

# ENGLISH ABSTRACT

This dissertation presents my studies of the research questions of how it is possible to motivate children with cochlear implants (CI)\* through integrating digital components in the speech and hearing therapy, and if it is possible to extend the focus from spoken language to a broader perspective that integrates linguistic, social and physical interaction with the surrounding environment.

Recently, the area of speech and hearing has undergone a significant transformation. Since the middle of the 90s, we have become aware that deaf born children have been able to obtain a kind of hearing through CI, but not until recently has it become obvious that children who are implanted before the age of one are able to obtain fast auditory integration and subsequently an age-appropriate, spoken language. Before that, hearing loss was typically not detected until the spoken language failed to appear, but an obligatory neonatal hearing screening enforced in 2005 has resulted in early detection of hearing loss and the possibility of early diagnosing, hearing aid treatment and CI operation at the age of 11 months.

This new generation of CI users has quickly become a fact which has resulted in a range of positive consequences and future prospects, including integration into mainstream daycare institutions – rather than special pedagogical institutions – good verbal contact with close relations, integration into the social surroundings and general well-being like normally hearing children. Within several fields, it has not been possible to keep up with the rapid development of the CI children; among others within field of hearing and speech therapy teaching resources. This new generation of CI users has appeared while this project has evolved which is why the three cases are based on three different groups of children who gradually advance linguistically and accordingly decrease in age through the overall intention of creating motivating hearing and speech teaching resources for CI children.

Children are interested in digital products, and a large group of children spend several hours daily in front of the computer. For some time game developers have been trying to utilize this enthusiasm in connection with learning through edutainment applications, which has been one of the starting points of this project. New tendencies within the game environment move towards a detachment to the fixed screens and towards 3D based activities that combine virtual reality with the physical and social world, and which is based on the concept of “pervasive gaming”. This project investigates the learning potential of traditional computer games as well as pervasive gaming in relation to the hearing and speech educational products.

The project aims at a broader perspective rather than a deeper, and through three cases I describe different approaches through different media, speech and hearing themes, learning styles, playgrounds, social relations, age groups, etc:

Case 1: The Magic Potion is a traditional computer game which is characterized by the fact that the player has to use his/her voice to interact with the game. The game accommodates CI children at the age of 2-5 and is primarily aimed at the speech and hearing lessons taking place at the speech and hearing therapist's place.

Case 2: The Wisdom Well is an interactive floor on which body movements are used as a means of interaction. It is established in a school environment and thereby aimed at children at the age of 6-12.

Case 3: is mainly a future perspective on how speech and hearing educational products can be developed in the future – for instance as digital toys. However, the case also describes other issues in relation to the new generation of CI users, and it results in giving directions for new design products as potential solutions.

The method of the project is an explorative process based on the concept "Research through Design" described by Frayling and with particular focus on the two subcategories "Design-oriented Research" and "Research-oriented Design" based on Fällman's presentations of these. Each case is described in relation to and is characterized by these two subcategories with specific focus on the processes, stages and results of the cases. These elements are related to a discussion about design practice and design research.

The theoretic foundation is the two areas: 1. Language and the area of speech and hearing, and 2. Learning through Play which includes learning, playing and game theories.

The results of the project are evaluated on the basis of design method, the area of speech and hearing, and game theory.

\*Cochlear Implant, CI, is an advanced hearing aid where an inner part is implanted in cochlea and an outer part is worn like a traditional hearing aid.