

Tallinn University
School of Digital Technologies
Digital Learning Games

DIGITAL DEVICES RELATED TO SOCIAL SKILLS, THE USABILITY OF THE
DIGITAL LEARNING GAME FABULOUS FAMILY IN REAL LIFE

Katrin Kuusik

Supervisor: Grete Arro, PhD Psychology,
Researcher, TLU Centre of Excellence in Educational Innovation

Certified by:

Grete Arro

(Supervisor)

.....

Signature Date

Peeter Normak

(Director of the Institute)

.....

Signature Date

Tallinn 2017

DECLARATION

I hereby declare that I have written this thesis by myself and without support from any other person or source, and that I have only used the materials and sources indicated in the list of work cited. Neither I myself nor any other person has submitted this to any other institution for a degree or for publication.

Katrin Kuusik

(candidate)

.....

Signature

.....
Date

TABLE OF CONTENTS

LIST OF FIGURES	6
ABSTRACT	7
ACKNOWLEDGMENT	8
INTRODUCTION TO THEORETICAL FRAMEWORK	9
21st century learners	9
THEORETICAL FRAMEWORK.....	11
Absent presence (Gergen 2002; Aagaard 2015).....	11
Engagement and power of games	13
Social and emotional learning (SEL) in digital learning games.....	15
Content and excessive Internet use.....	16
Multitasking	19
Digital devices, procrastination and willpower	21
Blue Light Damage and quality of sleep	22
Game Boy Disease, Tech Neck.....	24
Concept of the SEL game Fabulous Family	25
EMPIRICAL STUDY	31
CASE STUDY OF THE DIGITAL LEARNING GAME FABULOUS FAMILY	31
Objectives	31
Research questions about the game	31
Design and description of research procedure	32
Results	35
Respondents and use of digital devices	35
Favourite games of test players	38
Think Aloud Method	38
Emocard Method	47
Pragmatic and hedonic qualities	48
Interview about possible learning value of the game	49
Discussion.....	54
CONCLUSION.....	56
KOKKUVÕTE	57
REFERENCES	59

APPENDIX 1	63
Emocards Method / Fabulous family Episode “Lucky Cat”	63
APPENDIX 2	66

LIST OF FIGURES

Figure 1. The sketch of Cat S	26
Figure 2. Storyboard of the prototype	26
Figure 3. Picture of testing paper-prototype	28
Figure 4. Picture of the first screen view	29
Figure 5. Picture of options on the screen view	29
Figure 6. Picture of happy end view	29
Figure 7. How long do you stay on your phone per day during a week?	35
Figure 8. How many hours do you use a computer during a day? Not at all; 1 hour; 3 hours; 5 hours; longer than 5 hours.	36
Figure 9 How many hours do you watch TV per day? Not at all; 1 hour; 3 hours; 5 hours; longer.	37
Figure 10. How often do you play games? Not at all; sometimes; 3 times per week; every day; 1 hour; 3 hours; longer.....	37
Figure 11. Table of favourite games.....	38
Figure 12. Start of the game. The first screen	39
Figure 13. An introduction animation. Shop window and a Lucky Cat.....	39
Figure 14. Lucky Cat and Cat S	40
Figure 15. Happy Cat L1	41
Figure 16. Angry Cat L2.....	42
Figure 17. A tantrum	42
Figure 18.. Cat S is disagree	43
Figure 19. Later, home	44
Figure 20. Cost of toy	44
Figure 21. Game over	46
Figure 22. Results of the Emocard Method.....	47
Figure 23. 4-scale adjectives for gather pragmatic and hedonic qualities from children	48

ABSTRACT

Teenagers, and grown-ups as well, are spending more and more time on digitalised life. It is argued whether spending too much time behind computers decreases social skills. Could this be a new normality for the future, while two people having a conversation, at least one of them is permanently swiping other content from a screen? Would it be fine for the one sharing something important or personal whilst the partner of communication is *absent present*, only partly involved with the conversation? The point of concern is, would most of us tolerate communication with automatically acting partner? Or could it be possible that our ardor for online life will start slowly disappearing and we will consider our screen swiping friend acting rudely? Or may the other important reasons or problems occur that are not spoken widely and loudly yet? Are screens so useful and harmless as their producers convince us? Could there be any serious reasons to wheedle younger generations to use less screens? What are the reasons to set limits for using screens?

This thesis has been organized into two main parts. The first part contains theoretical framework where the influence of screen, awareness and threats for users of screens (depending on their age) have been described. In this part of the work answers to the argumentation, whether spending too much time behind digital devices decreases social skills, will be provided.

Questions of the research are following:

Have our social habits, related to digital devices, changed? How? Are there any other lately discovered threats connected to the use of digital devices proven?

The second, empirical part, is a summary of testing a game prototype “Fabulous Family”, episode Lucky Cat, that had been developed by the author during her studies. Based on mixed method in game research, answers will be given to the following questions:

- How does the prototype of digital game “Fabulous Family”, episode “Lucky Cat”, engage youngsters?
- What kind of new behavioral patterns do the players learn via the game?
- Which social skills does the game train, and are these skills transferable into real life situations?

ACKNOWLEDGMENT

I would like to thank my partners of the first ELU project - Mikk Oad, who programmed the game prototype, and communication lecturer Katrin Aava for giving me advice from the nonviolent communication point of view; my partner of the second ELU project - Katriin Beresnev for writing literal scripts for new episodes “Exit screens” and “Lazy Cats”. My classmates Anni and Julius for joining in and starting the whole process with “Cats” by studying together the interaction design methods, developing interactive systems and UX evaluation during the first spring semester. My deep bow for the internship opportunity in a leading game studio Creative Mobile and my supervisor Dmitry Kazimir. I am grateful for all the children who helped to evaluate the prototype. My supervisor Grete Arro whom I met in my entrance interview to Uni, and as a result of the conversation with her I got the last input to choose this game idea for my first, precious one. Most grateful I am for my biggest treasure, inspiration and support - my peerless family!

INTRODUCTION TO THEORETICAL FRAMEWORK

21st century learners

When the Lumiere brothers showed the first filmed clips in cinema, people started panicking and tried to escape from the train. The limit of the picture and content were the edges of the certain frames of the screen. The year was 1895.

This century one can tell most of the story behind the screen just feeding some expressive details via voices and sound effects, and not showing almost anything. Nowadays it seems to be an understandable way for audience to catch a story. We encode the narrative depending on our intelligence and semantic level. The ways of storytelling have spread and changed a lot.

Storytelling is the keyword for building up new educational environments. Before the 2000s we consumed provided content but now all, even children, can participate ourselves in content creating process. People are aware of the possibility that right here, around the corner, a missing Pokemon can wait. General understanding of the brain and ways to analyse or translate visual content have been changed remarkably.

Gamers pay real money to buy virtual cars or lands. These lands has never existed and goods are not real - just some data, but the buyer is pleased and game producer satisfied. Game industry has a fast growth in business and the sums will one day pass the film industry. For example in 2010, Tallinn, an independent game developer created Creative Mobile, that based on the information on their website “is the most downloaded franchises of all time with 350 million lifetime installs.” It has become more and more common to register a game production company in one country, where maybe only one fifth of employees are local ones, but depending on the projects they hire daily active workers all around the world.

Thanks to the digital technology, especially smartphones, we consume everything we can find on the web. Often without any reason, any purpose, just to spend some time or mostly because our peers do so. The only difference is that we, adults, are responsible for the quality of life of

the future generations.

Based to the statistics of Media Barometer 2016, the Swedish population spent up to 6,5 hours with media during a day, 15-24 years old even longer, almost 7,5 hours per one day (Nordicom 2016).

Nordicom, The Media Barometer: First Results 2016 is written in the chapter *Media time among children and youth* “Young people have completely different media habits than the older generation. In particular, social media and video clips make up a larger part of the media use among young people. In the age group 9-14 years, 74 percent used social media during an average day in 2016, and 70 percent watched video clips online. Among the 15 – 24-year-olds, 94 percent used social media, and 69 percent watched video clips.

Where children and youth access their daily news is also different from the older generations. Today, the web is the main platform for children and youth to get in contact with news. In the age group 9-14 years, 33 percent are getting their daily news on the internet, and that number is 69 percent in the age group 15-24 years. The Media Barometer also shows that among 15-24-year-olds, 47 percent get their news via Facebook”.

Teachers from different schools complain the raise of worrying tendency of emotional emptiness. Kids spend a lot of time alone and even when parents are present, they stick to their digital devices. At first it looks like all family is together in one room, but they are all *absent present* (Gergen 2002; Aagaard 2015), somewhere away. Based to the Mesch and Talmud (2010) and Blinka (2013), time spent online can easily increase family tension. Adults expect children to use web to educate themselves, while parents mostly entertain themselves. The reason behind that can be a trendy busy lifestyle, where each family member has several hobbies and spending common time is not important or valuable anymore, and when parents start to control kids' web behavior or they need some help with housework, it will lead to conflicts (Kalmus, 2007; Blinka 2013). Parents will lose temper when kids have been downloaded apps or games that were not for free, and kids will get temper tantrums if they have to exit screens.

Setting ourselves a longer time-perspective, we are just standing on the early beginning of Digital Era and digital learning game developer role is to provide information, how and why to use all these digital possibilities in most meaningful, safe and beneficial ways.

THEORETICAL FRAMEWORK

Digital devices related to communication skills

Power of games and social emotional learning (SEL)

Awareness about physical and mental influences of mobile devices

Absent presence (Gergen 2002; Aagaard 2015)

Thanks to the technical revolution it is much smoother to organise and simultaneously live our different roles as a colleague, a kid, a parent. Possibilities to be reachable and share or update important information is excellent for agile processes in our work or private life. On the other hand, our characteristic manner to read our emails and communicate permanently with others, when ever we are (for example at a meeting with colleagues, at a dinner with other friends, waiting the green light from traffic lights, in a lecture, watching football and so on), rise up our ability to handle several communication lines at the same time. Physically you are with your friend but you do not have any eye contact with him/her and despite the dialogue with any arguments you can just hear the response “mmm... well... mmm”. There is everything in order with your friend but he/she is just *absent present*, technologically mediated somewhere away (Gergen 2002; Aagaard 2015). When person does not look you face-to-face and despite of that is staring at a mobile phone, the reason can be that he/she is looking for necessary information or there is more interesting interaction via the phone than the conversation with you (Nakamura 2015; Aagaard 2015).

Based on Daniel Stern (2010), a developmental psychologist who pioneered the study of microsocial interactions description, a person affects the other with *dynamic momentary shifts in vitality* and one unintentionally starts to interact with same rhythm, intonation and body language, in case we are only focusing on communication with our partner and this conversation immerse us enough (Stern 2010; Aagaard 2015). However, the traditions of interaction in digital era look different because we are so intertwined with mobile devices. Aagaard (2015) has been pointed out three remarkable keywords how the person who is *absent*

present acts: delayed responses, mechanical intonation and a motionless body. *Delayed responses* (Aagaard 2015, p. 5) means postponed reactions and answers while one of the partners is currently engaged both with a screen and conversation with you. This kind of conversation can happen with a person who is partly out of sync and his answers and reactions might be quite hectic. *Mechanical intonation* (Aagaard 2015) are caused by automatic answers and reactions while your partner's attention has to compete with you and a screen. The lack of attention is a result of a situation when the partner has to share him/herself between a screen and physical partner. In these cases your partner can provide automatic replies like "Mmh... Yeah... Okay", compared to sending signals due to obeying psychological pressure for keeping on the conversation.

Motionless body (Aagaard, 2015) is literally described as a situation when your computer's hard disk is so occupied that it does not function properly and seems to be frozen or crashed. It is unavoidable for humans as well, while their poor observation has to keep fighting between screen of a mobile device, surroundings and a conversation partner. This proves inadequate process of our working memory and explains why our dear friends during the communication randomly freeze like a mannequin dolls, except thumbs (Aagaard, 2015). In the survey conducted by Aagaard (2015) young people confessed to feel treated offensively by partner who simultaneously staring a screen and swiping fingers while they had conversation ongoing. Furthermore, most of them confessed their girl- or boyfriends became anxious while they were using screens when the partner was talking to them.

An unwritten rule is that we do not talk loudly in public transport, no matter whether it happens face-to-face or via mobile devices. For safety reasons traffic rules forbid the use of mobile devices while driving. According to Jensen, Nutt (2015) a 87 percent of accidents happens and people die in traffic because of somebody's distracted driving and these number increase.

Social norms are still expectant and vague about using simultaneously digital devices but we all face an inflection point to decide, should we tolerate conversations with closed off, absently presented people (Aagaard, 2015) or we deserve fully focused partner. The decision will probably depend on a level of respect we feel for the certain person. Exaggeratedly, this is a kind of similar to the situation where someone accept to share his/her wife or husband with

another woman or man. Many would not like to do it voluntarily or consciously. Depending on cultural and general opinion of certain society there are rules for communication and good customs followed by default. Hence, young people feedback in Aagaard (2015) survey reflects that upsetting elements of mobile devices will be not accepted as a normalised reality for future.

Parents should be aware that if they prefer digital devices despite offline playing over conversation or joint activities with their child, they have to be ready to spend their old-days with social robot, which task is keeping their company and health-monitor oldsters. The grown up person is not heartless neither indifferent, just resulting his growing environment, feels normal to provide similar conditions to his parent he or she had back then. Hence, examples we show and argumentations we use with our family members, peers, colleagues are decisive for nursery we provide for the posterity.

Since 2014 Tallinn University Baltic Film and Media School for Children provides workshops for children in age 6-16. Children and youngsters task is to observe and recognise the world around them for point out important details and moments for them. They are consciously trained to be present and observe their surroundings. Additionally, most of the activities in field of media and film base on the teamwork and if somebody chooses a mobile phone despite collaboration, other kids find that kind of behavior rather offensive and the person would be asked to put the device away.

Engagement and power of games

Jane McGonigal, an American alternate reality game developer, introduced in her presentation *Gaming Away for the Better Future* the results of Gallup 2015 about engagement in United States. It was pointed out that 81% of global workers are not engaged with their work. Furthermore, only 44% students in age 14-18 years committed some engagement at school. Older, traditional educational approach in our region expects student just passively sit, and actively listen and write. From the learner point of view it is difficult to remember everything and create associations between different topics without any personally discovered

connections. You can affect or change something only if addressee is motivated for this. The main reason of popularity of digital devices is a phenomenon of unpredictability of content and immersion. Those powerful elements stick us to these screens.

Which generates both stress than joy and brings us out from everyday routine?

This is a game.

Johan Huizinga, the philosopher and author of the book "Homo Ludens" (1938)

(Unofficial translation from the newspaper Sirp (2004))

Based to the TedTalks presentation *Gaming Our Way to a Better Future with Jane McGonigal* (2016) there are 1,78 billion gamers in the World and the number will grow daily so it is impossible underestimate the influence of games. The positive side of engagement would be goal orientated, fully focused person. Playing produces dopamine, that is compared less or more with the taste of success (McGonigal, 2016, Sinek, 2016). Game elements as tools provide joy in combination of hidden problem solving tasks. Active gaming process supports learner's natural curiosity, motivation and depending on content creates links between topics. Furthermore, there are hypotheses that first shooter games improved speed of reactions and eyesight (McGonigal, 2016). Through engagement of the game, player can train stability and willpower to deal with topics which person usually is not interested in. After some failures and do-over moments in game, the joy through advancement will arrive.

Games are excellent reason for escapism from daily life reality. Or on the other hand they can be a great background for reminding to appreciate and value the real life you have. Therefore a game can be a treatment for illness, even depression (McGonigal, 2016). Jane McGonigal describes in her 2012 Ted Talks a painful, low period and background for inventing her game SuperBetter, where simple tasks push a player out of bed and playing process provides some relief for pain, encourages the player to talk about his feelings, so family could understand the person and the processes he is going through. Day after day playing the game and tackling the next obstacle, she and the other players started to feel better. Thanks to the game and epic win, their condition turned into post-traumatic growth. Another option, without playing the game,

post-traumatic stress would have been the possible result (McGonigal, 2012).

Gamification means using some game design elements in non-game context or environment for rising motivation of a student and workers about processes which originally are not engaging or attractive (Deterding, 2011; Hamari, 2015; Sillaots, 2016). There is some similarity to the process of the actors' daily work routine where each task is always guided by a keyword of Konstantin Stanislavski's "magic if" by psychological acting system. Adding some game elements to tasks will support to rise engagement to the process and motivate participant more actively involve and work along. Immersive game-based learning environment pushes your personal growth abilities through new challenges and keeps you continuously in learning process while playing (Hamari, Shernoff, Rowe, Collier, Asbell-Clarke, Edwards, 2015).

Social and emotional learning (SEL) in digital learning games

The role of social and emotional learning (SEL) is to teach soft values and skills. Social skills are important for beneficial communication, conflict solving and emotion regulation. These are the keywords for nonviolent communication (Rosenberg, 2003), respectful relations, empathy and tolerance. Ability to listen and collaborate with others for finding win-win situations for all parties, are basement for building up successful teamwork. We belong daily to different teams: families, colleagues, classmates, hobbies, friends. SEL support adequate decision making which decrease risk-behavior. Ability to regulate your emotions helps to avoid conflicts and develop diplomacy. Future professions need agile, creative, well adapted people. Based on the World Economic Forum's 2016 report titled *New Vision for Education: Fostering Social and Emotional Learning Through Technology*, 65% of students will have future work in jobs which does not even exist today (Elias, 2017). So the most needed virtues for the future are social and emotional skills and ability to collaborate with worldwide colleagues.

There are already several digital learning games to train SEL and this trend seems to be growing. Demand for that can lay on increased insecurity related to worldwide terrorism and

swiftly evolving digital economy (Elias, 2017). More and more companies, e.g nonprofit educational organisation Classroom, Inc. in New York, have been producing games like Community in Crisis and After the Storm. Both games provide simulation of situations where player can practice acting as a key person for helping others, especially the role of help seekers after a catastrophe. Furthermore, SEL games are excellent learning tools for students with special needs, for example games like Ripple Effects and Social Express (Edutopia, 2015).

According to the game developer Trip Hawkins, a founder of EA (Electronic Arts since 1982, the world biggest game publisher) and Digital Chocolate, 3DO interactive multiplayer company, one can practice several roles and professions through games that provide realistic background. Furthermore, based on the article of The Guardian (26.02.2014) his fantasy simulation educational video game “If You Can” has raised \$6.5m of venture capital funding. Hopefully more and more investors from different fields will start investing into development of digital educational games with the aim to provide more meaningful, complex and valuable content despite engage children just with “hunt and shoot” apps. The second important aspect is to educate parents, and teachers as well, to provide their kids more accurate digital guidance and support.

Content and excessive Internet use

Common time together in web will provide two-sided learning experiences: child can share important content and supervisor can show or add more aspects linked to the content. A parent or a teacher will get to know more about child’s interests and doings in web and can provide new useful hints for analyzing the topic and further developing. These actions, together with observing good and bad examples, will help to build up stronger emotional boundaries, and is the basis for critical thinking, trust and common values. This would be the most efficient way to increase web consumer’s educational and content creating activities.

Web and online games are an important section of nowadays business and the users can see advertisements randomly and unchosen contents on screens. Algorithms inside digital environment will feed us with new information. Without AD blocking system and training to find the right, liable channels for information, we are not able to control what our children will see next. Most adults, too, do not have enough skills to avoid or protect themselves from random content programmers and systems provide. Based to the summary of the study by Livingstone, Kirwil, Ponte, and Staksrud in EU Kids Online Network and LSE Research Online (2013, p. 1): “As children told us, video-sharing websites are often associated with violent and pornographic content, along with a range of other content related risks. Among the children who linked risks to specific Internet platforms, 32% mentioned video-sharing sites such as YouTube, followed by websites (29%), social networking sites (13%) and games (10%).”

While socio-digital participation generally supports development and experiences in social relations during leisure time, the goal-conflict is common and related to less interesting educational tasks at school and homework. Excessive Internet use and constantly interrupting activity on mobile devices are definitely serious threats for meaningful learning process (Salmela-Aro, Upadyaya, Hakkarainen, Lonka, Alho, 2016). Finding balance between staying online and cutting off to offline for studying or working may be crucial. That is why some parental or expert support will be needed, but these are effective only in combination with reasonable argumentations about limits and consistent supervision. Hence, Salmela et al. (2016) has pointed out strong connections between excessive Internet use and distinct psychological processes like depressive symptoms and school burnout.

According to the book “The Teenage Brain” (2012) by Frances E. Jensen and Amy Ellis Nutt, the digital devices with concurrent habits have changed traditional communication, as digital devices follow us everywhere. There are examples how thousand of texts are sent during a month and one of five teenagers sends up to 40 texts during a night in interval from ten minutes to four hours. Blinka (2013) studied young people's use of technology and there were shown excessive technology use by boys in Estonia and Lithuania, and girls in UK and Norway. Also, his study showed connections between emotional difficulties, partially problematic behaviour and excessive Internet use in Nordic and German speaking countries.

In other countries negative results in behaviour depended more on the use of media, but should be tested further (Blinka, 2013). Several other researchers have pointed out that excessive internet use is indicated also to low self-esteem, loneliness, depressive symptoms and anxiety (Ciarrochi et al. 2016; Gamez 2014; Lam and Peng 2010, Primack 2009; Salmela-Aro et al. 2016)

Furthermore, more and more experts are pointing out connections between mobile devices and dopamine based actions that must lead to a bit harder age-restriction (Sinek, 2016; Kardaras, 2016). Recent years more discussions have arisen that not only age-restrictions are needed for social media use but also general age-limits for using digital devices. There are compelling reasons why Steve Jobs (Apple), Sergey Brin and Larry Page (Google founders) and other leading tech designers, engineers and producers are the most tech-cautious parents (Kardaras, 2016).

Peculiarity of Virtual Reality (VR) needs to be more highlighted. More and more families buy virtual reality headsets home for their kids daily gaming, but parents do not think or know that there are actually age limits for using the Oculus Rift and VR headsets. Depending on manufacturer the age limit may vary but any of them is not recommended under 12-year-old children. Professor Peter Howarth, a Senior Lecturer, optometrist and vision expert explains that one of the thesis is *visually-induced motion sickness (VIMS)*: “This comes about because the image you’re viewing gives the brain the visual signals it receives when you’re actually moving – and these can give rise to motion sickness.” (Hill, 2016)

It is problematic, if the adult falls for the same perplexity trap with digital devices, as the youngsters. Parents have the key role in buying devices, setting online time limits, and providing common or private rooms with a web connection. Web-habits from different family members are an example for young, developing person (Blinka, 2013).

There is no point of prohibiting the use of digital devices due to a possibility to trigger even more defiance and secretiveness. With careful and tricky supervision you can test youngsters interests and start feeding them the content which you prefer they would be interested in. Carefully linking their desired content with your input will start a dialogue and educative

collaboration in both directions. It expects continuity from adult and depends on parental awareness, social and digital skills.

Multitasking

Teenagers, and most of the adults as well, believe in their ability to shift successfully between tasks and name these switching activities as multitasking. They are used to keep simultaneously an open window in messenger, Instagram, Facebook etc or watch videos from YouTube or play a game. Jumping between channels deepens a habit, without analyzing, just to swipe left and right between blinking banners and screens. The endless action creates an illusion of unlimited relations, successful communication skills and life passing by in full speed. It is interesting to observe teenagers' behavior and how immersive the collection of activities seems to them. If you start asking questions about the content they had just read, watched or heard some moments ago, youngsters will get confused. While jumping between different channels and swiping left and right they do not analyse or filter any content they see or hear. It is crucial that those boundless flashing fragments will piece by piece overload brain and cause serious problems to concentrate, focus and achieve something through advancement.

According to Jensen and Nutt (2015, p. 57) "the parietal lobes help the frontal lobes to focus, but there are limits. The human brain is so good at this juggling that it seems as though we are doing two tasks at the same time, but really we're not".

Therefore, based on the metrics by scientists at the Swedish Medical University Karolinska Institute (2009), there does not exist such a thing as *multitasking*. Brain's ability to work with several tasks at the same time were measured by showing several pictures and observing the work of a brain. It turned out that our working memory is only able to retain between two to seven different images at a time and one cannot focus thoroughly on more than one complex task per time (Jensen, Nutt, 2015).

Several tests have been carried out where problem with immature parietal lobes have been proven. For example a segment on Good Morning America, May 2008, by the ABC TV correspondent David Kerley and his teenage daughter Devan - a girl, who had had driving experience for years, had to make several tests while driving. The tasks included reading texts from a screen, keeping conversation with three friends at the backseat and sharing cookies and

water. Fulfilling each task while driving, she hit more and more cones. In the summary of the test was brought out that for meaningful tasks we are able to deal correctly only one task at a time, and an ability of multitasking is a myth (Jensen, Nutt, 2015). Based on the limited capacity theory our cognitive resources are limited and if we demand too many tasks, the performance will oppositely decrease (Lang, 2006; David, Kim, Brickman, Curtis, 2014).

There are some professions e.g air traffic controllers, live directors of multi camera recording, and many more whom personal skills require full concentration with big amount rapidly changing data processing. Practice make the master and these processes will be trained many years. Maybe digital natives brains already work differently? Based on the study of Marci (2012) at least they act differently: during one leisure hour they switch 27 times between different digital content. Older people, who have grown up with older technologies, switched ten times less. David et al. (2014) pointed out in their test *mobile phone interference in life (MPIL)* that dysfunctional aspects and lower performance appeared while doing both homework and texting or chatting in social media. Connections between owning a smartphone and a number of Facebook friends were positively linked to MPIL. Furthermore, interesting variations between physical and psychological time have been discovered, when talking about texting, music, social media, face-to-face communication, studying, sleeping, school, homework. Authors asked participants to estimate time spent on each activity and most of the participants marked down 39 hours in 24-hour day (David et al. 2014).

Keeping the illusion to handle everything at the same time is the reason for getting one, faulty written answer for your four questions sent. Permanently scrolling smartphone's screen, receiving and sending information, are reasons for remembering only few, first or last lines from the message. The ability to *multitask* with concentration in different *absent present* situations, is smaller than most of us ever expect or will be ready to admit. Hence, capacities of remembered and analysed information depend on importance of a topic, other simultaneous actions and the situation a person physically exists.

Most of the teachers and parents can provide several examples how multitasking while studying dazes the performance and influences self-regulation (Junco, 2012; Rosen, 2012; Wood, 2012; David et al. 2014). It is remarkable, how we sometimes feel *phantom vibrations*

or ringtone of our phones (Drouin 2012; Aagaard 2015). Our unceasing habits to check out screens regularly do not only influence the quality of activities, it will affect social skills as well. Hectic and superficial jumping between online and offline will tire out conversation parties and encourage disability of concentration. That kind of long term behavior patterns increase loneliness and may end up in emotional emptiness.

Digital devices, procrastination and willpower

In year 2014, when a game “Call of Duty” Advanced Warfare was released, the next day one of four players informed their workplace of being sick (McGonigal, 2016). There is a joke that PhD students have the cleanest windows in their homes because instead of writing expected articles they wash windows or procrastinate some other way. Procrastination means postponing your demanding, mostly unpleasant or complex tasks despite to do some alternate, more enjoyable actions (Steel, 2007). Choosing more pleasurable and attractive activities is humane. The Internet with all possible contents is an excellent “tool for procrastination”, found Reinecke, Meier, Aufenanger, Beutel, Dreier, Quiring, Stark, Wölfling, Müller (2016). It is described in their article how already small and innocent increase in the Internet use longer than planned results in not originally intended situations. How does this behaviour and procrastination affect health and well-being? Authors pointed out in their results of a study with a German example that there are strong connections between control-lost Internet use and procrastination, stress, depression and anxiety. Hence, trends show that Internet users goal-conflict, especially with irrational tasks, will obviously grow in our *media-saturated environment* (Reinecke et al, 2016). Literally, we have to be ready for the unceasing duel between our willpower and temptations of joy, entertainment and engagement.

It is impossible to minimise the positive meaning and benefits we gain from the development of Digital Era and all new devices that help to enrich our daily life. Most users glorify new devices for absolutely justified reasons. But there are certain commitments to point out, and some aspects and risks, to raise general awareness. Like with every good thing in life, if you drop out of balance, there can be dark sides beside positive ones as well.

All topics described above can for most of us bring along positive development, but when used too young or in large volumes, it can lead to hard-wired, automatically thinking individuals and mobile devices will take a role of ghosts in our lives (Sinek, 2016). Doctors have started pointing out some worrying aspects about mobile devices users that especially parents and teachers should know about.

Blue Light Damage and quality of sleep

Dr Celia Sanchez Ramos of Complutense University of Madrid has explained the meaning of light: “Eyes are not designed to look directly at light -- they are designed to see with light.” (Lux Magazine 2013/05 p. 2)

Based on The Vision Council 2015 Digital Eye Strain Report, Hindsight is 20/20/20: Protect your eyes from digital devices (p. 7) “light that appears white can have a large blue light component, exposing the eye to hidden spikes in intensity at wavelengths within the blue portion of the spectrum. These wavelengths range from 380 to 500 nanometers (nm). The band of blue-violet light considered potentially most harmful to retinal cells ranges from 415 to 455 nm. Some of the most favored digital devices and modern lighting — such as light-emitting diode (LED) lights and compact fluorescent lamps (CFLs) that have replaced most incandescent lights — can emit a high level of blue light, typically in the wavelength starting at 400 nm.”

The French Agency for Food warn about toxic stress to the retinas, caused by long term exposures (Lux Magazine 2013). The duty of retina in eyes is adjusting the intensity of light and color. All harmful factors influence long-term visual impairment. Damaged retina is over sensitive for light, for example direct sunlight makes eyes water, but this is the smallest of possible ailments. According to the same The Vision Council 2015 Digital Eye Strain Report (p. 1.) there are: “Symptoms Commonly Associated with Overexposure to Digital Devices:

- eye strain, 32,8%;
- neck/shoulder/back pain, 32,6%;

- headache, 24%;
- blurred vision, 23,3%;
- dry eyes, 22,8% “.

The pineal in our brain will produce the melatonin. Melatonin is a hormone that depends on the quality of sleep, especially *rapid eye movement sleep* (REM) and helps us to recover our ability to concentrate, and supports keeping our body younger.

Chang, Aeschbach, Duffy, Czeisler, Takahashi (2014) arranged survey with pre-screened healthy six young female and six male aged 22-28. They lived 14 days in Intensive Physiological Monitoring Unit of the Center for Clinical Investigation of Brigham and Women’s Hospital. The lightning of the rooms and other facilities were dimmed the same. The read material was some favorite for each participant and the same readings was used as a paper and a digital version. Half of them read before sleeping an LE-eBook (iPad; Apple Inc., Cupertino, CA), and the others used a printed book for reading. The second week vice versa. As a result of the survey common indicators were found that LE-eBook readers fell remarkably later to asleep, their REM sleeping period was shorter, and the eBook readers had decreased EEG delta/theta brain activity. Survey results for the same person by using paper book or digital device were remarkably different: the time of fell asleep by reading paper book was shorter up to 1,5 hour. The blue light of devices delays sleep-phase and repetitive use of the devices from evening to evening affects disorders in circadian melatonin phase or even worse, lead to insomnia. Night-shift workers have higher health-risks for high blood-pressure or cancer due to the same reasons.

According to a presentation by Fenella Frost from the company PhotonStar Lighting, at a conference Lighting Fixture Design (2013), she presented some dramatic results to the tests with mice. Mice who lived in blue light (460 nm) conditions, lived shorter, gained weight and got more cancer compared to individuals who lived within a cycle of natural daylight.

Therefore, it is rather important, especially with kids and teenagers, to shut devices down at least an hour before going to sleep (Jensen & Nutt, 2015). Most importantly, to avoid to wear your eyes out, is to remind the 20-20-20 rule by The Vision Council Digital Eye Strain Report (2015, p.8):” Look away from the screen every 20 minutes for at least 20 seconds at something

20 feet (6 meters) away. This helps to refocus and recharge eyes during long periods of usage of screens and helps blinking return to a normal rate.”

Before purchasing any digital device it is recommended to check device's possible blue light-blocking lens and several special glasses have been suggested already as well. This is a part of future business so before buying anything it would be wise to consult specialists and check the latest scientific researches.

Game Boy Disease, Tech Neck

Kids these days are spending too much time hunched over smartphones and tablets that their spines, especially the neck and back, are at risk of developing incorrectly. According to the article in Gadget, The Magazine of Personal Technology (11.06.2016) the Dutch spinal surgeon, Dr. Piet van Loon, named it a Game Boy Disease. The symptoms of Gameboy Disease are actually wider and include neck and back pain, headaches, vision problems, and mood issues. Dr. Piet van Loon pointed out this increasing problem, especially among children in age 8-18 and if left untreated, it can lead to obesity, depression and spinal disc herniation (Gadget, 11.06.2016). In the same article Dr. Vahid Sahiholnasab, one of Medical Wearable Solutions' founders, introduced future glasses with the role to remind the user instantly to stop slouching with warning messages on screen. After the fifth warning the used program will shut down.

Furthermore, on 10.04.2017 published Gadget, a new but very important topic is introduced and advice shared, how to take care of digital hygiene. There are four main rules: update apps to avoid their vulnerability, clean apps regularly to avoid improperly managed smartphone's apps to share data, change app settings to check smooth process and to minimise transferring wrong data, use specialist software to receive alarms and reminders of apps functioning incorrectly.

There is a slight possibility, one day our children will ask whether we even considered at all destroying their retina and bending their bones by providing them with all possible digital

devices. Hopefully they will not. The crux is to find the right balance between providing meaningful content and educative activities, and the duration while using the digital devices. So the cats from the SEL game Fabulous Family are already waiting for us.

Concept of the SEL game Fabulous Family

The main aim of the game Fabulous Family is to teach communication skills, and the second aim (in future versions), would be to teach the concepts of different cultures and tolerance.

Challenge of the game is to pass all the episodes with as many happy and pleased cats as possible. The address of the prototype can be found on the website www.fabfam.eu (usable only with computers and demands an installed Adobe Flash Player).

The game provides various everyday situations which most of us have already experienced. Each cat has a pocket where to click and see the persons' background information for better linking with theory of mind (ToM). Commonly there are some disagreements or even conflicts of interest, too. The importance of the game is to provide new perspectives and possible solutions as well as behaving patterns in real life situations, where we usually do not have do-over possibilities. In the game one can try out different options together with reasons and consequences. A player can play vary of options through the game and test, how the behavior of the other cats changes if he chooses different options. The task of the game is to provide some recognition of situations you or your friend have gone through. Hidden tasks of the game is to train players to develop better communication skills and use more the standard of nonviolent communication (Rosenberg, 2003).

The target group of the game are teenagers in a range of ages 11-15, and their family members. A wide scale of topics is provided, some of them are similar to easy parts of a daily routine, for example whose turn is to go out with the pet (future episode of Lazy Cats); how to get a child away from a digital device without tantrum (future episode of Exit Screens), etc. Like in real life, the game provides also more challenging, serious topics as well. Lot of kids nowadays have to grow up without one of the parents due to his/her work abroad. The trend of

individual happiness, and changed social norms, have lead society to jigsaw families, where the situation is new for every member. Furthermore, there are periods in life, where one has to go through a mourning process, and facing the reality having lost someone close. At the same time, like in life, there is a wide scale of situations to provide as much fun as possible, and to introduce new perspectives, different views and reasoning for the game characters behavior in various situations. Therefore the Fabulous Family is suggested to be used as a supportive game for school curricula.

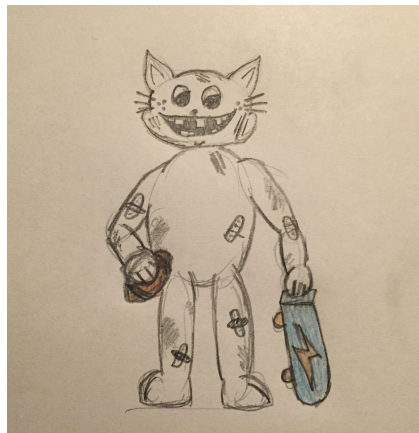


Figure 1. The sketch of Cat S

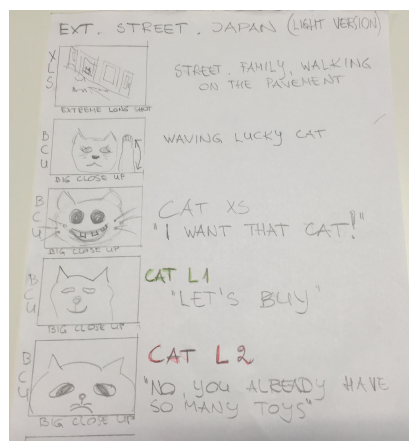


Figure 2. Storyboard of the prototype

The crucial part of the game was to write scripts in accordance with ethics, possible learning value and engagement. In script writing the mostly used logic was that the weakest

characteristic foible of the character will start working against the character itself. Hence, game characters possible age, gender and names were fixed to the sizes of clothes, not names. That provides more freedom for the future character design, and helps to avoid possible future problems with different specialists from different fields.

Cat XS = a toddler

Cat S = a child

Cat M = a teenager

Cat L = an adult

Cat XO = an elderly

Description of the main characters:

Cat S

A restless and curious child. Absolutely tone deaf, but can make remarkably loud voice.

Hobbies are rugby and playing spy-game. Parents force to play trombone. Favourite food - ice cream of fish, favorite drink is lemonade. Best and worst thing to happen is the birth of siblings.

Cat M

A typical teenager, too cool for anything. Usually spends time in its room, door closed.

Never admits it, but actually likes spending time with its family. Hobbies are graffiti and listening to music. Favorite food is fish and chips, favorite drink fish oil lemonade. Best thing to happen is summer break from school. Worst thing to happen is the birth of Cat S and siblings.

Cat L1

All about being a healthy cat, but secretly eats lots of sweets. From time to time takes a day off to calm down by hanging out with neighbour cats. Hobbies include cat yoga and betting rat race.

Favorite foods are salmon fillet, fish mousse; favorite drink is water, but on daily bases drinks a lot of spirulina shake and becomes too energetic.

Best thing to happen is the birth of children, worst thing to happen is quitting work to be a stay-at-home parent.

Cat L2

Has short temper. Business cat, works long hours. Hobbies include watching Cat TV and betting rat race. Favorite food is olive pie, allergic to fish; favorite drink is protein shake

Best thing to happen: winning a lottery; worst thing to happen: selling the sports car to buy a family car.

Cat XO

Have happily passed at least 50 ruts. Joints hurt but Valerian shot provides some relief.

If sights a handsome cat, moves visibly faster.

Each episode will start with an animated clip of episode for introduction. There is no presented future visual, artistic appearance in the prototype yet. Due to time limits and poor skills of programming the visual game world and characters are there only as stamped. Future visual design of the game will be simple style of hand drawn 2D animation.



Figure 3. Picture of testing paper-prototype

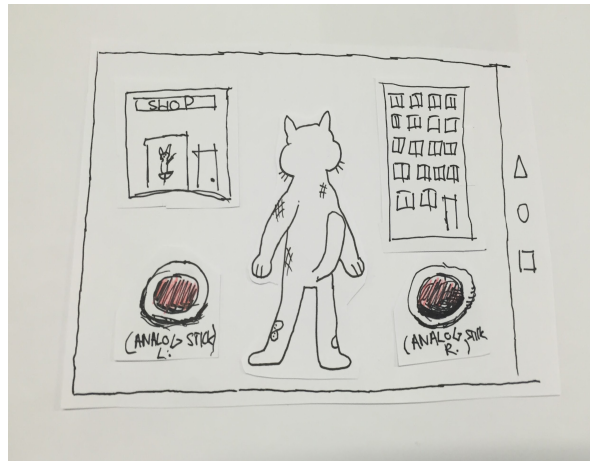


Figure 4. Picture of the first screen view

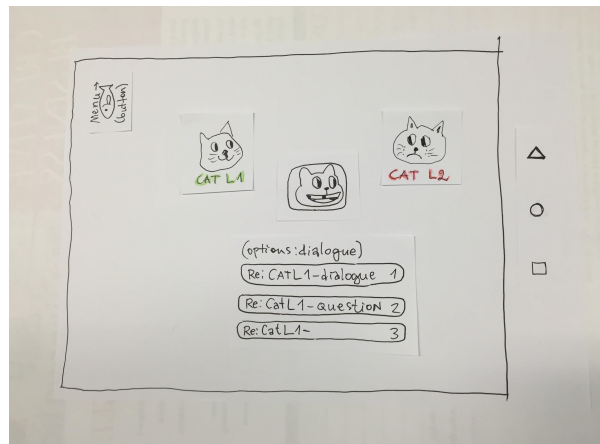


Figure 5. Picture of options on the screen view

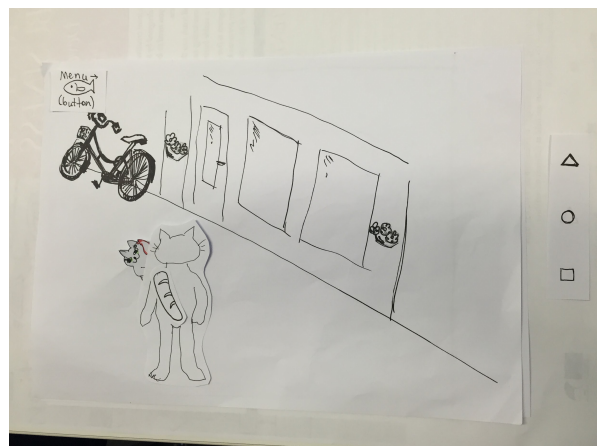


Figure 6. Picture of happy end view

The second, future aim of the game, is to introduce different cultures and teach tolerance. When a player has earned his next six fish (points), as a bonus there will be an episode that takes him somewhere abroad (India, Japan, Turkey, Italy, China, Cuba, Syria, Canada, Portugal, Chile etc). Sometimes it will be a business trip, sometimes a holiday trip, but for some reason there will be always at least a part of the family travelling together.

In addition to developing a game, it is important to create a website, where the future game episodes together with further topics and all possible links for different content will be presented as an one game universe. The webpage will be a “nest” for the whole game world: firstly, one can find there the background information about characters, topics and related articles; secondly, by using elements of transmedia storytelling new game episodes and topics will be promoted; thirdly, it will enlarge the possibility for promoting and introducing the game to future sponsors. Fourthly, one can find links for other social and emotional learning (SEL) games, for example That Dragon, Cancer created by Ryan and Amy Green <https://level1.ee/2016/02/that-dragon-cancer/>.

The website is in the progress, still in its very early steps, and the working title of the site is Cat’s World: <http://www.tlu.ee/~marfi/CommunicativeCats.html>

The aim of the website is to introduce the game and characters’ profiles to the target audience and provide further background information about the game episodes, different solutions for the problems the cats are going through, and the most important - there are links for important articles and websites related to the topics of the episodes. The main idea is to gather game topics and all further links with similar content on one website that makes finding information about healthy lifestyle, sustainable relationships, culture and habits of different regions the cats will travel during the game.

EMPIRICAL STUDY

CASE STUDY OF THE DIGITAL LEARNING GAME FABULOUS FAMILY

Objectives

The interactive part of my master thesis is the prototype of one episode of my game Fabulous Family www.fabfam.eu. This part of the work will mainly address the procedure of the research for gain feedback from test players.

Mixed methods in game research (Lankoski, Björk 2015) have been decided to use to combine methods and integrate multiple hedonic and pragmatic qualities data gathering with concurrent UX evaluation and feedback.

The main target group for the game are children in age 11-15, so six girls and boys in different ages have been evaluated separately. As the goal of the game is to introduce same situations from different perspective and point of views, it was important to test separately three parents as well. Each tested person (and parents) were informed of filming the process and they gave their written approval for that beforehand. After the survey the participants received an email with description of the procedure in detail, and a question for permission to use the recorded clips during the defence process of master's thesis at university.

Research questions about the game

Does this kind of a game attract children's attention?

Does the game teach something?

Do the functionality and structure of the game support playfulness?

Do the options function well and work logically?

Does the player enjoy the process?

If the player enjoys the process, could hidden tasks be used for the future game for more effective learning process?

How many options each character should have (for the reasons of good learning point of view

and functionality of storyline)?

Detect errors of game system and script.

How do digital devices affect our social skills? (Personal opinion of the test player)

Design and description of research procedure

A pilot study was conducted with 11- and 14-year-old girls. After determining the uses and content of it, and before any testing began, the procedure was divided into three main parts:

Part 1, getting to know each other and introduction of the process:

- introducing Think Aloud Method (Larusdottir, 2007).

Part 2, survey: playing with prototype:

- starting the game;
- camera recording reactions and think aloud thoughts by player through the game process;
- end of the game prototype.

Part 3, survey:

- Emocard Method (Tähti and Niemelä, 2005) about game idea and topics of next episodes.
- Scale about pragmatic and hedonic qualities of the game (adaption with easier selection and narrowed scale for children inspired from AttrackDiff Method (Wechsung & Naumann, 2008).
- Interview about possible learning value of the prototype
- Short questionnaire of background information about test player's general digital habits.

Participating kids were students with different profiles from BFM Children's Film School or their friends. The samples were mixed from players and layman in the field, kids and adults

from both, jigsaw and traditional families. The kids were firstly suggested by their teachers and I knew them briefly as a coordinator of hobby school.

All three adults are parents and have all together 5 kids in age 1-19 years. One's profession is a teacher, second is an accountant, and third one is a photographer.

The survey took place during two days in Tallinn University School of Digital Technologies. On the first day, after a second part of pilot study with 14-year-old girl, four children were evaluated separately, person by person. On the second day three adults and a boy were evaluated, each separately. Therefore the participants were asked to think aloud during the process and a short practice for that was done. It was explained beforehand, that the game the participant started to play was a game prototype and the test person to “think loudly” while playing it. The prototype is because of study in English, like most of other digital games children play. During the procedure test-players spoke and wrote Estonian, and all materials are later translated to English.

When the player said to be ready, a camera recording was started. A camera recorded players gaming process by Think Aloud Method (e.g., Larusdottir, 2007), which was a new experience for all nine test-players. After this procedure the test was continued with Emocards method (Tähti and Niemelä, 2005), that is very convenient, fast and simple to use, especially with children, to reflect their emotions about the game idea and topics of next episodes. Actual test blank and emoticons were prepared by the author (Appendix 1).

The method was followed by a scale about pragmatic and hedonic qualities of the game. The scale was originally inspired by AttrakDiff method (Wechsung & Naumann, 2008) and was adapted by the author for more suitable version for children, and to the needs of a specific study about the game prototype.

The game was followed by an interview, where closed questions were avoided, to gather as many thoughts and expressions as possible together with brief background info about general use of digital devices, with following questions:

What would you do, if you were a parent? Are there any options you would like to add to the game?

What would you do, if you were a kid? What options would you like to add?

What are your thoughts about the game?

Describe your emotions about the game.

What can this game teach related to school programs?

What can this game teach related to communication with family?

What can this game teach related to communication with peers?

What kind of influence have digital devices on your social skills?

How long do you stay on your phone per day during a week? (Possible answers: not at all; 1 hour; 3 hours; 5 hours; longer.)

How many hours do you use a tablet during a day? (same scale as previous)

How many hours do you use a computer during a day? (same scale as previous)

How many hours do you watch TV per one day? (same scale as previous)

How often do you play digital games? (Possible answers: not at all; sometimes; 3 times per week; every day; 1 hour; 3 hours; longer.)

List your first favourite digital games, please.

Do you have any thoughts or suggestions?

Thank you!

The test players reactions, emotions, questions, and interviews during the evaluation process were recorded. Recording was important to avoid possible missed data from different kind of procedures.

The procedure for each person was exactly the same and last 28-35 minutes per person.

Results

Respondents and use of digital devices

For validity of the survey it is important to know the general digital habits of the test players. The participants had to scale their average time spent on phone, tablet, computer and TV per day during a week. First question was about average they use their phone time per day.

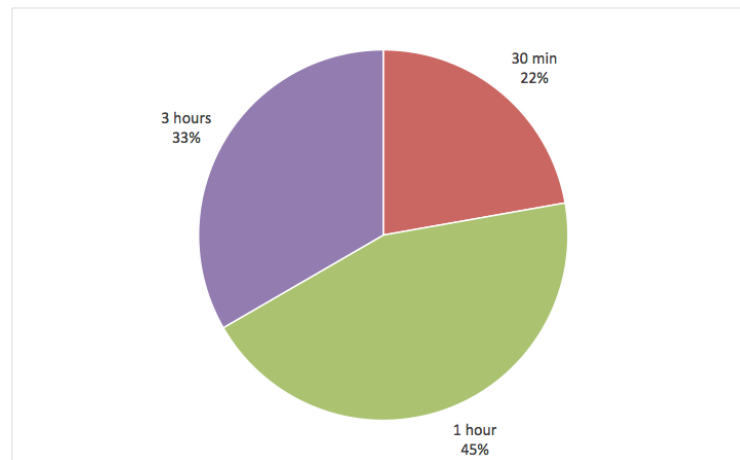


Figure 7. How long do you stay on your phone per day during a week?

The actual scale was wider than the pie chart shows: not at all; 1 hour; 3 hours; 5 hours; longer.

One girl marked that she uses a phone 5 minutes per day and does not use any other devices during a day. Some questions later she said, that she plays approximately 3 hours per week. After my specified question she realised, that she uses phone more than she recognised. All nine participants marked, that they use daily their phones at least 30 minutes up to 3 hours.

The next question was about using tablets. Remarkable, that all of them marked not to use any tablet at all. Two children said, that her mother or father have tablet, but they are not allowed to use it.

About using computers the scale was wider than the options were chosen, again. Three of nine do not use computers at all. Unique, that no one of test players do not use computers only one hour per day. Four persons of nine use computer daily at least 3 hours and longer. Three of five most computer using people are adults and the number is high because of their daily work with computers.

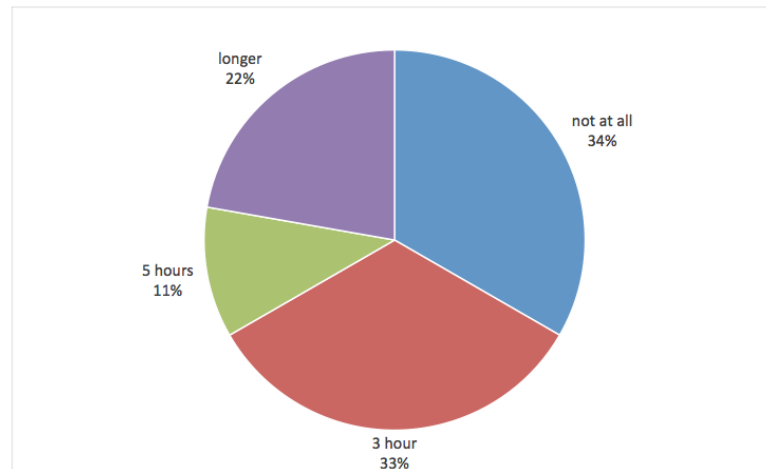


Figure 8. How many hours do you use a computer during a day? Not at all; 1 hour; 3 hours; 5 hours; longer than 5 hours.

The last question about average use of digital devices was about how many hours the person watch TV per day.

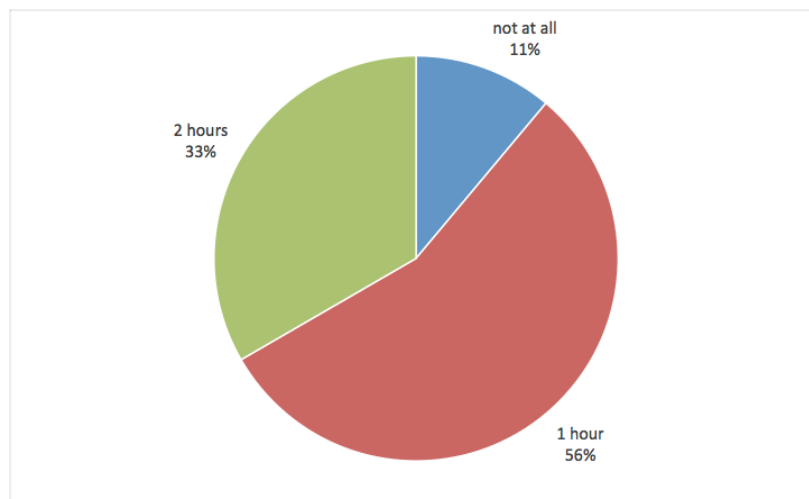


Figure 9 How many hours do you watch TV per day? Not at all; 1 hour; 3 hours; 5 hours; longer.

Only one girl from the sample do not watch TV at all and most, five persons watch approximately 1 hour daily. Two respondents marked in questionnaire their crosses between 1 and 3 hour, so the final scale of options changed from “not at all” up to “2 hours”. The last options: 3 hours; 5 hours and longer were not to be chosen at all.

Final part of the questionnaire was about games and playing habits.

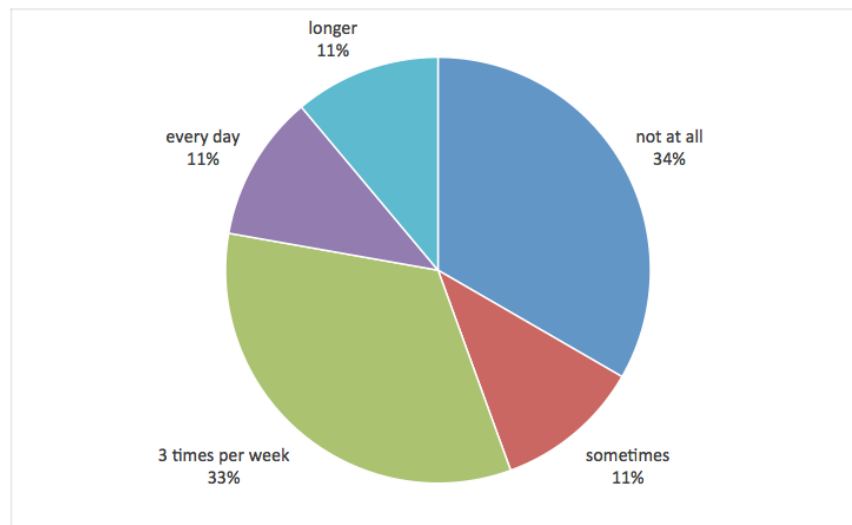


Figure 10. How often do you play games? Not at all; sometimes; 3 times per week; every day; 1 hour; 3 hours; longer.

Three respondents, (34%) of nine, all adults, had not played any games before. All tested children play games, one child (11 %) play randomly and one child of six plays daily longer than 3 hours. Most of them, 33% plays 3 times per week.

Favourite games of test players

Player	Favourite game 1	Favourite Game 2	Favourite Game 3
Girl, 11	Puzzlerama	Learning games	Games with console
Girl, 11	Piano Tiles	Subway Surf	Lightbot Hour
Girl, 11	Brain Dots	Piano Tiles	
Boy, 14	Grand Theft Auto 5 (GTA)	Paladins	Rust
Boy, 12	Counter-Strike:Global Offensive (CS:GO)	Grand Theft Auto 5 (GTA)	Overwatch
Boy, 11	Minecraft	Games with friends	Adventure

Table 11. Table of favourite games

All kids listed at least two names of the games, one girl checked exact names of games from her phone. Remarkable, that two of boys play games GTA 5 and CS:GO despite both games are prohibited for them because of age-limits.

Think Aloud Method

Think Aloud Method proved that eight test players of nine seemed to really enjoy the game.

Players' gender, age, starting and ending time and duration of the test-play:

Girl, 11: 3'15"- 6'57"= 3'42"

Girl, 11: 00,25"-7'34" = 7'9"

Girl, 11: 00,11"-8'40"= 8'29"

Boy, 14: 14'14"- 20'45 = 6'31"

Boy, 12: 00'13"- 5'51"= 5'38"

Father, 48: 00'43"-5'19"=4'16"

Mother, 44: 2'00 - 6'32=4'32"

Boy, 11: 2'30-6'12"=6'42

Mother, 41: 1'45-8'24=7'39"

The first girl was the fastest player and passed episode only in 3 minutes and 42 seconds, but the task wasn't to be the fastest. The longest playing process lasted 8 minutes and 29 seconds. Two of players admitted during the process, that they did not think very much. Their gaming process was shortest. The time code is the key for identify the test-players and gaming process of each of them.

Valuable quotes from users during the process:

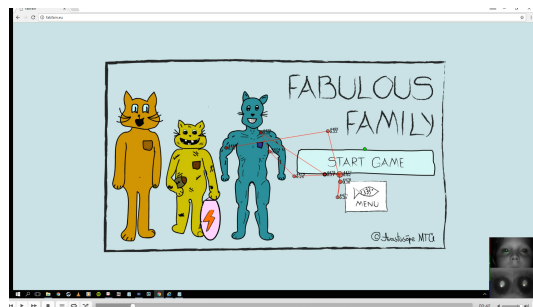


Figure 11. Start of the game. The first screen

Mother, 41: "Fabulous Family!... But why is it in English?... Aa, curriculum!"



Figure 12. An introduction animation. Shop window and a Lucky Cat

Girl, 11 (0,18"): "Strange."

Boy, 11 (2'38"): "Funny mouth." Smiling (*Cat S is surprised*)

Mother, 41 (1'58"): "Well, what is the point...? Are these the characters of the game?"

Boy, 14 (4'16"): "A very different style of drawing..."

Boy, 12 (00'32"): "Two persons meet, somebody will ask something from somebody... A toy... What should I do now?"



Figure 13. Lucky Cat and Cat S

Mother, 41 (2'15"): "Not now, darling." Laughing.

Girl, 11 (3'28"): "This face is strange... This face is even stranger... ok..."

Boy, 14: (4'28") is laughing

Mother, 44 (2'16"): "A very familiar situation!" Laughs. "Should I click here? "

Girl, 11 (00,32") : "A lovely cat."

Father, 48 (00'43): "Three cats... Something is going to happen here!"

Boy, 14 (14'31): "This cat would like to get that cat!"

Girl, 11 (0,28"): "What a heck... strange cats!"

Girl, 11 (4'20"): "This is a really strange game."

Boy, 14 (14'41"): "Mmm, let's buy then... Ouch, too many toys already..."

Girl, 11 (00,32"): "A funny voice!"

Boy, 14 (14'54"): "The kitten really wanted that cat..."

Mother, 41: (2'48"): "I want that toy!" Reading loudly, laughing.

Father, 48 (1'20"): "I said you will get it!"

Girl, 11 (00,40)': "Why are you laughing?"

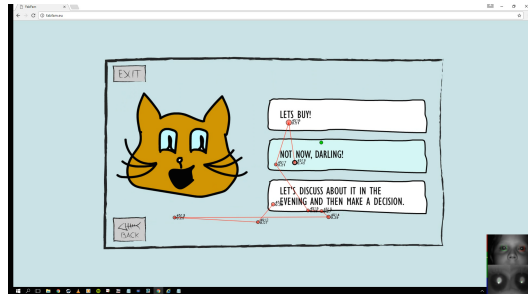


Figure 14. Happy Cat L1

Boy, 14 (15'16"): "Oh, the kitten is angry now... I really like the face of that cat." (*Cat L1 neutral*)

Girl, 11 (4'37"): "I have a question... Why is this cat broke?"

Boy, 14 (15'34"): "I'll choose this...(Cat L1 we promised to talk about it)... Here is a spelling mistake! *For buy* has to be *to buy* new things..."

Mother, 41 (3'05"): "I need to discuss it... I have already chosen this option, haven't I? Does anybody write a transcript about it later? Aa."

Girl, 11 (5'09"): "But why?!"

Girl, 11 (00'55"): "I don't like that cat... This is even weirder cat." (*Cat L1, then Cat L2*)

Mother, 44 (3'13) is laughing (*Cat S is sad*)

Girl, 11 (1,40"): "I want that!"

Father, 48 (1'30): "I'll just randomly try because I can't understand the issue."

Boy, 14 (16'07"): "Uh, the kitten is sad again..."

Girl, 11 (2,01"): "Strange voice!"

Father, 48 (1'55"): "I assume that the answers have some kind of connections with the questions."

Mother, 44 (3'30") is laughing (*Cat S is sad*)

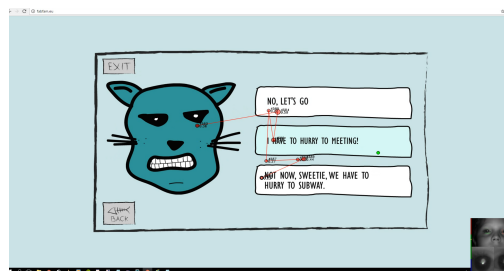


Figure 15. Angry Cat L2

Girl, 11 (1'14"): "Don't be angry!" (*Cat L2*)

Girl, 11 (2,20"): "A blue face!" (*Cat L2*)

Boy, 11 (3'16"): "Uh... Angry!" (*Cat L2 is angry*)

Boy, 14 (16'17"): "I'll choose this, like parents would say... You don't achieve anything with this kind of behavior Yes! Let's talk about that in the evening!"

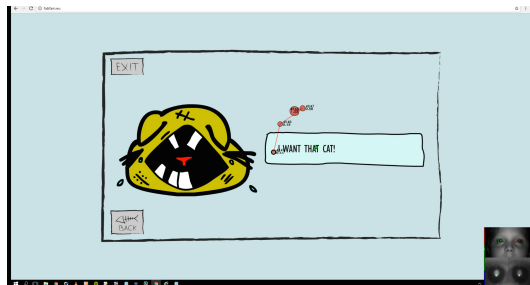


Figure 16. A tantrum

Boy, 11 (3'40): "Oh, now there is a tantrum."

Mother, 41 (3'35): "Oooooouh, unhappy... cat... Is it a cat?... I am not coming with you!"

Mother, 44 (3'43): is laughing

Girl, 11 (1'41"): "Why this cat again?!" (*Cat L2*)

Mother, 41: (3'45): "You won't achieve anything behaving like that.... Sounds very parenting."

Father, 48 (2'15): "The character is saying something here. Do I need to choose another option?"

Boy, 14 (16'40"): "A bit automatic cat..., a bit scary cat, too!" Laughing at (*Cat L2*)

Girl, 11 (2,30"): "A lovely cat." (*Cat L1*)

Boy, 14 (16'47"): I like this cat very much!" (*Cat L1*)

Girl, 11 (2'03"): "Again this strange cat, why this one again?" (*Cat L2*)

Mother, 44 (4'20) is laughing (*Cat L2 is angry*)

Father, 48 (2'30): This is an evil character. (*Cat L2*)

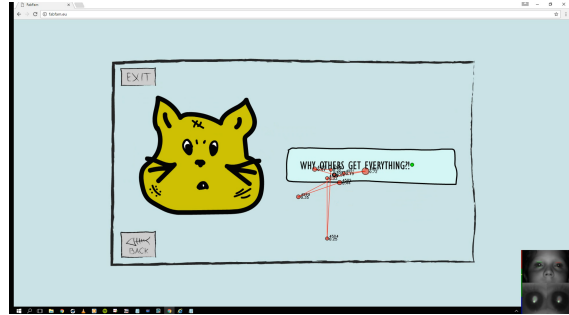


Figure 17. Cat S is disagree

Girl, (11): 2,53": "Funny!"

Mother, 44 (5'06") is laughing

Boy, 14 (16'53): "Yes, I chose this help option... Ouch, it will start to cry..."

Mother, 44 (5'28"): is laughing (*Cat S is crying*)

Girl, 11 (2'19"): "Don't cry! You are crying very strangely..." (*Cat L is crying*)

Boy, 12 (2'15): "I guess this cat has to wait and tidy up. Now it needs help from the other cat."
(*Cat S from L2*)

Girl, 11 (5'09"): "At the moment I am not thinking at all... I don't know why."

Boy, 12 (2'52"): "The small one is sad because it didn't achieve the desired thing."

Girl, 11 (5'40"): "What is the idea of the game?"

Girl, 11 (3,20"): "A cute cat." (*L2 is confused*)

Girl, 11 (2'35"): "A strange face." (*L1 is disappointed*)

Boy, 12 (3'25"): "Mom will ask how much money he has got... The small boy is still begging... And their daily things are more important than toys... Then mom is asking not to torture..."

Boy, 14 (17'25"): "Maybe... I feel... that... this story is going a bit too fast? It is a bit complicated to concentrate ... It's confusing."

Girl, 11 (4,15"): "So cute teeth!" (*Cat S is confused*)

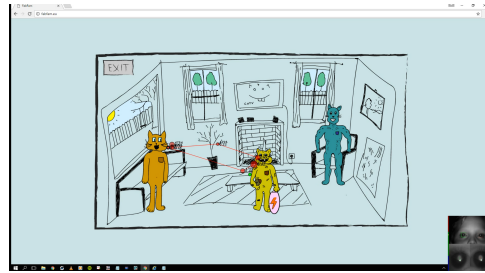


Figure 18. Later, home

Mother, 41 (4'03"): "What I do now?"

Girl, 11 (3'00"): "But how will you get in there?" (*home, livingroom*)

Girl, 11 (4,43"): "So sad." (*Cat S is sad*)

Girl, 11 (3'05"): "Why do you want to rest?" (*Cat L2 is trying to avoid communication*)

Girl, 11 (3'57"): "A funny face." (*Cat L2 is confused*)

Girl, 11 (5'40"): "There are some words I don't understand... What does *argue* mean?"

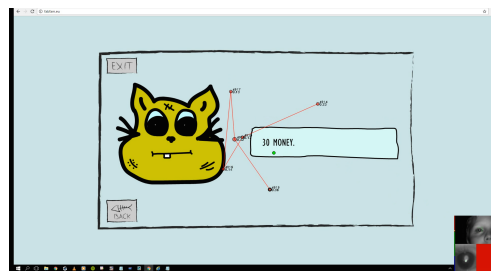


Figure 19. Cost of toy

Boy, 14 (17'48"): "Thirty money!" Laughing

Girl, 11 (4'35): "Thirty *money*?!"

Boy, 11 (4'20): "There is a mistake! Thirty money..."

Mother, 41 (4'35): "Money is always important... What money?... Thirty money... Ok, now I understand what money!" Laughing.

Boy, 14 (17"55): "Ok, this means quite a lot."

Girl, 11 (5,15"): "What does this *yearn* mean?"

Boy, 14 (18"11): "This is too expensive."

Girl, 11: (4'55"): "I don't know, you have to be a good cat." (*for Cat S*)

Mother, 41: (4'45): "They will never have enough toys, will they?"

Boy, 14 (18'15"): "Yes, let's calculate! ... Mh, still crying..."

Girl, 11 (5'48"): "It is crying funnily."

Girl, 11 (5'07"): "Ok, ok, you will get your cat!"

Mother, 41 (4'55): "Mmmm... this is too expensive." Sighs.

Boy, 14 (17'55): "30 money is maybe really too much..."

Girl, 11 (6,21"): "The cat is so happy." (*Cat LI is confused*)

Boy, 12 (5'10"): "What does this 10 money mean?"

Boy, 14 (18'05): "Ok, this sum means quite a lot."

Girl, 11 (5'50"): "Yes, I'll buy!" (*for Cat S*) "Mh, an angry cat." (*for Cat LI*)

Boy, 14 (18'27"): "Mh, still unhappy....What will this suggest then... Oh, this is a good idea: collect money!"

Girl, 11: (6'23"): "I still want this cat. Why do you have only three teeth?"

Girl, 11 (7'00): "Why XO?"

Girl, 11 (7'11): "Funny eyes." (*LI is happy*)

Mother, 41 (5'01"): "What do I have to do to get... This is a good question..."

Boy, 14 (19'06"): "In my opinion the parents are right and it is a good decision: if you want to get this thing, you have to collect money."

Mother, 41 (5'15"): "Let's teach some math!"

Girl, 11 (7'35"): "Oh, let's count how many teeth you have: one, two, three, four... six teeth, not three!"

Mother, 41 (5'23): Reading "*We have common hobbies.*" Comment: "And buying toys is not our common hobby..."

Boy 14 (19'21"): "This is good... I'll work to get pocket money. "

Mother, 41 (5'30"): "Stop extorting money from us... that's a good choice of words."

Boy 14 (19'39"): "This is also a good option if I don't buy anything.....ok, Cat S is happy!... Oh, this cat doesn't agree."

Mother, 41 (5'41"): "You never buy me anything... that's not true, I am quite sure they have bought you something!" Laughing

Boy, 14 (20'09"): "Ok, we don't argue...."

Mother, 41 (7'50"): "I forgot the question... Yes, back... and... But here is something ... Or no option for..." (logic mistake of options after Cat XO)

Boy, 14 (20'39"): "This is good! (*Brings out daily trash*)
Well done!"



Figure 20. Screen of game over

Mother, 44: "Like usual life!"

Girl (6'57"): "What does this fish mean?"

Mother, 41 (8'24"): "Oh, I earned two fish! Bye!"

Girl, 11 (8'40"): "I didn't understand a thing... Did I have to buy this toy for the cat?"

Girl, 11 (7'10"): "Not only the face, on the wide shot you can see that the cat has band-aid all around the body... And I really would like to know why."

Girl, 11 (7'44"): "It's like a family drama... Similar to every evening at our home. I have also got smaller brothers who would like to get something all the time!"

Mother, 44 (8'03): "This is not a game, this is like a real life!"

Mother, 41 (8'30"): Nice idea. I liked the options for providing negotiations. And for this smaller one to get something, and also have to provide, too. And visually, very nice, an eye-friendly design! For me this blue background was very good for the eyes. The texts were in boxes and were easy to read. Clear characters. Maybe the boy had a too few teeth...cute... oh, was it a boy? Is this L1 a mother? Somehow it feels very soft and feminine. I thought L2 is a father, and blue colored and... but he looks like released from prison... It need still to work on with this character. Maybe it would be a good idea at the beginning of the introduction to explain who is who.

Emocard Method

A scale of three emotions were presented to the test-players to measure their responses with help of the Emocards to gain reflections and feedback on the game likeability, options, topic, playfulness, and other ideas of the game.

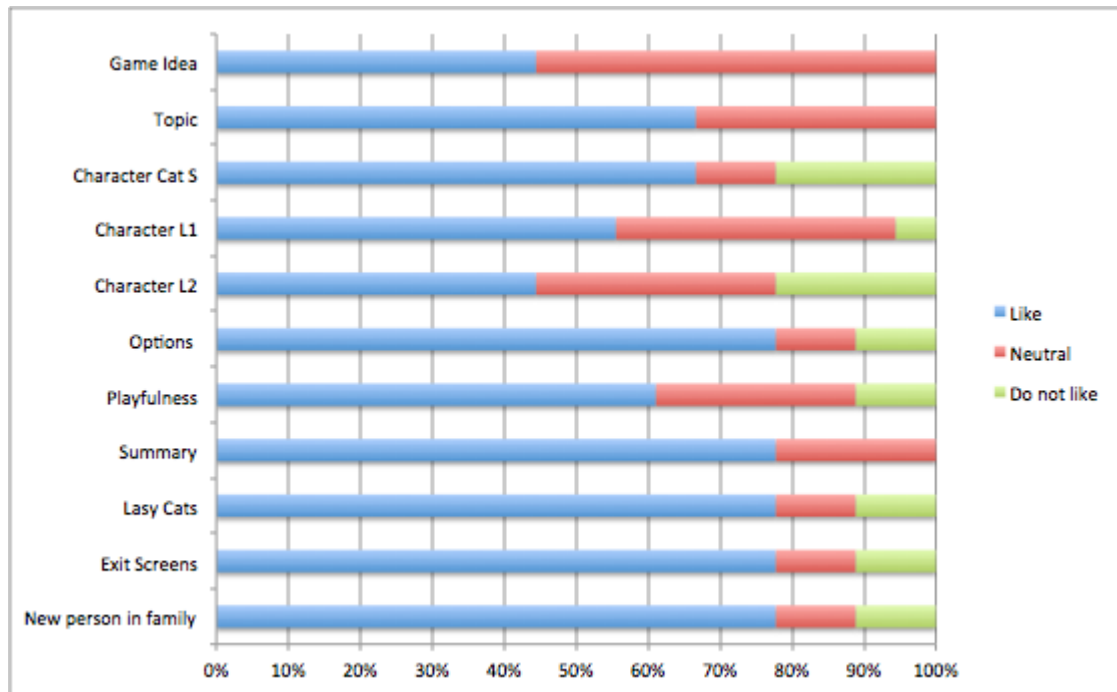


Figure 21. Results of the Emocard Method

The chart of Emocard Method shows the feedback given for the game idea stayed between liked (43%) and neutral, that was a little less liked than expected based on the interviews. The demure indicator was feedback given for the character L2, that was liked only 42%. The likability for Cat L1 shows 55%, and the main character Cat S 67%, which generally shows, that all three characters need further development in appearance, especially Cat L2.

80% of players marked that three options per character is enough. For further development the three options would be a useful average number, but some in specific situations it would be possible to add fourth option if really needed. Definitely there is still some work to be done with logical connections between the options.

Pragmatic and hedonic qualities

First reflections about pragmatic and hedonic qualities of the game was gathered via 4-scale adjectives inspired originally by AttrakDiff (Wechsung & Naumann, 2008). One of it's perks is that there are no direct questions but pairs of bipolar adjectives, which reflect user's subjective opinion according to a scale. This was the reason, why it was used. The 7-scale AttrakDiff method inspired to create a new questionnaire suited for the children and needs of this specific study. Regarding to the game and target audience, the original Attrakdiff was too complicated to use, but using the shorten adapted scale a lot useful information was gathered about the concept of the game and prototype.

Complicated	2	6	1	Simple
Unpredictable	2	5	3	Predictable
Confusing	2	3	2	2 Clearly structured
Separates me		2,5	1,5	5 Brings me closer
Dull		1	5	3 Interesting
Ordinary		3	1	5 Novel
Unpleasant			2	7 Pleasant
Rejecting			6	3 Inviting
Bad			3	6 Good
Quit Play		2	2	5 Continue Play

Table 2. 4-scale adjectives for gather pragmatic and hedonic qualities from children

The scale reflects that the game process was rather complicated and confusing than simple for the player. It is important to add a short overview of rules and introduction of characters in the beginning of the game. Based to the values in the table, more players felt it bringing them closer than separating to the situations. The same reflected from triggered emotions and empathy through playing process.

Interview about possible learning value of the game

What would you do, if you were a parent? Are there any options you would like to add?

Girl, 11: "I would say, that do the dishes daily, if you want this cat so much."

Girl, 11: "I will give you a half of the money and you have to collect the rest by yourself."

Boy, 14: "Like in game, making compromises."

Boy, 12: "I think I would say that the kid has to make some contribution too. Maybe then the kid doesn't yearn it anymore."

Father, 48: "Usually I bought a wished thing for my child. Usually a bubble blower. My child didn't demand things. I don't remember this kind of situations."

Mother, 44: "At first I wouldn't agree to buy, and would start to haggle. Depending on an economic situation and a price. Very good options."

Boy, 11: "From the beginning similarly, you have to earn it somehow. I don't remember at the moment whether this option was there."

Mother, 41: "One moment, in home, I would like to choose another option." (mistake of logic between the options.)

What would you do if you were a kid? What options would you like to add?

Girl, 11: "I would start a tantrum."

Girl, 11: "Would be sad, but would accept to share the cost."

Boy, 14: "I would accept parents' decisions."

Boy, 12: "I would ask opinion of the parents. I would try as long as they will buy it. Would have an option to go back daily."

Father, 48: "Obviously I would obey my parents, what ever they would say."

Mother, 44: "Exactly the same, if I were a teenager. Kids don't know how to get things they like."

Boy, 11: "Depending on age. When I was younger, obviously I would be the same. Being a bit older, you already understand how the circumstances are."

Mother, 41: " Maybe as a kid I would also do some proposals. I would add more questions, e.g If I do so, will I get it? In order to rise child's initiative."

What are your thoughts about the game?

Girl, 11: "Interesting, peculiar and unpredictable."

Girl, 11: "Cats have funny faces. It was cool, when you had to choose an option and then you could see the reaction."

Girl, 11: "Cool."

Boy, 14: "Exciting. I have not played this kind of a game earlier. It teaches how to cope in certain situations."

Boy, 12: "It was interesting. I didn't understand it from the start but it was engaging. In the beginning, where a person sat on the window, I thought someone moved in their home."

Father, 48: "The game should be more understandable. The texts should be with sounds and you should see the characters communicating. There should have been an introduction of the characters in the beginning. The texts didn't always match with the storyline."

Mother, 44: "A very familiar situation for me. Cool! A Great game for children to learn how to behave and what parent will do if he behaved like this or that. It teaches how to achieve something."

Boy, 11: "Done simply, but was interesting to play. Would like to play even longer episode."

Mother, 41: "I would keep this blue background, that was eye friendly. Just like Tiina Ehin's last collection of poems, I would recommend! The character of the father (was it the father?) looks a bit scary for me. Maybe kids are used to that... but for me it seemed to be too aggressive, it needs to be worked on!"

Describe your emotions about the game.

Girl, 11: "A bit confusing, I didn't understand who is who but then realised that this is a child that would like to get this cat."

Girl, 11: "Interesting."

Boy, 14: "It was a bit confusing in the beginning, and I didn't like the design of some characters. The used green color was odd, and the kid with a tiny white dot in its eye."

Boy, 12: "It was interesting. In the beginning it was hard to understand it but at the same time it was... funny also. I think it is suitable for younger ones. It was a bit funny and friendly. It can't do any harm. It could teach more complicated things."

Father, 48: "Mostly I felt confused."

Mother, 44: "Very funny."

Boy, 11: "It helped me to memorise some situations. There have been similar cases with my younger brother when I was five or six."

Mother, 41: "So many parental feelings rise up." Laughing. "You start to think how you would behave in that kind of situations. This is a very realistic situation, when tantrum is starting to come. And how to negotiate then. And it feels like the author of this game has also kids."

What does this game teach related to school programs?

Girl, 11: "Be careful about what you will say next!"

Boy, 14: "We studied social skills in human science about three month ago. There we only talked about it, but here you can test and try."

Boy, 12: "It is not taught at school how to talk, when one person wants something the other doesn't. And how to negotiate."

Father, 48: "Does it have to? Maybe playing it will start to teach something, if there are enough knacks of communication, for example how to persuade your parents."

Mother, 44: "This is not exactly how it should be taught at school. This is real life, not from a study book."

Boy, 11: "That you have to work if you want to get something."

Mother, 41: "Actually it teaches all humane values that link to different humanities - respect, honesty, negotiating. Money and family budget was brief topic but it gave a general understanding about money and numbers. Responsibilities... we all have in this life."

What does this game teach related to communication with family?

Girl, 11: "Do not argue with adults."

Girl, 11: "Do not permit everything for everybody, they have to deserve it."

Girl, 11: "That you don't get everything you want."

Boy, 14: "How to make compromises between each other and not think only for your own good."

Boy, 12: "If a kid wants something she or he should get it, but not too often or too expensive things. This is not good, when parents will buy for themselves all the time but kid doesn't get anything."

Father, 48: "For the parent it will teach how about kids can behave and how they try to impose."

Mother, 44: "So cool! You can try out how to be an extremely stupid parent, saying all the time no and checking, does the story lead somewhere at all."

Boy, 11: "You shouldn't... Everybody has to be equal, as a parent you shouldn't obey each yearning by a kid."

Mother, 41: "Negotiation skills are the basis. And if child's initiative and choices are provided, it is good."

What does this game teach related to communication with peers?

Girl, 11: "To give your permission, but not too often. They can exploit it."

Boy, 14: "I don't even know."

Boy, 12: "For example different ways to talk to them, one shouldn't impose his opinion too much and should listen to the peers and maybe then you will hear something nice."

Father, 48: "Probably nothing. For the communication with friends there have to be some additives."

Mother, 44: "Basically the same. Actually there are no differences from whom you will need something. Everything starts expressing your wish, then the reaction of the second person follows. It depends on attentiveness, how and what you provide. It is a deal, not just one partner asking and getting all."

Boy, 11: "With friends... suppose that in a group meeting, when you start demanding for something, you should know that others might have their own opinion."

Mother, 41: "A tantrum does not lead anywhere. Let's always be nice to each other."

In your opinion, do digital devices have some influence on your social skills?

Girl, 11: "Yes. Unfortunately watching too long time screens can make you aggressive."

Girl, 11: "If you spent too much time with digital devices, your friends and family don't want to spend time with you anymore, and you will lose your friends."

Girl, 11: "Not the best way. There will be less interpersonal communication."

Boy, 14: "Don't know, maybe it supports the use of abbreviated slang?!"

Boy, 12: “If a person spends too much time behind the computer, the computer can become his only tool for communication.”

Father, 48: “As the time goes on, the more it influences social skills. This... communication is... these digital devices have been developing during the last 10-15 years so much, that ones, who are not able to use those, are considered to be antisocial.”

Mother, 44: “Of course it has! There are less eye-to-eye conversations held, and this is not good at all. On the other hand there are possibilities we didn’t have before. It’s kind of sad, if there are no eye-to-eye contacts anymore.

Boy, 11: “Depends on... if used too much, it’s bad because you don’t go outdoors. But if you don’t have any chance to communicate with your friends via smartphone, then it will be complicated!”

Mother, 41: “General opinion seems to be that the influence is decreasing. On the other hand communication has become easier because of the devices. I think that communication has become shallow. Everything goes quickly, without discussion. Sending and receiving, without further thinking. Lack of depth.”

Do you have any thoughts or suggestions?

Girl, 11: “This is a nice idea but should be more attractive.”

Boy, 11: “The game should be longer.”

Mother, 41: “Maybe it would be wise to start with an introduction.”

Girl, 11: “The cats were cute. Lazy cats seems to be a good idea!”

Father, 48: “An introduction for the characters is important.”

Boy, 11: “There should have been more options at some points.”

Mother, 41: “You could add an episode of the importance of homework. First work, then play.”

Discussion

As the result of the interviews it was concluded that most of the test-players were interested in playing the game. Although the players were expecting more developed characters, they still enjoyed acting out in familiar situations.

The results of Emocard method showed overall neutral feedback for the game idea, while the feedback during the interviews was more positive. The result can be poor due to the missing introduction part of the game. Definitely based on the Think Aloud method and 4-scale pragmatic and hedonic qualities data, there has to be an introduction about tasks and characters in the beginning of the game.

The usability and accessibility of the game varied according to the differences in test-players age and earlier playing experiences. The children started with the playing process immediately and only two of the six kids checked, whether they understood the task correctly or not. The adults, contrary to the children, were asking for extra information about the introduction. Children are used to start playing immediately, and they will check out the nature and rules of the game through the game process. Adults, especially not experienced players, need definitely introduction to the game world and characters before playing. For the future survey it is rather important to evaluate user experience (UX) with more experienced adult players as well to check the validity of gathered data.

Before starting to create the visual design for the game, the further design and evaluation of appearance of the characters will be needed. The character L2 had been rapidly sketched and its chump design resulted in rather negative feedback. The majority of players who tested the game liked the childlike drawings as well as the ascetic hand drawn graphics. This clumsy hand drawn visual polarize general trends of 3D.

The entire testing procedure was a useful and effective process that pointed out what works and what has to be fixed and improved within the game. More affective cognitive data would have been needed in the research for the author to learn more.

Most of the participants were curious about the process, open minded and helpful. According to their feedback, they were happy and proud that they got an opportunity to help.

The recommendations provided in the overall reflection were very useful in determining further improvements. These would mainly be:

- Short overview of rules and introduction of characters are important in the beginning of the game and important background information for each episode should be added.
- Implementation of improved and more reliable graphics, environment and characters is needed to be done.
- More developed visually supported storytelling to improve the game flow should be added.
- For future planning and development, a project application writing for development funding, should be taken into consideration.
- Future game development, to deepen the knowledge about different aspects of social cognition, social-emotional learning and social skill development.

It has been a valuable learning experience with useful information, in every meaning.

CONCLUSION

The game developers are responsible for the content that has been worked with. Each game has to provide some extra values to decrease the gap between commercial and educational games. Producers of the evolving game business understand the needed learning value as one possible selling point for the future product.

Our daily job is to inspire and educate youngsters through building digital environments where logic, problem solving and creativity are combined.

Firstly, the task is to provide content containing some new values to help raising student's intrinsic motivation.

Secondly, both adults and kids need hints and support at finding better balance between online and offline lives. Parents and teachers should be educated how to analyse different content through a play, and they should be recommended games with perspective of player's age and peculiarity.

Thirdly, possible risks should be pointed out and informed about. Unlimited time spending in front of screens (and blue light) can literally eat retina of our eyes, steal our sleep and bend our bones.

Youngsters should be inspired and wheedled to create and consume more meaningful, valuable digital content. In order to a youngster to participate actively in a creation process, his or her analytical thinking and value judgment skills will be trained too.

Related to our changed social norms, limits and guidance towards digital devices in new normality will be needed. Balance between texting and eye-to-eye communication is important to avoid increasing shallowness in communication.

This is one of the most important ways to rise the quality of digital culture and decrease producing mechanical, automatic, like Aagaard (2015) has said, “out of sync” people.

KOKKUVÕTE

Mängude loojad ja arendajad vastutavad loodava sisu eest ja iga loodud mäng peab pakkuma mingit lisandväärtust. Lõhe kommerts- ja õpimängude vahel hakkab tasapisi hääbuma, sest tootjad mõistavad hariduslikku sisu kui ühte võimalikku müügiargumenti üha tihenevas mängude tootmise konkurentsisis.

Meie igapäevane töö on inspireerida ja harida noori, luues ja pakkudes neile neid kõnetavaid keskkondi, kus on ühendatud loovus, loogiline mõtlemine ja probleemide lahendamine.

Esiteks, meie ülesanne on luua sisu, mis lisaks õpetatavatele väärtustele motiveerib õpilase loomulikku uudishimu ja rikastab tema sisemaailma.

Teiseks, nii täiskasvanud kui lapsed vajavad häid näiteid, mis toetavad tasakaalustatumat ja mõtestatumat digitaalsete hüvede tarbimist, unustamata reaalse elu ja suhete olulisust. Oluline on erinevate mängude näidetel suunata nii vanemaid kui õpetajaid analüüsima sisu, et kasvab võimekus leida, suunata ja soovitada sisu, mis on oluline lapse vanust ja isikupära arvestavas arengus.

Kolmandaks, suurendada teadlikkust hüvedega kaasnevatest võimalikest ohtudest. Piiranguteta (sinises valguses) ekraanides viibimine võib piltlikult ära hävitada meie silmade võrkkesta, koolutada kõveraks meie luud ning röövida maguse une.

Noori on vaja meelitada ja inspireerida rohkem tarbima mõtestatumat ja mitmetahulisemat digitaalset sisu. See on võimalik ainult kaasates neid endid sisu loomesse, mis läbi suurenevad ka nende analüütiline mõtlemine ja väärtuskasvatus.

Meie suhtluskombed on sünkroonis digitehnoloogia arenguga muutunud. Me vajame tuge ja juhtnööre leidmaks tasakaalu hapras murdepunktis, kus lisaks küsitava digikultuuri kvaliteedile kannatab sõnumite pörgatuses ka silmast silma suhtlemise sügavus.

Teravneb igaühe valikuküsimus uue normaalsuse osas, kas lepime pidevalt hanguva ja mittetsünkroonse suhtluskaaslasega (Aagaard, 2015) või väärtustame rohkem siin ja praegu aset leidvat päris suhetega elu.

REFERENCES

- Aagaard, J. (2015). *Mobile devices, interaction, and distraction: a qualitative exploration of absent presence* (pp.2-8) © Springer-Verlag London
- Banville, L., (2014). Games and Learning. *Paper Offers Insight into Strategy, Design behind Trip Hawkins's "If..."* Last visited 22.04.2017
<http://www.gamesandlearning.org/2014/07/10/paper-offers-insight-into-strategy-design-of-trip-hawkins-if/>
- Blinka, L. (2013). *The "good" and the "bad" of the internet: Studying subjective well-being as an outcome of young people's online practices*. (p. 10; 30; 35; 38) Dissertationes de mediis et communicationibus Universitatis Tartuens 20
- Burgmann, T. (2016). The Canadian Press Posted: *Game Boy disease? Wearable technology helps prevent, creator says Entrepreneurial Vancouver doctor is on a kick to persuade people tech is health-smart*, Last visited 24.03.2017 <http://www.cbc.ca/news/canada/british-columbia/game-boy-disease-video-games-tech-high-glasses-wearable-technology-1.3653424>
- Chang, A. M., Aeschbach, D., Duffy, J. F., & Czeisler, C. A. (2015). Evening use of light-emitting eReaders negatively affects sleep, circadian timing, and next-morning alertness. *Proceedings of the National Academy of Sciences*, 112(4), 1232-1237.
- Creative Mobile OÜ, (2017). official website. Last visited 21.04.2017 <http://creative-mobile.com/about/>
- David, P., Kim, J-H., Brickman, S. J., Ran, W., Curtis, M. C. (2014). *Mobile phone distraction while studying* (p.3-15) © The Author(s) 2014 Reprints and permissions: sagepub.co.uk/journals
- Elias, J. M. (2015). Edutopia. George Lucas Educational Foundation. Social and Emotional Learning. *Using Digital Games for SEL Assessment and Skill Building* Last visited 22.04.2017 <https://www.edutopia.org/blog/using-digital-games-sel-assessment-and-skill-building-maurice-elias>
- Elias, J. M. (2017). Edutopia, George Lucas Educational Foundation, Social and Emotional Learning *How Gaming Connects to SEL and Career Readiness*, Last visited 30.04.2017 <https://www.edutopia.org/blog/how-gaming-connects-sel-and-career-readiness-maurice-elias>
- Gadget, The magazine of personal technology. (2017). *Digital hygiene essential*. Last visited 24.04.2017 <http://www.gadget.co.za/digital-hygiene-essential/>
- Gadget, The magazine of personal technology. (2016). *People 'N' Issues. Fight 'Gameboy Disease'* 15.06.2016. Last visited 24.04.2017 <http://www.gadget.co.za/fight-gameboy-disease/>
- * Gergen, K. (2002). *The Challenge of Absent Presence*. In: Katz J, Aakhus M (eds) *Perpetual contact: mobile communication, private talk, public performance*. Cambridge University

Press, Cambridge

Hamari, J. Shernoff, J. D., Rowe, E., Collier, B., Asbell-Clarke, J., Edwards, T. (2015). *Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning* © 2015 Elsevier Ltd. All rights reserved

Harvard Health Letter. (2012). "Blue light has a dark side." Last visited 25.03.2017 http://www.health.harvard.edu/newsletters/harvard_health_letter/2012/may/blue-light-has-a-dark-side/

Hill, S. (2016). Digital Trends. *Is VR too dangerous for kids? We asked the experts*, last visited 23.03.2017 <http://www.digitaltrends.com/virtual-reality/is-vr-safe-for-kids-we-asked-the-experts/#ixzz4c89kOiD9>

Jensen F. E. (MD), Nutt A. E., (2015). *The Teenage Brain: A Neuroscientist's Survival Guide to Raising Adolescents and Young Adults*. (p. 57-58; 67-69; 118-119; 120-121; 123). HarpenCollinsPublishers e-books.

* Kalmus, V. (2007). *Socialization in the changing information environment: Implications for media literacy*. In D. Macedo, & S.R. Steinberg (Eds.), *Media literacy: A reader* (pp. 157–165). New York: Peter Lang.

Kardaras, N. (2016). *It's 'digital heroin': How screens turn kids into psychotic junkies*, New York Post, last visited 15.03.2017, <http://nypost.com/2016/08/27/its-digital-heroin-how-screens-turn-kids-into-psychotic-junkies/>

Kiisler, V. (2004). Sirp, Eesti kultuurileht, *Vana mees liivakasti serval*, Last visited 30.04.2017 <http://www.sirp.ee/s1-artiklid/c9-sotsiaalia/vana-mees-liivakasti-serval/>

Lang, A. (2006). *Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages*. Journal of Communication 56(Suppl. s1): S57–S80.

Lankoski, P., Björk, S. (2015). *Game Research Methods. An Overview*. Creative Commons Attribution-NonCommercial-NonDerivative 2.5 License

Larusdottir, M. K. (2007). "Using the Think-Aloud method – A Case Study", in proceedings for the COST294-MAUSE International workshop "Review, Report and Refine Usability Evaluation Methods (R3-UEM)", Athens.

Livingstone, S., Kirwil, L., Ponte, C., Staksrud, E. (2013). *In their own words: what bothers children online? with the EU Kids Online Network*. EU Kids Online and LSE Research Online, London School of Economics & Political Science, London, UK

Lux Magazine, (2013). *Research on retina damage sparks fresh LED health scare*, Last visited 25.03.2017 <http://luxreview.com/article/2013/05/research-on-retina-damage-sparks-fresh-led-health-scare>

* Marci, C. (2012). *A (biometric) day in the life: engaging across media*. Paper presented at Re: Think 2012, New York, 28 March.

McGonigal J. (2016). *Gaming Our Way to a Better Future with Jane McGonigal (Part 1)* YouTube. Last visited 5.04.2017 <https://www.youtube.com/watch?v=hgRL2oFNTVk> 9'30''

McGonigal, J., (2012). Ted Talks *The game that can give you 10 extra years of life* Published on July 9, 2012 Last visited 5.04.2017 <https://www.youtube.com/watch?v=lfBpsV1Hwqs>

McGonigal, J., (2010). Ted Talks *Gaming can make a better world* Pulished on March 17, 2010. Last visited 14.04.2017 <https://www.youtube.com/watch?v=dE1DuBesGYM>

* Mesch, G., Talmud, I. (2010). *Wired youth. The social world of adolescence in the information age*. New York: Routledge.

* Nakamura, T. (2015). *The action of looking at a mobile phone display as nonverbal behavior/communication: a theoretical perspective*. Comput Hum Behav 43:68–75

Nordicom, Lindell, J., M. (2017). *The Media Barometer: First Results 2016*, Publications | 27 Mar 2017, Nordic Information Centre for Media and Communication Research. Last visited 27.3.2017 <http://www.nordicom.gu.se/en/current-topics/news/media-barometer-first-results-2016>

Novod, R. R. (2016). Level 1: *That Dragon, Cancer kutsub leinama*. Last visited 29.04.2017 <https://level1.ee/2016/02/that-dragon-cancer/>

Reinecke, L., Meier, A., Aufenanger, S., Beutel, E. M., Dreier, M., Quiring, O., Stark, B., Wölfling, K., Müller, W. K (2016) *Permanently online and permanently procrastinating? The mediating role of Internet use for the effects of trait procrastination on psychological health and well-being new media & society* Johannes Gutenberg University Mainz, Germany, SAGE. 1–19 © The Author(s) 2016 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/1461444816675437 nms.sagepub.com

Richman, J., Berlinski, J. (2014). *On Newtown Anniversary, A Call to Use Video Games to Encourage Empathy*, Last visited 29.04.2017 <http://www.gamesandlearning.org/2014/12/14/on-newtown-anniversary-a-call-to-use-video-games-to-encourage-empathy/>

Rosenberg, B. M. (2003). *Nonviolent Communication: A Language of Life*. Second Edition. A Puddledancer Press.

Salmela-Aro, K., Upadyaya, K., Hakkarainen K., Lonka, K., Alho, K. (2016). *The Dark Side of Internet Use: Two Longitudinal Studies of Excessive Internet Use, Depressive Symptoms, School Burnout and Engagement Among Finnish Early and Late Adolescents*. Ó Springer Science+Business Media New York 2016 (p. 9-10)

Sillaots, M. (2016). *Creating The Flow: The Gamification of Higher Education Courses*. Dissertations On Social Sciences, Tallinn University

Sinek, S. (2016). *Understanding the game we're playing*, last visited 12.03.2017, <https://www.youtube.com/watch?v=sjxNTcsquG8>

* Steel, P. (2007). *The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure*. Psychological Bulletin, Vol 133(1), Jan 2007, 65-94

* Stern, D. (2010). *Forms of vitality: exploring dynamic experience in psychology, the arts, psychotherapy, and development*. Oxford University Press, London

Tähti, M. Niemelä, M., (2005). *3E – Expressing emotions and experiences*. Medici Data oy. VTT Technical Research Center of Finland, Finland.

The Guardian (2014). *EA founder Trip Hawkins raises \$6.5m for If You Can learning games*. Big-bucks Silicon Valley VC backing for company whose first iPad game, IF, launched this week Last visited 22.04.2017 <https://www.theguardian.com/technology/2014/feb/26/trip-hawkins-if-you-can-games>

The Vision Council (2015). Digital Eye Strain Report, *Hindsight is 20/20/20: Protect your eyes from digital devices* (pp. 6–8). Alexandria

* Wechsung, I., Naumann, A. (2008). *Evaluation Methods for Multimodal Systems: A Comparison of Standardized Usability Questionnaires*, pages 276-284. Perception in Multimodal Dialogue Systems. Book series Lecture Notes in Computer Science. Publisher by Springer Berlin /Heidelberg vol. 5078.

APPENDIX 1

Emocards Method / Fabulous family Episode “Lucky Cat”

Vastaja nr

Poiss

Tüdruk

Vanus

Elan: (linna, asula või küla nimi)

EI MEELDI

EI OSKA ÖELDA

MEELDIB

MÄNGU IDEE
(GAME IDEA)



TEEMA
(TOPIC)



TEGELASED
(CHARACTERS)

CAT S (LAPS)



L 1 (VANEM 1)



L 2 (VANEM 2)



EI MEELDI
EI MEELDI

EI OSKA ÕELDA
EI OSKA ÕELDA

MEELDIB
MEELDIB

VALIKUD
(OPTIONS)



MÄNGULISUS
(PLAYFULNESS)



ÜLDMULJE
(SUMMARY)



MIDA ARVAD SELLISTEST MÄNGU TEEMADEST?

LAISAD KASSID (kes viib koera õue?)



PANE TELEFON ÄRA (Ekraani aeg on läbi)



MEIE PERES ON UUS INIMENE (ema või isa uus sõber kolib meile)



SINU SOOVITUSED JA MÕTTED?

APPENDIX 2

Vastaja nr Poiss Tüdruk Vanus Elan: (linna, asula või küla nimi)

.....

Mis sina oleksid teinud, kui sa oleksid lapse vanem? Kas oleksid tahtnud lisada mõne valiku?.....

.....
.....
.....
.....

Mis sina oleksid teinud, kui sa oleksid see laps? Kas lisaksid mõne valiku?.....

.....
.....
.....
.....

Sinu mõtted mängu kohta?

.....
.....
.....
.....

Kirjelda oma tundeid selle mänguga seoses?

.....
.....
.....
.....

Mida õpetab see mäng seoses koolis õpitavaga?.....

.....
.....
.....
.....

Mida õpetab see mäng perega suhtlemisel?

.....
.....
.....
.....

Mida õpetab see mäng sõpradega suhtlemisel?

.....

.....

.....

Kuidas sinu arvates ekraanid mõjutavad suhtlemise oskuseid?

.....

.....

.....

Mitu tundi päevas sa kokku telefonis oled?

ei olegi 1tund 3 tundi 5 tundi rohkem

Mitu tundi päevas sa kokku tahvlis oled?

ei olegi 1tund 3 tundi 5 tundi rohkem

Mitu tundi päevas sa kokku arvutis oled?

ei olegi 1tund 3 tundi 5 tundi rohkem

Mitu tundi päevas sa kokku televiisorit vaatad?

ei olegi 1tund 3 tundi 5 tundi rohkem

Kui tihti sa mängid?

ei mängi mõnikord 3 korda nädalas iga päev 1 tund 3tundi rohkem

Mis on sinu lemmikmängud?

- 1)
- 2)
- 3)

On sul veel mõtteid?

Suur aitäh Sulle abi eest!