the researchers would split up, with one doing a separate interview with the children and the other with the parent(s). For practical reasons, which include the project time frame and the fact that some families live outside of Osijek, four interviews were conducted by just one researcher. Those interviews were conducted after the first few interviews had already been done by both researchers together, so they both got a good sense of the interview process by the time they conducted interviews on their own.

In both cases, the visit started with a short introduction in order to explain once again the purpose of the study. The parents were given (and explained) the consent forms for themselves and for the child and asked to sign them. In some cases, the consent forms were previously sent to parents by e-mail, together with a short description of the research project, so those parents already had a good idea of the project and its aims.

We started the interviews with the activity from the activity book "Play and Learn: Being Online", with all the members of the family. In this game, with the help of the parents, the children had a task of introducing us with their usual daily activities, using stickers. This proved to be a good ice-breaking activity because children responded well to it, and it also gave the researchers a good basic idea of the digital technology practices of the child and of the whole family.

This was followed by separate half structured individual interviews with the children and the parents. The children would gladly go with one of the researchers to their room and show them their toys, as well as their digital devices. The other researcher would stay with the parent(s). In the case when there was only one researcher present, she would always first interview the child, because children were very excited about the interview and would have probably lost their patience if they had had to wait for the interview with the parents to finish. This way, they would feel good by being given the priority, and later would also lose interest, so the researcher had enough time to do the interview with the parent while the child would do something else. Another good point in this scenario is that the researcher had a chance to check some of the child's statements with the parent.

The card game, a set of cards with pictures of different media devices (tablets, laptops, smartphones, etc.), and traditional toys, such as dolls or cars, were also used during the interview with the children. The card game was usually used as a "warm up" activity at the beginning of the interview, when the researcher and the children played with the cards. The game was always used for orientation – which devices the children know, which they use and what they do with them. The game was sometimes used for orientation about which position technologies hold among other toys, when the child needed to sort the cards by popularity.

The parents were first asked for factual information, such us age, income, education, extracurricular activities the children attended, the parents' employment and family income. They were also asked to help us with the ICT use charts for their children. These carts show the onset and progress of children's use of specific digital device by average number of hours during one week. The standardized instruction regarding the creation of such charts tells parents that they are kindly requested to start by the oldest child and enter the devices that the child uses, one by one. The vertical axis of the chart represents time of use per weeks and the horizontal axis displays the age of the child. Parents were kindly asked to try to think aloud while they complete the ICT Use Chart, and this information proved to be very valuable in means of data collection. Also, they completed the chart by adding activities for all the children in the family.

Individual interviews with the children and parents lasted between 45 and 90 minutes.

At the end of each interview, the children were given a goody bag, and all the family members were thanked and asked if they had any additional questions. In most cases, parents didn't have any specific questions for the researchers, but they often had the need to express some concluding remarks on their children's engagement with digital technology, which also proved to be very useful.

5.1.4. Recording

The interviews were recorded with an audio recording device and a small camera. Those were the two tools used by the two researchers. At the beginning of each interview, while the entire family was sitting together with both researchers, only one device was turned on, and later on, when the children and their parents separated with one of the researchers, the other devise was also used. The recordings made with camera were of poor image quality because the primary aim was to get a good recording of the audio material, and sometimes it was difficult to position the device so that it captures good images and also good quality voice recording. In addition, children would often move around the room and the researchers didn't want to move the camera all the time because it would interrupt the conversation flow and affect spontaneity.

Both researchers took notes during the interview. This was more easily done while talking to parents than while talking to the children. The reason for that was that while talking to the children, we wanted to concentrate on achieving a more natural flow of conversation in order to make them feel more relaxed and at ease, and taking too many notes while interacting with the child might have interfered with this process.

In addition, both researchers took some photographs of the children interacting with devices they use or during card sorting assignments. Sometimes, a researcher took photos the children playing with their favorite toys, or doing something important for them. All the photographs taken were later shown to the parents in order to show them that the children's faces or any other information that could reveal their identity was not visible.

After each interview, the researchers made more detailed notes about the children's and the families' practices with digital technology. They also made notes about their personal impression of the atmosphere during the interview, families' home environment, life style and similar things which go beyond the answers to the research questions, but possibly give a wider picture of the families' interactions with digital technology.

5.1.5. Implementation of the protocol of analysis

After the interviews, all the recordings were transcribed. Those were partial transcripts that tried to focus on what the parents said in response to the research questions. Due to the project time frame, and a limited number of researchers in the Croatian team, there was no time to do the full transcripts which would require for each pause in the conversation and each conversation turn to be coded. The quality of the audio material was very good, except for some parts when there were more people in the room, e.g. a younger sibling, who would talk at the same time as parents or older children, or sometimes cry and interrupt the conversation in a similar manner. Those parts were a little more difficult to understand and transcribe, but not so difficult that it could not be done.

The analysis was done based on the transcripts, the researchers' notes and debriefings that took place while making notes after the interviews and during the analysis.

5.2. Discussion

5.2.1 Why might the results have turned out that way?

Our research included a diverse set of families. Their children's practices with digital technology differ in terms of range of available devices, and time and content restrictions. It is reasonable to assume that there are families in Croatia, with children aged six or seven, who have yet different practices in this regard, but we were not able to include all of them in the sample at this time. We feel that the obtained sample gives us a good idea of what these practices are in Croatian children younger than eight.

However, regarding the age of the target children in Croatia, it is important to point out that only three of them are in primary school, while the others are still in kindergarten. Compared to other European countries, children in Croatia start primary school a little later, at the age of six or seven – depending on their date of birth. All the children whose sixth birthday falls prior to April 1 in a given year are obligated to start school in September of the same year. Before that, there is now a mandatory pre-school program for all children and it is free of charge. For children who are in kindergartens, this program is incorporated in the kindergarten curriculum, and for those who do not attend kindergarten, classes are organized in the afternoons, two or three times a week, at their local kindergarten (they need to attend 250 hours of pre-school program) in total. Before they start school, children are not taught reading and writing skills in any systematic way. That is why the children in our sample have only limited skills in this domain and it may be a factor that limits their ability to conduct information searches beyond those that involve simple names.

5.2.2 In what way did the findings change over time?

Unfortunately, no longitudinal data are available at the moment, but at the end of the interviews, all the parents participating in the research said they would welcome a follow-up if needed, and would be willing to participate in a similar research project again.

One particularly interesting thing is that when the researchers contacted some of the families later for some additional data, they would usually report that after the interview they reconsidered their strategies regarding the limitations of screen time and mediation strategies. At that time those strategies had not yet been changed, but it is our opinion that merely thinking more about their children's interaction with digital technology made the parents more aware of the exact time and conditions of the use of those devices by their children.

5.2.3 How could the study be improved?

The best way to improve the findings is to recruit more families with even more diverse background and even more diverse strategies when it comes to children's engagement with digital technology. As much as we tried to do that in the current research project, ten families is still quite a small sample when we consider all the variables we tried to balance. For example, it would be interesting to investigate the perceptions of digital technology in parents from high income families that do not have many digital devices in their homes, and to see what their children do with the devices once they are allowed to use them.

5.2.4 What are the methodological recommendations for future research?

The observation protocol included a lot of questions, which is good because we tried to cover a lot of practices of children and families with digital technology. On the other hand, sometimes the researchers would feel that the parents got a little tired of the conversation, especially when it took longer to complete. Considering this fact, as well as the fact that during the interview parents would often report they didn't think about some particular aspect of children's digital technology use unless they were asked about it, it might be wise for future research to plan two separate visits to families, if possible. This would allow researchers to go through some parts of the interview in more detail after the parents get some time to think about it. It would also allow more time for simple observation of children's activities with digital technology, which is something that was not always possible in this research. Furthermore, two separate visits might give both parents a chance to get involved in the research and give their personal opinion, which at times proves to be very valuable.

One other important thing to take into consideration in future research is the problems that our team faced when it came to interviewing multiple children from the same family. Younger siblings of the target children had difficulty understanding our questions even when they were simplified for them, and the researchers had problems understanding their answers. At the same time, these younger siblings were often unable to refrain themselves from talking at the same time as their older siblings or researchers, so it would often get difficult to talk to the target child if the younger sibling was present. In situations like that, we would often ask the parents to take the younger sibling to their room, but in the end that made it even harder to conduct the interview with the parent, because younger children again had their demands for attention that needed to be met. Two separate visits might allow more time for younger siblings to get acquainted with the researchers and this might lead to them feeling less excited about participating in the conversation, which in turn would allow the researcher more alone time with the target child.

5.2.5 What is the future direction for research on this topic?

One of the aims of the future research in this area could be to try to integrate children's activities in schools and kindergartens with those in home environment. Extending the field of research in this manner might give us a better picture of children's overall digital practices, beyond those in home environment.

Also we find that more attention should be given to capturing the role of peers, especially in pre-school children and children in the first grades of primary school. In Croatia, since 2014, even the children who do not attend kindergarten are obligated to attend pre-school and for some of them this is the first time they spend more time outside their homes interacting with previously unfamiliar peers on a regular basis. It would be interesting to see if such experiences, which probably include sharing experiences of playing video games and other activities that children enjoy, have an effect on children's personal interactions with digital technology (e.g. they might learn about new games, and new possibilities that digital devices provide).

6. Conclusions

Despite the fact that children use a wide range of digital devices at a younger age than ever before, the knowledge we currently have on the topic is such that there is still much left unexplored. This study, done in collaboration with a selected group of academic partners in different European countries (Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Finland, Germany, Italy, Latvia, Portugal, Romania, Slovenia, Spain, The Netherlands and the United Kingdom), tries to explore in more detail how children from zero to eight engage with digital technology, but also how their parents mediate this engagement and what they feel are the risks and opportunities of such use.

In this report we have summarized the main findings of the ten interviews conducted in Croatia with young children and their families. Each of the families in the research included at least one child aged from 6 to 7 – the target child. The target children differ in how often they use digital devices during a typical week, so we have children who represent "low users" (they use a digital device at least once a week), "medium users" (they use a digital device at least two or three times a week) and "high users" (they use a digital device at least once a day). The families also differ with regard to family income and family composition (target children's younger or older sibling). Most of the data collected from the parents is based on their answering the questions during the interview. The data collected from the children is mostly based on observations and the interviews conducted with the help of a card game and an activity book. The interviews took place between July and October 2015.

The result of this study provided us with an insight into young children's and their families' everyday life and how, in this context, they engage with new (online) technologies.

Results show that digital technology is an integral part of lives of families included in the sample, but it doesn't dominate their daily routines. Children enjoy using digital technology and would probably gladly welcome more screen time if they were allowed, but at the same time they also enjoy doing a lot of outdoor activities or playing with their toys. Children use a limited range of digital devices, which often include a computer and smart phones or tablets and this finding is further supported by the data of personal ownership, which show that three of the children have their own tablets, one has his own personal computer, and four children have mobile phones but not always including a SIM card. It is interesting that, although that was not the focus of the research, when compared to the previously mentioned devices, the most dominant form of interaction with digital technology involves watching television.

As for the content that children access using digital devices, most of them use those devices to watch cartoons on television or a computer, or to play simple free games and watch video clips on You Tube using a computer, a smart phone or a tablet.

Children have a vague understanding of the difference between on-line and off-line activities. When it comes to digital skills, they are on the basic user level at best and they obtained those skills mostly through observation and limited instruction. Children can play a game that has been downloaded for them, or in some cases they can download it and install it by themselves. Some of them can look for interesting video clips on the Internet, but only if they have simple names because of their limited reading and writing skills. Most of them can take photos with smart phones, but none of them know how to edit or share such photos.

They prefer to use digital devices on their own and for the purpose of having fun, to relax and enjoy themselves.

As for the risks and opportunities of digital technology, the children in the sample are only beginning to grasp them.

Parents usually first emphasize the negative effects of digital technology: addictive behavior, aggressive behavior, consequences for the eyesight and posture and the fact that other areas of life might get neglected if children have too much screen time. As positive implications, parents mention acquiring digital literacy skills and the help of digital technology in acquiring various other skills. Their mediation strategies differ regarding time and content, with most children having strict time limitations and more freedom when it comes to the content they watch.

It is our opinion that parents do not fully understand the scope of digital literacy skills. Although that does not pose a problem at this time, as their children get older they will need a lot more support in finding the relevant information about positive and negative sides of the children's engagement with digital technology in order to set reasonable boundaries in terms of time and content. We recommend that Policy-makers make sure there are such information available, and that parents can easily access them when needed.

From the perspective of Industries, it is interesting that all the parents in the sample allow their children to use only free games and applications – none of the parents have ever bought something on purpose.

6.1. Key findings

- For all the families in the sample, digital technology is an integral part of their lives, but it hardly dominates their daily routines. This means that even though the children love to use digital devices, they also enjoy doing a lot of outdoor activities or playing with their toys, and in most of the families these activities take up far more time than engaging with digital technology.
- Children use a limited range of digital devices, which often include computers and smart phones or tablets. Still, compared to those devices, the most dominant form of interaction with digital technology involves watching television, which is still the most available medium, and the most present in the lives of children in the sample.
- Tablets are not as widespread as expected. Only a half of the families own a tablet and in only four of them children are allowed to use it. One of those families obtained a tablet only a few weeks prior to the interview. The reasons for this are not quite clear, but probably involve financial reasons, because most of the families that don't have a tablet are of a lower socio-economic status. What is also interesting is that in two of the families that do have a tablet it is not the device children most often use.
- As for personal ownership, three of the children have their own tablets, one child has his own personal computer, and four children have mobile phones but not always including a SIM card.
- Most children use digital devices to watch cartoons on TV or a computer. Also, they play simple free games and watch video clips on You Tube, using a computer, a smartphone or a tablet.
- Most of them use the Internet search engine to find some interesting information, but almost exclusively with the help of their parents or older siblings. That activity is something that happens only occasionally, and it is not part of their regular interaction

with digital devices. More often they use the search engine to find some interesting content regarding cartoons or characters they like.

- They mostly use the devices on individual basis and for the purpose of having fun, to relax and enjoy themselves.
- Children find it difficult to understand the difference between on-line and off-line practices. They are instructed to react to pop-ups by calling their parents, or just pressing "no", but they do not know the difference between playing a game on-line or off-line.
- In general, their digital literacy skills are low. They have a limited grasp of the device and game navigation – they can play a game that has been downloaded for them, or in some cases they can download it and install it by themselves. Some of them can look for interesting video clips on the Internet, but only if they have simple names because of their limited reading and writing skills. Most of them can take photos with smartphones, but none of them know how to edit or share such photos.
- They obtained those skills mostly through observation and limited instruction.
- They do not fully understand the opportunities and risks of digital technology use. Positive perception of the technology includes the idea that the devices are entertaining, and the negative that it can hurt your eyes and make you "act goofy".
- Parents emphasize the negative effects of digital technology, but later have difficulty explaining what precisely they think is bad.
- As negative consequences, they mention health implications – addictive behavior, aggressive behavior, consequences for the eyesight and posture and the fact that other areas of life might get neglected if children have too much screen time. They are worried about the effect of social networks once children gain access to them. As for the fear of children being contacted by strangers, this is something they relate to children's future use of digital technology.
- Positive implications are related to acquiring digital literacy skills. They emphasize the ability of digital technology to help children acquire and improve the skills they would otherwise have no chance of observing. Also, they find that with digital technology it is easier to gain access to information in various forms, which helps children learn any kind of material. Another positive implication is that some logical games and apps can help children's cognitive development.
- Parental mediation strategies are quite diverse. There are different strategies involved regarding time and content, with most children having strict time limitations and more freedom when it comes to the content they watch. Still, there are families with practically no limitation whatsoever.
- Parents allow their children to use only free games and applications – none of the parents have ever purposely bought them.

6.2. Recommendations

6.2.1 Recommendations to Policy-makers

Based on the key finding in this report, we would recommend that policy-makers pay more attention to digital literacy skills of young children and develop national programs that would first of all educate parents, as well as teachers, about what digital skills to include beyond the skills such as downloading games. Also, this program should include more precise information about the positive and negative effects of digital technology on children and youth, as well as

the recommendations regarding the time and content children of different ages should be exposed to while engaged with digital technology. We believe that policy-makers should allocate more concrete and clearer age restriction ratings both to films and series, as well as to video games children are exposed to. Additionally, we think that each such rating should also be accompanied by a clarification of the restriction in terms of what is the concrete negative influence a game might have on children under the recommended age.

In this regard it would be good to have a web site managed by an unbiased public entity, where parents could find information about the time and content recommendations pertaining to digital technology use for each age group. The web site could also include a list of specific programs, games and applications with short descriptions and even a possibility for parents to rate and comment them.

6.2.2 Recommendations to Industries

We recommend that more attention be given to precise description of digital content and more elaborated ratings about the age appropriate content. This would make it easier for parents to find different games and applications appropriate for their children. Along the same lines, it would be good to have a special web site that would give parents an overview of the available games and applications that are considered appropriate for each age group.

6.2.3 Recommendations to Parents and carers

We recommend paying more attention to age restriction ratings. Another recommendation is for the parents and carers to be better informed and educated about digital literacy skills, what these include and how they can be improved in their children, but in accordance with their age.

6.2.4 Recommendations to School, libraries, Museums …

We recommend that these institutions be at the forefront of the above mentioned educational program of digital literacy. These institutions could have information points where leaflets would be distributed with information about the positive and negative effects of digital technology on children of different age, and recommendations regarding time and content of such use.

7. References

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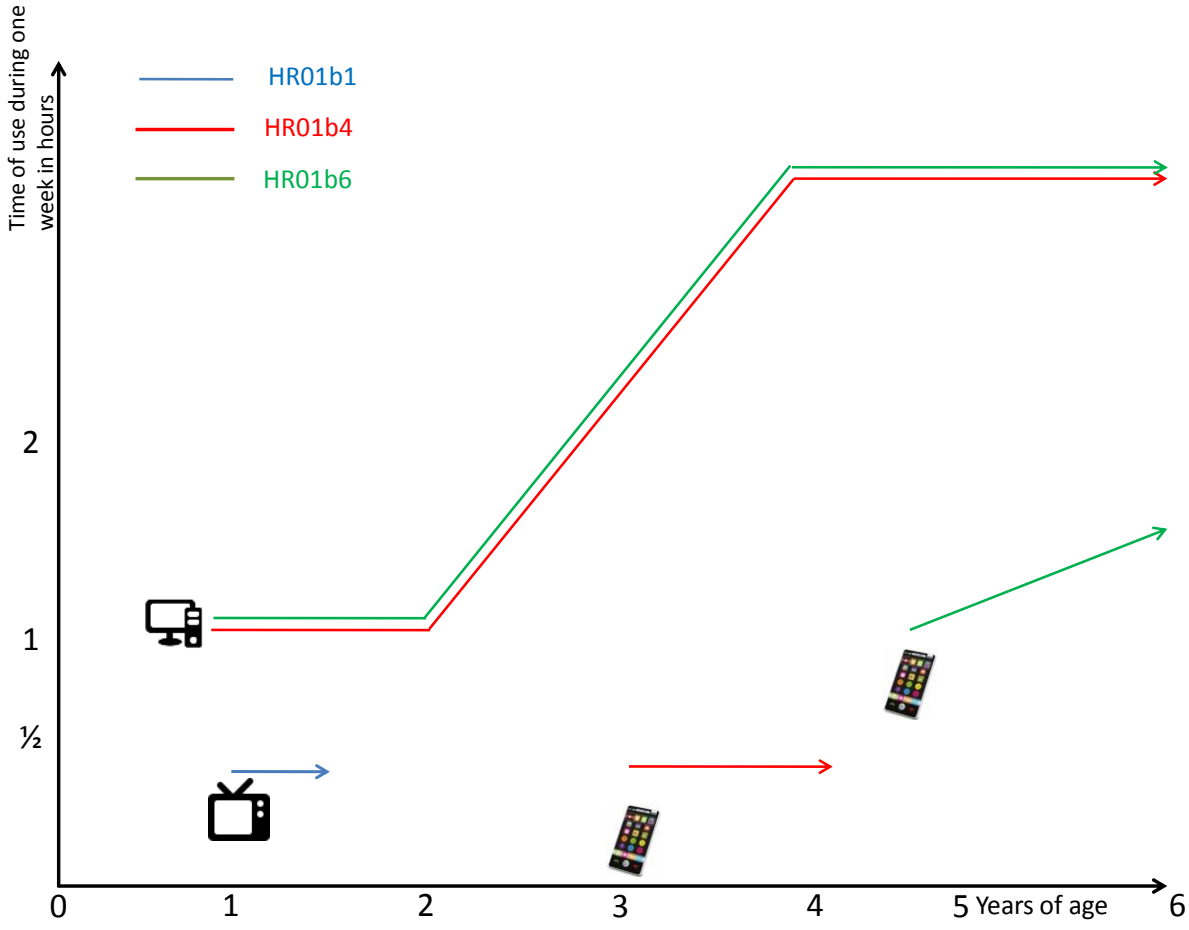
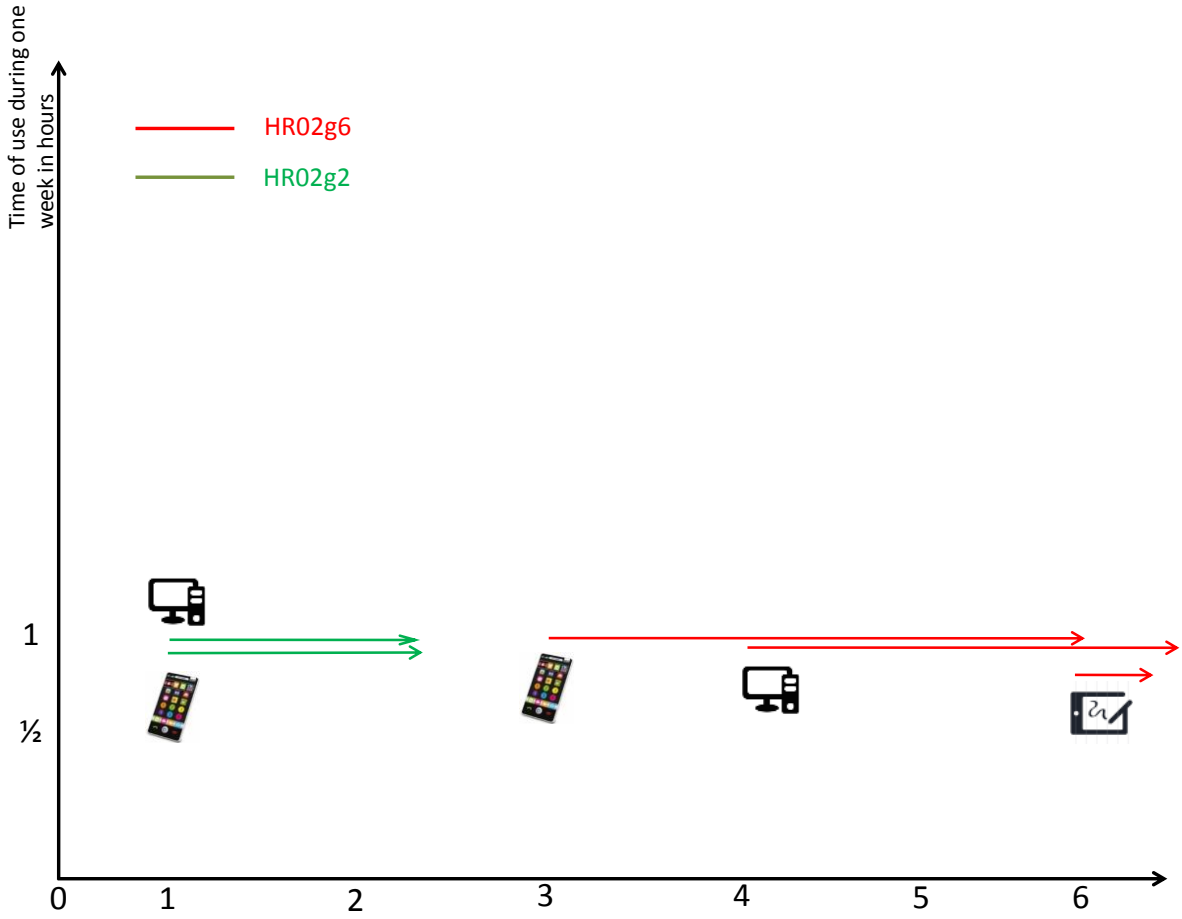
8. Annexes

The ICT use charts for each of the ten families in the sample.

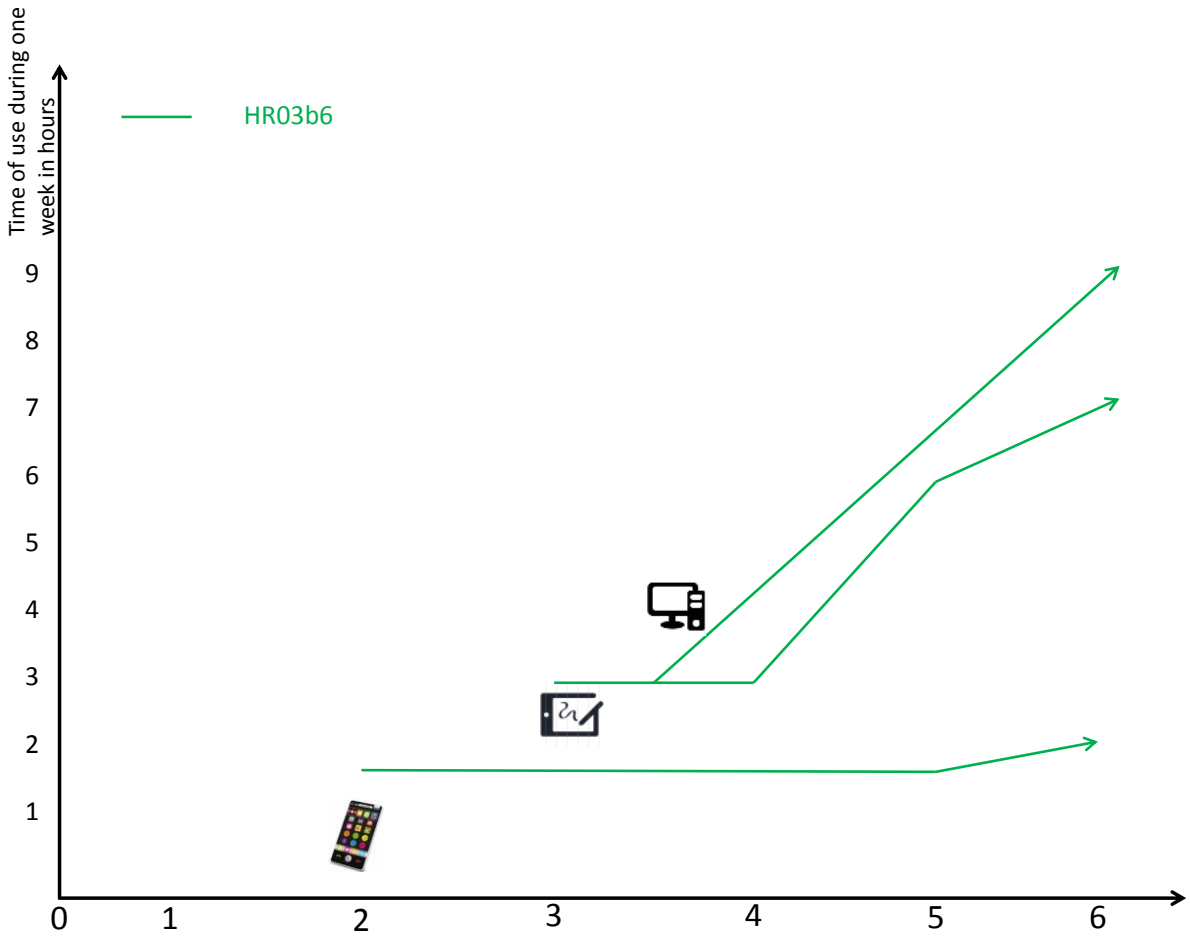
Chat 1. ICT chart for HR01



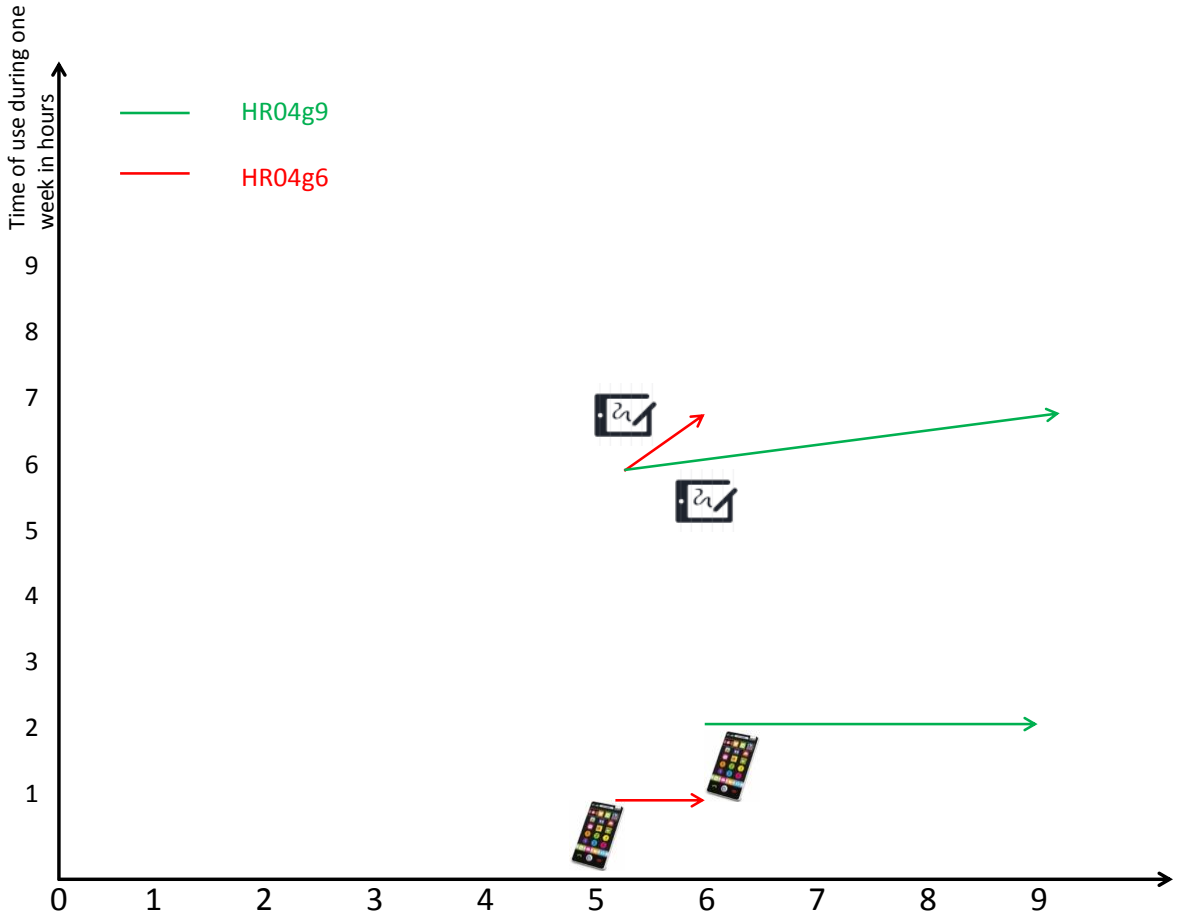
Chat 2. ICT chart for HR02



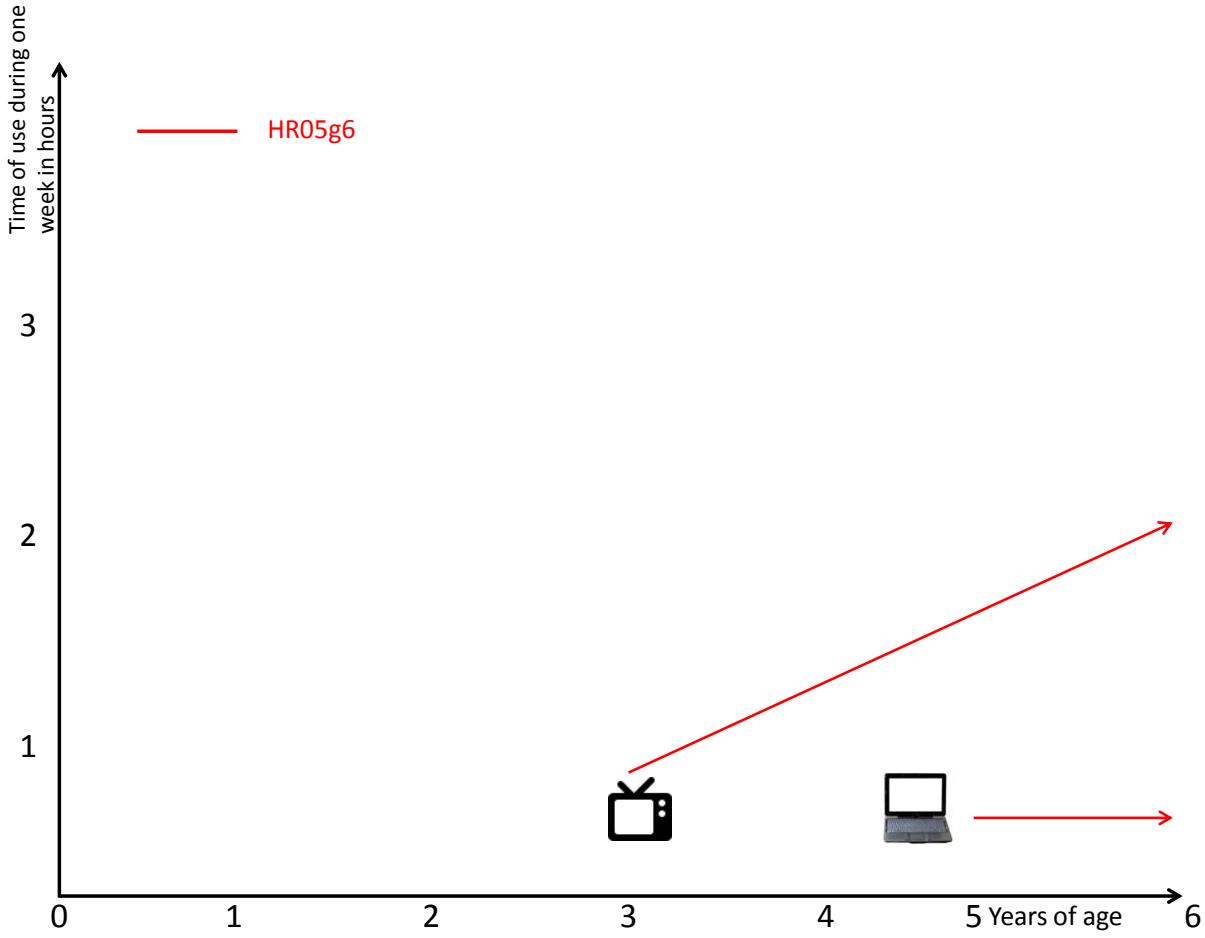
Chat 3. ICT chart for HR03



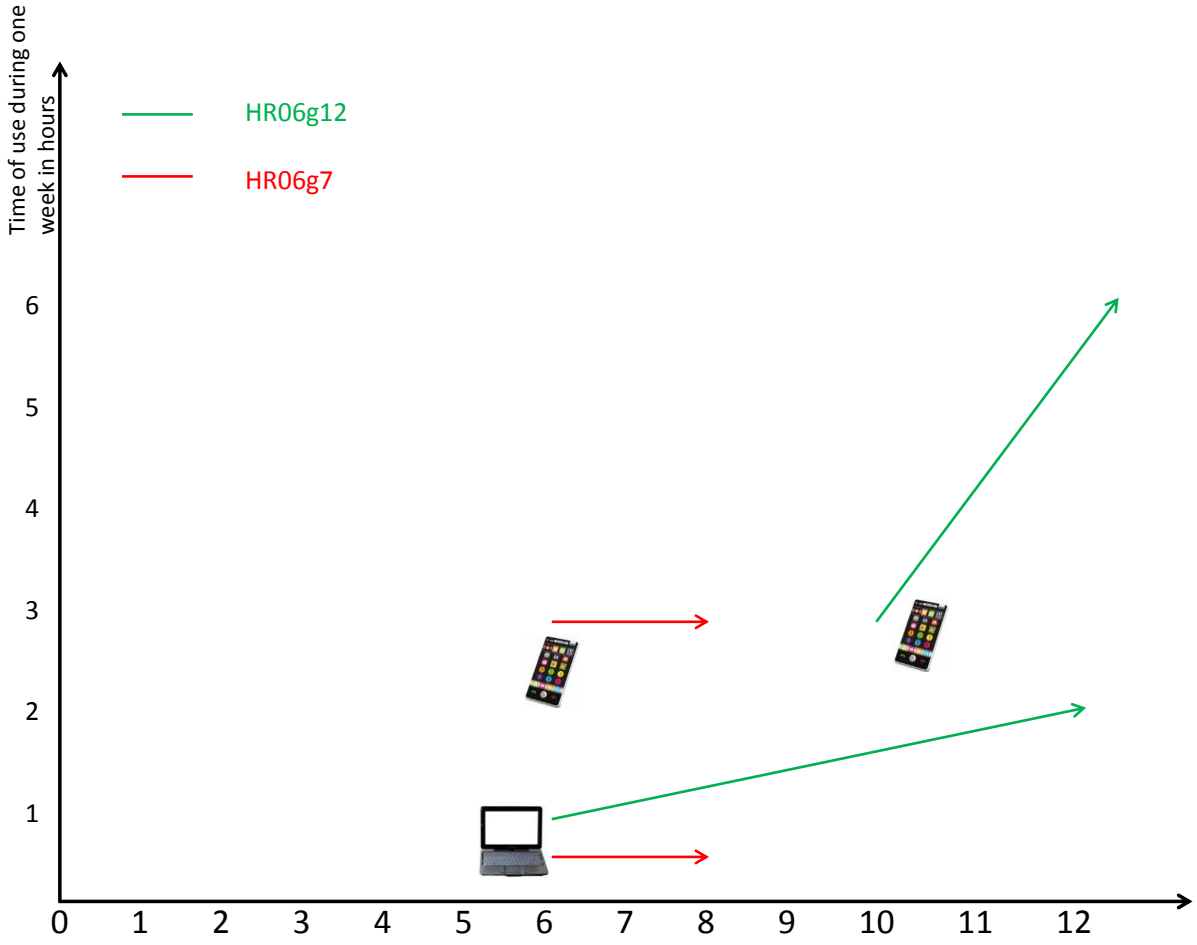
Chat 4. ICT chart for HR04



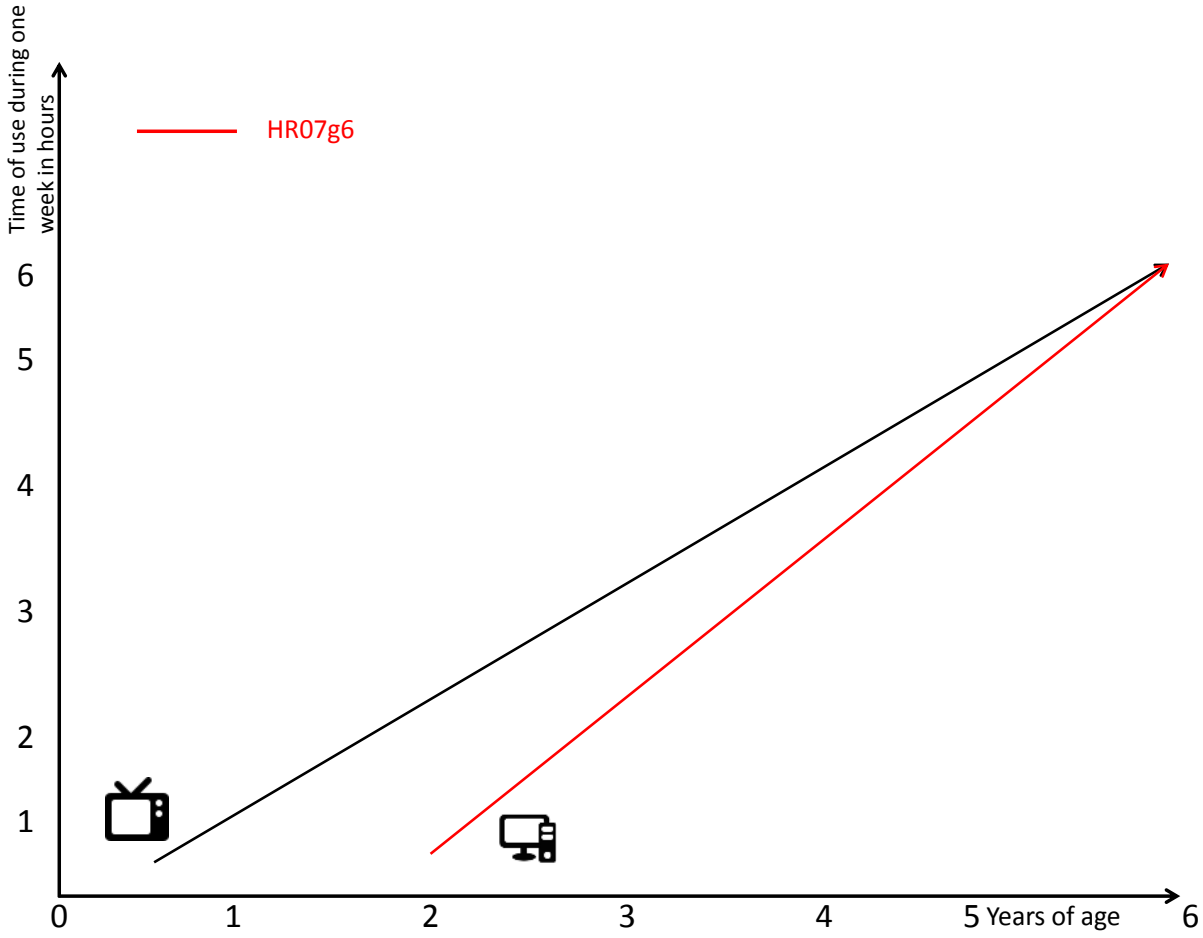
Chat 5. ICT chart for HR05



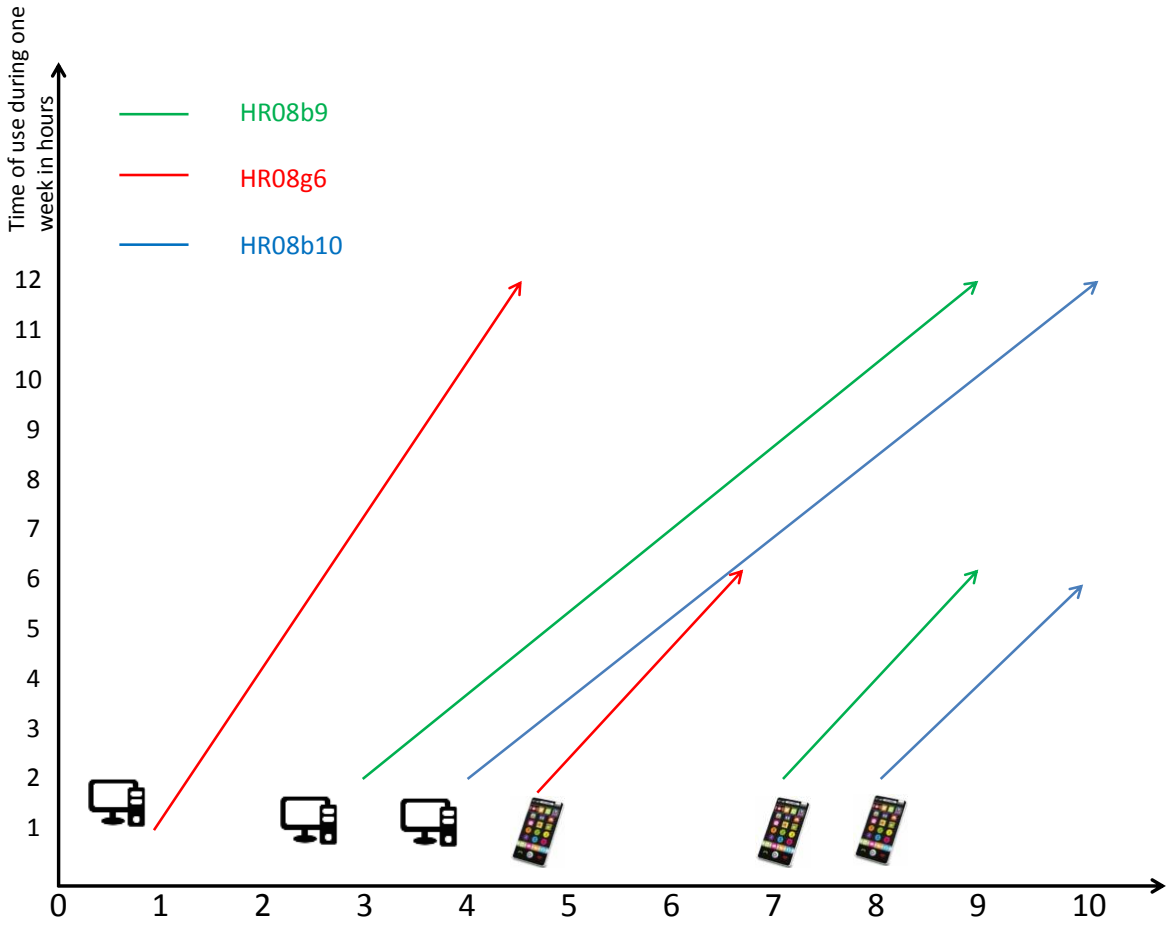
Chat 6. ICT chart for HR06



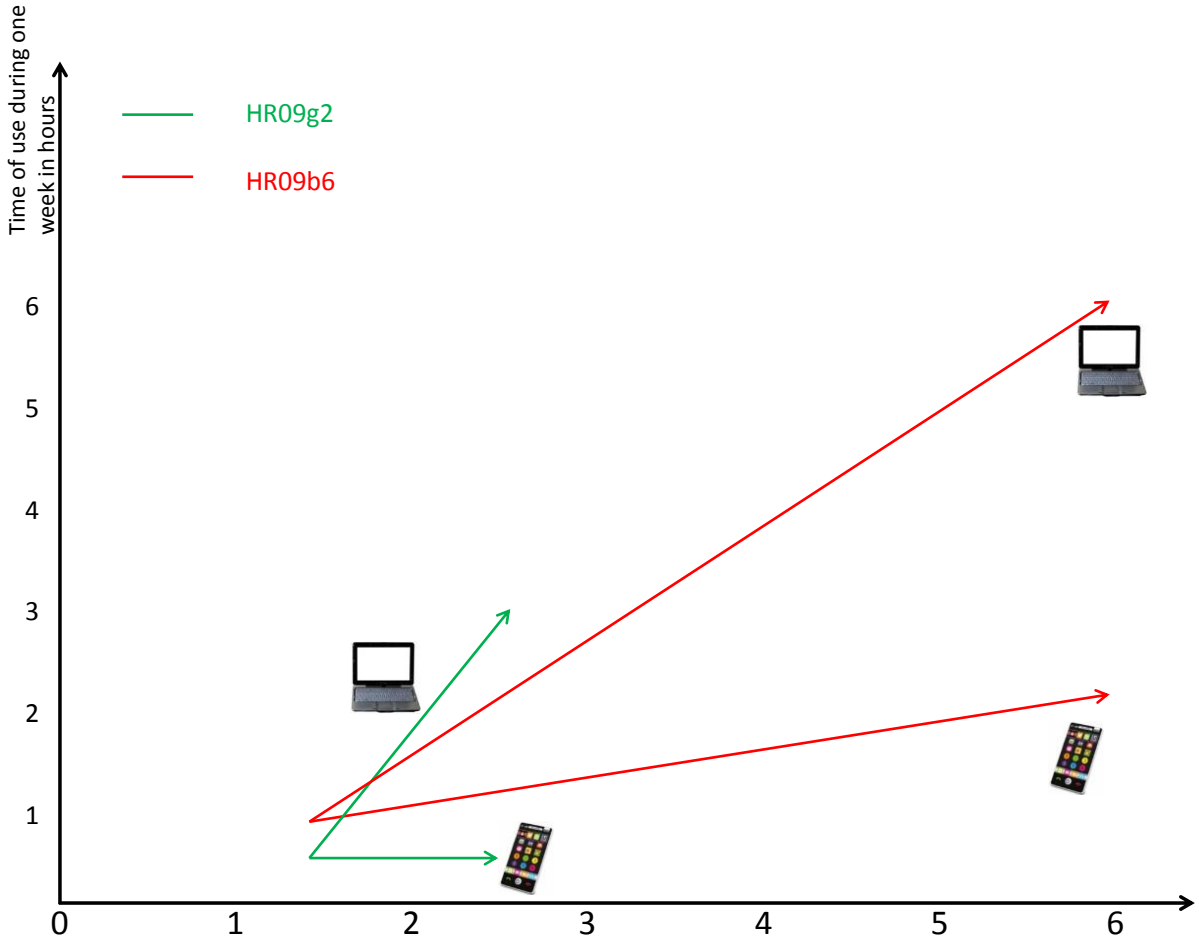
Chat 7. ICT chart for HR07



Chat 8. ICT chart for HR08



Chat 9. ICT chart for HR09



Chat 10. ICT chart for HR10