Older adults as 21st century game designers

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Abstract
This study aimed to explore what type of game genres older adults would want to play, given the opportunity. A series of creative workshops were devised, and the focal point was to facilitate the creation of individual game concepts relating to participants' hobbies, interests or dreams, and categorising them into a classification system. A series of presentations were given, followed by worksheets, to facilitate completion of the concept in a step-by-step approach. A survey was administered to 24 participants between the ages of 50 and 70+ years. Quantitative results showed the older adults in this study preferred or would consider playing games in the adventure, strategy, puzzle and sport genres. Qualitative results identified game concepts, categorised into current genre classification. Some designs were not easily placed, thus leading to the notion that combining respondent hobbies, interest and dreams with game designs may lead to new types of game(s) for an ageing population.

1: Introduction

During the last approximately 50 to 60 years, the innovative development of digital gaming has evolved rapidly. A number of leading videogame companies (e.g. Microsoft, Nintendo and Sony) has led the development of next-generation game consoles (e.g. Xbox and PlayStation). In particular, the Nintendo DS and Wii consoles have widened the appeal of this entertainment medium, offering digital games to broader audiences such as baby boomers, a cohort of people born between the years 1946 and 1964, who are not initially perceived as a typical gaming audience.

The concept of genre is found in many forms of entertainment (literature, and cinema) and particularly in gaming. There are particular characteristics which form a genre; in the context of gaming these are based more upon gameplay interaction than on visual and narrative representation (Apperley 2006). The designation of genre such as action is independent of the environment or content of a game, which is different to literature or film. For example, an action game will still be categorized as an action game whether it is in a fantasy world or not (Rollings and Adams 2003).

It has been suggested that the take-up of gaming by wider audiences has increased since the release of the Nintendo DS and Wii consoles, which coincided with games such as Dr Kawashima’s Brain Training (Nintendo, 2005), Wii Sports (Nintendo, 2006) and Wii Party (Nintendo, 2006). However, at the time of writing there is no statistical evidence to support this suggestion, and there may not be for some time (Marston, 2010).
In 2004, the most popular video game genre was action (27.1%), which at present is played by 21.7% of gamers, a decrease of 5.4% (ESA 2004, 2011). The sport genre in 2004 accounted for 17.6% of gaming. However, an increase of 2% to 19.6% by 2010 (ESA 2010) was followed by a decrease of 3.3% in 2011, bringing the sports genre to 16.3% (ESA 2011).

Since 2004 there has been a 12% increase of gamers who are aged 50 and over (ESA 2004, 2011) (see Figure 1), which contradicts the initial perception of computer gaming as a form of entertainment solely for young men and boys (Laurel 2001).

![Age of Gamers 2004 - 2011](image)

Studies of demographics of games showed that 18% of adults aged between 51 and 65 years old were gamers. By comparison, in the 25–35 age group 82% were active gamers (Pratchett Harris & Taylor 2005). According to the ESA (2011), the average age of a gamer in 2011 was 37 years. Additionally, 84% of 51 to 65 year-olds preferred playing games on a personal computer (PC), an observation which is supported by de Schutter (2010) and Pearce (2008). Minimal game playing was reported on three gaming consoles: 26% on the PS 2 console; 7% on the Xbox; and 5% on the Nintendo Gamecube (Pratchett et al, 2005).

Previous research has primarily focused upon younger audiences and gaming. However, there are exceptions: Copier (2002) investigated 12 elderly gamers adopting a qualitative approach; de Schutter (2010) recruited 124 individuals aged between 45 and 85 and proposed a series of ‘benchmark data’; and Pearce (2008) explored the lifestyle of “Baby Boomer” gamers.

Additionally, four studies considered the benefits of games playing to improve the quality of life of elderly adults (Goldstein et al. 1997; Farris et al, 1994; Whitcomb, 1990; Schueren 1986). Three studies focused on the effects of cognition and reaction time (Basak et al. 2008; Boot et al. 2008; Ball et al, 2002). Utilizing an ethnographic approach, six studies focus upon the design interaction and needs of older adults for game design (Nap et al, 2009; de Schutter and Vanden Abeele 2008; Ijsselsteijn et al. 2007; Vanden Abelee et al. 2007; Gamberini et al. 2006; Khoo et al 2006).
The United Nations 2011 world population survey points to a rapidly ageing society, and there does not appear to be any indication that this trend will end in the foreseeable future. Approximately 14% of the European Union (EU) population is aged over 65, and it is anticipated that the number will double by 2050. Many retirees in an ageing society want to learn a new skill or explore new technology media. The motivations and benefits for game playing vary, for example: cognitive exercise; social interaction; strengthening peer and intergenerational relationships (Chapman 2002). It has been proposed that game playing can strengthen memory, aid growth of the brain, delay the onset of dementia, and lead to healthier lives or even “recovery” from age-related illnesses (Chapman 2002; BBC 2000, 2002, 2003(a, b), 2008(a, b) and 2009). Nevertheless, older adults can experience enhanced anxiety through learning and experiencing new forms of technology, with several impairments e.g. physical, cognitive, motor and perceptual (Bouwhuis 2003), making the use and adoption of technology more difficult.

Building and enhancing intergenerational relationships are important benefits resulting from the adoption of technology and can help to maintain social activity with family and peers (Chapman 2002). Older people’s motivations for digital gaming included:

- the desire to interact more with their spouses or children;
- supporting a hobby or pastime;
- “passing the time” (i.e. avoiding boredom); and,
- because they enjoy playing (Copier 2002).

Research by Ijsselsteijn et al. (2007) supports the concept of social interaction with peers and family. They report that ‘seniors’ are underrepresented as consumers of digital games, and argue for ‘creating a significant and largely untapped market opportunity’ (Ijsselsteijn et al. 2007).

According to Bouwhuis (2003) and Ijsselsteijn et al. (2007), older adults who participate in the role of designer will identify and recommend engaging content attractive to this cohort. However, there appears to be scant research into the nature of game design, or on what game concepts entice older adults to play digital games.

Barriers to the adoption and use of technology by older people include:

- a lack of comprehension of instruction;
- little financial or other incentive to invest their time; and,
- a low value of the technology within their lives (Mattke et al. 2010).

Overcoming barriers such as these is important to designers, in particular those producing games within an ageing society. Including older adults in the processes of design, development, testing and marketing will facilitate the learning of both industry and ageing game players. Learning to understand the preferences and attitudes of older people - and acknowledging impairments and capabilities of older games players - may be positive for a long term and widespread use of products (Demris et al. 2010; Bouwhuis 2003).

For the purpose of this paper, the terms “second age” and “third-age” will be used when referring to the participants in the study. Weiss and Bass (2002) define these terms as:

“The life phase in which there is no longer employment and child-raising to commandeer time, and before morbidity enters to limit activity and mortality brings everything to a close, has been called the third age. Those in this phase of life have passed through a first age of youth, when they prepared for
The activities of maturity, and a second age of maturity, when their lives were given over to those activities, and have reached a third age in which they can, within fairly wide limits, live their lives as they please, before being overtaken by a fourth age of decline."

The identification of suitable game genres has the potential to engage and attract wider audiences when faced with the inevitable prospect of an ageing society. The aim of this paper is to present a series of game genres suitable for older adults who created their own game design concepts via a workshop process.

2: Methodology

Twenty-four participants completed both a workshop and survey. The mean age of participants was 64 years (standard deviation (SD) = 6.21). There were 10 males (41.7%) and 14 females (58.3%). The majority of participants were categorised as third-age adults (75%), with the other six (25%) categorised as second-age adults.

2.1: Participant recruitment

A series of workshops were organized across two university campuses. The first group of workshops were held at Northumbria University, whereby participants were recruited via the Psychological Aspects of Communication Technologies (PACT) Lab database. This approach proved successful and the three workshops were conducted over a two-day period. The second set of workshops was held at Teesside University.

2.2: Survey design

The questionnaire had five sections:

- Section 1 focussed on the participants’ computer literacy, including computer ownership, usage, access frequency, length of use, hours and purpose.
- Section 2 focused upon user confidence, which has been found to be a pivotal factor in computer use in older adults (Barbeite and Weiss 2004).* (over-page)
- Section 3 focussed on game playing activity among the participants, including type of games played; ownership of consoles; frequency/length of game play; hobbies/interests; online gaming; how participants learnt to play; and whether or not they consider playing a game relating to their hobby/interest.
- Section 4 focused on user confidence relating to computer games, implementing an adopted scale to that used in Section 2 (Barbeite and Weiss 2004).
- Section 5 included demographic questions, comprising of seven items: age, gender, education level, occupation, living arrangements, number of children, number of grandchildren, and whether or not the grandchildren play computer games.
A recently developed instrument, the (new) Computer Self-Efficacy scale (CSE) (Barbeite and Weiss 2004), was implemented in the questionnaire to measure computer confidence. More recently, Czaja et al. (2006) identified the CSE as an important aspect in the process of identifying computer anxiety. To decrease computer anxiety, positive feedback was given to older adults, in order to enable a greater level of success. To measure the participants' game confidence via the CSE scale, each item used a seven-point response range, from "strongly disagree" (value = 1) to "strongly agree" (value = 7). This was implemented in section two comprising of six items and section four comprising eight items. Two versions of each scale were included in the questionnaire: the CSE for computer users and non-users; and the computer game confidence scale for game players and non-players.

2.3: Workshop design

The following points were of interest to the study and formed part of the workshop data collection:

- what participants enjoy doing in their spare time;
- whether or not participants play computer games;
- why participants might want to play computer games;
- what type of computer games participants might like to play;
- what type of computer games participants might enjoy playing; and,
- a computer game design idea related to their hobby or interest.

The workshops consisted of four presentations with corresponding worksheets. Participants were not overloaded with information and jargon was kept to a minimum. The aim of each worksheet was to assist participants with developing their game concept using a step by step approach.

Part 1: Introduction

The first presentation outlined the study, purpose and structure of the workshop. The first worksheet required participants to record their hobbies, interests and/or dreams.

Part 2: Getting started

The second stage focussed on game concepts. Key to this was the term 'imbalance', which derives from the semiotic concept of binary opposition: good/bad, and young/old. Roland Barthes (1987) utilized this approach to underpin the context of narrative development, which drives game play. Players try to progress in a game by winning points to maintain the imbalance of good against evil, and winning against losing. Activities and pleasure were identified as facets found in games and experienced by players. There was no stipulation as to how many imbalances or activities participants could implement.

Part 3: How to play

The third stage of the workshop concerned the participants' focus on themselves as potential players, and to think of how their game would be perceived. This section of the workshop addressed features including sounds, the look and feel of the game as seen by a player (e.g. in a realistic or cartoon view), and whether or not the player's perspective would incorporate a first-person or third-person perspective. Consideration was given to how participants (or other players) would interact with the game using a variety of interactive devices (for example, a mouse, joystick, voice activation, hand gestures or pressing of buttons). Outlining the rewards of the game enabled participants to consider the gratification or excitement of the game, including winning and losing a game.
Part 4: Finale

In the last stage, participants answered questions relating to marketing, including:

- where would their game be available for purchase);
- what is the costing (free – if for educational purpose, loan, via the library or the recommended retail price); and,
- participants were asked to stipulate whether any other potential audiences would be targeted.

3: Results

3.1: Quantitative results

The study focused on the design of game concepts based upon second and third-age adult's hobbies and interests. Participants stipulated a variety of 'other' hobbies and in some cases gave examples of the type of arts and craft, and sports activities they enjoyed during their spare time. Those included needlecraft, model making, singing, writing, gardening, visiting relatives, bird watching, theatre, skiing, woodwork, history research/classes, photography and board games. In general, the participants categorised as “second-age” preferred walking, and “third-age” adults identified arts and crafts, walking, card games and dancing as their primary hobbies and interests.

Technology ownership responses showed that 25% of second-age adults and 46% of third-age adults in the survey either owned a computer or a games console. 8% of second-age adults and 8% of third-age adults in the survey owned a games console. A variety of consoles were owned, the PS1 console had similar ownership levels for both second (8%) and third-age (8%). Ownership of the PS2 console was similar with 4% of both second and third-age adults owning the console. There was a disparity with results on whether or not participants owned a Nintendo Game Cube, whereby 25% of the second-age adults owned one, compared with only 4% of the third-age adults.

Reasons for not wanting to play games were reported mainly by the third-age adults. Four participants reported having “no spare time”; one participant reported that he didn’t like sitting in front of a monitor all the time; one other participant reported having more interesting things to do; another participant compared computer games to golf, saying they were "a waste of time and are addictive".

There was a negative correlation between the age of the participants, with computer game play. In addition, the age of participants correlated negatively with various measures of computer and computer game confidence. Such findings make intuitive sense because computers and computer games are both interactive systems sharing commonalities in the method and skills needed by users to use technology.

Twenty-two participants were identified as game players, with varying lengths of time as gamers. The majority of participants reported having played computer games for between one and six months. 21% of participants aged 60 to 64 years of age reported playing games at least for one year or more. 13% of participants aged 55 to 59 reported they had been playing computer games for one year or more. 8% of participants reported playing games more than once a day: these were recorded in both the 55 to 59 and 65 to 69 year groups. 25% reported gaming once a day; these participants were
equally split between the third-age categories. Puzzle and sport genres were identified as the most popular genres participants would consider playing.

20% of participants reported playing strategy games: two participants were identified in the 55 to 59 years age group, and three were aged between 60 and 69 years. 13% of participants reported playing games from the shooter genre: the majority of them (three to be precise) were aged between 55 and 59 years of age. Adventure games were played by 13% of participants, all in the 55 to 59 years group. The puzzle genre was deemed most popular with 29% of participants. With the exception of adults in the 70+ age-group, participants were identified across all age groups, primarily in the 55 to 59 and 65 to 69 years groups. The sports genre was primarily popular with third-age adults (8%). 13% reported playing games from the platform genre.

The majority of participants who did play computer games were self-taught gamers (eight); and four participants reported being taught by a grandchild. Consideration of future game genres showed puzzle and strategy games to be the most popular, followed by sports and adventure. Additionally, fourteen participants would consider playing a game, and eight participants reported “yes” to playing a game, relating to a hobby.

3.2: Qualitative results

Discourse analysis showed that the gamers in the survey stated that they mainly had dreams of travelling, and that their hobbies were walking and cycling, with a combination of travel and walking. Non-gamers in the survey reported travel as a dream, and their hobbies included reading and gardening. Travel and gardening were found to be the most popular pastimes amongst both game-players and non-game players in the survey. During the concept design, participants were asked ‘what time was important to them’: the most important activity for gamers was being with their spouse; for non-gamers, the most important way to spend their time was with their grandchildren.

Games consist of several elements: “imbalances” are one of these facets (good/bad, win/lose), originating from the semiotic concept of binary opposition. This notion applied by Barthes (1974) underpins the context of narrative development, employing imbalances into game concepts, to facilitate and drive game play. For example, gamers want to progress in a game by scoring points or to maintain the imbalance of good against evil or order against chaos. Imbalances can be found in all game genres and the division of skill, providing a challenge to the player through appropriately balancing the odds provided.

During concept design, participants were required to write a series of verbs or activities that they would want to experience or execute as part of their game. Gamers reported “good/bad” and “old/young”, and suggested activities included walking and talking. Non-gamers also reported “good/bad” and their suggested activity was walking.

The experience of pleasure (e.g. winning/losing), is encountered throughout gaming. Participants were asked to write what type of pleasures they themselves wanted to experience, and what should be offered to prospective players of their games. Participants also recorded the objectives of their game concept. Results showed that winning was important to both gamers and non-gamers; non-gamers recorded the essence of learning, with educational content and losing given as additional pleasures. The game-players mentioned Satisfaction and Fun, while the non-gamers reported achievement as motivating factors.
The preferred mode of communication by computer game-playing participants in the survey was by mouse and speech; a preference for realistic games spaces was expressed. Non-gamers preferred realism, first-person perspective and calmness for their game space.

Table 1 displays the game genre preferences recorded by participants, derived by combining results from the participants’ game concepts and discourse analysis, and using a game industry classification system, which enables the combination of concepts and genres (Metacritic 2011):

<table>
<thead>
<tr>
<th>Game Genre</th>
<th>Gamers Frequency</th>
<th>Combined Game Genre</th>
<th>Gamers Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adventure</td>
<td>3</td>
<td>Sport, Adventure, Strategy</td>
<td>1</td>
</tr>
<tr>
<td>Sport</td>
<td>2</td>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td>Casual</td>
<td>2</td>
<td>Adventure, Sports, Education</td>
<td>0</td>
</tr>
<tr>
<td>Puzzle</td>
<td>2</td>
<td>Adventure, Sports</td>
<td>0</td>
</tr>
<tr>
<td>Strategy</td>
<td>2</td>
<td>Adventure, Education</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Game Genre</th>
<th>Non-Gamers Frequency</th>
<th>Combined Game Genre</th>
<th>Non-Gamers Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adventure</td>
<td>6</td>
<td>Adventure, Education</td>
<td>6</td>
</tr>
<tr>
<td>Serious</td>
<td>3</td>
<td>Adventure, Sports</td>
<td>2</td>
</tr>
<tr>
<td>Strategy</td>
<td>3</td>
<td>Nothing stated</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>3</td>
<td>Educational</td>
<td>2</td>
</tr>
<tr>
<td>Casual</td>
<td>2</td>
<td>Strategic, Simulation, Education</td>
<td>2</td>
</tr>
<tr>
<td>Real time strategy</td>
<td>2</td>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>Role Playing Game</td>
<td>1</td>
<td>Adventure, Sports, Education</td>
<td>1</td>
</tr>
<tr>
<td>Sport</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Preferred game genres

The results indicated game genre preferences were broadly similar for gamers and non-gamers. Participants appeared to have combined genres together during the design process. Furthermore, non-gamers developed game ideas in two genres not covered by gamers - real time strategy (RTS) and role playing game (RPG) - suggesting non-gamers want a role to play within a game or to be part of a community. By contrast, the gamers in the survey chose to stay within the confines of familiar genres based upon mental models previously developed via game playing experiences.

4: Discussion

The results show that some older adults have played computer games, but fewer have played games than have used computers. Participants were more likely to play games on a PC than on a game console or additional technological devices. De Schutter (2010) reported similar findings, stating that participants in that study were more prone to casual gaming on the PC platform than to using a games console.

A wide variety of hobbies were recorded, but only a quarter of participants considered the possibility of designing and playing a computer game related to their hobby. The participants were required to design their game concept prior to completing the survey and therefore may have found it difficult to imagine how their hobbies and interests could transfer into a video game.
Participants reported puzzle and strategy to be the most popular game genres. Similar conclusions were identified via casual games such as Bejeweled (PopCap, 2001). The notion of puzzle and casual gaming being a popular genre to play is supported by de Schutter (2010), who concluded that participants preferred ‘puzzle games’, expressing their liking for this type of genre through ‘a fondness for the intellectual challenge of puzzle games’. Similar motivating factors were reported by participants playing puzzle games, stipulating a ‘challenge’ as their rationale for participation (de Schutter 2010). Additionally, motives for game playing included: passing the time; relaxation; fun; and facing a challenge. This observation might also be applied to the participants within this study, although their motives were not the primary focus of this study.

Lack of spare time was cited amongst some participants as the primary reason for not playing computer games (as opposed to having negative perceptions of games). Participants perceived how their time is spent to be important. However, the results showed that the non-gamers perceived the most important use of their time to spending it with grand-children (whereas gamers considered time spent with their spouse to be most significant). This supports the findings of Copier (2002) who reported participants played digital games with spouse or family members. These findings suggest that, with the combination of suitable concepts, multi-player options, marketing strategies - and building upon the work of Voida and Greenberg (2009a, 2009b, 2010) - there may be a broader scope for older adults to lean towards and enhance peer/intergenerational relationships. Nap et al. (2009) stipulated that computer games should enable and ‘emphasize connectedness, for example via multiplayer options and extra forums’.

The participants in this study reported primarily learning to play games through self-teaching, although learning via grandchildren was also mentioned by some participants. This contradicts the results reported by Copier (2002) who identified that the participants in another survey had learned to play from family members or from their peers.

The notion of hobbies and interests being incorporated into game concept design has the potential to facilitate a gateway for audiences to have an active participation in an area, which for many is unfamiliar. Encouraging and developing this concept of game design from an audience perspective has the potential to show positive results for future game concepts, forming an initial point of game concept design. Collaborating with older adults during the design and development process of future games, enables the consideration of both the game playing experience, and the fear (particularly experienced by older adults) of learning and adopting new technologies into ones’ life (Nap et al. 2009).

According to the results from this study, older adults may have the capability and creativity to design computer game concepts relating to their hobbies or interests. Some non-gaming participants incorporated and developed game concepts, which integrated RTS and RPG characteristics, suggesting they want a role to play or to be part of a community. Although the number of participants was low, the results indicate that a role perspective could be implemented in computer games aimed at older people.

The concepts designed by participants were not necessarily straightforward and could not be placed easily into a current genre classification system. This suggests that there is the potential to add genres or sub-genres into current classification systems, through the development of game content, in order to widen the gaming audience of the market. The combination of imbalances and concepts suggested by non-gamers implies they have the ability to develop a wider variety of imbalances and concepts, suggesting non-gamers are less constrained than gamers (Marston 2006 and 2010).
Consultation with older adults provides the opportunity to understand and facilitate their needs and to use this knowledge in developing games for an ageing population - both at present - and in the future (particularly for those currently in their twenties, thirties and forties). In turn, designers and developers need to communicate and work alongside potential audiences throughout the development, production and marketing processes to gauge and understand all parties' concerns. This notion is supported by van Bronswijk (2006) who states, “Active participation of older persons in the design process appears to be a key factor in effective persuasion, probably since it bridges the technology-generation gap between older users and younger designers”.

These findings form a basis for understanding what type of game genres older adults may want to play. This work reinforces the findings of Pratchett et al. (2005) who concluded that, for the age cohort (51-65 years) which they studied, the countless first person shooters (FPS) and racing genres on the gaming market were not necessarily the type of game older adults preferred to play. This study has presented results showing puzzle, sports and other as potential game genres which older adults have an interest in playing. Taking into account the notion of education, it is suggestive this additional element may possibly entice older adults to play games.

This study showed that some older adults have the ability, with little or no gaming knowledge, to design and implement technological elements such as modes of communication and visual perspective. There was no definitive answer by participants as to whether they would want to play a game relating to their hobby, interest or dream, although results do show a positive outlook. Taking this notion into consideration IJsselsteijn et al. (2007) concluded, “The most important design requirement we can formulate is to offer seniors the kind of content they will appreciate and engage with”.

5: Conclusions

This study has demonstrated that older adults have the ability to create game concepts using a step-by-step approach encompassing little or no jargon. The concepts showed the adventure genre to be the most popular with gamers, with ‘other’ being popular with both gamers and non-gamers. The concepts designed by non-gamers combined adventure and education together, suggesting an amalgamation of game concepts that does not fit within the current classification systems. Further, this amalgamation of game concepts/genres suggests a role for games designers in developing a broader range of designs suitable for this audience.

Future work could enable adults to design concepts on topics of interest, combining intergenerational input, which would enhance generational game play and confidence of older adults.

The results from this study are limited, although they suggest that older adults have the ability to create their own game concepts and provide constructive feedback, which is essential for games design in particular, for an untapped area which is still relatively new yet growing. Inclusion of older adults within the computer games market would help to redress the resistance to new ideas and technology often expressed by older people. This approach to games design has additional benefits of providing a further insight into the type of game concepts preferred by older adults and providing extra indicators for the games industry.

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