

# Aging Well: Can Digital Games Help Older Adults?

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## Introduction

The aging of populations worldwide is no secret. 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). In 2010, almost five million Canadians were over 64 years of age; by 2036 there will be more than 10 million (HRSDC, 2011). 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. Successful aging - maintaining an independent, positive, independent, healthy, and meaningful quality of life - is a continual challenge for older adults, yet it is paramount for individual older adults and societies.

Digital games offer many potential benefits to older adults for improving cognitive and social functions in a motivating, playful way. Using a positive psychology approach, Astell (in press) 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. The overarching objective of this four-year project is to examine the use of digital games to enhance older adults' quality of life.

The specific research questions to be addressed are: (1) Can older adults' cognitive functioning be enhanced through the use of digital games? Can older adults' social lives be enhanced through the use of digital games? (3) What are the key implementation factors for effectively using digital games with older adults?

## Method

### Conceptual framework.

Our conceptual framework for this project is based on the numerous evaluation models that use a similar structure, i.e., inputs, process, outcomes (Stufflebeam & Webster, 1980).

Table 1.  
*Conceptual Framework for the Project.*

Background	Gameplay Process					Outcomes
	Setting	Context	Players	Device	Genre (Game type)	
Age Gender Education Occupation (former) Technology skill & experience Current state: cognitive, social	Private home Older adults centre (drop-in) Assisted-living facility Nursing home	Face-to-face Online	Individual Two players Groups	Computer Handheld device Tablet Game machine	Frame* Brain Action Strategy Social Sport Biofeedback MMORPG** Simulation Other (to be decided)	Cognitive Social Usability Satisfaction

\* Our team has developed a generic game shell and a series of online frame games, which are online versions of popular board games, e.g., *Snakes & Ladders*, *Parcheesi*.

## Participants

Participants will be drawn from all four settings listed in the conceptual framework: homes, older adults centres (drop-in), assisted living facilities, and nursing homes. Samples will be situated in Greater Vancouver, Greater Montreal, Quebec City, and the Ottawa region. The estimated sample sizes over the five years of the project are shown in the table below. Over the full project, we plan to involve over 500 active participants in our project. This will represent one of the largest scale studies ever conducted of games for older adults.

## Interventions

We will conduct studies in each of the four settings, both online and face-to-face, with players playing alone or with another player or in groups. Various digital game platforms and games and a variety of games will be used based on whether participants' goals are cognitive or social. It is important to note that we will not use violent, sexist, or culturally-biased video games, and will be careful to avoid overuse issues that sometimes have been shown to lead to video game addiction in adolescents. Finally, all studies will examine the outcomes of playing games. Before selecting games for testing, usability studies will be conducted to learn about older adults' capabilities and interests in playing specific games and game types.

The following examples illustrate the range of experiments to be conducted. Older adults will be recruited through local older adults' centres, community agencies, and our numerous existing contacts and will be surveyed to determine their goals, and the games, and platforms that they wish to use.

1. We will continue our earlier work with our online 'frame games', such as *Parcheesi*, *Snakes and Ladders* and *Trivia*. Older adults will then play games over a period of several months to learn about self-care and health promotion.
2. Older adults in older adults' centres and assisted living facilities will play for several months the game *Brain Age* on a Nintendo handheld game machine.
3. Older adults in older adults' centres, assisted living facilities, and nursing homes will play for several months selected sports games from the EA Sports series.
4. We will experiment with digital game genres such as action games (e.g., *Harry Potter*), online strategy games (e.g., *Chess*, *Scrabble*, *Bridge*), simulation games (e.g., *SimCity*), reaction games (e.g., *Tetris*), and others to test their usability and benefits for these populations.
5. We will experiment with older adults at home who wish to play an online MMPOG (massive multiplayer online role-playing game) such as *Everquest* or *World of Warcraft*.

## Measurement Instruments

A number of paper-based and online measurement instruments will be used in the full study, as follows:

1. Questionnaires on background characteristics of participants, user satisfaction and usability;
2. Interviews with selected individuals and focus groups with all participants covering their self-reported enjoyment, benefits and difficulties, as well as suggestions for improvement
3. Non-participant observations (some video recording with permission) of gameplay to determine how well the games are working, and what could be done to improve the gameplay and benefits.
4. *Cognitive measures*. A number of instruments will be reviewed by the research team and pilot tested to determine the ones to be used in our outcome studies.
5. *Socio-emotional measures*. A number of measurement instruments will be used in the full study.

## First Research Activity: Survey of 891 Older Adults

The purpose of this survey was to explore the opinions and experiences of older adults (55 yrs and older) who play non-digital and digital games.

## Research Questions Addressed in this Paper

What are the experiences and patterns of use of older adults who play non-digital and digital games?  
What are their opinions about the benefits and difficulties of digital and non-digital game playing?

## Participants

The population that was targeted comprised older adults, age 55 or more, who play digital games. This involved 891 participants recruited from assisted living and community centres, shopping malls, and other public venues as needed. Formal permissions were obtained from all organizations before approaching participants to complete the survey.

## Research 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.

## Data analysis

The data are being analyzed using the SPSS software (ver 19). Both descriptive and inferential statistics are being used to do the analysis. The descriptive statistics reported will be frequencies and percentages on some items, and means and standard deviations on others. The inferential statistical tests used will be independent samples t-tests, analysis of variance, and chi-squared analysis to compare respondents on selected items based on their background characteristics, e.g., sex, age, etc. (see survey) and game-playing patterns. Finally, the open-ended items will be coded into categories (using grounded theory) and themes will be created.

## Preliminary Results

**Participants (n=463 who played digital games; 428 played only non-digital games and are not reported here)**

1. **Sex:**  
(39%) Male (63%) Female
2. **Age:**  
(18%) 55-59 (19%) 60-64 (16%) 65-69 (20%) 70-74 (10%) 80-89 (3%) 90 +
3. **Living arrangement:**  
(36%) Alone (36%) In a couple (23%) With family (4%) With others
4. **Where do you live?**  
(83%) Home (8%) Assisted-living facility (0%) Nursing home (9%) Other
5. **Are you retired?**  
(80%) Yes (20%) No
6. **Describe your working situation at the present time:**  
(62%) Not working  
(28%) Working part-time (paid or voluntary)  
(10%) Working full-time (paid or voluntary)

Almost two-thirds (63%) of respondents were females. Respondents ranged in age from 55 to 90 plus years, and were fairly well balanced across the various age categories between 55 and 89 years. Slightly over one-third (36%)

lived alone and the great majority (83%) lived at home and were retired (80%). Almost two-thirds (62%) were not working at all while more than one-third (38%) were working part- or full-time.

**Q1: What are the experiences and patterns of use of older adults who play digital games? (n=463)**

- 1. How many years have you been playing digital games?**  
(20%) Less than 1 year (30%) 1-4 years (19%) 5-9 years (31%) 10 + years
- 2. Have you played digital games in the past month?**  
(84%) Yes (16%) No
- 3. During the past month, how many days per week on average have you played digital games?**  
(12%) 0 (18%) 1 (16%) 2 (11%) 3 (9%) 4 (9%) 5 (3%) 6 (22%) 7
- 4. During the past month, when you played digital games, how many hours per day on average did you play?**  
(0%) 1 hr or less (58%) 2-3 hrs (35%) 4-5 hrs (5%) 6-8 hrs (2%) More than 8 hrs

It is interesting to note the broad spread in number of years playing digital games, with almost one-third (31%) having played for 10 years or more. Most (84%) had played in the past month (88%) and almost one-quarter (84%) had played every day in the past month. Most (88%) reported that they had played at least one day or more per week on average. Nearly all (93%) had played between 2-5 hours per day on average when they played.

**Q2: What are their opinions about the benefits and difficulties of digital game playing? (n=xxx)**

- 1. What do you think are the greatest benefits of playing digital games? (select all that apply)**  
(83%) Mental exercise  
(26%) Social interaction  
(71%) Enjoyment (fun)  
(26%) Escape from daily life  
(7%) Other
- 2. What are your main difficulties in playing digital games? (select all that apply)**  
(0%) Difficult to see or hear  
(21%) Too complicated  
(5%) Privacy  
(10%) Difficult to use controller  
(10%) Limited or no access to technology  
(12%) Other

Most (83%) of respondents reported that ‘mental exercise’ was the greatest benefit of playing digital games. The next greatest benefit was ‘enjoyment/fun’ (71%). The main difficulty reported was that digital games are ‘too complicated; this was reported by less than a quarter of respondents (21%). No one reported that these games were difficult to see or hear.

**Conclusions**

These results demonstrate that a large and diverse group of older adults are actively playing digital games on a regular basis. Most players report a number of benefits and few difficulties. The results are promising for providing an innovative and fun activity for enhancing the aging process for older adults. However, these results are preliminary and much more work will be done in this project to address the socio-emotional and cognitive benefits of digital games for older adults.

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