8 SUMMARY

Games playing – on designing and using children’s computer games in the rehabilitation of disabled children in particular
Games have reflected society and been an integral part of their society and era. Games are events in the lives of the children and adults of their time. Currently, computers and computer games have also been introduced into the realm of play. In this research, I have studied children’s computer games as applied arts products that contain visual communication from the viewpoint of game design and representing the views of both the designers of computer games and their users. In this context, I have used the expression ‘children’s computer games’ to refer to computer games designed for the use of children below school age (7 years of age in Finland). Naturally, older children and adults can use these games as well. The users that I have studied include personnel involved in the rehabilitation of multiply disabled children, who are using computer games in their everyday work, the rehabilitation of disabled children and young adults.

Although people have been designing computer games since the late 1940’s, they only became common and economically significant alongside the development of microcomputers in the 1980’s. In the 1990’s, the design and production of computer games expanded to become applied art and a part of the entertainment industry producing games for computers at home, at school and at work. The games are used in the rehabilitation of multiply disabled children as well.

Existing research and views on designing and using computer games have not addressed the needs of multiply disabled children and young people and rehabilitation personnel as users of ordinary computer games designed for all children. Research on rehabilitation has not specifically studied the relationship between computer games and rehabilitation, and visual communication research has not studied the use of computer games by disabled children. Therefore my research subject and approach are well founded.

In my research I have studied children’s computer games, their designers’ and users’ views. The designers were selected through the sample games. The users, personnel involved in the rehabilitation of multiply disabled children, were selected based on their keen interest and motivation in computer aided rehabilitation. They had used computer games as their tools and using games had already been an everyday part of their activities long before my study.

My research material consists of two children’s computer games and includes interviews with their designers and users. I obtained research material both about the computer game designers’ and the users’ viewpoints using theme interviews. There is no previous research on the subject or the viewpoint, which makes my research exploratory. The scarce research literature in the subject field does not present any handling criteria and my views are therefore based on material gathered for this research.

The subject of my research can also be approached using other methods. I believe that from the designer's point of view, the implementation of a computer
game would be the most challenging approach for research. From the users’ point of view, the most challenging approach would be to use computer games as rehabilitation tools with multiply disabled children. Considering the amount of work it would require, implementing a computer game and observing the process by participatory observation could not be achieved through a single dissertation, as the implementation of a game can easily take two years. By limiting the scope of the work, for example, by studying one computer game, participatory observation would also be possible. On the other hand, in my previous research, my licentiate thesis, I have already studied the viewpoint of game design. In that study, the games were specifically designed and implemented for rehabilitation purposes and not for all children. I chose not to study the rehabilitation of multiply disabled people and playing, as I could not have made the relevant observations about the actions of the disabled children. The disabled children and myself would have had a different communicational basis and my view is that I would have interpreted the children’s communications incorrectly and inadequately. That kind of research would be possible, but it requires a multidisciplinary research group.

I have studied examples of computer games, their designers and users. As samples in this research I have selected the U.S.-made computer game “The Tortoise and the Hare” (1994), which is based on Aesop’s fable and the British game “Duck City” (1996). I selected an American and a British game, because, when I was starting my research and selecting the samples in 1996, there was only limited production of Finnish computer games, especially children’s computer games. Finnish computer game players selected their games from foreign ranges and many of the games were produced in the United States or in Great Britain. The samples therefore correspond to the situation of the time. I have specifically chosen these examples, because they differed both in their visual appearance and in their expression. Both of the games are suitable for the rehabilitation of multiply disabled children.

The game based on the “The Tortoise and the Hare” fable is narrated like a book: the game progresses linearly from start to finish. It includes the written and spoken story in English and in Spanish, both of which are foreign languages for Finns. In addition to following the story, the player can interact with the game and perform actions on the screen. The other game, “Duck City”, consists of six relatively short, independent games. The designers of the game have not implemented a specific narrative or written or spoken language in the same way as in “The Tortoise and the Hare” game.

The sample games have different visual outlooks. “The Tortoise and the Hare” game includes painting like background images; its characters and images are more detailed and drawn with thin, fluent outlines. The visual traditions of illustrated children’s books and animated films can be seen in the game. “Duck
City” is drawn in a rough manner and includes little detail. The figures are stout and often drawn with thick and rough outlines. Colours are solid. The roughness and lack of detail may be linked with low resolution computer displays and limitations in presenting colours.

My examples of children’s computer games are essentially linked with the development of computer games and computers and the selected children’s games are not isolated from general development of such games. The development of computer games started soon after electronic digital computers were developed in 1959. The first computer game, “Bouncing ball”, was produced in 1949. The visual appearance of the game, a ball bouncing on a graphical display, was the solution of differential equations describing the ball bouncing. Children’s computer games today, their choice of subject and actions reflect the history of computer games. Ideas for designing children’s computer games are derived from illustrated children’s fairy tale books, films and also from adventure and simulation games developed during the era of mainframes and mini-computers. These ideas can be seen in the samples of children’s computer games used in this research, “The Tortoise and the Hare” and “Duck City”. For example, the bouncing of a ball can be seen in one part of the “Duck City” game, moreover, both my sample games apply the search and effort method presented in the 1976 adventure game, “Adventure”.

The users in my study were personnel involved in the rehabilitation of multiply disabled children and young people. They work with children and young people with communication difficulties and delayed development of other areas of social competence compared with non-disabled children.

Multiply disabled children have various problems in communication, mobility and daily activities. These problems are due to motor, developmental, sight and hearing disabilities that delay the development of the child's social competence compared with their non-disabled peers. The developmental stages of various areas of social competence have a major effect on each other. For example, the development of social contacts affects communication and vice versa, just as the development of mobility affects, for example, the possibility of social contact. An increase in social contacts in turn affects the development of emotional expression, etc. Although the emphasis of my research was on the development of communication, this area cannot be completely isolated so that it can be researched alone.

The purpose of rehabilitation is to improve disabled children’s social competence. In this research I have studied computer games used in the rehabilitation of disabled children. These games are the material and tools of personnel involved in the rehabilitation, which are used in the same way as any tools, such as toys or fairy tale books.
Children’s social abilities are increased in games and also in play. However, traditional play and disabled children’s games are different from those of non-disabled children. Therefore learning concepts, understanding causal relations and association of things and also the development of their social competence is easily delayed compared with their non-disabled peers. The development of communication and interaction starts in early childhood, and if a child does not have the opportunity to play with other children or adults, the development of communication and thus, for example, social contacts and abilities do not develop well.

The motor abilities of some children with disabilities are not adequate for handling toys, picture cards or picture books. People caring for the child act as the hands that the child controls. The child cannot perform the task, investigate objects, turn pages, but always needs a carer acting on their behalf. Men the child uses a carer, he or she gets less experience of the environment than if he or she would perform the tasks himself or herself. It is central for the development of social competence that the child can and may act independently.

The computer can be used for several games, you can change programs and in a way the computer contains several toys. Using the appropriate controls and computer games the child can act independently without an aide. Motor disabilities are not a hindrance as in turning the pages of a book, for example. Computer games also differ from all other materials in the sense that the computer gives the child constant feedback. The game is created in interaction with the child. By pointing and clicking the mouse the fairy tale figures move, talk and make noises, animations fill the display, figures give humorous visual feedback and the game proceeds.

The disabilities may hinder the child’s movements so much that motor disability alone may restrict communication and interaction with other children and adults and may restrict the amount of feedback and support received from them. A lack of communication and interaction may lead to problems with self-esteem, which in turn may hinder and prevent communication and interaction. A computer game that supports and gives the child immediate feedback helps the child’s development, additionally, succeeding in a game promotes development of self-esteem. This also encourages the child to act more, to communicate and to interact with people.

In rehabilitation, the personnel involved in the rehabilitation and the children communicate about the themes of the game and share the game and its subject. Rehabilitation and play shift the communication and interaction between the children and the computer games and between the children and the personnel involved in rehabilitation to communication and interaction between the child and other people. Thus playing computer games induces similar communication and interaction as non-disabled children experience in play and in playing
traditional games and communicating about the activity to others. Play and games assist the child to communicate and interact both with the play and with people. 

As such, a computer is an everyday appliance today. It is used in the workplace, in schools and at home. Therefore using a computer is already a civic skill. When disabled children start to play computer games, they learn to use computers. Games include tasks and constituents that are present in other uses of computers: these include, for example, selections, conclusions, hierarchical structures and classification. In this way computer games rehearse skills that are essential in using computers in contemporary society.

Disabled children and perhaps also non-disabled children, have a need to do and experience more than their current skills allow them. Also for this reason they need games that allow them to perform new things – things that they could not otherwise accomplish. New skills increase their reserve of concepts, improve their self-esteem, make them more sociable and increase communication and interaction.

By performing actions on their own and controlling the game, children can affect the way the story progresses. Disabled children may not be able to handle traditional printed fairy tale books at all. But controlling the computer makes the fairy tale figures speak and move in addition to turning pages. The child accomplishes all this alone, not through a carer, for example. Here the child is in direct interaction with his or her surroundings.

Before disabled children can use computer games as part of their rehabilitation, the personnel involved in the rehabilitation have made their own choices. They have decided which games to buy and which game to use with each individual child. In my samples, the choice of visual appearance is central to the decision-making and the preferences that affect it. The samples in my study show that the rehabilitation personnel rely on the traditions of visual presentation and familiar imagery solutions in selecting the computer games. New visual approaches are rejected. However, it is beneficial for the children to accept, view and play new computer games, including games with visual presentation, which are different from earlier games. This also makes it possible to extend the disabled children’s visual experiences and promote the improvement of social competence. Computer games make disabled children more equal in the visual world as well.

The designers of the sample games express themselves through computer games in the same way as the authors and illustrators of children’s fairy tale and picture books. Based on the samples that I have studied in this research, designing and implementing computer games is a combination of telling a tale, visual design and planning interaction.

For its designers, a computer game is a means of expression. The aim is to get the players to see and hear what the designers have to say. The game is about
communication, sharing and interaction. The designers of the game want to approach the children, be their friends, convey the feelings they have experienced to the players and get the players to share their thoughts. Metaphorically speaking, the players can touch the game designers' minds.

The designers of both example games could freely design the contents of the game. The designers of “The Tortoise and the Hare” could present Aesop’s fable the way they wanted to and the designers of “Duck City” could experiment with new ways of interaction and user interfaces. The designers also delighted in their games and enjoyed making them. The freedom and delight of creation and discovery spawned new ideas, visual presentations and ways to interact with children’s games that were used as examples. The visual presentation of the sample games reflects the artistic views of their designers. Additionally, the selected programming tools, their possibilities and limitations had an important effect on the visual presentation. Similar opportunities and limitations have existed throughout the history of computer games. The designers of games use their games as means of expressing themselves. They want to tell others interesting stories, to share their experiences and to communicate.

In addition to stories and visual presentation, the design and presentation of interaction affects how the game is experienced. This is particularly apparent when the players are multiply disabled children, as in my research. The game, its user interface and interaction need to challenge and enable the children's abilities. The designer’s task is to formulate refined solutions so that they are easy for the player, because the function of the user interface is to enable the user to act, not to make it more difficult. At its best, the user interface is so well thought out and self evident that when the player wants an action, he or she finds that the designer has already implemented the feature in the game.

The designers of the children's computer games that were used as samples in this research implement games that are also intended to entertain the children visually. The designers consider that they are implementing entertainment products, computer games that in their opinion do not need to be educational. Why should the games educate, as their idea is to be different from “ordinary life”. However, the definition of a game does not rule out the possibility that one could learn from games – just as they can learn from illustrated children’s fairy tale books. In this research, learning means developing the social abilities of multiply disabled children and therefore, in broad terms, learning skills in life.

Playing games teaches children to be systematic and to be critical in their thinking, as well as teaching them problem solving, selection and causal relations. Computer games and playing games on a computer teach children how to use computers: how to insert a CD-ROM in the CD drive, how to start a game by double clicking the correct icon, how to use a mouse, etc. To be systematic, to solve problems and to select are prerequisites for using computers and computer
software. A computer game is not just playing. It teaches you how to use a computer, how to use computer software and it also provides the ability to use applications other than just games and provides the skills to use computers in adult life as working tools.

The sample games were not specifically designed for multiply disabled children. But disabled children have the same need to gather experiences and to communicate as their non-disabled peers. Their need can be even greater, if they cannot move or be understood unassisted.

Computer games are not exactly the same as traditional games. The actions and experiences gained are different. For disabled children it is important to participate in the game and to act in it. If there is no possibility to participate in traditional games, interactive computer games can offer all children essential experiences and feelings of success. The aim of a game is not that the user is a passive spectator, but that the player is an active participant. When you point at objects on the screen, the game makes you feel in control. The child can point at objects on the screen, click them with the mouse and the game responds to their actions. As the player, a child is in control of the game. The game is intended to proceed as the player clicks on the objects. This gives the player the feeling that he or she is controlling all actions in the game with his or her own actions. The child is immersed in the game. This is exactly the feeling that the designers of the game want to give the player. The designers of the game want the player to be immersed in the game and to give the player the impression that he or she has the power and control in his or her hands.

The importance of the power to control and to immerse oneself is emphasised in the game when the player is a multiply disabled child. In many ways, multiply disabled children are not in control of their lives in the same way as their non-disabled counterparts. They can not move around independently or other people may have difficulties in understanding their speech – they need assistance and can not decide where to go, when to move, who to talk to, with whom to communicate and interact. A computer game that removes these obstacles, at least for a moment, releases the disabled person and provides him or her with the means to act regardless of his or her disabilities. With adequate controls, disabled children can use a computer game and play it at a speed suitable for them. A disabled child can master his or her life and control it during the game. The control is naturally restricted by the limitations implemented by the game’s designer and the selection made by the personnel involved in the rehabilitation.

Immediate positive feedback and interaction with a game like this enables a multiply disabled child to change his or her way of thinking. As a child receives positive feedback on his or her actions in a situation that he or she controls, it also encourages him or her to act in a similar way in other situations. In the same way
as in games, people notice other people – disabled people too – when they approach and start to talk to them.

According to this thesis, the designer’s communication with the game becomes communication between the game and the player. The designer shares things and actions with the player. When a player interacts with the game, he or she also interacts with the game’s designers through the game. When playing a computer game, the player acts in an environment that functions in the player’s conditions; the player decides the speed of communication. In rehabilitation, multiply disabled children have control over what they want to do and at what speed. This is invaluable for the child’s self-esteem, communication skills and other areas of social competence, which thus promotes the child’s development and independence. Communication and interaction with computer games are transferred to communication and interaction with other people. In that sense, computer games have an important role in our society.

On one hand, computer games are tools for children’s voluntary actions. They have their own purpose for the child, which results in feelings of excitement and joy; games are something different to ordinary life. On the other hand, computer games are associated with the way society functions. According to this thesis, computer games can teach many skills, particularly in the rehabilitation of multiply disabled children; they teach how to act together, how to interact, how to share and how to communicate. Computers are part of adulthood: they are used in the workplace, at home and in schools. Games guide the child in an interesting and pleasant way to use computers as working tools. Therefore computer games are tools that lead to adulthood and work and teach essential skills. There is a Finnish saying that half of life is play, and playing computer games can therefore be said to also be half of life.