Evaluation and understanding of Playware Technology – trials with playful balance training.
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This thesis is an investigation of the new technologies used to motivate elderly people in a playful manner to do physical exercises, which can improve their physical health and, thus, prevent accidents. For example, fall accidents caused by falling are widespread among older adults. The thesis further studies exactly how digital technology and games can create play for the elderly, with the ambition of reaching a more substantiated understanding of this process that could then lead to a better and more calculated design of new products. The technology in focus, “MOTO Tiles”, is an example of “playware”, which is defined as hardware or software that aims to initiate play and playful experiences among its users. The thesis evaluates MOTO tiles as an example of a relatively new area of research, Games for Health, where digital games are seen as tools for the creation of health-promoting activities. The thesis starts with a presentation of the results of two different pilot trials done with the MOTO tiles technology which showed remarkable development among the elderly, particularly regarding balance. It further contextualizes MOTO tiles in the research area of “games for health” by an account of research done in this area, including the sub-area of “exergames”, which are games that require the user to be physically active in order to play. This account points out that the research hitherto completed is inadequate with regards to scientific validity. The review of randomized controlled trials (RCT) done in the area of exergames shows that there is a need for more studies, and for studies with a higher methodological quality. Based on the knowledge gained in the pilot studies and the review of the area of exergames, the author of this thesis analyzes and presents how RCTs are done, as well as exploring how to secure studies of high methodological quality. The knowledge gained from this analysis is then used to plan and conduct an RCT on the MOTO tiles with elderly people in the age range from 70 years and above. The findings from the RCT show that it is possible to do a study of high methodological quality, but it also points out problems that are partly to do with the age group, including the problem of missing data due to, for example, sudden illness, which is more common among elderly. None the less, the findings of the study showed one primary outcome that was significant (an increase of 22% in score in the test “Chair Stand”) and another that had indications that there could be an important clinical finding (a decrease of 12% in score in the test “Timed Up & Go”), while one was unaffected (no difference in the test “6 Minutes Walking Test”). The author concludes that more studies are still needed and that higher power of the studies should be considered or meta-analysis on several trials combined. The trial additionally confirms the findings from the pilot tests and shows that the participants saw statistically significant improvements on the balance score (“Line Walk” or “Tandem Walk”) with an impressive increase of 149% in score after adjusting for the outlier. Besides the physical tests, the participants answered a questionnaire, and here the findings showed that the vast majority of the participants enjoyed the training and wanted to continue using the MOTO tiles. Over half also indicated that they felt better and 75% indicated that they had improved physically. This shows that playware such as the MOTO tiles can promote health and, not least, that this can be done in a playful and thus, motivational manner. Taking these findings as the point of departure, the thesis further investigates how the MOTO tiles as an example of playware and exergames created play among the users. This investigation begins with a presentation of the concept of play, based on the philosophy of play that is the foundation of modern game research. Play is here understood as something we humans engage in for nothing else than the sake of the enjoyment it brings, or, as it is formulated: The purpose of play is play itself. From this understanding, the thesis goes on to present we in play we have a special attitude towards the world, and this frames our understanding of actions done when we are in what we call the “state of play”. Further, the thesis gives an account of an important finding in playware research, that in order to get into the state of play we use “play tools”, such as games, toys etc. This finding is further developed in the thesis by applying the Actor Network Theory (ANT) as a framework for analysis, by which the author reaches a new understanding of games as “actors” which encourage their players to act in certain prescribed ways, with the goal of bringing them into the state of play. This brings a new perspective on games and gives a framework to understand how play tools work. Developing on these findings, the thesis then presents the notion of “play dynamics” that is, dynamics, which play tools make use of to bring players into the state of play. Examples of such dynamics are presented, and the thesis points to the need to further develop our understanding of play dynamics, the different types of dynamics and how they work together to create new dynamics and effects.

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