Digital Gaming by Older Adults: Can It Enhance Social Connectedness?

David Kaufman[1] and Louise Sauve[2(✉)]

[1] Faculty of Education, Simon Fraser University, Surrey, BC, Canada
dkaufman@sfu.ca
[2] Teleuniversite, Quebec, QC, Canada
louisesauve25@gmail.com

Abstract. It has been well established that social engagement is an important component of positive aging, yet little is known about whether and in what forms digital games can provide social benefits. This paper addresses this issue by discussing research we have conducted during the past four years. The research question addressed in this paper is: Can playing digital games provide social benefits to older adults? To address this question, we provide overviews of four of our research studies that have investigated the social aspects of playing digital games. These are: (1) a face-to-face survey of 463 older adults in Canada who play digital games; (2) an eight-week Wii Bowling tournament involving 73 older adults from 14 long-term care facilities; (3) a four-week Bingo 'frame game' study involving 50 older adults in long-term care facilities; and (4) an online survey of 176 older adults who play the Internet game entitled *World of Warcraft*. The findings of these four research studies are encouraging as we found social benefits in each study. Although many older adults play digital games, a minority play games with others. These findings suggest that promotion and education would be helpful to encourage and support older adults to play digital games with others to gain the social benefits.

Keywords: Older adults · Social connectedness · Social benefits · Digital games · Survey · Wii games · Bingo · World of Warcraft

1 Introduction

Although social isolation (lack of social relationships) and loneliness (a feeling that one's social relationships are insufficient) can be issues at any age [1], older adults are often at increased risk of both, due to causes such as smaller social networks, mobility difficulties, and the death of spouses. Both social isolation and loneliness are associated with increased health and mortality risk [2–4]. Previous studies have shown that a lack of communication and social connection to others can contribute to isolation and loneliness [5], which in turn can result in problems such as depression and cognitive decline for older adults. It is well established that social engagement is seen as an important component of positive aging [6, 7]. In addition, social engagement provides opportunities for older adults to deal with stress and receive social support and connect with friends. One unique study [8] with 30 participants yielded supportive evidence

J. Zhou and G. Salvendy (Eds.): HCII 2019, LNCS 11593, pp. 167–176, 2019.
https://doi.org/10.1007/978-3-030-22015-0_13

that individuals with regular social interaction over 10 days showed diminished neuroendocrine stress responses and distress of social separation. Therefore, there are numerous reasons why creating opportunities for older adults to connect socially can be valuable [9]. Such opportunities may help reduce feelings of loneliness or isolation, increase self-esteem and facilitate the process of forming new social relationships, creating community, and expanding social networks.

For these reasons, it is important to provide opportunities where older adults can build relationships with others in a positive and supportive social environment. Digital gameplay is one activity that can draw older players to engage and interact socially with other players [10, 11]. Digital games can support and encourage social interaction and socializing is an important reason that many older adults play digital games [11, 12]. In some studies, older adults have reported that playing games socially has led them to make new friends and strengthen connections with current friends and family [13–16]. Social connectedness can be conceptualized as the degree to which people have and perceive a sufficient number and diversity of relationships that allow them to give and receive information, emotional support, and material aid [17]. This creates a sense of belonging and value and fosters growth. Social connectedness is important because it provides people with the emotional support, material help, and information they need to thrive. Social connectedness—both the sum of individual relationships and a sense of belonging—is crucial to overall health and wellbeing. Social connectedness decreases feelings of loneliness [18–21]. De Schutter [11] identified connectedness with family and friends as well as the broader community as one of five categories of perceived needs motivating older adult game players. In a study by De Schutter and Brown [22], older adults valued their digital gameplay because it distracted them from feelings of loneliness and helped them to connect with younger generations. Based on observation and interviews, other researchers [23] reported that playing digital games together led older adults to experience social and emotional benefits including social interaction, increased self-esteem, positive emotions, and wellbeing.

Several other studies have shown that social interaction that takes place when playing digital games is very important to older players [12, 24, 25]. Playing digital videogames promotes positive health outcomes associated with alleviating depression, and reducing feelings of loneliness, and isolation [25]. Digital gaming also provides a venue for developing social capital that strengthens strong social ties both on- and offline [26]. Despite the potential benefits of digital game playing, little is known about whether and in what forms digital games can best and most efficiently benefit older adults. Within the limited research reported, there is more focus on the efficacy of playing digital games to improve the *cognitive* abilities that tend to decline with age. There is not much research on the *social* benefits of digital game playing for older adults [28].

2 Statement of Purpose and Research Question

This paper addresses this issue by discussing several studies conducted during the past four years within the Canadian National Centre of Excellence Project entitled *AGE-WELL* (see https://agewell-nce.ca). The research question addressed in this paper is:

Can playing digital games provide social benefits to older adults? In particular, we addressed social connectedness in the quantitative research methods and, to some extent, in the qualitative research.

To address this question, we provide overviews of four of our research studies that have investigated the social aspects of playing digital games. These are: (1) a face-to-face survey of 463 older adults in western Canada who play digital games [28]; (2) an eight-week Wii Bowling tournament involving 73 older adults from 14 long-term care facilities [13]; (3) a four-week Bingo 'frame game' study involving 50 older adults in long-term care facilities [14]; (4) an online survey of 176 older adults who play the Internet game entitled *World of Warcraft* [15]. The key results of each study are discussed below.

3 Overview of Research Studies

This section provides an overview of our research studies that addressed the research question given above.

3.1 Survey of Older Adults in Canada

This study employed a closed-ended cross-sectional survey developed by the author and his team aimed at understanding older adults' (aged 55 years and older) experiences of playing digital games and their opinions regarding these [31]. The questionnaire included questions about older adult respondents' characteristics, experiences of playing digital games, patterns of playing, and opinions about digital games. It was administered to older adults in shopping malls, local community centers, nursing homes and seniors' centers. A total of 463 questionnaires were analyzed; 27.5% of respondents reported that they play online with other players and 15.3% reported that they met new people while playing online (Table 1).

Table 1. Social Benefits of Playing Digital Games (n = 463)

Benefits	% Reporting an Increase
General Benefit	
Social interaction	25.9
Specific Social Benefits	
Dealing with loneliness	34.5
Connecting with family	32.5
Connecting with various age groups	28.1
Connecting with current friends	26.6
Developing new friendships	25.6

Note: Respondents could select more than one benefit

A total of 25.9% of respondents selected social interaction as one benefit of playing digital games. Respondents also reported that digital games increased specific social

benefits of dealing with loneliness, connecting with family and various age groups, connecting with current friends and developing new friendships.

These results show that a minority of older adults actually play games online or face-to-face with others. Therefore, fewer older players reported socio-emotional benefits although those that did play digital games reported an increase.

3.2 Social Benefits for Older Adults of Playing Wii Bowling

The primary research question in this study was 'Does playing a digital game with others increase social connectedness and reduce social isolation?' The purpose of this study was to explore the social experiences of older adults (60 yrs and older) who played the digital game Wii bowling in an eight-week tournament. The 73 participants aged 60 years or older were recruited from 14 centers in Greater Vancouver including independent living centers, senior recreation centers, and assisted living centers. Those recruited to play in the tournament were organized into teams formed within each participating site. Scores were posted weekly on a website and paper copies were provided at each site as not all players used or had access to the Internet.

We used a mixed methods research approach in this study. For the quantitative data collection, players were asked to rate their agreement on a Likert scale with statements relating to loneliness and social connectedness. The questions relating to social connectedness and loneliness were adapted from two existing social scales: the UCLA Loneliness Scale and Social Connectedness Scale. The pre-and post-tests were analyzed using a paired samples t-test. The qualitative study interviewed players' about their perceptions such as friendships and social contacts they made during the tournament, their conversations with friends and family about their involvement in the tournament, and the team experience.

It is notable that 80% of our group were 70 years of age or older with half of all participants being 80 years old or older. The key results were as follows: There was a statistically significant decrease in loneliness ($M = 2.214$, $SD = 0.528$) before game playing and ($M = 2.049$, $SD = 0.54$) after game playing ($t = 3.518$, $p = 0.001$. There was also a statistically significant increase in social connectedness ($M = 3.410$, $SD = 0.528$) before and ($M = 3.526$, $SD = 0.485$) after game playing ($t = -2.180$, $p = 0.03$).

Themes relating to the category of social connectedness were:

- Interaction with others because of Wii
- Conversations about Wii with family and friends
- Better social connections
- Team experience

In this mixed methods study, both the quantitative and qualitative analyses showed socio-emotional benefits for older adults who played Wii bowling. When measured before and after the tournament, quantitative results suggest that participants experienced an increased level of social connectedness and decreased level of loneliness. The results of the qualitative study show that some participants made social connections that extended beyond their teammates to family and friends and in some cases created opportunities to meet and socialize in other contexts outside the tournament.

3.3 A Customized Digital Bingo Game

The purpose of this study was to investigate learning and social connectedness through a digital game for older players. The two primary research questions were:

1. Are there increases in older adults' knowledge, social connectedness, and attitudes toward digital games as a result of playing a multiplayer, educational digital Bingo game?
2. What is the social experience of older adult players while playing a multi-player, educational digital game?

Participants played an enhanced online "Bingo Nutrition and Health" game for four weekly sessions, after first playing for one familiarization session with a similar "Bingo Canada" game with different learning content. Quantitative data were collected using pre- and post-tests for knowledge of the game's learning content and for changes in participants' social connectedness. Qualitative data on the players' gameplay experiences and preferences were collected through semi-structured post-game interviews. For this paper, only the social connectedness results are discussed. A complete report of this study is available elsewhere [14]. We spent more than a month visiting residential seniors centres to recruit 50 participants who completed the study.

The Bingo Nutrition and Health game chosen for this study is a replica of traditional Bingo that has been digitized as a multiplayer online game. Our team developed this game following a user-centered design process and applied ergonomic principles appropriate for this target audience, i.e., older adults [31]. Due to server limitations, gameplay during this study was limited to eight players at one time. As in traditional Bingo, each player had a Bingo card or board, of five columns, with five rows of numbers, and a score panel that displayed all players' scores. The game was modified to include pop-up educational content in the form of questions. When a Bingo number was "called" by the game (e.g., "B 13"), a player checks on his or her Bingo board's column B to see if the number matches. If the number matches, the player clicks on the number on his or her board, followed by receiving a question in a pop-up frame. The number will be registered or covered if s/he answered correctly. Players needed to have a row of numbers registered or covered—horizontally, vertically, or diagonally—in order to win. Points were also awarded to the player based on question difficulty, and the player with the most points when "Bingo" was called was declared as the winner of the game.

Bingo was chosen as the game for this study because it is a common, yet, traditional game, popularly played by many older adults. Its embedded educational content and competition encourage players to learn the topics embedded in the game, and at the same time have fun playing socially with other players. Although this game could be played without a computer, the affordances provided by the digital version make it much easier for older adults to play, even without a game facilitator. The immediate feedback provided, pop-up windows, scoring system, and touch screen capability provide a comfortable and smooth game experience for older adults. The questions were in True/False and multiple choice formats with easy, medium, and difficult levels. The questions were entered into the game by the researchers and fell into the four categories of Nutrition, Physical Exercise, Socialization, and Prevention.

Each gameplay session lasted for about 30 to 45 min. Each week, each group played two game sessions at their respective centres. Players played seated around a table in a group of four to eight persons, using touch-screen laptop computers that were logged into the Bingo game server. Each player had an individual laptop for gameplay. Players were free to collaborate or socialize during the gameplay.

Both pre- and post-tests included sections on knowledge of the game's learning content, participants' social connectedness, and their attitudes toward digital games. The pre- and post-test social connectedness questionnaire used a five-point Likert scale and post-gameplay interviews were used to collect qualitative data. The open ended, semi-structured, face-to-face interviews of 10 participants asked about their perception of the gameplay experience and about learning socially with other players.

The quantitative results showed that participants' scores on social connectedness showed a statistically significant increase from before ($M = 3.54$, $SD = 0.43$), to after ($M = 3.73$, $SD = 0.48$) their gameplay ($t = 2.32$, $p = 0.02$).

The qualitative analysis resulted in two main themes and five sub-themes shown in Table 2.

Table 2. Results of qualitative analysis in Bingo study

Theme	Sub-themes	Sample quotes
Playing with others	Player Connectedness	*Player 31: "I would like to continue playing the game with the same group – we became very close doing it. Good to come out of my room to socialize and do other things, be connected with others …"*
	Player Interactivity	*Player 17: "I am more interested to play with others – much better than playing alone. It's better because I could communicate with others and interact with them."*
	Player collaboration	*Player 31: "It's a game you are playing together, working together…. It's teamwork."*
	Talking to other players	*Player 10: "Playing, I talk to people who play with me, and we talk about playing, about the food and something like that."*
	Positive co-playing experience	*Player 02: "Playing in a group, I have more fun and can hear the sounds of other players. It also improves your mood while playing…"*
Making new friends		*Player 21: "I can see how other elderly people are playing and get to know others I haven't met before. They can share their life stories, too"*

This study adds to the evidence that certain types of digital games can be both entertaining activities and valuable resources for older adults. Participants in this study acquired new and useful knowledge; expanded their social connectedness; valued the enjoyment, learning, and socializing that took place during their digital Bingo gameplay. As a result, they finished the study with more favorable attitudes toward digital games.

3.4 Older Adults' Social Interactions in an MMORPG

The purpose of this study was to investigate older adults' social interactions in MMORPGs. An online survey was developed and posted to eight World of Warcraft (WoW) player forums to gather information about older gamers' demographic characteristics, play patterns, social interactions in WoW, and challenges facing older adults while playing WoW. This is the most played MMORPG in North America. Invitation messages including the URL to the Web questionnaire were posted on the WoW player forums. The study addressed several research questions regarding older adults' play of the MMORPG entitled World of Warcraft (WoW). One of the research question is addressed here: What are older adults' social experiences within MMORPGs? The other questions are discussed in another paper published earlier [31].

Participants were asked to complete a Web questionnaire that consists of four sections. The section relevant to this paper asks questions about older adults' social interactions within WoW, including (1) methods used to communicate with other players; (2) with whom older adults play; (3) discussing with other players; (4) depth of relationships; and (5) quality of guild play.

Playing MMORPGs is not only about mindlessly killing monsters, but also about learning and participating in the shared practices of a game community [32]. To progress quickly through the games, players need to group with others and work together to overcome challenging quests for mutual benefits. Due to these mechanisms, playing MMORPGs provides many opportunities for social interactions. Compatible with previous findings, playing MMORPGs not only offers older adults many opportunities to sustain offline relationships with family and real-life friends, but also build meaningful and supportive relationships with game friends. MMORPGs also have the potential to function as a "third place" for older adults to socialize and be entertained similar to a real-world club or coffee shop.

Data from 176 older adult participants aged 50 and over who play WoW were analyzed. The majority of older WoW players were young older adults who were in their late 50s or early 60s. A substantial majority of them still maintained a certain amount of social contact, and were well-educated. In addition, the majority of them could be defined as heavy gamers (who played video games more than 2.5 h a day) based on De Schutter's criteria [11].

The questionnaire consisted of four sections and one section is discussed here. This section asked questions about older adults' social interactions within WoW, including: (1) methods used to communicate with other players; (2) with whom older adults play; (3) discussing with other players; (4) depth of relationships; and (5) quality of guild play. The complete study has been described elsewhere [15]. The results of the social research question are summarized here.

With Whom Older Adults Play. A larger number of older adults played with their family and real-life friends.

Discussing with Other Players. The majority of older adults never or rarely shared their personal problems with game friends. Older adults were more likely to discuss game play and general information within WoW such as weapons, rules and trades.

Depth of Relationships. Almost half of participants agreed or strongly agreed that playing with family members made them feel closer, and that they developed closer relationships with their real-life friends due to playing with them.

Guild Life. Guild life is a major part of the social interactions that take place within the game. Most participants mentioned they were either satisfied or very satisfied with the organization of guild, leadership, and interaction with guild members.

4 Conclusions, Limitations and Implications

The results from these research studies are encouraging. We addressed the research question: Can playing digital games provide social benefits to older adults? In particular, we addressed social connectedness in the quantitative research methods and, to some extent, in the qualitative research. We conducted four very different digital game studies with older adults and found social benefits in each study. Social connectedness was enhanced in all studies and was a consistent theme.

The survey conducted in the first study demonstrated that a minority of older adults actually play games online or face-to-face with others. As a consequence, fewer older players reported socio-emotional benefits, although those that played social games reported an increase in social benefits that were all aspects of social connectedness. The Wii Bowling and Bingo studies demonstrated that providing older adults with the opportunity to play a digital game with others resulted in positive social benefits; once again these benefits were types of social connectedness. These findings were confirmed by both the qualitative and quantitative results. Finally, the WoW study showed that playing online in stable groups, called guilds, with family members and friends resulted in closer bonds. It also demonstrated that new friendships could be formed by playing online with others. This study also demonstrated that MMORPGs have the potential to function as a "third place" for older adults to socialize and be entertained similar to a real-world club or coffee shop.

Overall, these findings suggest that promotion and education are needed to encourage and support older adults to play digital games with others to provide them with the social benefits and social connectedness that can be gained from this enjoyable activity.

Acknowledgement. This work was funded by AGE-WELL NCE Inc., a national research network in Canada supporting research, networking, commercialization, knowledge mobilization and capacity building activities in technology and aging to improve the quality of life of Canadians and contribute to the economic impact of Canada. AGE-WELL is a member of the Networks of Centres of Excellence (NCE), a Government of Canada program that funds partnerships between universities, industry, government and not-for-profit organizations.

References

1. Dykstra, P.A.: Older adult loneliness: myths and realities. Eur. J. Aging **6**(2), 91–100 (2009)
2. Ong, A.D., Uchino, B.N., Wethington, E.: Loneliness and health in older adults: a mini-review and synthesis. Gerontology **62**, 443–449 (2016)
3. Shankar, A., Mcmunn, A., Banks, J., Steptoe, A.: Loneliness, social isolation, and behavioral and biological health indicators in older adults. Health Psychol. **30**(4), 377–385 (2011)
4. Holt-Lunstad, J., Smith, T.B., Baker, M., Harris, T., Stephenson, D.: Loneliness and social isolation as risk factors for mortality: a meta-analytic review. Perspect. Psychol. Sci. **10**(2), 227–237 (2015)
5. Cacioppo, J.T., Patrick, W.: Loneliness: Human Nature and the Need for Social Connection. W. W. Norton & Company, Inc., New York (2008)
6. von Faber, M., et al.: Successful aging in the oldest old: who can be characterized as successfully aged? Arch. Int. Med. **161**(11), 2694–2700 (2001)
7. Reichstadt, J., Depp, C.A., Palinkas, L.A., Folsom, D.P., Jeste, D.V.: Building blocks of successful aging: a focus group study of older adults' perceived contributors to successful aging. Am. J. Geriatr. Psychiatry **15**(3), 194–201 (2007)
8. Eisenberger, N.I., Taylor, S.E., Gable, S.L., Hilmert, C.J., Lieberman, M.D.: Neural pathways link social support to attenuated neuroendocrine stress responses. Neuroimage **35**, 1601–1612 (2007)
9. Adams, K.B., Leibbrandt, S., Moon, H.: A critical review of the literature on social and leisure activity and wellbeing in later life. Ageing Soc. **31**(4), 683–712 (2011)
10. Delwiche, A.A., Henderson, J.J.: The players they are A-Changin': the rise of older MMO gamers. J. Broadcast. Electron. Media **57**(2), 205–223 (2013)
11. De Schutter, B.: Never too old to play: the appeal of digital games to an older audience. Games Cult. **6**(2), 155–170 (2011)
12. De Schutter, B., Vanden Abeele, V.: Designing meaningful play within the psycho-social context of older adults. In: Vanden Abeele, V., Zaman, B., Obrist, M., IJsselsteijn, W. (eds.) Fun and Games 2010: Proceedings of the 3rd International Conference on Fun and Games, Leuven, Belgium, pp. 84–93 (2010)
13. Schell, R., Hausknecht, S., Zhang, F., Kaufman, D.: Social benefits of playing Wii Bowling for older adults. Games Cult. **11**(8), 1–103 (2016)
14. Kaufman, D., Seah, E.T.-W., Zhang, F., Ireland, A.: Play, learn, connect: Older adults' experience with a digital educational Bingo game. J. Educ. Comput. Res. **56**(5), 675–700 (2018)
15. Zhang, F., Kaufman, D.: Older adults' social interactions in MMORPGs. Games Cult. **11**(1–2), 150–169 (2016)
16. Loos, E., Kaufman, D.: Positive impact of exergaming on older adults' mental and social well-being: in search of evidence. In: Zhou, J., Salvendy, G. (eds.) ITAP 2018, Part II. LNCS, vol. 10927, pp. 101–112. Springer, Cham (2018). https://doi.org/10.1007/978-3-319-92037-5_9
17. https://fullframeinitiative.org/wp-content/uploads/2011/05/SocialConnectedness_Factsheet.pdf
18. Hausknecht, S., Schell, R., Zhang, F., Kaufman, D.: Building seniors' social connections and reducing loneliness through a digital game. In: Helfert, M., Restiva, M.T., Svacek, S., Uhomoibhi, J. (eds.) Proceedings of the 7th International Conference on Computer Supported Education, pp. 276–284. Science and Technology Publications, Lda., Setúbal (2015)

19. Ijsselsteijn, W., Nap, H.H., de Kort, Y., Poels, K.: Digital game design for elderly users. In: Kapralos, B., Katchabaw, M., Rajnovich, J. (eds.) Future Play 2007: Proceedings of the 2007 Conference on Future Play, pp. 17–22. ACM, New York (2007)
20. van Bel, D.T., Smolders, K.C., Ijsselsteijn, W., de Kort, Y.: Social connectedness: concept and measurement. In: Callaghan, V., Kameas, A., Reyes, A., Royo, D., Weber, M. (eds.) Intelligent Environments 2009: Proceedings of the 5th International Conference on Intelligent Environments, pp. 67–74. IOS Press, Amsterdam (2009)
21. De Schutter, B., Maillet, S.: The older player of digital games: a classification based on perceived need satisfaction. Communications **39**(1), 67–88 (2014)
22. De Schutter, B., Brown, J.A.: Digital games as a source of enjoyment in later life. Games Cult. **11**(1–2), 28–52 (2016)
23. McLaughlin, A., Gandy, M., Allaire, J., Whitlock, L.: Putting fun into video games for older adults. Ergon. Des. Q. Hum. Factors Appl. **20**(2), 13–22 (2012)
24. Khoo, E., Cheok, A.: Age invaders: intergenerational mixed reality family game. The International Journal of Virtual Reality **5**(2), 45–50 (2006)
25. Wollersheim, D., et al.: Physical and psychosocial effects of Wii video game use among older women. Int. J. Emerg. Technol. Soc. **8**(2), 85–98 (2010)
26. Trepte, R., Juechems, K.: The social side of gaming: how playing online computer games creates online and offline social support. Comput. Hum. Behav. **28**(3), 832–839 (2012)
27. Allaire, J.C., McLaughlin, A.C., Trujillo, A., Whitlock, L.A., laPorte, L., Gandy, M.: Successful aging through digital games: socioemotional differences between older adult games and non-gamers. Comput. Hum. Behav. **29**, 1302–1306 (2013)
28. Kaufman, D.: Aging well: can digital games help older adults? In: Bastiaens, T., Marks, G. (eds.) Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2013, pp. 1943–1949. AACE, Chesapeake (2013)
29. Kaufman, D., Sauvé, L., Renaud, L., Sixsmith, A., Mortenson, B.: Digital gameplay by older adults: patterns, benefits, and challenges. Simul. Gaming **47**(4), 475–489 (2016)
30. Sauve, L., Renaud, L., Kaufman, D., Duplaa, E.: Ergonomic criteria for creating online educational games for seniors. In: Sourina, O., Wortley, D., Kim, S. (eds.) Subconscious Learning via Games and Social Media. GMSE, pp. 115–134. Springer, Singapore (2015). https://doi.org/10.1007/978-981-287-408-5_9
31. Zhang, F., Kaufman, D.: Massively Multiplayer Online Role-Playing Games (MMORPGs) and socio-emotional wellbeing. Comput. Hum. Behav. **73**(c), 451–458 (2017)
32. Ducheneaut, N., Moore, R.: The social side of gaming: a study of interaction patterns in a massively multiplayer online game. In: Proceedings of the ACM Conference on Computer-Supported Cooperative Work, Chicago, USA, pp. 360–369. ACM Press (2004)