Building Seniors' Social Connections and Reducing Loneliness Through a Digital Game

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Abstract: Quality of life is related to social interactions as social connectedness can be an important aspect in older adults' sense of well-being. Technology offers many opportunities for older adults to build social connections and possibly reduce feelings of loneliness. In recent years, investigations into using digital games for older adults have shown some positive results. This study involved 73 participants in 14 different centres across a large city in western Canada. The group played in a Wii digital bowling tournament that lasted for eight weeks. Pre and post-tests were given to measure social connectedness, and loneliness. Semi-structured interviews then were conducted with 17 participants. Positive results were found for social connectedness and loneliness.

1 INTRODUCTION

1.1 Background

Seniors (60+) are the fastest growing segment of society, with estimates of this population tripling by 2050 (United Nations, 2009; WHO, 2002). In Canada, there are almost 5 million seniors, and it is predicted that there will be an increase from 15% of the population to 24.5% by 2041 (Statistics Canada, 2011). This growth will have an impact on institutions, work places, culture and society, and current roles may need to be reassessed (McDaniel and Rozanova, 2011). With aging there can also be a decline in physical and cognitive abilities, shift in types of activities, change in social relationships and support, and change in lifestyle (Kaufman, 2013). Everyday living can become more difficult with increased concerns, such as fractures, isolation, physical ailments, and cognitive decline (WHO, 2002). There has been a recent interest in improving quality of life and active aging in older adults (Kaufman, 2013; WHO, 2002).

Quality of life in older adults has received increasing attention among researchers (Bowling and Dieppe, 2005; Lee, Lan, and Yen, 2011; Sixsmith, Gibson, Orpwood, and Torrington, 2007). A variety of terms have been used to describe maintaining a good quality of life in older adults, such as 'successful aging' and 'active aging'.

Traditional views on successful aging have focused on biomedical considerations (see Rowe and Kahn, 1997), but in recent years a more holistic approach has been applied to concepts of aging. One survey and review by Bowling and Dieppe (2005) found that the most important dimensions which older adults associated with successful aging were psychological well-being, social well-being, and physical health. The Institute of Aging also points to the importance of holistic approaches that consider psychological, social, environmental, as well as biological dimensions of aging when planning interventions designed to improve quality of life (Joanette, 2013).

Recent research has shown that one of the main areas that influence older adults' quality of life is their interactions with others and social support (Adams, Leibbrandt, and Moon, 2011; Reichstadt, Sengupta, Depp, Palinkas, and Jeste, 2010; Theurer and Wister, 2010). Furthermore, social capital has been found to have a specific relationship with the perceived well-being of older Canadian adults (Theurer and Whister, 2010). Social capital can loosely be defined as the advantages and resources available through an individual's connections with others (Cannuscio, Block and Kawachi, 2003). These connections can involve various social networks with different purposes (Litwin and Shiovitz-Ezra, 2011).

Technology is increasingly playing a role in creating social connectedness (van Bel, Smolders, IJsselsteijn, and de Kort, 2009). One technology that has recently gained interest among researchers is digital games and the possibilities they may afford. Digital games provide an opportunity for individuals to interact, communicate, and socialize in a fun way (Kaufman, 2013). The opportunities they may afford range from educational (Gee, 2003), cognitive (Boot, Kramer, Simons, Fabiani, and Gratton, 2008), social (De Schutter, 2011), psychological (Rosenberg et al., 2010), physical (Wollersheim et al, 2010), and let's not forget having fun (Astell, 2013). Games can help to motivate older adults and contribute to specific aspects of their lives that they feel may improve their quality of life (Astell, 2013).

Digital games can provide an environment where social interaction can occur in a fun and playful way. In many of the discussions on designing digital games to improve quality of life in older adults, both socializing and interacting were found to be important aspects (IJsselsteijn, Nap, de Kort, and Poels 2007). A few studies have found that digital games may provide an opportunity to increase social connectedness and decrease loneliness (De Schutter, 2011; Kahlbaugh, Sperandio, Carlson, and Hauselt, 2011; Wollersheim et al, 2010). However, further rigorous studies are required to understand the possibilities in more depth.

Digital games can be used to offer older adults a fun and playful context to improve social connections. This in turn may help to improve quality of life, well-being, health, and cognition. A healthy happy population can benefit both seniors and society. The promise of digital games for developing and maintaining social connectedness has been largely overlooked by research. There is a need for experimental studies to determine whether such theoretical promises can be realized. It is also essential to examine the types of affordances that games can provide for those playing them.

1.2 Purpose of the Study

The purpose of the Wii Bowling study was to determine whether a digital game was effective in enhancing various socio-emotional aspects such as increasing social connectedness and decreasing loneliness. A mixed methods was used to thoroughly examine the experience.

This study will help to inform future studies that may investigate the use of digital games as a way to increase social connectedness, which may help to increase quality of life in older adults.

1.3 Research Questions

1. Does playing a digital game increase social connectedness?
2. Does playing a digital game decrease loneliness?
3. What socio-emotional experiences do older adults have while playing a Wii game for eight weeks

2 LITERATURE REVIEW

2.1 Social Connectedness and Loneliness

No person is an isolated entity but interacts throughout his/her life with numerous people in different ways. These social connections can influence a person's trajectories throughout the life span (Elder, 1994). Older adults interactions, social connections and support are major contributors to their quality of life and perceptions to aging successfully (Adams et al., 2011; Reichstadt et al., 2010; Theurer and Wister, 2010; Bowling and Dieppe, 2005). A lack of social relationships can affect older adults adversely in many ways (House, Landis, and Umberson, 1988).

Social aspects of a person's life can be examined in a variety of ways, including social capital, social connectedness, social network, and social support. Social capital can be discussed as the benefits and resources that become available through social connections (Cannuscio et al., 2003). Social capital may affect older adults' perceptions of well-being (Theurer and Wister, 2010). Additionally, social capital is influenced by the various social networks and connections, with those people having the most diverse connections often showing the highest sense of well-being (Litwin and Shiovitz-Ezra, 2011). This may relate to the different types of socialization, such as social support vs social connectedness. A rich variety may help to fulfil numerous needs. Social connections related to leisure and fun serving their own role in the life course and future well-being of older adults (Ashida and Heaney, 2008).

One contributor to social capital is a sense of social connectedness. Social connectedness can be defined as a person's feelings of belonging and being able to relate to others (van Bel et al., 2009). Social connectedness can often also be related to feelings of loneliness. If individuals feel a lack of belonging and are not able to relate to others it is

easier for them to become isolated (Cacioppo and Patrick, 2008). Ashida and Heaney (2008) suggest that social connectedness is separate from social support and serves a different yet important role in well-being. Social connectedness allows us the enjoyment of others company and fulfills a social need. Someone may provide support, but not the sense of companionship (Ashida and Heaney, 2008). Thus, Ashida and Heaney suggest that social support and connectedness can be seen as two different aspects fulfilling different needs.

Having a sense of social connectedness is important not only for well-being but it also has an impact on improved health measures (Ashida and Heaney, 2008; Forsman, Nyqvist, Schierenbeck, Gustafson, and Wahlbeck, 2012). For example, a study by Forsman et al. (2012) showed that social activities were effective in maintaining well-being and a positive mental state, but also that social contacts and relationships had positive outcomes for health. Glei, Landau, Goldman, Chuang, Rodríguez and Weinstein (2005) found that cognition was also related to social engagement and network size. In this study they examined the relationship between cognition and social engagement. Participants who took part in more social activities did better on cognitive tests than those that had fewer or none. Furthermore, it may be that social networks outside the family have an increased effect on cognition, compared to within the family (Glei et al., 2005).

Lack of social connectedness can also create feeling of loneliness (Rook, 1990). Loneliness is defined as a disturbing feeling someone gets when they perceive that their social needs are not being met by their current social relationships (Hawkley and Cacioppo, 2010). It should be noted that this is a perception, since people can be alone and not feel lonely (Hawkley and Cacioppo, 2010). Hawkley and Cacioppo (2010) postulate that loneliness is similar to social needs as pain is to physical needs. For example, when we are hungry we experience hunger and so when we feel we lack social connections we become lonely. Thus, it is meant as a motivator for searching for social connection.

Although there has been mixed results regarding older adults and loneliness, a meta-analysis found those over 80 were more likely to report increased loneliness (Pinquart and Sorensvn, 2001). Furthermore, a longitudinal study by Dykstra, van Tilberg and de Jong Gierveld (2005) found that over time many older adults increased their loneliness scores. Furthermore, they found that increasing their social network lowered feelings of loneliness.

Loneliness has also been connected to various negative health and behaviour outcomes.

Social networks are considered the web of social connections within an individual's life (Ashida and Heaney, 2008). These networks form the areas where individual interact and connections with others can occur (Ashida and Heaney, 2008). Forming these networks can be a good starting point to increasing a sense of social connectedness (van Bel et al., 2009). This is the contextual basis for where we can create feelings of social connectedness (Ashida and Heaney, 2008). These networks extend to numerous groups from family, neighbors, friends, acquaintances, health care professions, and a number of other people we come in contact with. Often the more social ties a person has the more socially connected they feel (Buckley and McCarthy, 2009).

Technology may be useful in developing social connections. Baecker, Moffatt, and Massimi (2012) suggest that technology may provide a medium where entertainment, communication and social connections can be enhanced. Of the technologies, digital games can play an important role in providing the motivation and excitement to pursue aspects to improve older adult health, including social well-being (Astell, 2013).

2.2 Digital Games and Older Adults

Digital games have potential for improving the lives of older adults (Ijsselsteijn et al., 2007). They provide a unique experience where through play a participant may enhance certain areas depending on the design. Thus, digital games are increasingly being examined in ways that may be beneficial for players.

Of the studies done on gaming for older adults more reports are emerging about the possible benefits (De Schutter, 2011; Ijsselsteijn, et al., 2007; Kaufman, 2014; Kaufman, Sauvé, Renaud, and Duplàa, 2014). Specific designs are being produced for this demographic that allow for a variety of age related adaptations and considerations (e.g. Gamberini et al. 2006; Buiza et al. 2009). However, empirical studies on older adults and digital game use are still limited. Furthermore, older adults are increasingly playing digital games on their own accord. In 2011, the Entertainment Software Association (ESA) (2011) reported that 29% of computer game users are aged 50+. A previous study that examined the beliefs of older adult gamers found that they reported a variety of benefits, including those related to socio-emotional aspects, cognition, and learning (Kaufman et al, 2014).

Play within itself is often a social activity in which interaction with others occurs (Vygotsky, 1978). Many games are specifically being designed to incorporate social elements within them (Ijsselsteijn, et al., 2007). Furthermore, various digital games allow for specific types of interaction; for example multiplayer online games allow for players to interact within the games virtual space while being at a distance, while console games allow players to interact virtually and in person simultaneously.

Wii games have been used in previous studies with older adults and have shown some benefit (eg. Wollersheim et al., 2010, Kahlbaugh et al., 2011). Exergames, such as Wii Fit, have been used to demonstrate the benefits of certain games for improving balance and exercise in older adults (Peng, Lin, and Crouse, 2011; Heick, Flewelling, Blau, Geller, and Lynskey, 2012). These types of games may also help with such areas as rehabilitation and prevention (Wiemeyer and Kliem, 2012). Furthermore; as well as the possible physical benefits they may also affect psychological health (Wollersheim et al., 2010).

Many of these games allow for play with others, either competitively or collaboratively, and may provide a social medium. For example, Kahlbaugh et al. (2011) performed a study with 35 older adults assigned to either watching TV or playing Wii, and they found the Wii group had a more positive mood and lower levels of loneliness. In an intervention study by Wollersheim et al (2010), it was found for older individuals in a community dwelling asked to play Wii together, that gameplay was reported by participants as increasing their bonding with other participants. Furthermore, gameplay has also been reported to be useful in reducing feelings of loneliness (De Schutter, 2011)

The possibility of digital games to increase social interaction is not limited to the actual gameplay. Discussing games within social networks has also been shown to provide opportunities to exchange information and have fun socializing (Pearce, 2008; Nimrod, 2010). Nimrod (2010) found that older adults used an online social website to satisfy their need for play while fostering communication and community.

Digital games have been used to improve various aspects of quality of life for older adults; however, many studies have focused on cognitive or physical aspects and at this point only a few have examined the social-emotional benefits.

3 RESEARCH METHOD

A Wii Bowling tournament was organized and took place over two months. The Wii digital bowling game was chosen because it allows for multiple players and is fairly accessible to numerous age groups. Furthermore, many older adults are familiar with bowling. The tournament utilized both collaboration (they worked in a team) and competition (they competed against other teams). The competitive aspect was increased by having cash rewards for the first, second, and third teams.

3.1 Participants

Participants were older adults aged 65 and over. There were a total of 73 participants who played in the tournament from 14 different centres. The participants either lived or frequently visited these centres, including independent living centers, senior recreation centers, and assisted living centers.

3.2 Recruitment and Data Collection

Seniors centres, retirement villages, and community centres were approached to help recruit participants and to provide a space. In total, 14 centres in the Greater Vancouver area participated. Posters and flyers were used to recruit participants with a date for an information session where a researcher would come to explain the study and tournament in detail.

3.3 Instrumentation

This study used a mixed methods approach using both questionnaires and semi-structured interviews to collect the data. This allowed for a triangulation of the results, helping to confirm the findings while also allowing us to dive deeper into the participants' experience.

Firstly, there was a pre and post questionnaire given to all participants. The following factors were included: background/demographics such as age, sex, living arrangements; levels of loneliness and social isolation; and attitudes toward video games. The questionnaire was adapted from the UCLA Loneliness Scale (Russell, 1996) and the Overall Social Connectedness Dimensions (van Bel et al., 2009). Part of the adaption was a rewording to make all the statement forms and response scales consistent among the various questionnaires. A group of researchers then tested each sentence for understanding, and where there was confusion the phrasing was altered for clarity. The response scale

options were strongly disagree, disagree, unsure, agree, and strongly agree. Respondents required 15-20 minutes to complete the survey and received a $20 honorarium for completing each questionnaire.

For 17 participants, a pre and post semi-structured interview was conducted. The second interview was an in-person interview based on semi-structured questions that asked about the participants perceptions of their game experience during the tournament. This allowed the researchers to get a more in-depth understanding of the participants' experience with the game and the connections they made during the tournament.

3.4 Data Analysis

Data analysis was carried out using SPSS 21.0. Demographics were examined using frequencies and percentages Paired sample t-tests were conducted comparing pretest and posttest scores of loneliness snd social connectedness.

The interviews were first transcribed and then analyzed to find common codes. MaxQDA was used to help with the coding. Codes were collected and major themes were identified. Only those codes that were present in at least 50% of the interviews were examined for the overarching themes, one of which was social connectedness

4 FINDINGS

Both the quantitative and qualitative findings are reported below.

4.1 Participants' Backgrounds

Table 1: Participant background characteristics.

Characteristics	Category	Frequency (N)	Percent (%)
Sex	Male	21	28.8
	Female	52	71.2
	Total	73	100
Age	65-74	21	28.8
	75-84	27	37
	85 +	25	34.2
	Total	73	100
Living arrangement	Alone	51	69.9
	Other	22	30.1
	Total	73	100
Housing	House	7	9.6
	Condo	29	39.7
	Independent/ Assisted living	37	50.7
	Total	73	100

Table 1 summarizes participants' background characteristics. The participants consisted of a higher portion of female participants (almost three quarters) to males. The age of the participants was also examined with a fairly even distribution between the different categories. It is interesting as this included a third of participants being 85 or over. Approximately two-thirds lived alone versus only one-third that lived with another person, and half were in assisted or independent living conditions.

4.2 Social Connectedness

Table 2: Paired sample t-tests comparing pre-test and post-test scores on social connectedness.

Group	Pre-test Mean (SD)	Post-test Mean (SD)	Effect Size	t	p
(N =73)	3.410 (0.53)	3.526 (0.48)	0.42	2.18	.033

A paired-samples t-test was conducted to compare social connectedness before and after game playing (Table 2). There was a significant difference in the scores of social connectedness (M=3.410, SD=0.528) before and (M=3.526, SD=0.485) after game playing; t (72) =2.18, p = 0.033. The result suggests that social connectedness score of older adults increased after two month game playing.

4.3 Loneliness

Table 3 shows the results of a paired t-test tests comparing pre-test and post-test score on loneliness.

Group	Pre-test Mean (SD)	Post-test Mean (SD)	Effect Size	t	p
(N=71)	2.214 (0.54)	2.049 (0.54)	0.42	3.63	.001

A paired-samples t-test was conducted to compare loneliness before and after game playing (Table 3). There was a difference in the score of loneliness (M=2.214, SD=0.528) before game playing and (M=2.049, SD=0.54) after game playing; t (70) =3.518, p = 0.001. The result suggests that loneliness score of older adults decreased after two months of game playing.

4.4 Theme of Social Connectedness

Qualitative data analysis of the 17 interviews revealed an overarching theme of increased social connectedness through playing the Wii game. A list of some of the top codes related to this and the number of times they appeared are outlined in Table 4.

Table 4: Number of times and participants that a code was found.

Code	No. of times applied	No. of people
Interaction with others b/c of Wii	84	16
Better social connections	70	13
Conversations about Wii with family and friends	49	13

Social-connectedness was a major theme that occurred within the interviews of participants. This was found to have three main categories: increased social interactions around playing Wii Bowling, stronger social connections with previous acquaintances, playful conversations with family and friends.

4.4.1 Increased Social Interaction around Playing Wii Bowling

During the interviews many participants (16) commented about the social opportunities that playing the game afforded. It seemed to give some participants a break and a fun way to interact with others. For example, John reported that, "I would say my spirits have been uplifted a bit. Definitely, and it's because of this activity. Because up to that point in time, I just do my thing and go about my daily business, so to speak. But this, again, brought us together and very beneficial."

Some of the interactions continued outside of the game. For example one participant, Liz, points out "Well, I got to know the lady next door. And because she was on my team, and we found out that we lived next door to each other. So we are going to share a garden spot together. Um, and now that I look at the size of the spot, we probably both needed one. But anyway, we will garden together. We're going to buy the plants together. So, yes, I met my neighbour. So that was—and I might not have spent the time with her otherwise."

These interactions were not limited to the players but also other older adults who came to watch the team play, as pointed out by Faith "Because we had people come to watch. Because they showed interest, they thought "what are they up to now"."

The Wii game allowed for participants and observers to increase their daily interaction with others. This allowed players to meet new people within the centres. As Bill explained "It's expanded the socializing in this complex, and I think that was really helpful, especially for the new people."

4.4.2 Stronger Social Connections Formed

Playing the game didn't just increase the amount of interaction but also allowed players to get to know each other better and build stronger connections. As Jocelyn explains, it helped her to bond with some of the people she had only ever said hi to:

"It got me mixing or getting—I knew two of the girls I was playing with—I knew them quite well, but I met somebody else that I just sort of said hello to in the building. So we got together. And we've kind of bonded quite nicely and there's been people come up to watch and, you know, and you do more than just saying hello like you say in the elevator. "Hello," and that's as far as it gets. Then, they'll come up and they'll watch or they'll sort of like encourage them to kind of try it. So there's a lot of communication. I really enjoyed it. "

Many of the participants stated that they got to know the other team members better as Faith stated "We got to know our team members well, and we had a good time." Some of these bonds extended to outside of the game as mentioned by another participant "I became better acquainted with several of the residents. And we exchanged contact information."

Stronger connections to people who were previously acquaintances were sometimes formed. As Ruby explained, "…when we pass each other now, we always stop and have a chat. They're different girls than I'm used to and so it sort of added to my collection of girls. (laughing)." For Isabelle this opportunity to get to know people and get together with them on a regular basis was important to belonging. She stated, "you get to associate with people you probably wouldn't normally associate with all the time, and it gives you a sense of belonging, right."

The playful environment fostered many of these social connections as Ruby states "the fact that you mix together and have a few laughs and enjoy each other. It's good for you too, to be doing something rather than sitting in your room."

4.4.3 Playful Conversations with Family and Friends

Outside of the Wii Bowling tournament and building networks participants also spent a certain amount of time discussing the game with family and friends. It was something fun to talk about. A few participants mentioned how it became a point of conversation and activity with grandchildren, such as John who said, "when I pick up my grandson or my

granddaughter, after school, they've got a Wii machine and I practice my golf – pick up my golf again. And tennis. And I said, "Now, it's grandpa's turn" my grandson, Jacob: "Come here, because Grandpa's going to whip your butt." (Laughs)."

Another participant, Jane, mentioned how her family cheered her on, "They loved it! They were so proud of me. I played with my grandsons and I always beat them. They rooted for me! They adored it."

Even the older players found that their families were often interested, as this 90-year-old player expressed:

"They laughed at first. I was thinking why not but they started to get interested and wanted to know how I was doing. Did I still enjoy it and all this? I told them we did, 'cause we were having fun together. They thought that was good."

Another participant expressed how the excitement she had for the game caused her to talk to others about it, "and I've been talking to everybody about it, you know, my friends and my family. Yeah. I was just so excited that I joined."

One of the winners of the tournament, Margot, explained when she "phoned my family to tell them we had won, you would have thought that they had won. I had the granddaughter: "Wow, Granny!""

As can be seen by these few examples, participants did not just attend the games and then forget about them. Instead they discussed it outside of the tournament. These playful conversations and activities with various age groups may help to enhance intergenerational relationships and increase social connections through not simply the game, but through the conversational aspects it seemed to inspire in the participants.

5 DISCUSSION

In this mixed methods study, both the quantitative and qualitative analysis showed an increase in socio-emotional benefits for older adults who played Wii Bowling, particularly in relation to social-connectedness. The group increased their scores in social connectedness and decreased loneliness scores from pre to post test. Social connectedness was defined as the sense of belonging and being related to others (van Bel et al., 2009). The quantititave questionnaire adapted from van Bel et al. (2009) was used and confirmed a change in these scores. The results were further confirmed and expanded upon through the qualitative findings, in which most of

the participants interviewed found that the game increased their social connections in some way.

Social connectedness and loneliness are intimately related since feelings of not having a social connection can result in feelings of loneliness (Rook, 1990). This study seems to reinforce this idea, as both scores were affected. Furthermore, the types of bonds and connections go beyond that of game play. Previous research found that individuals with diverse social connections and networks show the highest sense of well-being (Litwin and Shiovitz-Ezra, 2011). Although most of the interaction occurred during the Wii Bowling event, it seemed to extend to various other connections such as with family, friends, or the team members in different circumstances. All of which may increase the participants social capital. Many of the connections formed and described were related to companionship versus support. It has been noted that companionship plays an important role in meeting the social needs of older adults (Ashida and Heaney, 2008). These are particularly important when considered with loneliness. In that, a simple feeling of belonging may help to reduce loneliness (Rook, 1990).

It should be noted that the current study was designed with a variety of social considerations that may have helped to enhance the social experience. It utilized both competition and collaboration, since members collaborated in a team but also competed with other teams. Spectators were also encouraged to watch and cheer the participants on. This could help make the environment a socially rich context. The study did not examine the effect of the Wii Bowling tournament on the observers. However, this would be an interesting aspect to examine in future studies.

The study also had a large number of participants over eighty-five and this may help to promote further research into the possible benefits of digital games for this age group. Further studies could examine ways to help support interaction and make games as accessible as possible for different generations. Finally, it would be of interest to examine whether digital games have a similar benefit if played online with others. Thus, whether the physical presence is necessary or whether older adults gain a sense of social connection even if interacting through a virtual environment.

6 CONCLUSIONS

This study suggests that through games where older adult players play together it allows them to increase

their sense of belonging and reduce loneliness. Digital games are a fun way for older adults to interact and form more social networks, or tighten the bonds of those already formed. These increases in social connectedness may contribute to an increased quality of life. Increasing quality of life of older adults through means of an engaging leisure activity could be important to those experiencing feelings of isolation.

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