Comparing Children’s and Parents’ Preferences Regarding E-books for Children

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Abstract

With the improvement of ICT, the e-book offers a new opportunity to help improve the children’s reading. There are arguments about choosing e-books or printed books for children, but the e-book provides some new features that printed do not have, thus to find out what is the good factors of the e-books will help the development of the e-books. I have discussed the relationship between children and reading, and furthermore, what is a good design of e-book is discussed, this aims to find the ways to design e-books that will encourage children to read and help improve the engagement between children and e-books.

For finding the good factors of the e-book design, interviews with children and their parents were made. Each family is treated as an individual case. I have found out what are the most common opinions in these 11 families and what are differences between the preferences of parents (including grandparents) and children. The different tastes from younger children to the older children is also included in the findings. Due to the amount of the interviewed in the study, including all the data in a single case seems to get a lot of mass, thus the cross-case synthesis helps to get a clear result.

This study reveals that not all the children have accessed to e-books, and the preferred feature between parents and children are not all different. The preferred interfaces of e-books from parents to children are quite the same, most of the interviewee choose the interface which is colourful, cartoon and with animations. However, one of the mothers also mentioned that animation is an argued feature that may limit the children’s imagination. What’s more, all of the parents mentioned that the screen of the e-books need to be improved, but this is also considered that the informing to the parents of the screen is needed. Moreover, both parents and children are interested in the read-aloud feature of the e-books, apart from this, parents are more focusing on the interactive features, animations while children prefer gamifications.

Keywords
ICT and children, e-books, interaction design, cross-case synthesis
Foreword

This study consumed many interviewed, it is a good opportunity here to thank all the participants in the interviews, without their participation, this study cannot be done.

At the same time, this thesis is written under the supervising of Professor. Netta Iivari, who offer a lot of help and instruct me patiently in this study.

I hope this study will help the researchers in this field and give the opinions to the e-book designers as well. More importantly, all the comment of the thesis is warmly welcomed, it is my pleasure to hear from it by sgsnf@gmail.com

Wu Qi

Oulu, August 20, 2016
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1. Introduction

The relationship between children and the ICT is not a new topic in the area of information and technology, the researchers now are inviting the children to be in the part of the design of the new technology, what children can do in the designing processing is worth to find out. According to Moore's law, we know that ICT is experiencing a huge change in the past decade. The growth of ICT industry also brought birth to a lot of electronic products like social media, wearable devices, smart mobile devices and etc. during this period. At the same time a new type of approach for reading material named ‘e-book’ had also become popular due to its special features. E-book reading can be fruitful and the choice of the books is much more than the printed books (Korat, 2010.) Besides, the features like read-aloud, animation and gamification are the features that can help children engaging with the books deeply when they are reading, especially for the younger children (Colombo & Landoni, 2014.) Even though e-book has so many features as the advantage, there is still an argument which said e-book is a product which has more disadvantage than its good side. For example, Dalla Longa and Mich (2013) found that not all the children are activated by the animations inside the e-books. Moreover, some also argue that e-books do not have the features like weight and size so that the selection of a book is not as easy as printed books. (Colombo & Landoni, 2011.)

People inspire children to read more books, however, children are special groups for reading books comparing with adults. This is caused by some special characteristics. Comparing with adults, children can easily be distracting by thing around them which makes them not able to concentrate on the books. The e-books designed for children are different from the ones designed for adults, children have special needs, for example, some younger children especially those who are in the kindergarten, lack of vocabulary that limits their reading. (Landoni, 2010.) Thus the designs of the e-book can include the features like oral reading (read aloud) and dictionary, which will improve the engagement between children and the e-books. (Colombo et al., 2014.) Besides, the animation feature seems to attractive children while for the adults this may be tasteless. (Colombo et al., 2012.)

There is an old saying in China that says “Children are the future of the world.” Thus the new technology which is designed for children must be careful and suitable. I was not good at reading when I was a child, and I was confused why some other children found the enjoyment in reading. When I knew the new technology on the e-books, I have read a lot of books on the device called Kindle, then I found that reading is full of joy, thus I was thinking about what can encourage children to read, if they are bored of reading, there must be some way to help them in reading. People’s reading habit can be formed since they are young. (Maynard, 2010.) To cultivate a good reading habit in the childhood will help improve the engagement between children and books.

For this special group, there is not doubt that e-books for children should be different from those for adults. So the research question of this study is what are the differences between parents’ and children’s preferences in e-books for children. How to design an e-book that matches children’s characteristics and also meets the needs of the parents becomes the main idea of this research. In order to achieve this goal, I used qualitative research method. In this research process, case study is the method to do the research. I have interviewed 11 families in total and including 16 children. Each family is a case, and the method used to do the data analysis is cross-case synthesis. After the interviews, I made a big table to show all the data of the interviews, and then analyze each family’s
data as a single case, and after that searched the common characteristics as well as the different characteristics. After that, the smaller classification of the interview results details was made. I have used only interview to get the data and the recording equipment is audio recording.

The thesis consists of five parts. First is the introduction, followed by the literature review part which is divided into four parts—interaction design and children, children and reading, children and e-books and designing e-books for children. The third part of this study is the methods I have used to do the study, which illustrates the research method, qualitative analysis and the application of the research methods. The fourth part is the findings of this study, including the interview results and the data analysis. The last part is the concluding discussion, there are five sub-parts in the concluding discussion part, which are summary of the results, research implications, practical implications, limitation of the study and the future work.
2. Literature Review

Inviting children to work in the development of a new technology or an e-book is not a new thing. In this section, the literature review will be introduced in five parts including interaction design and children, children and reading, children and e-books, designing e-books for children and summary part.

2.1 Interaction design and children

Children are fortunate to live in a world full of well-designed educational artefacts, and as the technology improves, the output devices are changing their life. (Eisenberg et al., 2003.) Children have been part of technology design for over two decades, and it is important for children to know that they have choices when they are in the team of new technology designing. (Van Mechelen et al., 2015.) Besides, the methods when involving children in the new technology design are many times involving children in a design group. When children are in the design process, when they are in line with Participatory Design, they are providing something children do care about and what is important in their life, in a children’s view, and this is very helpful in design process to help the designer obtain the information about what children really care about and need. (Van Mechelen et al., 2015.) Technology for children can help children and change their life in a positive way, and when technology can help children is always wondering us. (Druin, 2003.)

Children can play a role in the interaction design process. There are researchers that invite children to take part in the development of the new technologies. Besides, the children can take part in the development of the new technologies in these roles: “user, tester, informant and design partner”, and the relation of these roles can be shown in figure 1 (Druin, 2002).

![Figure 1. The Relation of Roles of Children (Druin, 2002, p.4)](image)

According to Druin (2002), the original role of children being part of the new technology invention is as users. Besides, Druin also found that the research method is usually similar to the methods working with adults, observing is the common method especially when the user groups are young children in the early years. Moreover, it is interesting that it is common to invite teachers to the research due to their experience of being with children. She also found that when people do research on children, they usually think of the people around children. When concerning the children’s limitation of language expression, she found it is also usual to ask children to write or draw their thoughts in journals when doing the data collecting and ask children to explain them to the researchers, this is a feasible way to obtain children’s thoughts and ideas. It is also useful to collect the data from users
and non-users of technology, with the comparing, it is easier to find out what is better. (Druin, 2002.)

Druin also did study on children as testers in the design team, she found it is not only indirectly influencing the technology design, but also giving feedbacks to the design team and the child is considered as a design team member. The study also revealed the importance of the child being part of the design team relates to the idea sharing between adults and children, besides, the most important thing is the ‘idea elaboration’. The methods used when children are being testers are similar to the methods used when children acting as users, but since children are part of development team, their work also includes helping adjust the prototype and give feedbacks of the design issues. (Druin, 2002.)

Druin (2002) found that when children play the role as informant in the design process, they are not only giving feedbacks or indirectly participate in the design process, they also take part when the technology is not there yet, the children as informants give ideas or sketches before the technology is designed, and after the technology is developed, they also give feedbacks, what’s more, the role of children being informants including indirect feedback and dialogue which are more than when children are as testers. In this situation, observation is needed as well, but the difference of the children as informants from children as users or testers is that children can directly influence the new technology being designed. (Druin, 2002.) Children can be in the design team at any time the researchers think they need the support or inspiration of children, not only in some special part of the design process, for example, when children participate as testers in the design of technology, they only participate in the prototype part of the new technology. (Druin, 2002.)

Druin (2002) also found that children are considered as equal stakeholders when they are playing the role as design partners. The study revealed that although children have limitations of doing things like adults do, they have their own experiences and view, thus they may support the technology design in ways by which it is for other team members not possible to contribute, and they have their own thoughts and ideas about the technology or even the world. What’s more, the important thing is that the children and the adults share their ideas in the design process together. This is quite normal when the members of the design team are all adults, but when it comes to children, the communication with the children should be concerned with the fact that those members are young children. The methods used are as follows: a) setting expectations; b) brainstorming; c) team reflections. (Druin, 2002.)

Read and Sim (2014) did a playful interaction when they are designing a game with groups of students. The two groups of the participants all have some previous study about the technology field, and they have some basic knowledge of the basic principles of the design. The students were given some biscuits in order to design a game, and the time limitation of their design are strict, only 25 minutes, and then the group members describe the game to the other group. In this design, the biscuits were evident in the game design, and the eating of the food was concerned as a reward for the students. The team has come up with two games by using biscuits as the props, and these games were both viable to the recognition technology. (Read & Sim, 2014.)

Creation of meaningful design concepts is mentioned as the core design task between researchers and children participants, and the value conflicts should have more attention. The group dynamics is a series of behaviours and psychological processes. Vanderschantz et al. (2015) found six co-design dynamics, which are “(1) unequal power; (2) free riding;
Conflicts are always considered as a negative phenomenon, however, it may become dynamic to promote the progress of technology designing by the group members sharing their viewpoint to each other. The balance in the co-design group is rather important, because children sometimes may not go too far in a theory or they may not understand a concept well due to the lacking of experiences, thus they need group members to leading them to find the new and fresh concepts. But teamwork is not always an efficient way to accelerate the technology design process, a well-designed goal is needed and it is advantageous to leave some space to come up with new ideas individually and increase the feeling of personal responsibility. (Vanderschantz et al., 2015.)

Theory gives a concept for organizing thinking about the cooperation and competition, and Vanderschantz et al. (2015) propose the key principle of Social Interdependence Theory with students in two schools in Flanders in Belgium as a case study. They aim at designing a digital tool to help students in case of bullying both in the traditional and on-line sense. After analysis of the case, they found that Social Interdependence Theory is a useful theory when co-design with children has challenging intragroup dynamic aspect. In most cases, children need spending more time on the design to adopt it.

Falcão and Price (2010) did research on interaction design for children who have learning difficulties. Children who have learning difficulties have special educational needs, the reasons for them having learning difficulties can be many, they can hardly reach the learning expectations, and having the needs of ICT to help them learning. Digital technologies like PC have been used to support children who have special learning needs for decades, and it aims to helping children to access the curriculum as well as gaining the feeling of achievement and self-esteem.

Tangible technologies support the improvement of educational designing not only on PC, but also with systems beyond screen-based applications in physical environment. Engaging in tangible interaction means more than the interaction in physical aspect like body engagement, it provides the modes of representation as well. Children with learning difficulties need more sufficient ways to access the learning material, issues not only limit to the text, but also the graphics, sounds, and even animation as well. Although PC applications are useful tools to help children to learn in some aspects, technology can provide more than PC applications as auxiliary tools to help children learning better (Falcão & Price, 2010.) Moreover, Read and Sim conclude that the interaction designers begin with three constraints: (a) “technology to be used”; (b) “the user who will use the technology”; and (c) “the aims or objectives of the interactive experience”. (Read & Sim, 2014, p. 371.)

2.2 Children and reading

Davila and Patrick (2010) found that children’s reading materials are under the control of adults mostly, thus children’s needs and preferences are needed for under consideration as well as the context of the books. Children’s preferences of books vary from boys to girls, from series to magazines, and television-/film-related books to comics, thus it is hard to say which kind of book children prefer more, and as time goes by, the taste of books of children is still changing, furthermore, as children use the technology like internet, their reading preferences will shift due to the new media and technologies. (Davila & Patrick, 2010.)

People’s reading habit can be formed when they are children, thus it is inappropriate to ignore the reading undertaken in childhood. Maynard (2010) also mentioned that it is
important to encourage children to read and the enjoyment when they read is regarded as the impetus, in addition, when children are required to read and how to encourage them to read are important issues. The students who enjoy reading usually do reading more frequently and when they are becoming skilled at reading, they do better. (Maynard, 2010.)

Maynard (2010) found that improving a good reading habit is rather important to children, thus helping children gain good reading habit through good reading environment in classrooms is considered a good way. However, the study found some also argue that school environment may damage children’s passion for reading. Furthermore, researcher found that some children may feel ‘daunted’ or even ‘scared’ when they just think of reading, thus it is necessary to find the needs of different readers, which can be solved by the way they are leading the children to read. Families play important roles in encouraging children to read as well as schools. (Maynard, 2010)

Maynard also found that family members have deep influence on children’s reading habits, and even children’s attitudes toward reading. The study revealed that simple actions such as reading to children can inspire children’s learning to read, therefore, a child’s reading attitude can be affected by the reading attitude of their parents, and the positive reading habit can pass on to a child when it is the family's reading atmosphere. The research also found that most children do not start with a negative attitude to reading, but this attitude may grow when they are at school, thus this is a controversial issue whether children should be encouraged in reading at school or create a reading atmosphere in classrooms. It is interesting to find that if the family’s reading environment is positive, a child may still become negative to the reading at some time of their school experience. (Maynard, 2010.)

According to Maynard, with the improvement of internet and digital technology, young people now are more willing to sit in front of the computer and surfing the internet rather than reading a book, but this may lead to the development of e-reading behaviour. The new technology may change the way children are reading, what’s more, recent studies show that the e-books satisfied readers as well as printed books but more parents choose the printed books. More functionalities can be added to the e-books comparing with printed books such as animation and sounds. Even reluctant reader may be benefit from e-books. (Maynard, 2010.)

Maynard (2010) found the materials that parents and teacher decide to give children influence children’s reading and writing abilities. Children who have more interests in reading are more efficient in reading, and allowing children to select their preference books will increase children’s enthusiasm towards reading, and this can be a solution to help children to read and learn. In recent times, children are using digital devices like computer since they are very young, thus the digital technologies have the potential to promote children to read and learn. (Jones & Brown, 2011.)

Jones and Brown (2011) also did a research on 22 third-grade children including 11 boys and 11 girls trying to find the effects of e-books to third-grade students’ reading engagement, and it is proved that when children have choices in choosing reading material, they are more likely to read, and in this situation, using e-books seems to offer wider choice for children to reaching more books, and most children likes books which are relating “to their own culture and environment”. (Jones & Brown, 2011, p.16.)
2.3 Children and e-books

The e-books are more and more popular in recent days (Jones & Brown, 2011), and they are becoming part of children’s daily life (Koche, et al., 2014). There exists limitations for children when they are reading, especially at the different stage of their age, as well as the lacking of vocabulary and the poor physical library and the school facilities (Landoni, 2010; Hourcade, et al., 2013).

While different children prefer different readers (Hourcade, et al., 2013), the development of interactive e-books still has a long way to go. However, due to the invention of mobile phone and tablet, the series of new technology tools may play an important role to help children to read and learn (Colombo & Scipioni, 2014). Children now become fanatic about the mobile tools and it seems that the digital reading technology provides more practices with children than the paper books (Colombo & Scipioni, 2014).

Vanderschantzet al. (2015) illustrate the Design exploration of eBook interface for personal digital libraries on tablet devices, and they found that the prototype with book cover, title and blurb was the most preferred one, which is easy to understand, effective for browsing, and time-efficient. Drew, Courtney, Cingel et al. (2015) researched the haptic e-books and discuss the design considerations of developing such e-books to help children reading with their parents.

However, focusing on designing an e-book for a variety of different people, Colombo et al. researched on how to design leisure e-books while Roskos et al. more focused on educational e-books. The designing of a leisure e-book should more notice children’s experience, the balance between children’s skills and their reading activity is the point that the designers need to consider (Colombo et al., 2014; Colombo & Landoni, 2014), gamification is also a very important aspect in leisure reading, but how to add these features is another challenge (Colombo & Landoni, 2014). The text of the stories is the core of the books (Colombo & Landoni, 2014). But for educational books, it shows that robust analytic tools are needed, and the design of the e-book should be careful and thoughtful as well as related to support children for early literature reading (Roskos et al., 2009). The using of e-books also influences children’s learning and understanding (Maynard & Cheyne, 2005).

Colombo et al. (2014) also summarized Roskos et al.s’ article which points out the design features for educational e-books: “(a) oral reading with text highlights that illuminate the nature of print; (b) hotspot activation aligned with text; (c) a dictionary option that allows repeated action by the child; and (d) a game mode separate from text mode” (Colombo et al., 2014, p. 281). Besides, Larson (2010) appealed the possibility of using the digital reading devices in the literacy development.

When it comes to the user experiences of e-books, there are more issues of concern, for example, e-books do not offer some features (like weight and size) that printed books offer, and the interface of e-books will help to develop an enhanced e-book (Colombo & Landoni, 2011). The book selection for children will be quite difficult, as the only information they can get is as simple as the book title, the author’s name, the book cover and some little blurb in a virtual library, thus the traditional recommending may only suit for adults rather than children. (Colombo et al., 2012.)

Korat (2010) found that children’s independent e-books reading can be fruitful and enjoyable, and it is also mentioned that learning of using the software by younger children can be very quick. Nation et al. (2010) found that the length of the time children use e-
books will affect children’s reading experiences. Moreover, the interaction between oral language skills and the development of written languages will influence the children’s reading comprehension.

Improving the child users’ engagement in user experiences of e-book reading is considered as an important issue. As e-books are different from the printed books, we can use e-books’ characteristics to improving the reading experience. Dalla Longa and Mich did a research on animations in enhanced e-books, and they found that the animations in the e-books are not activated by all the children when they are reading the e-book, furthermore, the children who activate few animations understood better and memorized the story (Dalla Longa & Mich, 2013). Children are now increasingly improving the engagement with digital devices (Eisenberg et al., 2003; Ryokai et al., 2012), and they learn things even from games, “younger children did engage playfully and richly with the tools” (Ryokai et al., 2012).

2.4 Designing e-books for children

Here I more focus on the e-books design for children, thus the article written by Colombo and colleagues compared whether low-tech or high-tech prototyping for e-books when designing with children was more helpful. They designed both low-tech (paper prototype) and high-tech (iPad prototype) prototyping for e-book co-design with children, and they also compared the advantages and disadvantages of these two aspects (Colombo & Landoni, 2013). Antle (2007) provides five dimensions of designing a tangible system for interaction and children (Antle, 2007), and the key of interaction to children is offering, like a good toy, the mental room for playful exploration, which means raising children’s interest and their curiosity to the new devices (Sylla, et al., 2012). Colombo et al. (2014) provide design guidelines for e-books which mentioned co-design with children as an effective method (Colombo, Landoni & Rubegni, 2014). E-books are digital files, and the formats of e-books are limited such as .txt, .pdf and etc. In recent days, as the improving of mobile devices, e-books are designed based on the platforms of applications on mobile devices or online digital libraries. (Mana et al., 2013.)

Tangible systems are digital reading materials, thus they are regarded as e-books in this thesis, and they are discussed in the following paragraphs. Children are regarded as active learners. Tangible systems are different from the virtual reality, it is the real word instead, the system contains a variety of physical actions like gestures and haptic, the design for children should provide special artifacts and environments. The developers should understand the concept of the tangible systems and offer spatial interaction for children. (Antle, 2007.) Antle (2007) also provides a preliminary conceptual framework which includes five themes based on tangible and spatial interaction, the five themes are showed on table 1.

Table 1. The Five Themes of Tangible Systems (Antle, 2007, )

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Design requires</th>
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<tr>
<td>Space for Action (p.196)</td>
<td>This is different from the traditional interaction with computer by using keyboard or mouse, the requirement of interaction through physical actions is needed</td>
</tr>
</tbody>
</table>
Concepts | Design requires
--- | ---
**Perceptual Mappings (p.197)** | The mapping between the physical emotional aspect and the digital aspect of the system. | Consideration of children’s understanding of the relationships between how things appear and how things respond.

**Behavioral Mappings (p.197)** | The mapping between the input behaviors and output effect of the physical and digital aspects of the system. | Consideration of children’s understandings of how things behave.

**Semantic Mappings (p.198)** | The mapping between the information carried in the physical and digital aspects of the system. | Consideration of children’s understandings of what things means in various representational forms.

**Space for Friends (p.199)** | Collaboration and imitation are considered important ways that children develop schemata. | An understanding of the key factors that a system must embody to successfully facilitate children’s collaboration as well as an understanding of the importance and mechanisms of imitation in experiential learning.

Sylla et al. (2012) used questionnaires and interviews among two groups of children aged 4 to 5 to get a better understanding of the potential of the tangible interface. Drawing intervention is considered an efficient way of accessing children and technology and it creates more fun when children are interacting with the interfaces (Sylla, et al., 2012).

Roskos, et al. (2009) have put forward two frameworks of the highest level of e-book design, one is multimedia design referring to the gathering of digital properties, and the other is interactivity design referring to the interface allowing selection, switch, and engagement. For the children who are very young, especially the children in kindergarten, some features can help children more focusing when reading, for example, oral reading, dictionary function and a separate game mode apart from the text mode (Shamir and Korat, 2009 (as cited in Roskos et al., 2009)). Some features added on the e-books can also be negative to children’s learning while it is still helpful for the others, but the animated illustrations are considered better than the static ones (Roskos, et al., 2009).

When considering a good design of e-book for young children, the researchers propose three considerable design domains which refer to multimedia design, interface design and learning design, these three designs are listed by Roskos et al. (2009). The multimedia design refers to the diversity of the media used in e-books, as mentioned in the previous part, the animated image is better than the static one, and voice sometimes even audio recitation will help improve children’s interest to reading. Furthermore, interface design is also considered as important as multimedia design, and learning design about the instruction’s basic features. Furthermore, Roskos et al. (2009) did research on the different analytic tools which aim at creating a better e-book for children’s early literacy learning, and they used three tools to examine what is important to an e-book. While the mainstream researchers focus on the educational e-book design for children, Colombo et al. (2014) pay more attention to the leisure e-books for children. They used Cooperative Inquiry (CI) (Druin, 1999) as a method to do the design, they mentioned the guidelines of using the e-books for children, the interaction of the interface of the product to children and the e-book production.
Besides, Colombo et al. (2014) also summarized six guidelines of designing an e-book for children. A book, first of all, “should not be boring”, this is obvious, but when it comes to the e-book for children to read, a simple requirement seems to be complicated, how to keep the e-books from boring is not an easy question, thus Colombo et al. (2014) suggested to add some audiovisual elements to the e-books, but it is important to note that these elements are used to support the text or image parts rather than replace them. Then consider adding the read-aloud narration to the e-books, which helps children better to keep the text and the pictures in mind by giving them a lively impression.

Moreover, playful interacting is indispensable as the e-books are designed for children, using the interactivity to add more fun. If the e-books are dull and difficult to read, then it is not surprising to find that children are running away from them. Colombo et al. (2014) provide a feasible solution — “provide inline dictionary definitions and illustrated descriptive Cards” (p.283), which support children’s better engagement with the e-books. Furthermore, a colorful e-book is more attractive to children, colors make them impressed, improve the experiences when they read and learn. Last but not least, the e-book should stay a book, when it comes to playful, colorful, it is inevitable for people to link to games or other applications, but it is important to remember that a book is a book, the engagement with the readers of the texts is more important than the other functions.

Colombo and Landoni (2013) compared the different kinds of prototyping when they are co-design e-books with children. They divided their experiments into four parts – two paper prototyping and two tablet-based prototyping. For the first attempt of prototyping they chose the simplest one, paper prototyping, the resources they have are as simple as some stick papers and color marks, and when children are doing the prototyping with them, they found that children pay more attention to the features of the design, the children use their imagination to think of the functions they want in e-book design. In the second part, the design team decided to use the tablet to create the prototype, but the challenge they met was to teach children how to use the application on the tablet to support the design, and with the digital tools, children began to focusing on the interface design of the e-books. The following stage is paper prototyping again, but they mentioned that this time the design is processing without raw material, and this time, children point out some embedded functions like the dictionary. The last prototyping they made is the digital prototyping, and this time, children began to value the intractability of the images rather than focusing on the context of the e-books.

After doing the prototyping with children, Colombo and Landoni (2013) summarized the advantages and the disadvantages of both low-tech prototyping and high-tech prototyping. The advantages and the disadvantages of low-tech prototyping and high-tech prototyping are summarized in table 2.

**Table 2.** The Advantages and the Disadvantages of Low-tech Prototyping and High-tech Prototyping. (Colombo & Landoni, 2013)

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<th>advantages</th>
<th>disadvantages</th>
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<tbody>
<tr>
<td>Low-tech prototyping</td>
<td>Fewer resources, More creativity, Better collaboration</td>
<td>Higher level of abstraction, Frustration, Adult interpretation, Lower fidelity</td>
</tr>
</tbody>
</table>
Children’s books are very different from the books of adults, thus can the design of e-books for children use the same rules and ways as the e-books for adults is a worthy question, thus it is needed to find out the difference between the e-books design for children and the e-books design for adults. As we know, there are so many e-books that are designed for adults, but they are not suitable for children to read, and finding the special point of designing an e-book for children is rather important (Landoni, 2010). Landoni (2010) also proposed that the e-books designed for children need to be attractive, interactive and can have a good engagement with child readers. This means that a good e-book can attract children’s eye sights, which children are willing to read and engage with. The interaction between children and e-book is also considered as an important aspect as well.

The e-books designed for children are aimed at educational and entertainment reading materials for children, thus Landoni (2010) mentioned an edutainment e-book design, and with the user study, the e-books designed for children have such features like playful, interactive and good engagement, and they are more attractive to children. Furthermore, taking into account the special nature of children, designing e-books for them should consider the feasible vocabulary, the writing style, the presentation as well as the format, these features are being valued, and the e-books should be designed in a way that suits children’s needs. Moreover, pictures and the color in the e-book play an important role in attracting children’s eye sights as well as transfer specific information (Landoni, 2010). Limitation such as children’s age and the stage they are at, also influence the design decision.

User experience with e-books for children does not have a clear standard to measure, Colombo and Landoni (2014) did a research about “enhanced” e-books (The e-books have multimedia and interactive features) and “basic” e-books (digital copy of the printed books) for children by using a flow theory. The experience of reading a book like “being lost in a book” (Csikszentmihalyi, 2008 (as cited in Colombo & Landoni, 2014)) refers to “being in flow” (Csikszentmihalyi, 2008 (as cited in Colombo & Landoni, 2014)), which means the reader is fascinated with the reading and has a strong engagement with the book. Colombo and Landoni (2014) gave eight components of the “flow”: “challenges/skills balance, clear goals, and immediate feedback, merging of action and awareness, focused concentration, sense of potential control, autotelic activity, and loss of self-consciousness and distortion of time perception”. (Colombo & Landoni, 2014, p.136.)

Colombo and Landoni (2014) did an experiment by using flow theory to examine whether “enhanced” e-books have better user experience to the “basic” e-books, thus they divided the volunteers into two groups – one is experimental group who read the “enhanced” e-books while the other is the control group who read the “basic” e-books. After the experiment, they found that the “enhanced” e-books do have better user experience when children are reading, and some of the participate even have read over the “enhanced” e-books which they have the same printed books at home that they have never been willing to read. Furthermore, the read-aloud narration is selected as the most popular function.
among the functions in the given “enhanced” e-books, children thought that the read-
aloud function helps their deep engagement with the book and some even said that it is
like “being in a theater” when reading it.

It is mentioned in the previous paragraph that the multimedia element can help build
better e-books for children. Ryokai et al. (2012) have presented a special tool named
StoryFaces which let children pretend-play with e-books. This is a tool that allows
children to do the story telling with the recording of their own faces, which seems to be a
playful function to children, thus when children record their own face on the e-books,
they feel like being in the virtual world in the e-books and they are the protagonist of the
story, thus the pictures of their faces they took are on the e-books. The researchers allowed
children to do the reading whenever they want and they found that more time is spent on
the “freestyle” story with which children can create their own faces. Children’s
understanding of facial expression is improving as they grow up. (Ryokai et al., 2012.)
According to the results of their experiment, it is proved that the StoryFaces motivate
children in reading and narratives, besides, multimedia authoring can support the
emergent literacy in children (Ryokai et al., 2012).

Koche et al. (2014) did research on the dialogic reading of e-books with children, who are
very young, and they found that children have more interest in animations and sounds,
and the increased interaction did not reduce the children’s responses. Although many
studies prove that animations in the e-books helps children having a better engagement
with the e-books, Dalla Longa and Mich (2013) found that not all the children are active
with the animations in the e-books, and more importantly, the children who are not active
with animations or less active with the animations have the better understanding of the
stories and have better memorized the stories than those who are more active with the
animations.

2.5 Summary

As the technology improves, the children’s life can be changing in a positive way
(Eisenberg et al., 2003), children are now can play role in the interaction design
technologies (Druin, 2002). The children’s reading can be formed since they were young,
thus to develop a good reading habit for children is very important (Maynard, 2010).
However, adults are controlling the reading materials for children (Davila & Patrick,
2010), and the materials that adults decided to give children to read will influence
children’s reading and writing habit (Jones & Brown, 2011).

The mobile tools get into children’s life and the children are fascinated with them
(Colombo & Scipioni, 2014), but these devices can help children in their daily life, the e-
books as an electronic tool can help children to read and learn (Colombo & Scipioni,
2014). For designing the leisure e-books for children, gamification is suggested as an
important feature, while for the educational e-books, robust analytic tools are needed
(Colombo & Landoni, 2014).

Although e-books can help children in a positive way in reading, for example, solve the
problem of having the poor physical library and the school facilities (Hourcade, et al.,
2003), there are still some features that e-books cannot offer, for instance, size and weight.
Children’s reading habit and the length of the time children use e-books will affect
children’s reading experiences (Korat, 2010; Nation et al., 2010). Thus improving the
children’s engagement of e-books is an important issue (Dalla Longa & Mich, 2013).
The designs of e-books for children and for adults are very different (Landoni, 2010), the e-book design for children should consider many features, and the e-books for children should be designed for children’s needs (Landoni, 2010). Read-aloud is a popular feature in e-books for children (Colombo & Landoni, 2014), and the multimedia element is also good for children (Ryokai et al., 2012). Animations help children having a better engagement with e-books (Koche et al., 2014), but it also proved that not all the children are active with it (Dalla Longa & Mich, 2013).
3. Method

In this part, the methodologies of this study will be discussed, the research method used in this study will be in paragraph 3.1, and 3.2 will introduce the qualitative analysis in details, and 3.3 is the application of the research method which introduces the methods, how I used this method in this study.

3.1 Research Method

There are 3 parts in this chapter, qualitative research will be introduced briefly at first, and then the case study research will be illustrated and this is the method mainly used in this study. The last part of this chapter will discuss the data collection in theory.

3.1.1 Qualitative Research

Qualitative research is used as the research method in the research processing, and it is a research method to help researchers understand more about why things happen rather than what is happening (Davy & Valecillos, 2009). Myers (1997) illustrated the philosophical assumptions of qualitative research, and they are listed in table 3.

<table>
<thead>
<tr>
<th>Philosophical assumptions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivist</td>
<td>Positivist studies usually focus on testing theory, and the aim is to increase the accuracy of the prediction of the understanding of phenomena. Moreover, the result of the positivist studies is based on the precise evidence.</td>
</tr>
<tr>
<td>Interpretive</td>
<td>Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them and aim of the interpretive methods of research in IS is to understand the context of the information system as well as processing the influences of the system and the information system will be influenced by the context as well.</td>
</tr>
<tr>
<td>Critical</td>
<td>Critical research is assumed to find out the social reality by the historical constitution. The researchers of critical research believe that social reality is produced and reproduced by people. “The main task of critical research is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light.” The results of critical research are to withstand critical oversight.</td>
</tr>
</tbody>
</table>
The qualitative research methods vary as regards different subject and object, thus I will introduce the common qualitative research methods, several common qualitative research methods are listed in table 4.

**Table 4. Qualitative research methods**

<table>
<thead>
<tr>
<th>Qualitative research methods</th>
<th>Description</th>
<th>Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action research</td>
<td>Action research is the systematic approach to investigation that is used to help people find the solutions to the problems they meet in their daily life.</td>
<td>Stringer, 2013</td>
</tr>
</tbody>
</table>
| Case study research         | Case study is the empirical inquiry which includes:  
  - The focus on the interrelationships of a specific entity,  
  - Analysis the relationship between the studied entity and the factors, and  
  - The purpose to contribute to a theory | Mills et al., 2009                     |
| Ethnography                 | The ethnographic research comes from the discipline of social and cultural anthropology where an ethnographer is required to spend a significant amount of time in the field. | Myers, 1997                           |
| Grounded theory             | Grounded theory is a research method that seeks to develop the theory that is grounded in data systematically gathered and analyzed. | Myers, 1997                           |

3.1.2 Case Study Research

A case study is for the questions in people’s daily life, and it aims to study the questions like ‘how’ and ‘why’, thus the main purpose of the case study is to solve the real-life questions. It is motioned that it is better to study the complex social phenomena by case study. (Yin, 2013.)

According to Yin (2013), the individual case is not the thing that we see from the case itself, it always presents something bigger. The case study makes the abstract things concrete, and it is kind of the proof of the theory. Doing case study is suitable at any time for any kind of research, but it also points out that it is always good to do the case study when a research question is at its early stages. The case study is sometimes like a story, and it is needed to make it scientific which refers to use positivist and experiment rather than complex research method or calculation method. The cases need to be true and reality to help the results trustable, besides, the research should focus on a specific area. After all, the true data and honest research attitude are very important. (Yin, 2013.)

When to do research on a single case or multiple cases? It is decided by the study situation. If the case is unique and it is special and worth to research on, or it is a revelatory case, then the researcher can study on this single case and according to the case to get some
results. But if the researcher needs a comparison on several cases or the theory the researcher is working on is at the beginning and it is under the development, then researcher probably needs to use several cases to do the research. (Yin, 2013.)

It is quite strong evidence if several cases all present the same results, it will shortly increase the credibility of the research. The data gained from the case should be trustable, and several data collection methods are introduced in the literature, as mentioned in the previous literature, interview, observing, document are all the suitable methods depending on the data collection method. (Yin, 2013.)

The general steps of the case study are listed in figure 2.

![Figure 2. Case study general steps](image)

### 3.1.3 Data Collection

Sharp et al. (2007) mentioned four key issues of data collection which are listed as following, see in table 5.

**Table 5.** four key issues of data collection

<table>
<thead>
<tr>
<th>Key issues of data collection</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Setting goals.” (p.292).</td>
<td>To identify the goals of the study.</td>
</tr>
<tr>
<td>“The relationship with participants.” (p.292).</td>
<td>This refers to the relationship between the data collection person (people) and the person (people) who offers the data.</td>
</tr>
<tr>
<td>“Triangulations.” (p.293).</td>
<td>This is the strategy that means using more than one data collect method to get the goal.</td>
</tr>
<tr>
<td>“Pilot studies.” (p.293).</td>
<td>A small study of the study, this is for making sure the method is suitable for the study.</td>
</tr>
</tbody>
</table>
Data recording
Taking notes, audio recording, taking photographs and video recording are the most common ways to do data recording. Taking notes and photography are the easiest and the most inexpensive ways to data recording, but only with the paper and pencil can lead to an incomplete result, and the reliability of the data by these two methods can be very low. The audio is a flexible way to do data gathering, the complete audio recording can be gathered. While the visual data is missing, the reliability of the data is high. The video is the more expensive way to do data collection, but the data gained from this method is a complete one. Besides, when doing data recording, more than one method can be used by the researchers. (Sharp et al., 2007.)

Table 6 shows the details of four data recording methods

<table>
<thead>
<tr>
<th>Methods</th>
<th>Taking notes</th>
<th>Audio recording</th>
<th>Taking photographs</th>
<th>Video recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>Pencil and paper, inexpensive</td>
<td>Recorder with good microphone, inexpensive</td>
<td>Camera, inexpensive</td>
<td>Editing, mixing, and analysis equipment, more expensive</td>
</tr>
<tr>
<td>Reliability of data</td>
<td>Very low</td>
<td>Very low</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

Interviews
Sharp et al. (2007) introduced 3 data gathering methods—interviews, questionnaires, and observation. But in this chapter, only interviews will be illustrated, because only interview is used as the data collection method in this study. Interviews are the conversations where questions are being asked and answered. Sharp et al. (2007) illustrate four interview methods which can be seen in the following table 7.

Table 7. Four interview methods (Sharp et al., 2007)

<table>
<thead>
<tr>
<th>Interview methods</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured interviews</td>
<td>The interviewer and the interviewees are more like having conversations around popular topics, and the depth of the topic can be considerable. But it always has a main topic. Besides, the interviewers can get rich data through unstructured interviews</td>
</tr>
<tr>
<td>Structured interviews</td>
<td>Predetermined questions are asked. Structured interviews are suitable for those studies with clear goals and specific questions.</td>
</tr>
<tr>
<td>Semi-structured interviews</td>
<td>The features of structured and unstructured are combined together. Both open questions and closed questions are used.  \“It is important not to pre-empt an answer by phrasing a question to suggest that a particular answer is expected.\” (p.209) The interview cannot be processed too quickly in order to give the interviewees time to speak.</td>
</tr>
</tbody>
</table>
### Interview methods

| Focus groups | People are interviewed in groups, normally, 3 to 10 people are involved, “participants are selected to provide a representative sample of the target population.” (p.302) The diverse or sensitive issues can be revealed otherwise by using other methods. The questions to the groups are simple but it is important to enable people to talk about their ideas. |

The interviews with children can be different. Child-friendly methods are needed in the interviews because children’s thoughts and reactions are different from adults. Moreover, for the younger children, taking images and having chats is more beneficial rather than doing questionnaires. (Sharp et, al., 2007)

Ritchie (2003) mentioned that the interviewer needs to know how to efficiently manage the interview in progress so that the results of the interview can meet the purpose of the research.

### 3.2 Qualitative analysis

Four general analytic strategies of the case study are mentioned by Yin (2013). Reasons of these four general analytic strategies are introduced in table 8.

#### Table 8. Four general analytic strategies of case study (Yin, 2013)

<table>
<thead>
<tr>
<th>Analytic strategies</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relying on theoretical propositions</td>
<td>“To follow the theoretical propositions that led to your case study.” (p.182)</td>
</tr>
<tr>
<td>Working your data from the ‘ground up’</td>
<td>“Contrasts directly with the first.” (p.183)</td>
</tr>
<tr>
<td>Developing a case description.</td>
<td>“To organize your case study according to some descriptive framework.” (p.185)</td>
</tr>
<tr>
<td>Examining plausible rival explanations.</td>
<td>“Trying to define and test plausible rival explanations.” (p.187)</td>
</tr>
</tbody>
</table>

Yin (2013) also listed five analytic techniques for case study research, including pattern matching, explanation building, time-series analysis, logic models and cross-case synthesis. The descriptions of these five techniques are illustrated in table 9.

#### Table 9. Five analytic techniques (Yin, 2013)

<table>
<thead>
<tr>
<th>Name of the Techniques</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern Matching</td>
<td>This may be the most popular technique in the case study. It is mentioned to match the empirical pattern and the prediction based pattern, and if the results of these two patterns are the same, the study results are more satisfactory.</td>
</tr>
<tr>
<td>Name of the Techniques</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Explanation Building</td>
<td>This is a special pattern matching aiming to analyze the case study data by building an explanation to the case.</td>
</tr>
<tr>
<td>Time-Series Analysis</td>
<td>The time-series analysis has many complicated forms. The more complicated and accurate pattern is build, the better result will be gained.</td>
</tr>
<tr>
<td>Logic Models</td>
<td>The logic models have become more and more important recent days especially in the assessment of the case studies. It refers to the chains of the complicated events in a special period of time.</td>
</tr>
<tr>
<td>Cross-Case Synthesis</td>
<td>The cross-case synthesis is used for the multi-cases analysis. Comparing to the single case study, the multiple cases provide more evidence and are more convincing.</td>
</tr>
</tbody>
</table>

**Cross-case synthesis**

In this study, cross-case synthesis is illustrated by details, because I have used cross-case synthesis to analyze the data. As mentioned in table 5, cross-case synthesis is used for multiple case study. Documenting a table to show the details of the data in every single case is normally the first step to do the cross-case synthesis. Then an analysis of each case is needed, based on these analyses, the overall characteristics of these cases will be listed. Then it is important to find out the common features of the different cases so that the cases which are the same type can be found. If it is possible, try to make a smaller classification in order to get and inspire the profound views. The point of cross-case synthesis techniques is to identify and interpret rather than listing numbers. (Yin, 2013.) The details of cross-case synthesis are shown in figure 3.

![Figure 3. Details of cross-case synthesis (Yin, 2013)](image-url)
3.3 Application of the research method

This chapter will introduce the application of the research method which is introduced in the previous chapters, 3.3.1 is the application of the case study research in this study, and in 3.3.2, I will introduce how I did data collection, the literature related to the interview questions will also be presented. 3.3.3 will show the detail information about the participants in the interviews, and I have grouped each family as a case, thus a number of the family will be given. 3.3.4 is the application of the data analysis, which tells how I did data analysis in this study.

3.3.1 Case study research

In this study, case study as a method is used to collect and analyze the data. To analyze the results from two cases is usually more powerful than the one from a single case alone (Yin, 2013), therefore each individual family is regarded as a case and interviews are processed based on family.

Each family in this study has the different composition, and the ages of the children and the nationality of the family will also influence the children’s experience of reading the e-books as well as the reading preference. Comparing with treating each child as an individual case or regarding the whole 11 families as one case, consider each family as a case unit will provide more information. Ashmore (2014) revealed that family plays an important role in children’s life, thus it is interesting to find out the family’s influence on children in reading.

Yin (2013) has introduced four types of designs for case studies, which are “(Type 1) single-case (holistic) designs, (Type 2) single-case (embedded) designs, (Type 3) multiple-case (holistic) designs, and (Type 4) multiple-case (embedded) designs” (p.87). Each family is considered as a single case, therefore in this study, it is a multiple-case design. The 11 families are selected through “snowball sampling” (Goodman, 1961). The interviews are designed to find out the similar and the contrasting results of their opinions to the e-books. Moreover, the number of the cases(families) is chosen to make an effective case design. While “In an embedded design, a study even may call for the conduct of a survey at each case study site.”, (Yin, 2013, p.99.) each family has more than one member participate in the survey, thus a multiple-case (embedded) design is used in this study. Figure 4 shows structure of the multiple-case (embedded) design.
Figure 4. The structure of multiple-case (embedded) design (Yin, 2013, p.86)

The structure of my case design is shown in figure 5, which is using the model shown in figure 4.

Figure 5. The structure of the case designs in this study
Due to the numbers of the families which had been interviewed, the cross-case synthesis is considered as a feasible method to do the analysis. The details will be written in the following data analysis chapter 3.3.4.

3.3.2 Data collection

Interviews are being done to collect the data in this study.

*Interview questions*

The interview questions in this study are listed as the follows, and the questions are designed according to the literature. The details of the interview questions are presented in Appendix A.

*Reading preferences:* The reading experiences between reading textbooks and e-books are not equal, the design of the e-books needs to have something different from the printed books otherwise the student will prefer textbooks than e-books in studying (Woody et al., 2010).

*E-book using experiences:* Children today living in an environment full of high technology are not only reading the books of their parents but also can learn things by self-study through the e-books or CD-ROMs. Quite many parents report that their children have e-books reading devices at home. (Korat, 2010.)

*Use limitations of e-books:* The increasing use of electronic media may cause the bad effects of children’s’ health (Granich et, al., 2011).

*Reading experiences:* The e-books provide the different reading experiences from the printed books, the visit of online books store will provide more functions to the e-readers. The e-books in high technology will provide student more than words and pictures. The special features of the e-books give the readers more experience in engaging and interacting with the e-books. (Larson, 2010.)

*Using time of the e-books:* The time of the reading influence the children’s comprehension of the reading (Nation et, al., 2010).

The students always read more when they are having access to the e-books, the new functionalities can meet the special needs of the students (Larson, 2010).

*Preferred features of e-books:* The feature preferences by parents and children are different, the point of their focusing are different, and their needs are different (Cingel et al., 2015).

*Preferred interfaces of e-books:* Tractinsky (1997) point out that the aesthetic quality is a very important issue in the designing of the interface, and he suggested that the aesthetic quality will influence the usability (as cited in Hartmann et al., 2008, p. 2).

*The advantages of e-books:* The advantages of the e-books to the printed books include the reducing of the book storage space and mitigate the need for carrying the books, as well as allowing children to write more notes and more flexibilities in functions (Maynard, 2005).

*Disadvantages of e-books:* The reading on the screen slower the reading speed of the children, and some of the features or functions of the e-books are hard to understand so that the children may be confused when using it (Maynard, 2005).
3.3.3 Participants

19 parents (including grandparents) and 16 children in total (5 of the children are under the age of 3 so I did not interview them directly, 7 children are aged 3-6 and 4 children are aged 7-14) are interviewed in this study, 4 of the children were born in Finland and the others were born in China. Besides, 5 of the children have used e-books before and one of them is a frequent user. All the interviews I did are face-to-face interviews, the first 6 families were interviewed individually based on family, but for the other five families, I have interviewed them together. For each family, the interview time was approximate 1 hour, but for the five families I have interviewed together, the interview time was around 3 hours. The details of the participants are in table 10.

Table 10. Details of the participants in the interviews

<table>
<thead>
<tr>
<th>Family ID</th>
<th>Parents (grandparents) in the interview</th>
<th>Children in the interview</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age &amp; Gender</td>
<td>Nationality</td>
</tr>
<tr>
<td>1</td>
<td>54, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td></td>
<td>29, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td></td>
<td>33, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td>2</td>
<td>41, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td></td>
<td>41, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td></td>
<td>61, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td>3</td>
<td>26, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td></td>
<td>55, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td>4</td>
<td>44, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td></td>
<td>44, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>Finish</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Finish</td>
</tr>
<tr>
<td>6</td>
<td>36, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td></td>
<td>34, Female</td>
<td>Chinese</td>
</tr>
<tr>
<td>7</td>
<td>27, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td>8</td>
<td>30, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td>9</td>
<td>29, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td>10</td>
<td>36, Male</td>
<td>Chinese</td>
</tr>
<tr>
<td>Family ID</td>
<td>Parents (grandparents) in the interview</td>
<td>Children in the interview</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td>Age &amp; Gender</td>
<td>Nationality</td>
</tr>
<tr>
<td>11</td>
<td>40, Female</td>
<td>Chinese</td>
</tr>
</tbody>
</table>

### 3.3.4 Data analysis

As mentioned in case study research part in 3.3.1, cross-case synthesis is the data analysis method in this study.

Based on figure 3, the analysis of the data is as following.

**Analyzing each case**

The results of the interviews of each family are listed, which related to the records of the interviews, see 4.1.

**Documenting tables**

According to the records of the interviews, a large figure is made to show the clear answers of the interviews, and the figure is divided into 3 parts, the details of each family are list in figure 6-8.

**Making smaller classifications**

Finding that some of the opinions of the parents and children are quite different, thus the results are listed according to the preference of both parents and children. Besides, the different aspects of e-books (like the use time, preferred features, preferred interfaces, etc.) are considered in this study.

**Finding the common characteristics**

Based on the figure 6-8 and the results of each family, finding what are the common opinions of these families, what are mentioned most as well as what they are caring about most.

**Identify and interpret**

After finding the common characteristics of each case, the most-mentioned features are brought up, and figures are made to see the result in a clearer way, to identify what the parents care about and what the children prefer. The figures show the comparison strongly, and show the important factors in designing e-books for children.
4. Findings

Based on the methods in the previous part, the results and the analysis of the data will be shown in two parts—interview results and data analysis.

4.1 Interview Results

In this section, 6 of the families are described separately, the other 5 families are illustrated in another paragraph, however, the results from the parents and the results from the children are not similar, thus what parents’ and children’s focus on in the e-books are different. Parents are more focusing on the benefits the e-books can provide to children, and children prefer the joy that e-books can provide to them.

**Family 1**

A 6-year-old boy in China is a frequent user of e-books, he has used Leleyuzhongyingwendianzishu (An e-book reader designed for children) and some applications of e-books on the iPad before. I have interviewed the boy, his parents, and his grandmother. He enjoys reading, especially the leisure story books, and according to his parents, he loves e-books much more than the normal books, and he will be addicted to the stories once he starts reading, thus his parents have to set an alarm to stop his reading concerning the harm to his eyes of the screen. So they mentioned an alarm setting function to the books which they think is a very useful function. They also point out that the reading aloud feature is a good point to help children understand the content better. The boy has a sister who is only 1-year-old, their parents also try to read to their little daughter, however, concerning the age limit, they only read to their daughter. The game in the e-books seems to attract children a lot, and they mentioned that adding the roles of popular movies (like Disney Princess) into the story will also motivate children to read. The education of common sense in the daily life is also needed to be added into the books as their concern.

**Family 2**

Another couple lives with their parents and their family have 3 children, I interviewed the 3 children, their parents, and their grandmother. The oldest child is 14 years old and she has used e-books in the school, comparing with the e-books, she finds herself more concentrated on the printed books, but she also likes to read e-books due to the color picture feature. Her 4-year-old sister and 1-year-old brother are banned from using electronic devices from their parents because their parents think that the screen is harmful to children’s eyes. The parents agree to read to their children but they work a lot and said they have little time to read to their children. Concerning of this situation, they think the reading aloud feature will help a lot. The children’s grandmother thought the e-books are hard to use and she mentioned that simplified operating of the e-books’ applications is very important.

**Family 3**

I have also interviewed a Chinese family including the 6-year-old boy, his mother and his grandmother. The boy has never used e-book before, so I gave him the application on the iPad called Qizhiyoushengshu (An application to read e-books for children) to use for a day and interviewed them after the boy used it. His family expressed that they want to try to use e-books and the boy used to read the printed books which have pictures. The parents care about the child’s eyes and this is one of the reasons they are not using the e-books now, but they like the boy to use the e-books with the limit of the reading time. The mother mentioned that the read-aloud feature is very helpful and she tries to let the boy
read alone. The grandmother said that a child-protection feature is needed and the animation of the e-books is a very interesting feature. The good price is also the advantage of the e-books.

**Family 4**

Another Chinese family has one 9 years old girl. The girl sometimes reads the e-books on the tablets but not frequently. Her parents see the importance of reading in child’s growing up time, and they think bringing up the good reading habit of the child is significantly important. But they also limit their child’s reading time as considering it to be harmful to the child’s eyes because of the screen. The parents like to read the literature books to their girl and they think that an e-book is a convenient tool so that the girl can read at any time in any place. The mother of the girl points out that the animations in the e-books is not a charming feature and this feature may limit the children’s imagination. Thus the parents like the e-books which are the same as the printed books in the outlook, and the good price of the e-books is another reason for buying them. Comparing with reading to their child, they would rather let the child read the books with her friends.

**Family 5**

The Finnish family I interviewed together with my classmates (Liang Shulang, Zhu Mo, and Li Bo) included the parents and their 2 daughters (one is 5-year-old and another is 2 years old). The father said that “The children are fascinated with the electronic devices.”, and the two girls have used e-books before in the applications on iPad. The parents are strict with the children’s use time on e-books as well, so that they are interested in trying special reading devices like Kindle. “Children are excited about the moving features and like to touch them all the time.”, said the father. He mentioned that a user-friendly interface is very important and the highlighting is a nice feature. The read-aloud feature he also mentioned as a helpful feature, and he said that it likes giving a life to the story. The parents want a child-protection feature inside the application so that they can avoid the children buying the books by mistake. They also said that a better screen is needed to protect the children’s eyes. The children reading the e-books alone like to watch the pictures. When they are reading with their friends they focus more on the sounds.

**Family 6**

Another family I interviewed with my classmates in Finland included the parents and their two children (one 5-year-old boy and one 2-year-old girl). The children never used e-books before and their father said that he will not consider to let the children use e-books at the moment. I give the children an application called MeBooks (An application for reading the e-books designed for children) on the iPad and let them use it for hours and interviewed them and their family. The father said that for the children this is like playing a game rather than reading a book. The parents are worried about influence on the children’s eyes and attentions when using e-books. The parents mentioned that the colorful interface is attractive as well as the recording feature. The father said, “Sometimes too much choice is not a good choice.” Thus he mentioned there are thousands of books on the e-books market and sometimes he would rather go to the bookstore in the street and buy one. The father also said that it is not a good feature that the e-books cannot be turned to any page randomly, but printed books can. However, the boy likes e-books more than the printed books, and he likes the read-aloud and the recording features.

**Family 7-11**

These five families were interviewed together, here I summarize the result of these five families together, but in the later part, each of these families is regarded as an individual family. Most of the children had used the e-books before, the younger children prefer e-
books while the older children liked printed books. All the parents have the restrictions to the children when they were using e-books, and they said: “we don’t want the children to lose their eyes when they are reading.” Besides, the parents mentioned that the e-books must develop the children’s motivation towards reading, as the development of the electronics and information technologies, the e-books can be the tools to everyone.

Figure 6, figure 7 and figure 8 show the details of the results of the interviews, some of the families have more than one children, and different children have different thoughts, so the ages of the children are marketed as the numbers in the brackets in figure 6 and figure 7, and in figure 8, the results are showed by family-based.
<table>
<thead>
<tr>
<th>Family Number</th>
<th>preferences</th>
<th>Frequency of using</th>
<th>Restrictions of using</th>
<th>Using time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E-book</td>
<td>Frequently(6)</td>
<td>Reading time(6) Only read aloud function(1)</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>E-book (6, 1)</td>
<td>Seldom(1)</td>
<td>When parents have time(1)</td>
<td>Leisure time</td>
</tr>
<tr>
<td>2</td>
<td>Printed book</td>
<td>Not often(14)</td>
<td>No limitation(14) Banned to use(4 &amp; 1)</td>
<td>Leisure time</td>
</tr>
<tr>
<td></td>
<td>Printed book (14)</td>
<td>Banned to use(4 &amp; 1)</td>
<td>After class(14)</td>
<td>Leisure time</td>
</tr>
<tr>
<td>3</td>
<td>Printed book</td>
<td>never</td>
<td>Reading time</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>E-book (6)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
<tr>
<td>4</td>
<td>Both</td>
<td>Sometimes</td>
<td>Reading time Content of the book</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>E-book (9)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
<tr>
<td>5</td>
<td>E-book</td>
<td>Sometimes</td>
<td>Reading time</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>E-book (5, 2)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
<tr>
<td>6</td>
<td>Printed book</td>
<td>Never (5 &amp; 2)</td>
<td>Reading time Use only cannot find a printed version</td>
<td>Leisure time</td>
</tr>
<tr>
<td></td>
<td>Both (5)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
<tr>
<td>7</td>
<td>E-book</td>
<td>Sometimes</td>
<td>Reading time</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>Don’ t know (2)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
<tr>
<td>8</td>
<td>Printed book</td>
<td>Sometimes</td>
<td>Reading time</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>E-book (3)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
<tr>
<td>9</td>
<td>Printed book</td>
<td>Frequently</td>
<td>Reading time Content of the book(for study and science)</td>
<td>Any time</td>
</tr>
<tr>
<td></td>
<td>E-book (4)</td>
<td></td>
<td></td>
<td>Any time</td>
</tr>
<tr>
<td>10</td>
<td>Printed book</td>
<td>Seldom</td>
<td>Reading time</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>E-book (7)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
<tr>
<td>11</td>
<td>Printed book</td>
<td>Sometimes</td>
<td>Reading time</td>
<td>Leisure time(6)</td>
</tr>
<tr>
<td></td>
<td>Printed book (14)</td>
<td></td>
<td></td>
<td>Leisure time</td>
</tr>
</tbody>
</table>

**Figure 6.** Details of preferences, frequency of using, restrictions of using and using time.
<table>
<thead>
<tr>
<th>Family Number</th>
<th>Prefer interface</th>
<th>sharing</th>
<th>buying</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>parents</td>
<td>children</td>
<td>parents</td>
</tr>
<tr>
<td>1</td>
<td>Colorful Animation Cartoon</td>
<td>Colorful</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>Colorful Cartoon Animation</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>Colorful Cartoon Animation</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>Same as printed book</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>User friendly</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>6</td>
<td>Same as printed book</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>7</td>
<td>Colorful Cartoon</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>8</td>
<td>Colorful Cartoon Animation</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>9</td>
<td>Colorful Cartoon Animation</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>10</td>
<td>Colorful Cartoon Animation</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
<tr>
<td>11</td>
<td>Colorful Cartoon Animation</td>
<td>Colorful Cartoon Animation</td>
<td>yes</td>
</tr>
</tbody>
</table>

Figure 7. Prefer interface, sharing and buying
<table>
<thead>
<tr>
<th>Family Number</th>
<th>Prefer features</th>
<th>Disadvantages</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>parents</td>
<td>children</td>
<td>parents</td>
</tr>
<tr>
<td>1</td>
<td>Alarm setting</td>
<td>parents</td>
<td>parents</td>
</tr>
<tr>
<td></td>
<td>Read-aloud</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Game</td>
<td>Read-aloud</td>
<td>Read-aloud</td>
</tr>
<tr>
<td></td>
<td>Adding roles of popular movies into the stories</td>
<td>Education</td>
<td>Interactive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td>2</td>
<td>Read-aloud</td>
<td>Read-aloud</td>
<td>Hard to use (more simplified operating)</td>
</tr>
<tr>
<td></td>
<td>Interactive</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Read-aloud</td>
<td>Better screen is needed</td>
<td>Helping children to grow a good reading habit, can be read at any time and any place, interactive</td>
</tr>
<tr>
<td></td>
<td>Child-protection</td>
<td>Animation</td>
<td>Animation(limit the children's imagination)</td>
</tr>
<tr>
<td>3</td>
<td>Read-aloud</td>
<td>Read-aloud</td>
<td>Better screen is needed</td>
</tr>
<tr>
<td></td>
<td>Interactive</td>
<td>Recording</td>
<td>Hard to use (more simplified operating)</td>
</tr>
<tr>
<td></td>
<td>Read-aloud</td>
<td>Too much choice is not a good choice</td>
<td>Reading experience on printed books are better; children reading e-books are more like playing games</td>
</tr>
<tr>
<td>4</td>
<td>Read-aloud</td>
<td>Read-aloud</td>
<td>Children are fascinated with electronic devices; they are excited about the moving things</td>
</tr>
<tr>
<td></td>
<td>Convenient to carry</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Interactive</td>
<td>Read-aloud</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>High light</td>
<td>Read-aloud</td>
<td>Game</td>
</tr>
<tr>
<td>5</td>
<td>Read-aloud</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Child-protection</td>
<td>Recording</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Interactive</td>
<td>Read-aloud</td>
<td>Game</td>
</tr>
<tr>
<td>6</td>
<td>Read-aloud</td>
<td>Read-aloud</td>
<td>Too much choice is not a good choice</td>
</tr>
<tr>
<td></td>
<td>Animation</td>
<td>Read-aloud</td>
<td>Read-aloud</td>
</tr>
<tr>
<td>7</td>
<td>Convention to carry</td>
<td>Read-aloud</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Animation</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Convention to carry</td>
<td>Interactive</td>
<td>Game</td>
</tr>
<tr>
<td>8</td>
<td>Read-aloud</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Animation</td>
<td>Read-aloud</td>
<td>Game</td>
</tr>
<tr>
<td>9</td>
<td>Read-aloud</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td></td>
<td>Animation</td>
<td>Read-aloud</td>
<td>Game</td>
</tr>
<tr>
<td>10</td>
<td>Read-aloud</td>
<td>Game</td>
<td>Game</td>
</tr>
<tr>
<td>11</td>
<td>Read-aloud</td>
<td>Game</td>
<td>Game</td>
</tr>
</tbody>
</table>

Figure 8. Prefer features, disadvantages and advantages
4.2 Data Analysis

In this section, the details of the interview result will be illustrated, 10 aspects of the e-books are described separately, including preferences of the reading, frequency of e-book use, restrictions on using e-books and the use time, reading experiences, sharing and buying, advantages and disadvantages, and interface preferences.

Preferences of the reading

It is interesting to find out that when children are reading, what is the first option of them and their parents in printed books and e-books. The parents from 7 families chose printed books as the reading tools for their children and one of the father from China but lived in Finland now strongly disagree to let his children using e-books. The parents from the other 3 families prefer e-books as the reading tools for their children, and one of them is the only Finnish family I have interviewed. The parents from the rest one family said they like to try both the printed books and e-books for their children. However, 11 of 16 children chose e-books as their preference reading tool, 2 children are more inclined to printed, but it is dramatic to find out that these two children are both 14 years old which are the two oldest children I have interviewed. 2 children don’t know their preference and 1 child like to use both printed books and e-books. Figure 9 shows the parents’ and children’s preferences of reading tools.

![Preferences of the reading tools](image)

**Figure 9.** The preferences of reading tools

Frequency of e-book using

Before asking the participants about their opinion to e-books, it is also needed to do the survey on their frequency of using e-books. 2 of 16 children were frequent users of e-books. 6 children sometimes use e-books but not every reading times. 3 children had used e-books, but they seldom use e-books (including one child who said “not often”), and 3 children never used e-books before. What the point is that two of these three children are in the family 6, in which their parents strongly disagree children to use e-books. However, 2 of the 16 children I have interviewed were banned from using e-books, whose parents concerned their children were too young to use e-books. Figure 10 shows the distribution of the children’s frequency of using e-books.


**Figure 10.** Children’s frequency of using e-books

*Restrictions on using e-books and the use times of e-books*

There are many rules set by parents when their children are using e-books, and these restrictions can be related to the function design for e-books. Nearly all the parents I have interviewed mentioned reading time restrictions to their children, and this restriction is concerning the protecting the eyes of children, which means parents thought the screen of the e-books may do harm to children’s eyes and this feature I will also illustrate in the following part of this thesis. Besides, two families set the content of the e-books for their children, and the parents said: “children must read something related to the science and can be a good guide in their future life”.

For the use time, almost all the family members I have interviewed chose leisure time to use e-books.

*Sharing and buying*

All the parents in the interview agree to share the e-books to the others, and all the children participants agree to share e-books to others except one who likes read alone.

Besides, parents in family no.10 said they didn’t want to buy e-books for their child because they thought the screen of the e-books do harm to their child’s eyes and e-books may have bad influence in children’s education, another family said that “reading experiences on printed books are better.”, but all the other parents wanted to buy the e-books for their children.

*Preferred interfaces*

The preferences of the interface of the e-books were not too much different. For the parents’ choice, 8 families considered colorful was an important characteristic, 4 families liked cartoon interfaces, 3 families preferred animation, 1 family thought user-friendly interface was very important, however, 2 families liked the interface of the e-books which were the same as the printed books.
As for children, all the 11 families liked colorful interfaces, 10 mentioned animation and 9 liked cartoon interfaces.

Figure 11 shows the interface preferences of the e-books.

![Interface preferences of the e-books](image)

**Figure 11. Interface preferences of the e-books**

*Preferred features*

In the interview, parents and children were asked what features they thought were the good features in using e-books and what were the disadvantages of the e-books. In the previous table, I listed these features as family-based. All the parents in the interviews agree the read-aloud is a must-have feature in the e-books, “It’s like that someone is talking to the children and the children can really listen attentively.”, said one of the father. Besides, according to the answers of the parents, an e-book should be interactive (5 families mentioned), animation in the e-books was noted by 4 families as well. Besides, easy to carry was also mentioned by 3 families, and a mother said in the interview “with e-books, children can read at anywhere in anytime.” Education, child-protection and editing were also noted by more than 1 family, and the other features motioned in the interviews were alarm-setting, game, popular stories, better price, highlight and recording.

Apart from what parents prefer, all the children in the interviews were found of the read-aloud feature, and children in 10 families said games in the e-books were charming, one child mentioned record, and another child thought e-books must have education features.

Figure 12 shows the preference features in e-book using.
Both parents and their children were interviewed about their reading experiences of the e-books, for those children who had never used e-books before, I gave them the e-books on iPad to use for a period of time and interviewed them after they used the e-books. The most common feature that parents came up with is the interactive e-books, which they considered as a new way to let children focus on reading. Another thing parents said in the interview is that e-books are convenient to use and carry (comparing with printed books), and one of the parents said: “It is quite convenient to take the e-books to anywhere and many books can be read by only one electronic device.” It is also mentioned that e-books save parents’ time, some of the parents in the interview were too busy to read to their children, but e-books with read aloud functions solve this problem. But there were also parents who said the e-books designed like printed books will provide a better reading experience. However, having fun is another important feature that parents considered as what e-books should have.

Children’s tastes seem not exactly the same with their parents. Children prefer the lively e-books, which means an e-book can “talk” and move, they like the games in the e-books and they like to read different kinds of the books, some children like fairy tales, others like science. Children liked to try new things and they prefer the e-books which can give them the sense of joy when they are reading, for example, one of the girls said in the interview “I like the e-books, because when I am reading, I feel like I am taking into an adventure.” Moreover, children mentioned that e-books can help them to learn, they are willing to spend more time on reading, and one child also said that learning becomes easily. Thus educational is another good feature of e-books which can help children’s learning become easy and help them grow a good reading habit.

Figure 13 shows parents’ and children’s focus on the reading experiences.
Figure 13. What parents’ and children’s focus on reading experiences

Disadvantages
Except for the good features, the parents also talked about the disadvantages of children using the e-books, but children in the interviews didn’t mention the disadvantages of the e-books. 8 families said that a better screen was needed, and the reason is that they were worried about the children’s eyes, and 4 families thought that e-books were hard to use. Besides, one mother in the interview disagree that animation was a good feature, “Too many animations can limit children’s imagination”, said the mother. Besides, one father in the interview thought that there were millions of books in the e-book market, and sometimes having too much choice is not a good choice. Figure 14 shows the disadvantages of the e-books.

Figure 14. Disadvantages of the e-books
5. Concluding discussion

This chapter is divided into five parts. The first part is the summary of the findings of this study, and the second part will give research implications, which is followed by the practical implications. Then the limitation of the study will be discussed and the last is the proper future work.

5.1 Summary of the results

The research question of this study is what are the differences between parents’ preferences and children’s preferences in e-books for children. The preferences of reading tools for children are different in parents’ preferences and children’s preferences, most parents in the interviews prefer printed books for their children while more children choose e-books.

Besides, the results of this study reveals that there are still quite many children who have never used e-books, only small group of children are frequent user of e-books, while comparing with the result of preferred reading tools (most children prefer e-books), it shows that parents play important roles in deciding children’s reading tools. What’s more, a large amount of the parents in the interviews set restrictions for their children in e-books using, and some of the children are even banned from using electronic devices (including e-books).

Almost all the parents and children choose leisure time to use e-books and except one child who enjoys read alone, all the parents and children are willing to share their reading with others. Thus, it was suggested that most children are willing to share their reading with their friends, but few of them also enjoy self-reading. Moreover, the preferred interface for both parents and children is colorful, with animation and cartoon. Thus in the interface aspect of e-books, colorful, animation and cartoon are the most common preferences that are suggested to be included in the e-books for children, but there are also few parents who like the e-books designed as same as the printed books.

One of the more significant findings to emerge from this study is that almost all the parents are worried about children’s eyes when they are using e-books, thus some of the parents said the alarm function is helpful to remind children to have a rest when they are fascinated in reading, and other parents strongly mentioned the improvement of the screen of the e-books is needed.

However, parents more focusing on the interaction between the e-books and children, the read-aloud function is also considered a way to help children engaging with the e-books. Nevertheless, children prefer lively e-books, the game in the e-books are also a popular function to them, children like to try different kinds of e-books and the enjoyment when they are reading is important to them. One thing is that none of the participants in this study mentioned the dictionary feature which is suggested in the literature.

5.2 Research implications

This study integrates the relationship of children and e-books, starts from children and reading to the designing e-books for children. The study makes it clear to find out what is important in e-book designing for children in children’s and parents’ preferences. The previous research shows the designing technology with children can help them in their
life. Children in the technology design are not only playing the role as users, they can participate in the design part even as design partners.

The results of this study revealed that not all the children have access to e-books, and considerable parents prefer to choose printed books for their children, but children instead are fonder of e-books especially those younger children. As Colombo & Scipioni (2014) mentioned, children have now become fanatic about the mobile tools, most children are willing to use e-books as their reading tools.

What’s more, the results also show that some of the parents are strict with the content of the e-books when children are using, they are worried about what children can learn from the e-books, Colombo and Landoni (2014) also found that the text of the stories is the core of the e-books. Besides, both the parents and children choose to use e-books in children’s leisure time in the survey of this study.

The study has found that generally reading experience is also considered as the important factor in e-books, but the preferences of parents and children are quite different, even the children of different ages focus on the different features. Hourcade et al. (2003) found that different children have the different preference of e-books. As Maynard (2005) pointed out, the advantages of the e-books include the convenience to carry and storage.

The reading materials of children are mostly under the control of their parents, thus the family plays an important role in children’s reading. Children’s reading habit is built up since they are very young, therefore to cultivate a good reading habit and the sense of enjoyment when children are reading is necessary (Maynard, 2010). Apart from this, the initiative of choosing the reading materials will also influence the children’s enthusiasm about reading. E-books are the new reading technology and it does meet the readers’ demands as well as printed books, however, parents always choose printed books first.

As the improvement of interests towards e-books, this digital technology is becoming the normal reading choice in people’s daily life. As for children, due to the limitation of their age (poor vocabulary), the reading materials for children are different from the ones for adults in some aspects. Colombo et al. (2014) listed four design features for educational e-books which including oral reading, hotspot activation, dictionary and game mode. Read-aloud is the good feature that all the participants agree, but apart from what parents valued (interactive, animation, convenient, education, child protection, editing and etc.), children enjoy the game mode in the e-books.

What disadvantages parents are concerned about most is the screen of the e-book devices, which parents think will do harm to children’s eyes. Besides, some of the parents thought the e-books are hard to use. It is worth mentioning that animation is considered as a bad feature in some situations which will limit children’s imagination. Dalla Longa and Mich (2013) found that not all the children are activating to the animations in the e-books as well.

The reader is also developed by the invention of the new technology tools such as tablets and mobile phones, and children’s tastes of the readers are different, to decide which tools is another challenge. While the e-books can offer some features that printed books don’t offer, for instance, the animation, e-books cannot include the features such as weight and size, which may cause a confusion when children are choosing the books. Children especially young children are learning quickly, thus it is easy for them to learn to use the new technology tools.
Researchers also found that the features in the e-books do not enhance the enjoyment in reading to all the children, some children may benefit from some features (like animations) while others do not. Designing an interesting and charming e-book is required to add some elements like read-aloud function, nevertheless, these elements can not replace the basic function of a book in the texts and pictures.

Although the new elements cannot replace the texts and the pictures, they can help children engage with the books in a positive way. Researchers found that the recording and the dialogic reading features improve the children’s interest towards reading. But the balance of these features in designing e-books is needed because not all the children have the good engagement with the books with these features.

5.3 Practical implications

This study provides the comparison of what parents prefer and what children prefer in children’s e-reading, and the one who wants to design the e-books for the younger children may benefit from the results of the parents’ tastes. For those who wants to enhance the reading experiences for children, you can also find out what the children want. I have done the interviews of 11 families which are from two different countries—China and Finland, and the ages of the children vary from 1 to 14.

Accordingly, the most surprising finding is that all the parents in the interviews are worried about the screen of the electronic devices—in case of the harm to the children’s eyes, some parents even banned their children from using e-books. This information is even not in the literature I have reviewed. One of the father in Finland think that children will be fascinated with the electronic devices, e-books thus are attractive tools for children, however, children don’t know when to stop reading and have a rest, they may get eye disease. The lights of the e-book readers are considered as having a bad influence on children’s’ eyes as well, thus designers need to consider about the screen of the e-book readers.

The evidence from this study suggests that the preference factors from parents and children have huge differences in some aspects, but in other aspects, their tastes are the same. Finding the relationships of the preferences between the parents and the children will help to have a better understanding of children’s e-book design—especially those younger children. The reading materials for the younger children are mostly decided by their parents, thus what parents care about is important in designing e-books. Thus the design for the younger children should include the needs of the parents.

Figure 15 shows what are the parents and children caring about in children’s e-reading. While parents and children focus on the different aspects in e-reading, the common part of the preferences is more important, it is suggested that the features in the mid part of figure 15 come to higher priorities in e-book design.
Figure 15. what are the parents and children caring about in children's e-reading

Not all the parents will choose e-books instead of printed books, but e-books and printed are not on the opposite side, some parents or children will choose both in their reading. The reason for children’s reading is not the same in the parents’ view and children’s view, parents always choose what is good for their children while children prefer the reading which can bring enjoyment to them.

At the same time, not all the children are using e-books, moreover, some of the parents having a strong rejection of e-books, and most parents participating in this study mentioned that the screen of e-books is bad for children’s eyes when they are reading as mentioned in the previous paragraph. Thus to do the research on the screen or other carriers of e-books is an interesting field which is also mentioned in the follow chapter 5.5 future work.

Almost all the parents set the using time of their children when asked about the reason of the limitation of using time, most parents considered about the children’s eyesight. But for the older children, it seems they have the freedom to enjoy their reading time.

The study also suggests that the ages of children and their reading experiences have connections, and the younger children are fonder of moving and voice features. In particular, the only two children who are over 10-year-old (both aged 14) prefer reading printed books, the other children in the interview choose e-books or both or don’t know. I don’t know the reason of their choice, but the reason might be that when they were younger, the e-books were not as popular as now and they may have had few chances to read an e-book thus they are used to read the printed books, and this is an interesting question that can be studied in doing more interviews which are also pointed out in the follow chapter 5.5 future work.

The needs of the younger children and older children towards reading is also different, see figure 16. The younger children are attracted by many features, and they are focusing on the enjoyment when they are reading rather than the context of the book. But the older children are focusing more on the text itself.
The results of this study indicate that the e-books design need to concern both parents’ and children’s preferences, and the point is that parents and children have different thoughts in some aspect as well.

In general, therefore, it seems that children like e-books which are lively, joyful and including game mode, while parents more focusing on the interacting, convenient and read-aloud features. The e-books designed for the younger children who cannot read alone require to listen to the parents’ opinions.

Besides, the results also suggested that read-aloud function is a very popular feature which all the participants are fond of. An e-book is suggested to be designed as convenient, interactive, educational and having child-protection features. What’s more, for those e-books that want to attract children’s eye sights, adding a game mode is a good choice. In the interviews, children were given the tablets or the mobile phones which included e-books to use. Most children were fascinated with the e-books and they stared at the animations, and a five years old boy used an e-book application called Mebooks which included the recording function, he read the “Little Red Riding Hood” for 3 times, spent a lot of time on recording, and he really enjoyed reading the story, although he didn’t know how to record at first. The story is in the text with colorful pictures, it has the read-aloud feature as well.

The results in this research support that the improvement of the screen of the e-book is needed, or having an alarm feature (which was recommended by the parents in the interview) to remind children to have a rest when they are immersing in reading. Thus more simplified operating is needed as the way to help the user have a better user experience.

As for the interface of the e-books designed for children, colorful and cartoon are the popular features which both children and parents agree. However, the animation feature is a controversial feature that some parents thought may limit children’s imagination.
The results of the current study indicate the following suggestions. First, to get a healthy reading environment, build a better screen in the tools of e-book reading or add an alarm feature into the e-book to help remind the children to have a rest when they are reaching the limit time of their reading. If there are any other solutions to reduce the harm to children’s eyes when they are using e-books, try to do it. But it might also be that the parents think that the screen is more dangerous than what it actually is and the just informing the parents is needed.

Second, e-book designers need to consider the age range of the e-book users, in different age stage, the needs of the children are different. For example, the read-aloud feature to the children who are too young to read is significantly necessary, because the lack of reading ability made them hard to read the texts, but the voice helps a lot, as well as the pictures. However, for some older children who are able to read, the read-aloud feature seems not that necessary.

Besides, the interface of the e-books is suggested to be designed as colorful, animation and cartoon. Most families’ members in the interviews of this study talked about these three features, and the e-books designed colorful are strongly welcomed by both parents and children. But some of the parents said that the animation will limit children’s imagination, thus set a button that can turn off the animation of an e-books is one solution to this situation.

What’s more, the design of the e-books should focus on the reading experiences, the e-books are supposed to be interactive, convenent and including the read-aloud feature for the younger children. Nevertheless, for the e-books which are more focusing on the children’s reading experiences, they should be designed lively, joyful and including some small games so that the children can have interactions with the e-books.

Moreover, few children are frequent users of e-books, and some children even never use e-books, and few children prefer to read printed books. To design an e-book like a printed book is a capable way, although this seems to waste some of the special features of the e-books, but for the older children, designing e-books in this way may encourage them to read the e-books.

5.4 Limitation of the Study

While the study reveals some of the important factors in designing e-books for children, there were some limitations to the study that must be mentioned. The first limitation is that the study has small sample size, and almost all the families in the interviews are Chinese families, only one of the families is Finnish family. More families from the different area are needed. The number of the older children in the interview is small as well.

Another limitation is that the literature review of parent’s ideas about the e-books designed for children is limited. This makes the interviews with the parents rely on limited literature, and there is no comparison with parents’ choice and children’s choice in the literature review part.

A third limitation is that the e-books used in the interviews are different. I gave the Finnish family an English e-book application called Mebooks and the Chinese are given another Chinese e-book. The two e-book applications have different features, for example, the English one has recording feature while the Chinese one does not. This may influence the results in some situations.
5.5 Future work

Future research might investigate how to motivate children to read by using e-books, and what are the priority needs between parent’s preferences and children’s preferences. To find out this, the relationship of the parent’s thoughts and children’s thoughts is also needed to be studied.

E-book as a new technology is under development, thus more children will be in touch with it since they were young, but quite many parents still choose printed books as preferred reading tools. Finding out the advantages of e-books and the potential of them to help children get a better reading habit is needed.

The study of the younger children’s needs and the older children’s needs is also considered necessarily because children grow up fast and learn things fast, their needs will change in their different age stages. The study of the better screen of the electronic devices is also necessary.

For the future research, more features of the e-books are needed, and they need to be studied in the different country, what are the children’s preferences to the e-books, the environment of reading is also interesting. Although the current study focusing on the features and the interfaces of the e-books, the environment of reading is also important, the attitudes of the parents are also different. In this study, the only Finnish parents prefer e-books than printed books while most Chinese parents choose printed books for their children, but due to the small sample, this cannot be an evidence for the explanation, thus the study of the environment to the reading is necessary.

Moreover, the educational e-books and the leisure e-books are both important, most of the literature I have reviewed in this study are about the educational e-books design, only few about leisure book design, but I found that almost all the interviewees in this study choose to read e-books in their leisure time, thus more research on the leisure e-book design is necessary.


Appendix A Interview questions

1. Do you or your children prefer e-book or the printed books?
2. Does your child have any experience in using e-books?
3. Are there any limitations for you or your child/children about using the electronic devices?
4. Do you think you or your child/children has/have a better reading experience when using e-books?
5. How long does it take for you or your child/children to use e-books once?
6. When you or your child/children are reading e-books, what makes you feel like you want to read more?
7. Do you like to recommend an e-book to your friends or other parents?
8. What other features you want on the e-books? What’s your expectation to the e-books?
9. What kind of the interface of the e-books do you prefer?
10. What is the advantage of e-books according to your personal opinion (based on your child/children’s behavior)?
11. Is there any difficulty while your child/children using e-books?
12. Would you like to pay for an e-book for your children?
13. When does your child/children normally use this?
14. Does your child like to read books with friends of alone? /what about e-books/any different feeling while reading e-books with other children.