

Physical action gaming and fun as a tool within elderly care -

Game over or play it again and again...

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Abstract

How can we support elderly living in special housing to be active and on the move?

Around Europe and US there is a rapidly growing interest for use of computer games encouraging physical motion, such as the Nintendo Wii, within healthcare and rehabilitation. We report a study where we introduced and used this game at a special housing for old people with severe dementia in Ockelbo in Sweden. It was supposed to be a pilot-study during one month but the growing interest among all involved, especially the players, led to an over six month long study. An example is 91-year old Elsa saying “the motivation to win is still present”, “It is really exciting and fun – we have a match every day”. Examples of comments from the caregivers are “The ones I thought would never do this has been the ones that liked it the most and has played a lot”, “This is not something especially for old people, everyone does it”, “we need to change the repertoire of activities we propose for our elderly – me myself would get crazy if I when old were to be put in a room using potato-printing techniques on table clothes”.

Bridging the gap between differences in physical abilities to be able to play, compete or meet on an equal arena is tricky within elderly care. A conclusion is that Wii managed to bridge part of that gap, another that many of the elderly like to be more physically active, when the opportunities and the technologies are accessible for them.

Keywords: Learning, motivation, movement, engagement, fun

BACKGROUND

Elderly-care

In Sweden about 2.8 percent of the gross domestic product (GDP) is invested in the elderly care sector. Special housing, where the municipalities are responsible for basic health and medical care for 24-hours, is the home for around 16 percent of the inhabitants over 80 years of age. Dementia is common among those in need for support day and night.

But many of the disabilities that the older population are facing and experience do not at first relate to the fact that they are getting old but to passive lifestyle, lack of stimulation and a changed role and function in the society. (Folkhälsoinstitutet, 1998) Physical exercise and having confidence towards one's own abilities is key to support the self-esteem and mental health for elderly. (Lindwall & Hassmén, 2006)

Activities that entertain, engage, create excitement and learning are not common within special housing for people with dementia. The everyday-life provides few occasions of

stimuli other than basic activities of daily life. Often they cannot cope with the fact that they loose in level of function. They tend to be more and more passive in their life (Norlund, 2008).

In an attempt to address this we have introduced fun and movement through computer games, with a motion sensitive input device, within elderly care in a special housing in Ockelbo county. This was an activity offered within the activity project. Being together playing games such as Nintendo Wii at the special housing could open up possibilities for social interaction and use of the physical movement among the individuals, their relatives, friends and caregivers. Let the body communicate with movements since spoken language decline is often present in dementia diagnosis as described in (Burke, 2008). Body movements can support cognitive processes and therefore the benefit of introducing activities such as these can be seen on several levels (Brown and Cairns, 2004). Playing games can also be part of the way to mediate social and affective communication and balance and regulates emotions (Lazzaro, 2004).

Nintendo Wii Sports

In Sweden Nintendo Wii Sports was launched on December 8, 2006. The design of the system is a counter-example to those game-systems that focus mostly on the graphics and where the core interaction is static with regard to body motion. Target group for Wii is the average gamer 9-18 years old but Nintendo also aims for those over 30 years old that are non-gamers. Up to four Wii Remote can be in use at the same time allowing for quite a busy arena. The communication between the Wii Remote and the box is done using wireless Bluetooth-technology. The limit is 10 metres. The Wii Remote and the Nunchuk can both track movements in three axes. The Nunchuk is the device used in the boxing game. Included in the Wii Remote are a loudspeaker, an IR-camera and a shaking function. For the tracking, in order to know what and where you are pointing, the Wii Remote has PixArt optical sensor. (Wisniowski, 2006)

With the new technology development the use of ICT can become more physical and in some ways therefore more easy to use and more accessible for the elderly (Magnusson, Hanson and Nolan, 2005). There are quite a few reports on the net about the Nintendo Wii and elderly users although research studies are not yet that many. Here are a few examples, visited 2009-04-01.

<http://www.wiicentre.com/wii-for-the-elderly—a-report-441/>
<http://gizmodo.com/gadgets/home-entertainment/wii-turns-elderly-into-addicts-238986.php>
<http://www.bjhcim.co.uk/news/2008/n802012.htm>
<http://edition.cnn.com/2009/HEALTH/02/11/wii.fit.elderly/index.html>

PURPOSE OF THE STUDY

The purpose of the study was to investigate whether computer games such as Nintendo Wii Sports would support elderly, suffering from dementia and living in special housing, to enjoy moving physically and have fun. We also aimed to identify conditions for success and analyse the outcome.

METHOD

Support in theory

This study has been done using participatory design. This method involves end-users in all stages of the project. It is widely used within Human Computer-interaction HCI research-projects and originates in Scandinavia. It has proved to be a very successful method in research and development projects and has been used, developed and evaluated over more than 20 years, (Bødker et al, 2000, Bødker&Sundblad 2008). Participatory design is an iterative process and design, testing and evaluation is done concurrently and iteratively and as an interaction and collaboration between all the persons involved in the project.

Human-Computer Interaction (HCI) is applied research on novel forms and use of technology and novel ways of working together with users in all stages of the design process. The HCI

department at KTH has been focusing on research and education in HCI on all levels since 1985, heavily influenced by experience from participation in the early Scandinavian participatory design projects. The department has been part of and co-ordinated several collaborative projects (national and within EU) with industry, authorities and user organisations. It combines competencies in technology with competencies in human sciences and design. See <http://hci.csc.kth.se>

Design of the study

In the design of this study we have chosen to use observations, interviews in an open dialogue format, video, photos, diaries and disposal cameras in order to document and collect data. The special Housing Vibacka did not have case records with physical parameters and assessments on every user (inhabitant) so one starting point for the project was to record the physical movement status of each user at the start of the study. We then studied how the physical status evolved during the time of the study. We have not done any physical measurements other than that. We communicated with the caregivers and the users and their relatives around their physical ability and wellbeing. We gave the users disposal cameras and notebooks for leaving comments when playing at other times than in the project.

During the observations we have looked for change in body posture, range of motion and flow in movement. What we have noticed has been coloured by our different background knowledge as experts in physical ergonomics, design and healthcare. Signs of wellbeing such as smiles, laughter, hints and eye-glimpses while competing have also been in focus for the observations.

Our users/players

In the study there were ten people all living at the special housing Vibacka. They all had different stages of dementia and six of them were staying at a locked department. Many more of the people living at the special housing were playing the Wii Nintendo Sports but only the ten mentioned above were part of the study. There were eight female and two male with age spanning from 80 to 91 years old. The users were selected by the caregivers on basis of their knowledge of these users and were asked if they were willing to join a computer game study.

An estimated size of the whole group of “stakeholders” is 40 persons since we saw the users, their relatives and the caregivers as all included in the target group.

GAME

Start-up

We got help from a janitor to set up the system. The system includes a projector, a screen, loud speakers, the Nintendo Wii box and three consoles for the game Sports. We discussed with the caregivers and leaders about the appropriate spot to place the system. We agreed on an area where people normally meet and where it was likely that others could pass by and join. It was an area where they have other activities such as Friday

café, bingo, sitting-gymnastics and singing. We used a projector with screen instead of a TV-screen as projection surface with the motivation that the bigger the better immersion and also allowing for people keen on watching the game. The console aims at giving an intuitive feeling of control and natural movements. The aesthetics is somewhat like a remote control of a TV or stereo set. The projector was attached to the ceiling and the screen was fixed to a wall. The Wii box and the consoles (there were three to start with) are put in a minor cupboard that is locked with a key easily accessed from the receptionist.



The modified consol

After getting to know the system we produced our own manual for starting up and closing down the system. In the manual we used our own simple words and pictures in order to make it obvious what steps to take to make the system work. Since none of us had prior knowledge or skills in computer games we needed ourselves to figure out how to manage the system. We arranged meetings with the caregivers to make them a try and to get familiar with how to handle the game. We arranged a meeting with the users and their relatives in order to get them interested to participate and to decide if they wanted to be part of the study or just play. Those who want to be part of the study had to sign a document in order to accept that we documented the study with photos, video, being interviewed and quoted. For some of the users the relatives signed the document in consensus with them.

Step by step we got more and more skilled in handling the system. We spent a lot of time introducing caregivers and the users. In collaboration with the users and the caregivers and the users' relatives we selected them as participants for the study. The main criterion was: Do you think they would like to be part of this? We planned the project together with the ordinary caregivers in order to have it work smoothly with the normal agenda. After a while it was decided that this should be part of the normal job activities and the caregivers added it into their ordinary planning.

We were no experts and tried to overcome problems as they did occur. On the one hand we often felt that our lack of technology skill was time-consuming. On the other hand we discussed that that might have had a positive impact on the others since being novices was representative for the average worker in this domain. When they realized that we did not

come as experts the step was a little smaller for them to be active in the development of this activity within their workplace. We saw the users, their relatives and the personnel as one target group. The method throughout the project has been participatory design methods and user involvement. At the beginning we introduced the users one at a time to give them our full attention and for the extra observations around the study. We also had to try to try out words and ways to teach the handling of the console and the system interaction. In order to reach and teach our users the way to handle the system we had to individually adopt different ways of introducing them to the game and support them in the movements. We made the movements ourselves in order to give for them a visual clue and we used words, sounds, gestures and we guided them in their movements by giving physical support and led them through the movements. The fact that we ourselves had no prior experience of this game or for that matter any other computer or TV-game had its advantages and drawbacks. We took away the armrest from the armchair for the users that have lost the ability to stand in order to have more free movement space. We provided chairs for those that are stable to stand giving free space to move the arms freely. After a while they felt more secure and more motivated to perform and we helped them to stand up and then after some time of playing they stood for themselves. Then they got to play against each other, sometimes against someone they know and sometimes against someone that they did not know.

I observed what they said and how they said it and how strenuous it seemed to be for them from breathing, colour in their faces etc...and how they relate or not relate to each other while playing. Since it is a competition the outcome is not clear or not given, which is part of the excitement that keeps them alert and motivated to continue and strive for improvements.

We have redesigned the console by adding a cover a lid over the a button since it was a problem that they pushed that button when playing bowling, which stopped the game and made the users in the beginning loose motivation or express that they could not handle the console and therefore did not want to play or try. The console with a rubber cover is easier to manipulate and has a more stable position. It does not slide in the palm. We then made the same cover on the other console.

In Ockelbo the users almost directly discarded the boxing game, although we would as therapists have loved them to make the movements involved in boxing. We were careful not to persuade them to play since they were very clear on not wanting to do boxing. They said yes to bowling and golf. By these measures we hoped to assure that the whole thing would not just come to a stop when the project finished.

Now we are in full swing!

The movements get more secure, direct, and precise. The users focus more on the game itself instead of on the movement. This is a major advantage from gymnastics, where the movement itself is in focus. The users stretch the arms and move their legs in sitting gymnastics. It can be seen as more of a check-up that the function is still there but they seldom get a chance to use their physical ability in an activity that is more motivating for them.

We used the possibility in the game to design the user's own

player. Some make made them look alike some make made them extra “cool”. Some took the opportunity to have full make-up and hairstyles that really stand out.

In a game such as Wii Sports the focus is outside ones body. The body and mind “co-work” in order to score – to get at strike or a hole in one.

The caregivers commented that their users have become more alert and more active also back at the departments. They told us that the users say that they have won but do not always remember what.

They get to play several times per week. Mondays and Fridays between 13 and 16 were scheduled for the study. From December 2007 through May 2008 around 100 hours of play.

Paper copies about the schema are being sent out and on the different corridors one has been appointed as “Wii-responsible”. To our surprise they seem to like this and adopt much faster than we had ever expected.

The game attracted caregivers from other departments and other areas. The house-keeper, managers, service personal, secretary and visiting relatives stopped by and were invited to try it out and see for themselves.



gamers

The users tell us that they enjoy to compete and to fight. They start to comment on each other’s actions. High score and failures are equally noticed and they give full attention to each other. They start to develop a jargon and a language. They try out new vocabulary new expressions. Up to three players are active. Spectators are very involved and supportive and co-move with the players. When the time is over many of the players hang around and cheer-up the others. The time they need to learn the game varies a lot, but we are amazed by their rapid adoption and skills. Although some of them every time they come start by saying “I have never done this before” one can tell by the way they handle the consol and the smoothness in the movements and the adequate force they put in that they have definitely done this before. Wii is easy to adjust in order to support the user’s level of coordination and strength. Due to this it gives a quick access to the game and we do not need to put a lot of effort and time into learning and training to get going. Although we might think that our users have all the time in the world to do this they are not interested if it looks too complicated and if they do not see the benefit.

Observations and Comments

Observations and comments by the users/caretakers, caregivers and others, were originally in Swedish, below freely translated by the author:

Users:

”you have been playing more often than me”

”look how good she is”

”the winner instinct is still present despite that I am over 90 years old”

”of course I am in to win”

”now I sweep the floor and clean the house - score”

”this was fun”

”it is nice just to get out of the room and get some variety”

”just like a kid again playing marbles”.

”last time I played I got three strikes in a row”

”you have had more opportunities to practice”

”that bowling-game we would like to play more often but the personnel does not have the time”

”oh no; I think that the pins are glued”

Caregivers and others:

”The thing I like the most is to see how they wake up by learning something new. In their case it is otherwise more the situation of preserving skills such as getting dressed and manage the situation with eating”.

”we who are working with this must get into a new mind-set”

”they become more alert after playing and seems carry a feeling-good feeling for quite some time after”

”I did not have the expectations that it would become such a success”.

”It has been good to see them watch them – you could tell they had fun”.

“in bad mood because some has got to play more often”

”it is hard to find the time to play”

“For the users having dementia that often get stressed and worried during other activities we see that they can concentrate under a longer period of time then they usually can”

“it is great to see how they get excited about learning and trying something new. For them it is all about to try to preserve skills such as get dressed, eat and use the bathroom”

“The boxing they did not like. Then they wanted to go home”

“Last time they stood up when they should manipulate the consol – that gives them some opportunity to put some load on their legs to practise and everything”

“They did not say oh no now I will sit they were all red in the face”

“The movement improves if standing – they can feel it”

“You could see and tell when they are sitting there that they are excited: is it my turn now

The game invites them to move. They automatically get the physical movement”

“They have difficulties learning new skills but to some extent they can learn something new”

“It was a little bit nervous since you were not used to this game but you learn if you do it for a couple of times”

“this is a common thing kids play it - it is not something specific for old people, everyone is playing”

“We have decided for the new house to have a better approach

towards our users with dementia that they also should be included in the rehabilitation approach.”

“On the county level we shall provide a good elderly care and this is a part of the mission to not only provide healthcare but care. Sometimes there is too heavy focus on healthcare. If you need to move into an elderly-care centre you should be able to have a rich everyday life. The caregivers are doing a lot and fix and arrange but the users would like to be a part of this arrangement and fix themselves. There is so much that we never see or use. We should never be too narrow-minded”.

RESULTS

From observations, analysis of video and photos, from the note books, from comments from the players, relatives, the caregivers and other staff at the special housing the overall impression indicates that Wii provides an opportunity to move, to compete, to improve, to focus, to learn and to interact in ways that are not easy to provide within the usual repertoire of activities for elderly suffering from dementia and living in a special housing.

They ”learn” how to interact with the system. They give no indication that they find it odd that something they do with a console has implications on a screen. Immersion came more or less without questioning. We observe a development in the way they seem to trust their own movements. From sitting to standing. From using the zimmer frame to leave that to the side.

In the golf game they do more or less use a full range of motion in arm and shoulders. Those that stand up bend their knees in the swing (we did not tell them to stand sideways as in ordinary golf).

They balance and adjust the movements in the different games. The bowling game is more direct since the time it takes for the ball to go down the lane and hit the pins is quite minor as well as the time to do adjustments. The bowling game gives the most direct feedback. Golf can sometimes take too long and the users lose focus.

The users attain new competence, better balance, eye-hand coordination, use their muscles and their physical ability. Endurance is there since they sometimes played for over two hours without interruption, with repetitions of big arm movements extending their range of motion.

Immersed in the game, time flies, even for the caregivers. Sometimes, when they looked at the watch they realised that they had finished work, that their work hour time was over.

The users got feelings running through their veins, something is at stake, being at stage, win or lose, to gain and not only lose abilities. There has been a growing interest and many more departments have installed Wii as one of their ordinary activities. The organisations, with a structure with heavy focus on healthcare and supervision, should consider motion gaming activities. The game gave the users a possibility to act on a different arena than as caregivers and caretakers. They are no longer the ex police or ex nurse or current nurse, they are the winner of the day in Wii-bowling. Relatives commented that they were so happy to see how their grandma told them about what they had been doing, winning, playing etc.

DISCUSSION

Game over or play it again and again...

We decided at the start of the study to try to follow as smoothly as possible the present work culture and to be careful not to “take over”. The purpose of this was that we wanted the institution, if the result would be positive, to incorporate the game in the care that they provided for the users. That is part of the reason that we chose the participatory design methods for this project. We also believe that such methods are very well suited for these kinds of interventions and actions, in order to observe, listen and co-develop the activity together with the users in a broad perspective involving the manager, the caregivers, the users, the service personnel, caregivers and relatives. We reflected on all the positive comments around the joy to compete, that something is at stake, that they reported positive on the “stress” of possible failure in the game. Behind the dizzy gaze and the stiff movement there seems to be a real fighter, that will do the uttermost to perform. To include activities with the purpose to support joy of movement might be a way to save resources within elderly care.

There is research trying to investigate the relevance of individual social capital as a resource in the oldest old +85. (Nygqvist, Gustavsson and Gustafsson, 2006)

If possible we should consider to let them take part in their own everyday environment if they wish to do so.



“left for a golf-tour”

FUTURE RESEARCH

We would very much like to encourage further research and development into fun as a tool within elderly-care. This should be done together with game developers designing or redesigning games to fit a specific purpose and a broader target group. Most of the technology oriented development projects and systems for elderly put focus on monitoring and assisting in assessments, as in smart/intelligent homes, fall prevention, safety alarms etc.

The old of yesterday are already dead. The old of today we can include in the work for the old tomorrow and that will be you

and me. Manuel Castells writes that technological innovation takes part among us and reflects our learning by using and by doing:

” The key lesson is that technological innovation is not an isolated instance. It reflects a given state of knowledge, a particular institutional and industrial environment, a certain availability of skills to define a technical problem and to solve it, an economic mentality, to make such application cost-efficient, and a network of producers and users who can communicate these experiences cumulatively, learning by using and by doing.” (Castells, 1998)

Finally, with the lyrics from Phyllis Molinary, and music from composer Artie Butler, the jazz singer Shirley Horn recorded Here’s to life in 1990:

As long as I am still in the game I want to play, for laughs, for life, for love

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