Benefits and Barriers of Older Adults' Digital Gameplay

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Abstract: Gerontology researchers have demonstrated that cognitive and social factors are keys that may sometimes outweigh physical conditions in determining life satisfaction. Social interaction and cognitive challenge are consistently identified as key elements to enhance older adults' quality of life. Digital games can offer many potential benefits to older adults in a motivating and playful way, such as increased social interaction and maintenance of cognitive functioning. This paper describes some key results regarding socio-emotional and cognitive benefits as well as barriers reported from an early survey of 463 Canadian older adults who play digital games. The results demonstrate that a diverse group of older adults are actively playing digital games on a regular basis and that players report numerous socio-emotional and cognitive benefits and few difficulties. These results are promising and will be followed up with a variety of experimental studies.

1 INTRODUCTION

1.1 Background

The proportion of people age 60 and over is growing faster than any other age group and is predicted to grow to two billion by 2050 (Aalbers et al., 2011; WHO, 2002). Aging older adults face declining physical and cognitive capacities, shifts from career or family focus to different interests and activities, loss of long-term companions and social supports, changed living arrangements, and increasing likelihood of chronic and debilitating illness (Kaufman, 2013).

Successful aging - maintaining an independent, positive, independent, healthy, and meaningful quality of life - is a continual challenge for older adults, yet it is essential for older adults and their societies, which benefit both from older adults' continuing contributions and from reduced social and care costs (Kaufman, 2013).

Although a single clear definition has not been established for "successful aging" (Lee, Lan and Wen, 2011), gerontology researchers have demonstrated that cognitive and social factors are keys that may sometimes outweigh physical conditions in determining life satisfaction. Social interaction and support are consistently identified as key aspects of older adults' quality of life (Reichstadt, Sengupta, Depp et al., 2010). Declining social capacities are linked with declines in physical, cognitive and emotional functions (WHO, 2002) and their associated implications for disease, dependence, and poorer life quality. Digital games offer many potential benefits to older adults for improving social functions in a motivating and playful way. Using a positive psychology approach, Astell (2013) argues that games can contribute to older adults' happiness and life satisfaction through social interaction, cognitive exercise, and physical activity that motivates them to positively manage their lives. It is well known that games are engaging and promote flow experience (Csikszentmihalyi, 1990), support learning through graduated levels of practice, and offer opportunities for social interaction through group or online play (Kaufman and Sauvé, 2010).

As people get older, the social circle they developed through a lifetime will change and sometimes diminish. People who continue to maintain close friendship and find other ways to interact socially have reduced risk of mental health issues such as depression and live longer than those who become isolated. The psychological effects of social support in older adults have received a

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substantial amount of attention during the last two decades. A consensus view has been reached that the more opportunities an individual has to interact with other people, the more social support will be available, which, in turn, will have a beneficial effect on general wellbeing. For example, Glass, et al.'s study (2006) found that higher levels of social support were associated with lower levels of depression.

A study conducted by Forsman et al. (2012) showed the effectiveness and subjective importance of social activities for the maintenance of mental health and well-being among older adults. Individuals derive positive outcomes and resources from personal relationships and interpersonal contact.

Maintaining older adults' vitality, independence and quality of life well into old age helps both older adults themselves and their societies. The potential for technology to support older adults to live well and experience the things that make life worth living has received much less attention than the physical, mental and social challenges they face. However, evidence suggests that technology can provide people with meaningful and engaging activities that are stimulating, enjoyable and fun (Sixsmith et al., 2007). In particular, technology-based games promise many benefits to older adults, but research evidence is sparse about whether and how these can be realized. The evidence and guidelines for practice that will result are expected to benefit not only individual older adults, but also their families, communities and societies-at-large.

1.2 Purpose of the Study

The purpose of this survey was to explore the opinions and experiences of older adults (55 years and older) who play non-digital and digital games. It explored issues such as which games they play, with whom they are playing, how frequently they play, the reasons they play, and their perceived benefits and barriers. There also were questions about their ratings of social, emotional and cognitive changes through game play. Older adults' backgrounds and patterns of use were examined and compared with their opinions and experiences to search for relationships.

The survey will help to inform future studies that may investigate the use of digital games as a way to stimulate cognitive functioning and enhance psychosocial aspects that may help individuals to age more successfully.

1.3 Research Questions

1. What are the patterns of digital gameplay reported by older adults?
2. What are the socio-emotional and cognitive benefits of digital gameplay reported by older adults?
3. What are the difficulties in digital gameplay reported by older adults?

2 LITERATURE REVIEW

2.1 Social Interaction and Successful Aging

It is well established that social engagement is seen as an important component of successful aging (Ristau, 2011; Von Faber et al, 2001). Prior epidemiological, cross-sectional and longitudinal research has shown that older adults with high engagement in social interaction report more positive wellbeing. Glei et al. (2005) examined how changes in cognition over time are related to social participation and the extent of social networks. Data draw from this population-based, longitudinal study revealed that respondents who engaged in one or two social activities failed 13% fewer cognitive tasks than those with no social activities, and those who participated in three or more activities failed 33% fewer cognitive tasks. Glei et al. (2005) also indicated that social interaction outside the family may have a bigger impact on cognitive function than social contacts with family. In addition, social engagement provides opportunities for older adults to deal with stress and receive social support and connect with friends. Eisenberger et al.'s (2007) study with 30 participants yielded supportive evidence that individuals with regular social interaction during 10 days showed diminished neuroendocrine stress responses and distress of social separation.

2.2 Cognitive Functioning and Successful Aging

While physical and cognitive decline is generally thought to be a natural trend of aging, emerging evidence from social and cognitive neuroscience suggest that appropriate training or therapeutic techniques could not only slow, but also actually reverse this trend (Green & Bavelier, 2006). For example, Ball et al. (2002) examined the

effectiveness of three cognitive training interventions on the mental abilities and daily functioning in independent-living older adults. In comparison to baseline, participants in experiment groups exhibited immediately improvement in processing speed, reasoning and verbal episodic memory after 19-month intervention period, which were maintained at the two-year follow-up. Empirical evidence suggests that cognitive decline that is part of the natural aging process could be slowed or reversed by getting the elderly involved as active users of video games. Basak, Boot, Voss, and Kramer (2008) reported the use of a real-time strategy video game for the enhancement of executive control processes of older adults. They found that after a period of 23.5 hours game playing participants in the experiment group improved significantly more than participants in control group in executive control functions, such as task switching, working memory, visual short-term memory, and improving. Maillot, Perrot and Hartley (2011) assessed the potential of physically simulated sport games that could have cognitive benefits for older adults. The experimental group participated in a total of 24 hours of game training. In comparison to the control group, the experimental group underwent significant changes in executive control and processing speed.

Although these studies suggest that video games could be a powerful tool in slowing or reversing the age-related declines in perceptual, motor, and cognitive skills among older adults, some contradictory findings have been reported.

2.3 Digital Games and Older Adults

Older adults use many leisure activities offered by Information and Communications Technologies (ICTs), one of which is digital games (e.g. video, computer, and online games). DeSchutter (2011) investigated the use of digital games among 124 older gamers. He found that 16.1% are heavy gamers who play digital games more than 2.5 hours a day; 29.5% are moderate gamers who play 1 to 2.5 hours a day; 44.4% are light gamers whose time of digital game playing is less than one hour a day. The mean playing time is 1.45 hour a day (SD=1.14). In 2005, 18% of gamers (about 1.7 million) in UK were aged between 51 and 65 (Pratchett et al., 2005). Both heavy and light gamers are significant in this age group. In 2011, 29% game players in America were aged 50 and over (Entertainment Software Association, 2013).

Digital games hold a significant promise for enhancing the lives of older adults (Ijsselsteijn et al., 2007). Games that require progressively more accurate and more challenging judgments at higher speed, and the suppression of irrelevant information can drive positive neurological changes in the brain systems that support these behaviors. Also, in most digital games, hand-eye coordination, sustained attention to the task, as well as the ability to quickly locate a proper area of the screen is required. As the players practice and become proficient at these tasks, it is expected that their visual-spatial skills will be developed. What's more, digital game playing is increasingly becoming a means for social interaction (Mahmud et al., 2010). It has been hypothesized that digital game holds great promise for enhancing the quality of life in older people by improving their subjective well-being, enhancing their social connectedness, and offering an enjoyable way of spending time (Whitcomb, 1990).

Older adults have recently begun to experience the benefits of online communities as a medium for fun social interactions. In two studies of online communities, the majority of posts were part of online social games, including cognitive, associative, and creative games (Nimrod, 2010, 2011). He concluded that because online communities offer both leisure activity and an expanded social network, participation in these settings may contribute to the well-being of older adults. Recent research suggests that training in technology use can enhance older adults' cognitive functions as well as facilitate their social interaction and support. Astell (2013) suggests that games and social/interaction technologies offer both cognitive stimulation and social connection, particularly for older adults with dementia. Many older adults are already active technology users and should be able to readily learn and use digital games. (Pew Internet and American Life Project, 2011). *ELDERGAMES* (Gamberini et al, 2006) and *HERMES* (Buiza et al, 2009) show promise for improving cognitive function, although we are not aware of controlled studies measuring their impact. Regarding older adults' social interactions, Whitcomb (1990) identified several early studies in which older adults had positive social experiences when playing computer games. Participants in the *ELDERGAMES* project identified social interaction, defined as the "opportunity to create and maintain new relationships" as that game's biggest benefit. Researchers agree that much additional work is needed to establish whether and in what forms digital games can best and most efficiently benefit older adults. This issue has been addressed by

Ijsselsteijn et al. (2007), who identified four potential areas for games to contribute to improving the quality of life for older people: (1) relaxation and entertainment, (2) socializing, (3) sharpening the mind, and (4) more natural ways of interacting. The socializing and cognitive areas represent two of the three foci of this study. Very few rigorous experiments have been conducted, and our current knowledge of older adults' needs suggests that today's commercial games pose usability challenges for many older adults (Buiza et al, 2009; De Schutter, 2011). Yet new platforms such as the iPad and mobile devices offer great opportunities for ease of use (e.g., ipadnewsupdates.com)

Conclusions are difficult to draw from current empirical studies because inconsistency is related to many factors, including the demographic information of participants (e.g., age, education level, etc), the ratio of male vs. female, research design, the wide variety of outcome measures used, control variables in multivariable models, appropriateness of the selected video games, training interventions, etc. For example, Laver et al.'s (2011) study recruited 21 participants, 86% of whom were female. The large proportion of female participants may lead to the preference of conventional therapy programs over Wii Fit programs because there are more male gamers than female gamers (Entertainment Software Association, 2011; Entertainment Software Association, 2012). One tangible way to assess the effects of video games on the motor and cognitive functions in older adults is through the incorporation of outcome measures across available quantitative studies and taking into account the methodological characteristics and various outcome measures by conducting several moderate analyses (Borenstein et al., 2009).

3 RESEARCH METHOD

3.1 Participants

The population that was targeted comprised older adults, age 55 or more, who play digital games. We included both those who have and those who haven't retired since many people work part- time, or do voluntary jobs after retirement. Also a non-retired older adult group added an interesting comparative group. This involved 891 participants recruited from assisted living and community centres, shopping malls, and other public venues as needed. 463 of these responded to the digital gameplay section of the survey and are the focus of this paper.

3.2 Instrument

This study used a print-based, mainly closed-ended, questionnaire that consisted of questions that asked older adult gamers about their background characteristics, demographics, patterns of use, opinions, and experiences. A small number of open-ended questions were asked to gain a deeper understanding of some issues. The survey asked about background information, digital game playing patterns and experiences, and opinions regarding social, psychological, cognitive and educational aspects. Respondents required 15-20 minutes to complete the survey and received a $5 coffee card for their participation.

3.3 Recruitment and Data Collection

Recruitment occurred through four methods. Firstly, a number of older adults' independent/assisted living centres were targeted. Secondly, centre directors were contacted to assist in recruitment in local community centres and older adult centres. Thirdly, directors of local shopping malls were approached for permission. Finally, directors of independent and assisted living facilities were contacted. Each potential participating organization was sent a Recruitment letter and if they agreed, they replied in writing by email or letter. As recompense for the time involved, participants were offered a gift certificate of $5 for their participation, and offered entry into a draw for three chances to win $100 upon completion. If they agreed, respondents were given a separate postcard to provide their contact information in order to maintain their anonymity. Respondents also were asked whether they would be willing to be contacted later for a short interview. Six months after the draw was completed and the prizes awarded, all cards were shredded.

3.4 Data Analysis

The data were analyzed using the SPSS software (version 19). The descriptive statistics are reported below.

4 FINDINGS

A total of 463 completed questionnaires were received from older adults who play digital games. Selected findings from the analysis of their responses are reported below.

4.1 Participant Backgrounds (N=463)

1. **Sex:** Male, 39%; Female, 63%
2. **Age:** 55-64, 37%; 65-74, 36%; 75+, 25%
3. **Where do you live?:** Home, 83%; Assisted living, 8%; Nursing home, 0%; Other, 9%
4. **Are you retired? Yes, 80%; No, 20%**

Almost two-thirds (63%) of respondents were females; respondents ranged in age from 55 to 89 years and were fairly balanced across the three age categories. Most (83%) lived at home and 80% were retired.

4.2 Participant Gameplay Patterns (N=463)

1. **How many years have you been playing digital games?**
   Less than 1 year. 20%
   1-4 years, 30%
   5-10+ years, 50%
2. **Have you played digital games in the past month?**
   Yes, 84%
   No, 16%
3. **During the past month, during how many days per week on average have you played digital games?**
   0 days, 12%
   1-4 days, 54%
   5-7 days, 34%
4. **During the past month, when you played digital games, how many hours per day on average did you play?**
   1 hour or less, 0%
   2-5 hours, 92%
   6-8+ hours, 8%
5. **Have you played social games online with other players? (e.g., bridge, chess, scrabble, Facebook games)**
   Yes, 27%
   No, 73%

About half (50%) have played for 5 years or more. Most (88%) reported that they had played at least one day or more per week on average. It is interesting to note that almost all respondents (88%) played digital games every day or every other day and almost all (92%) played between 2-5 hours per day when they did play. More than one-quarter (27%) had played social games with other players.

4.3 Reported Social Benefits (N=463)

Table 1 lists the greatest benefits of playing digital games reported by participants.

Table 1: Greatest benefits of playing digital games.

Benefit	% Selecting[1]
Mental exercise	83
Social interaction	26
Enjoyment, fun	71
Escape from daily life	26
Other	7

[1]Respondents could select more than one benefit.

Most (83%) of respondents reported that 'mental exercise' was the greatest benefit of playing digital games. The next greatest benefit was 'enjoyment/fun' (71%). Social interaction was reported as a benefit by more than a quarter (26%) of respondents.

Table 2 below shows the self-reported socio-emotional benefits of playing digital games (n=463).

Table 2: Socio-emotional benefits of digital games.

Benefit	% Reporting an Increase[2]
Developing new friendships	26
Connecting with current friends	27
Connecting with family	33
Connecting with various age groups	28
Developing confidence	42
Dealing with loneliness	35
Dealing with depression	24

[2]Almost no one reported a decrease. Some reported no change.

From about a quarter (24%) to almost a half (42%) of respondents reported socio-emotional benefits. The greatest benefits reported were developing self-confidence, dealing with loneliness, and connecting with family.

The results in Table 3 show that the great majority (between 58% and 72%) of respondents reported an increase in cognitive skills as a result of playing digital games.

A further finding (not in a table) was that 61% reported an increase in computer skills and 54% reported an increase in internet skills as a result of playing digital games.

'Too complicated' was the greatest difficulty reported, but by only about one fifth (21%) of respondents.

Table 3: Cognitive benefits of digital games.

Benefit	% Reporting an Increase[3]
Focussing attention	72
Memory	69
Reasoning	58
Problem solving	65
Speed in reacting/ responding	66

[3]Almost no one reported a decrease. Some reported no change.

Table 4: Difficulties in playing digital games.

Difficulty	% Selecting[4]
Difficult to see/ hear	0
Too complicated	21
Privacy	5
Difficult to use controller	10
Limited/ no access to technology	10
Other	12

[4]Respondents could select more than one difficulty.

5 CONCLUSIONS

These results demonstrate that a large and diverse group of older adults are actively playing digital games on a regular basis. Many players reported a number of socio-emotional benefits, and almost three-quarters reported some type of cognitive benefit. These results are encouraging for using digital games to enhance the aging process of older adults. However, it should be emphasized that these results are preliminary. The next step will involve further data analysis to investigate whether there are particular groups that benefit more from playing digital games, e.g., older adults, expert players, active players. Then a series of experiments are being planned to directly address the socio-emotional and cognitive benefits of digital games for older adults. These experiments will include research to clarify whether gameplay is effective or not based on objective evaluation criteria.

Overall, this study provides a positive starting point for determining whether digital games may improve the quality of life in older adults. Improving lives through play is an appealing idea, and play itself also has been shown to lead to powerful learning (Kaufman & Sauve, 2010). The potential for digital games to provide benefits to older adults, even when they may be homebound or isolated, is exciting. It may be that in our technologically focused culture, digital games are a way to assist older adults in feeling more connected with the world, while providing a enjoyment as well as a social and stimulating environment. Play is not only for the young, but can be used throughout the life cycle to connect and bring joy at any stage.

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