

Wii play with elderly people

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Abstract. In this paper we report the experiences we had while elderly people in a residential home interacted with the *wii*, a game console offering haptic modes of interaction. While the haptic mode of interaction offers many opportunities for health related activities, we faced hindrances when introducing the *wii* to people who were skeptical about the usage of video games. We also faced problems when playing *wii* related to physical and / or coordination issues, such as problems in pressing or releasing buttons in the correct moment or being confused by menus opening accidentally when false buttons were pressed. To deal with these problems, we developed modifications of the setting and the devices used.

1 Introduction

In the last several years video games came into our daily life and gained a lot of attention, and the amount of people playing video games is increasing very fast [2]. When talking about video games there is a stereotype about children sitting at home and playing by themselves. However, video games are more and more often used in multiplayer settings both online in distributed settings [7] and offline in the same place [8]. Video games developed a social component and have the ability to bring people together. Recently, there have been success stories in newspapers and journals, reporting about the use of *wii* consoles in retirement homes as an example. Those groups were mostly organized by two university students who started a *wii* bowling league for elderly [1]. For their project they traveled to residential homes all over Germany and organized *wii* bowling events. The scores of the participants were summed for each retirement home, by this calculation they determined the best retirement home which got a little award. In the search for new methods of interacting with multimedia systems for elderly we started our own *wii* project in a residential home in Germany. In contrast to the studies of the two students we tried to understand the social perspective of playing *wii* with the elderly.

We wanted to investigate the two following topics and the related interaction with the *wii* with the elderly. The caregivers were mostly interested in the usage of the *wii* as a therapeutic device encouraging the elderly to be more active.

Additionally, we were interested in the social impact the organization of *wii* events would have to the elderly living in the retirement home. Especially to those who take part in the *wii* events but even to the related persons like staff and volunteers. We tried to find out what social impact the cooperative gameplay with the *wii* would have for the elderly. Based on this we wanted to gather knowledge about the usability of the *wii* in elderly environments in order to develop implications for design for new systems supporting social communities among elderly.

In order to get knowledge about the usability of the *wii* in these special use conditions we were interested in new ways of interacting with multimedia systems not specifically designed for the elderly. The *wii* input system is often described as intentional and easy to use so we were interested in seeing elderly using the *wiimote*, the original controller of the *wii* console. The *wiimote* has some buttons which are used for input. Additionally, it can be used as a pointing device, and it is able to track motion. This combination could be used to combine pointing and gesture input for new social media systems.

In the following we will first represent the related research before we will describe the setting and participants. Afterwards we describe the underlying methodological approach and we will then illustrate the problems we had and the solutions we developed before we come to a final discussion and conclusion.

2 Related Research

There has already been some research done on the potential that video games might have for the physical and or mental education of people [9, 11]. In research of cooperative gaming there has been some reporting on social effects computer games played online [10, 12] or even offline [8] could have. Even gender specific topics [13] were taken into account when researching effects of video game playing.

There have only been few studies focusing on elderly people [14]. Although much of the well founded research on implications for game design for elderly has been done. A major outcome in addition to the design related results were the benefits the elderly could gain by playing video games [15, 16]. The main stated benefits were in training the physical and mental capabilities successfully. This points out that from former studies we have hints that we should be able to train those capabilities with the *wii* as well.

The *wiimote*, the controller of the *wii* offers different ways of input we became actually interested in the interaction between the elderly and the video game. When moving towards new ways of input for the elderly we can find critical research on touch panel based input for the elderly [17] which gives implications for design towards usability for the elderly people. It shows that current interfaces as they are currently designed are not the first choice when designing input

capabilities for the elderly. By using the *wiimote* we introduced a new device which differed from the devices which were there had already been research on by offering the different ways of input.

When looking at research that was actually done with the *wii* and *wiimote* device we find that most frequent the outcome was that the *wii* is easy to use and quickly adopted by the elderly [18]. In her thesis Groveman [21] used the *wii* and built some software to track motions of elderly people. Although there is already a lot of studies in the different fields there have been no studies on the usage of the *wii* system as it is used by the elderly.

3 Setting & Participants

For the study we selected a German retirement home we already had contacts with, from other projects. The retirement home offers different programs for the elderly living in the home each day, the exercises are diverse from small sport exercises to doing little brainteasers to learning new languages. The retirement home provided us with a large screen television for the *wii* session which was ideal for playing *wii* with the participants. During every session there was at least one professional caregiver present who supported the elderly when needed. The settings were open which means that at any moment people could join or leave the group freely.

When taking the definition of health as “[...] a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”[6] we have to report the fact that we realized many of the elderly had very few social contacts since moving to in the retirement home. In our interviews we got many insights into the daily life of the elderly in this retirement home and noticed that some of them would like more social programs to be offered but would not try to organize social events by themselves. By organizing the *wii* events we tried to find out more about this phenomenon which differs from the situation seen in other European countries where they come to retirement homes in order to join the community [20].

When describing further details of the setting and the participants we have to describe two different types of settings. The introduction event where we first presented the *wii* to the elderly and the five following *wii* events we held in the retirement home once a month.

3.1 Tryout

In order to prepare the *wii* events in the retirement home we decided to introduce the *wii* during a regular fitness exercise. We asked the course leader, a female volunteer worker, for permission to introduce the *wii* in her event. We explained that our aim was to offer a new group not affecting her fitness exercise program.

The day before the first event we tried out the *wii* with the responsible caregiver and the leader of the retirement home in order to get them familiar with the usage and the gameplay. We played for about one hour trying out different games and

discussed if the elderly would be able to do the games. We also tried out the *wii*-fit-balance-board, a *wii* controller board with pressure sensors in it, which are used for controlling the games standing on the board. It is usually used to train your balance and reaction.

We decided in this session that we would not use this during the first phase because most of the elderly had physical problems which resulted in limited capabilities of balance. The capabilities were seen as not trainable with the balance-board by the care giving personnel taking part in the tryout.

3.2 First Presentation

During the first introduction we presented the *wii* to 18 elderly persons, mostly female (only three male practitioners) living in the retirement home. The elderly taking part in this event were all residents of the retirement home and members of the fitness program usually offered in this timeslot and were at least able to do basic coordinated movements, a fact we considered important.

The event took place in the big dining room which was also used for the program between the meal times. The room was quite big so the elderly taking part in this event could get seated in a U-shape where the television was placed to the open side of the U. The elderly were sitting on chairs or in their wheelchairs. We selected *wii* sports bowling in single player mode as the game so we had only one person playing at the same time. We put a chair in the middle of the U which was taken by the person who was playing with the *wii* if not sitting in a wheelchair. This setting implicated that the elderly had to interact with others when passing the controller which was as intended.

3.3 Following Wii Events

For the following *wii* events we invited six participants, five interested elderly from the first event and one elderly which was interested but could not take part in the first event because he was not living in the retirement home. The participants were selected based on their motivation and capabilities by the responsible caregiver. When selecting he tried to get a group of different people. Beginning with the third regular event we had an additional participant who moved to the retirement home some days before this third event. In those events we had about one third male participants and two third female participants. The physical and mental conditions of the participants were very different.

During the events we mostly played *wii* sports bowling, with some small breaks where we played *wii* sport boxing during the first two events.

Different from the first event we moved to a smaller room with the group for all of the following events, which was helpful as the following groups had fewer members. By moving to a smaller room the elderly could talk to each other and everyone could see the screen.

4 Method

We conducted a qualitative study with a limited number of participants. The empirical research was documented by field protocols taken during each of the six sessions and by total of six semi structured interviews of about one hour we took with the elderly and caregivers involved in the event. The interviews took place at different times during the study. The first time we did interviews with some of the elderly living in the elderly home before starting the *wii* events then during the *wii* events we did interviews with the same elderly people we had asked in the first interviews and additional elderly people who participated in the groups. In addition there was an evaluation meeting with the leading caregiver after each session in which we discussed the event, with focus on expectations, problems and solutions. Based on the results of this discussion we planned the next event.

In our observation we focused on aspects of interaction with the device and other elderly people. In the interviews we focused more on the experiences the elderly had when interacting with the *wii* and what problems they faced when playing the games.

We had the aim to recruit five to ten interested elderly from the first event, convinced that the volunteer group leader of the fitness event would willingly help us to recruit the elderly.

For the following events we expected improvements regarding the coordination and movements of the elderly and an increasing fun factor provided by the game.

5 Observations & Problems

Our expectations for the first event were simple and naive in the same moment. Based on the related work and on some positive articles [1] published in different German newspapers we were convinced of the fact that playing *wii* was very easy and intuitive and no problem for elderly people. During our test session we got familiar with the handling of the *wii* very quickly and could hardly imagine the problems we would face the next day. We were convinced by the fact that many elderly had played skittles, which has many parallels to bowling, in their past and was quite popular in former times in Germany. We decided to play bowling with the elderly more so because it was promoted, as the easiest from the movements and most fun, by the other projects we mentioned before.

During the first session we observed that the attitude towards the *wii* changed from skepticism to curiosity. At the beginning of the session all the elderly were very skeptical about playing with video games. *"I know this thing, my grandchildren are playing with it"*, one woman said. But when we explained the *wii* and started to play the picture changed. The elderly were getting more and more engrossed in the match. They supported each other and those who already had some success in playing the game gave hints to those elderly who had problems using the controller. This was an expected result as it was seen before in other studies on group console game playing [2] before. We could even observe

that of the some elderly in the event which could see the others trying out the *wii* already started to exercise the movement before it was their turn.

We were confronted with an unexpected situation: When half the participants tried out the *wii*, the volunteer group leader started talking to some of the elderly trying to convince them that playing *wii* was wrong and that the elderly should not participate. When she noticed that most of the elderly were happy with playing *wii* and lost their concerns about the games demographics, which could be seen by the enjoyment of the game and heard as they started talking to the others about the fun they were having. She tried to change the event by starting an alternative program with singing and gymnastics at the same time. This made it more difficult for us to get the attention of the elderly, because they were swamped by all the different activities happening around them. Most of the elderly joined the alternative program as long as it was not their turn on the *wii*. It turned out after the *wii* event that the volunteer had concerns about her fitness event.

When trying the *wii* out the day before we played the game while standing in the room we also tried to play sitting on a chair and had no problems with the game. When introducing the *wii* to the elderly during the event we noticed that most of the elderly felt insecure when standing and preferred to sit on a chair. Some of the elderly lacked a choice as they used a wheelchair. We observed that for the elderly it was more difficult to play the game when sitting on a chair. The armrests especially were a barrier and made the movement difficult. This was mainly caused by the needed sequence of movement which was needed to play the game. First you have to press and hold down a button while you hold the controller in front of you with an extended arm. Then you have to move your extended arm backwards that it reaches about 45° and quickly move it forward again. When the arm reaches about 45° in front of your body you have to release the button.

Our expectation that many participants had played skittles before turned out to be wrong. We only had one woman joining the event who had played skittles before and only this woman criticized the game because of the unusual movements needed. The other participants could not compare the game to their past experiences and did not complain about the necessary movements. During the following events the selected participants improved their coordination and movement capabilities. This fact was underlined by the difference in the skills compared to a new participant who joined the group in the third event and faced the similar problems when first using the *wii* as the others did before.

The bowling game was difficult to play and needed much attention from the participants. To throw the virtual bowling ball you have to press a button, do a throw-like movement with your arm and release the button in the right moment with this simple process we had different problems. The first problem was that the controller had many buttons which were not needed during the game but interrupted the normal sequence and opened up some menus. When something unexpected happened the elderly were afraid that they destroyed the video game. In this situation it was very unclear for the elderly that they had to press the button which was displayed on the screen in order to continue. It sometimes took a long time to explain to them that they could not destroy the game and what effect the buttons had. The other problem was that the right moment when you have to release the button is very short. This requires a high level of attention from the

elderly. But here we faced another problem: we noticed that our explanations in combination with the hints from the other elderly and the massive in-game sound created stress for the participants which resulted in less fun and more difficulties when playing the game.

6 Discussion

During our events we often noticed how important it is to explain what our intentions were with the *wii* event. For future projects we learned that convincing all the involved people is very important in order to prevent future problems. Although we talked to the volunteer doing the fitness exercises with the elderly before presenting the *wii* and made it clear that we were planning an additional program not affecting her activity she was convinced that we were trying to substitute her with a video game. After the first round the caregiver who joined the round explained that the woman was always afraid of losing her groups for different reasons. It turned out that she did not like video games at all and that she inferred from the name *wii* sports bowling that we try to offer a sport program to the elderly which could substitute her program. After explaining our intentions another time and telling her that it was only about presenting the device and that we already had a new timeslot for the *wii* events she ended up in believing that there would be no elderly people joining this group. It is not always possible to convince all the people involved in a project but it is very helpful if the people are in favor of and try to support the project.

We noticed this fact another time when the leading caregiver was on holiday and another caregiver who was not fully convinced of the *wii* acted as deputy and joined the event. The way of interacting with the elderly and the way of trying to help them was much less effective than it was when the other caregiver did. The caregiver gave up explaining the movements to the elderly very quick when the elderly did not succeed in doing the movements.

In order to solve the problems encountered while playing the game we did several modifications over time. The first modification was to use chairs without armrests. This was a great improvement giving the elderly enough freedom of movement to play the game. By retaining the chairs we could give them the ability to sit securely and move freely the same time.

As a second modification we covered the unneeded buttons of the controller with carton so they could not be pressed accidentally any more. We could by this method moderate the level of confusion and increase the fun provided by playing the game. It turned out that the elderly even noticed the fact that we were trying to make the game easier, did not complain about this fact, and liked the new controller.

To moderate the stress we turned down the volume of the television device and tried to talk to the elderly more calmly. As we noticed that bowling needed a high level of attention from the participants we tried to relax a bit by changing the

game to boxing which did not need such a high level of coordination but needs a higher level of physical activity.

The moment when the button must be released is quite short we noticed that most of the elderly released the button too late, so we started explaining the sequence more precisely and helped the elderly by pressing and releasing the button while they did the throwing movement. This worked well but was only intended as intermediate solution. We accidentally discovered that when we had to describe the order of the needed actions in a different way in order to get better results. We started explaining that the button must be released more early as really needed, so actually we changed the order of the throwing movement and the release of the button. By this method we could explain the sequence in a way that the elderly could easily perform.

We noticed that when we did something wrong while trying to show the elderly how to do the movement correctly it was very useful because it showed the elderly that even we cannot perform the movement correctly every time.

We regarded the fact that many elderly in Germany used to play skittles in their past as very important for playing *wii* bowling with elderly. It turned out to be a good fact that actually we had only one woman who had played skittles before. Even though we often are locked in the assumption that playing *wii* bowling is intuitive because we do natural movements we suddenly noticed that the moments were not intuitive at all. They turned to be out to be easy to learn for people who had never done any similar thing before but the women who tried to do the “natural” skittles movements instead of the “artificial” game moments had a much longer way of learning the game.

Beside of the several problems we realized we got many interesting data about the social interaction within the group. As already mentioned the participants of the group were selected by the management of the retirement home from the group of interested people after the first event. The management tried to select participants which were able to understand the explanations and able to coordinate their movements. They did not group themselves so the community was artificial and they had no interaction during the first round at all. During the rounds the picture changed as the participants started to come to the event together and spoke to each other during the events. This was best illustrated by two women who were talking more and more about the game and other topics about their daily life since the second event. They were even more involved in helping when the new people joined the group. One woman told me that they sometimes started talking during lunch about the *wii* and that they were always looking forward to the next event.

7 Conclusion

In contrast to other studies about video games and elderly like [2] we have evidence that playing video games, such as *wii* bowling is not as easy as often asserted. We could see that how long it takes till the elderly can handle the game and have fun instead of throwbacks mainly depends on the mental and physical situation of the elderly. The danger of overstraining the elderly is heavily present

and we had to be very careful. When promoting video games for the elderly we have to ask us what benefit the games bring to their lives.

In our study we found that the *wii* actually can help improving the coordination capabilities and encourage people to move their arms. We could track a development in the capabilities of the elderly from event to event. This extends the knowledge we already got about the *wii* as device for physical exercises towards the elderly.

We found the *wiimote* is not as intentional as an input device when used by elderly as expected and see in other studies on the *wiimote* before. We had to do some modifications with the controller and had to provide much action space till the elderly were able to use it. We saw that it was not clear that a button must be pressed when it is shown on the screen. On the other hand the pointing functionality was quickly understood and used. For further input devices for elderly we think that the possibility to modify the device (e.g. disabling buttons) is a very important feature. Movement and pointing can be used by elderly as input but it must meet the physical conditions and capabilities of the elderly. In order to do so complex sequences and exact pointing should be avoided instead a kind of magnetic buttons attracting the cursor when near could be helpful.

We could observe how the community developed during the time. We have seen many similarities to cooperative gaming studies done with adults or child. But we always have to be aware of the fact that in the other studies the community in most cases was already there before playing. In our case the community developed while playing and could break down as fast as it developed when the events will end. As the management of the retirement home realized this problem they think about buying a *wii* and empower the elderly to self organize additional *wii* events.

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