The Perspectives of Older People on Digital Gaming: Interactions with Console and Tablet-Based Games

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Abstract. The paper aims to investigate the correlation between the challenges associated with older people, their existing engagement with digital gaming, the andragogical perspectives and existing game design attributes. A pilot study was performed with 14 participants aged 55 and above. Data was collected from their interactions with and experiences of digital gaming. Questionnaires and group discussions were performed to collect feedback and perspectives on the experience. Preliminary results demonstrated that older people's initial perspectives and perceptions towards digital gaming and gameplay were influenced by perceived or assumed difficulties, relevance and benefits. Furthermore, the participants' perspectives and attitudes changed once they have broken the confidence barrier associated to engaging with new technologies and experienced the enjoyment from the social aspects of the engagement. They have also demonstrated renewed interest in digital games, and understanding of the potential of using digital games for achieving serious purposes, such as promoting a healthy lifestyle.

Keywords: Older people · Andragogy · Digital game · Interaction · Experience

1 Introduction

Digital game technology usage and its capabilities have attracted educators and researchers worldwide to address specific interest for certain targeted group of users. Historically, the design of most games used for both entertainment and serious purposes however focuses on general player population, and mostly the younger population currently engaging with digital gaming. In recent years, a game-based approach is being widely used and accepted to cater and address the needs (educational, health, social interaction, etc.) of various target groups, including the older people.

The application of games is becoming a popular medium in promoting healthy lifestyle and improving the quality of life especially for older people; for instance fostering social connectedness through social interaction, physical activity and cognitive exercises that can be afforded by digital game technology. It is essential that users or

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players are captivated and engaged by the game before any serious purposes/activities can be imposed.

Besides that, most models or framework for designing and developing games were particularly developed for general type of games (commercial games) and aiming for younger users in mind. A small number of research proposed game design for older people, however none of them developed specifically for the use of older people that correlates the attributes of game technology and considerations; such as andragogy perspectives and challenges faced by this target groups.

The paper aims to investigate the correlation between the challenges associated with older people, their existing engagement with digital gaming, the andragogical perspectives and existing game design attributes.

2 Related Work

In early 80s, the usages of video games towards older people have been conducted. Among the early study is by Weisman, where the author introduced the video games to institutionalised older people [1]. Based on his studies, Weisman asserts that game should have different levels of difficulties to support individual preferences and sensomotor abilities. In addressing visual and auditory impairment, he suggested the use of large font, well-defined visual symbols and clear auditory feedback.

Similarly, Whitcomb and Ijsselsteijn et al. [2, 3] also propose several game designs and recommend appropriate user interface for older people which emphasises on impairments in visual and auditory perception and a loss of sensomotor skill. Extension on above approach has been done by [4] where the author recommends the design of appropriate cognitive challenges, a simple user interface and ability to provide feedback. There are a number of game designs specifically focusing on older people; which mainly focusing on accessibility [5] and player performance [6]. Due to challenges faced and lack of technological experience, usability is a key issue with the older population compared to the younger population.

With respect to game design for older people, studies showed that older people have specific gaming needs and preferences. It is also observed that their abilities differ from younger people [7–11]. De Schutter and Abeele [12] propose that the game design should consider topics that are related to older peoples' real life experiences, foster connectedness and nurture one's self and others. Gerling et al. [13] echoes De Schutter and Abeele's view by suggesting user experience and sufficient information needs to be examined and provided to capture adequate interaction between players and the games. Studies by [14] however indicates that involvement by older people themselves throughout the design process is important to obtain valuable information in meeting their needs (the transactions of the ageing process that relate to their likes and dislikes). These studies indicate the importance of the andragogical aspects when it comes to designing and developing games, specifically for older people.

Andragogy can be defined as the art and science of 'helping' adults learning. This is based on the assumption of the two different learner groups, adult and children [15]. It shows that the way adults learn or perceive thing is different from children. Therefore,

to promote learning for an adult will require a different approach, through adopting the andragogical perspectives.

3 Methodology

This research involved multiple series of focus groups which comprised of; (1) the use of questionnaires, (2) game-play session for hands-on activities; and (3) group discussion for collecting feedback from the hands-on session. Games on two platforms including Xbox 360 console (*Kinect Sport: Bowling, Skiing*) and Android tablet (*Bowling, Car Racing*) were chosen for this research study. Xbox 360 console and Android tablet platforms selected for this study because they offer natural user interface (NUI) and intuitive, to ease the interaction between the participant and technologies in completely natural ways [16]. Each game was selected with regard to various skill and ability offered; and to trigger different reactions from the participants.

3.1 Participants

In total, 14 older people participated in the study (5 males, 9 females), aged 55 and above (55–60 (21.4%), 61–65 (28.6%), 66–70 (42.9%), Over 75 (7.1%)). The average age of participants was 65.04 (MEDIAN: 61–65) with more than 50% of participants were retired.

3.2 Recruitment

Target participants were recruited from various organisations, groups and forums, for instance *Research Support Volunteer Programme (RSVP), The Cheylesmore Good Neighbours* and *Neighbourhood University - Coventry Healthy Walks.* In total, 6 different organisations and groups were participated in the study.

The intended participants consist of independently living older people, who were physically and mentally healthy. The participants for this study were recruited using a combination of convenience and snowball sampling methods. The recruitment of participants was formed by approaching pre-existing groups, forums and organisations located in Coventry. Several other participants were referral from their friends. Institutional ethics approval was obtained for this study and participation was on voluntary basis confirmed by a signed consent.

3.3 Measures

This study employed a mixed approach. Results from the findings will help to inform user's interaction and experience in playing digital game. The following quantitative and qualitative measures were used in this study: (1) a questionnaire regarding participant's demographic background, user's acceptance towards technology and game experiences; and (2) the informal observations of participants during game-play and (3) group discussion.

3.4 Procedure and Data Analysis

In this study, only four focus groups were carried out with a total of 14 participants (n = 14). Each group consists of 2 to 4 people. The sessions took about 90 min each. Figure 1 shows the structure of focus group used in this study.

Firstly, there was *Introductory Session* where the participants were given a brief description on the main purpose of study, i.e. to investigate user's interactions and experience toward digital games.

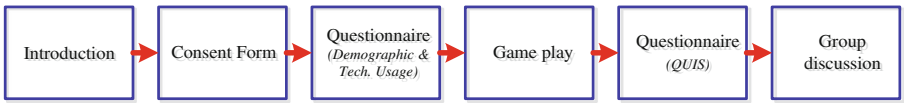

Fig. 1. Focus group flow chart

Later, *Questionnaire* was disseminated to gather participants' information, technology usage, game experiences and game interfaces. The questionnaire was a modified version of QUIS (Questionnaire for User Interaction Satisfaction) developed by The University of Maryland Human-Computer Interaction Lab (n.d.).

In *Game-play* session, participants were introduced and asked to take part in playing 3 games (i.e. *bowling, skiing, car racing*) on different platforms; console (Xbox 360) and tablet (Android operating system). This gameplay was conducted to gather participants' feedback, especially on their perceptions of game experience.

Finally, we conducted semi-structured interview in a *Group discussion* setting. The open-ended questions were asked aim to obtain participants' opinions about their game interactions and experiences and this offered in-depths information and understanding to researcher on participant's experiences.

All focus group sessions were recorded and transcribed. Participants feedback were analysed quantitatively and qualitatively. Quantitative data analysis was performed using IBM SPSS 22.0. Descriptive statistics was used to examine demographics data. *Mann–Whitney U test* was used to comparing scores of two platforms. The qualitative data was analysed mainly using Content Analysis (CA) to identify common codes and categorised them into themes. The findings were presented based on the relationship and commonality basis.

4 Results and Discussion

4.1 Participants' Background

All participants asserted that they own a personal computer and are familiar with using smartphones or tablets. They have used these technologies for many purposes such as email, news, social media and gaming. In terms of the gaming experiences, 9 participants reported previous experiences of playing digital games; with 5 participants affirmed that they play digital games every day. The participants generally played digital games on their personal computer, laptop, tablet or smartphone. Games such as monopoly, solitaire, Sudoku, and scrabble are some of the games that they are familiar with.

4.2 Participants Perspectives on Different Platforms

Figure 2 illustrates the views from the participants after interacting with both platforms, which address 6 criteria evaluated through game-play on both platforms. *Mann–Whitney U* test was conducted and showed a significant difference between console and tablet for two items; *Player Enjoy Playing the Game* (U (25) = 35.5, Z = −2.671, p = 0.008), *Player in Total Control* (U (25) = 44.5, Z = −2.130, p = 0.033). The result reveals that when the older people were in a total control of utilising the platform, they found enjoyment and engagement in playing the game. This is tally to our finding in Sect. 4.3.1, when the older people found it was easy to operate console which also offer appropriate user interfaces (i.e. better graphic, big screen), indirectly it brought fun (i.e. social aspect) and enjoyment to them. This result is directly proportional to the andragogical perspective in terms of the older people's need to take control over their learning (i.e. utilising the platform) and enthusiasm towards learning activities they are participating in (i.e. playing games) [15]. Meanwhile, no significant difference is found for the rest of the criteria.

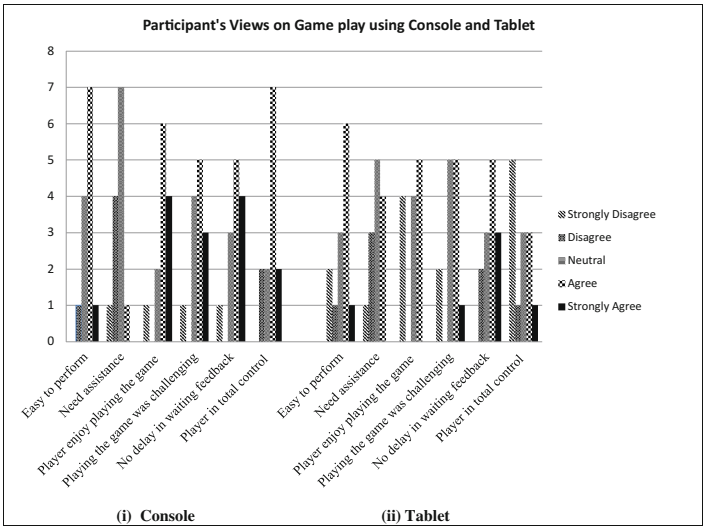

Fig. 2. Participant's view on game-play using *console* and *tablet*

4.3 Group Discussion on the Game-Play Experience

Based on the findings, there are 3 main components that we want to highlight; the view on interacting with the different platforms, views on digital games and change of perspective.

4.3.1 Platform

After the game-play sessions, there was a balanced number of participants (n = 7 each) choosing either platform; console and tablet. Based on the findings, both platforms have their own advantages and disadvantages and this contributed to the selection of platform to the participants – on which they favour the most.

Half of the participants prefer to play games on a tablet; the main reasons being that they can play alone (i.e. when they want to), its portability (can play anywhere at any time) and easy to use and play (less setup process). Pointed out by one participant, *"I prefer using a tablet. If you've got pain or disabilities, much easier to use a tablet. You don't have to be home to do that. It's much portable. You can do it on a train or bus, or sitting and waiting"*. The other half of the participants stated that they found that the console platform has comprehensive displays (better graphics, big screen), which enabled better control, more fun (i.e. social aspect) and provided immersion (i.e. flow), as well as offer physical movement. One participant stated, *"I like to play on that Xbox because you can immerse yourself in the game. And it's not dangerous and you don't need special equipment… You're in the flow and you're doing exercise while doing it. It's easy to understand what you're doing"*. Despite of the advantages of both platform, several disadvantages also been highlighted. For console, the downfall due to the cost barrier and it requires participant to learn some technical skills prior to playing the actual game. *"That one (Xbox), I would hate to do that (setting up). Anything technical like that I'll dumb foul. If somebody set it up, shows how to do it … then I got it, and I can do it"*.

While participants indicated that tablet has smaller screen and lack of physical elements compared to console make them lost interest in continue playing. One participant mentioned that she needs more time to understand the instruction (not clear on tablet screen) and sometimes delay in response from the system made the tablet games boring and frustrating to her.

The participants aged 66–70 showed higher level of engagement during gameplay using console due to the comprehensive displays and social interaction it offered. *"Console games were very attractive to me – greater possibility of whole body interaction than I previously thought."* However, tablet technology has gained place and widely accepted among the participants. This may be due to its relatively lower price and portability factor. The participants perceived the technology as difficult. *"Identifying controls may have taken a bit of time, but that would be expected for a first time with a particular item of equipment."* However, upon discovering some real life benefits to the game-play, their perceptions towards the technology changed. One participant stated, *"They were generally stimulating and relaxing at the same time"*.

4.3.2 Games

In general, 64% of participants classified as non-gamer, who played games occasionally or not at all; and only 36% were considered gamer, who played games every day (n = 5; 61–65 (40%), 66–70 (60%)). 90% of the participants prefer interacting with the console games (*Kinect Sports – Bowling and Skiing*), because these games were fun, challenging and involve body movement, indirectly leading to some form of exercising. Participants also pointed out they could relate those games with real life experience. Mentioned earlier in Sect. 2, to capture the adequate interaction between players and the games, the aspect of user experience, needs and interests should be considered and examined.

Feedback and suggestions from the participant's interaction and experiences were taken into consideration. Similar to findings by [2–4], age-related declines such as in physical and cognitive functions could influence gameplay (i.e. needs, preferences) for older people. Participants emphasised that simple and clear instructions are important (i.e. written, auditory) and should be included in the game. One participant mentioned that, *"…be viable both ways because actually when you looking at screen, something in your ear telling what to do is good, for me… There are people don't hear very well. So they got to have it and on the screen"*. Simple and less elements in interface design was preferable (i.e. not require too much working memory), appropriate information *"They must not be written in a lot of technical jargon…"*, adjustable interfaces (i.e. font type and size, screen resolution) *"Need to make sure the printing is big. I couldn't see so that straight. My glasses need changes. Older people needed big, bold print"*. Lastly, no timer should be included in the game, as suggested by two participants *"I don't like time limited thing. Because some people take longer to learn things than other"*.

4.3.3 Change of Perspectives

From our findings, we observe that the perspectives on the perceived difficulties and benefits of digital gaming are influenced by their confidence barriers related to their first impression, their perception of engaging with something new (i.e. technology) and their perspective towards the relevance of technology.

4.3.3.1 Something New or Beneficial

As mentioned earlier, some of the participants owned a tablet due to the portability and affordability of the device. The participants demonstrated interest in playing games on the device after participating in the study. For example, one participant (who has 'hand tremor') was impressed to see that he could play car racing using tablet which he never thought of before. He learned playing the games by tilting the tablet to right and left as steering a real car. *"I was pleasantly surprised by some features on the tablet (mainly the steering by tilting it – I hadn't thought of that as an option before the session), and the details visible were better than I would have thought beforehand"*. It showed that the participant learned new knowledge and learning new thing, when playing the car-racing game on the tablet and learned new skills by discovering the functions on the tablet (tilting to imitate steering a wheel).

Based on the andragogical perspective, it would be easier for someone to learn something or use something new if it has relevance or beneficial to them. People will only interact with something familiar, interest them, meaningful and beneficial to them. As mentioned one participant, *"… if you would to offer me a serious driving… to improve your driving skills or an aircraft simulation or something. I might be more interested. But, that's maybe because I am an engineer and more interested in that type of thing"*.

4.3.3.2 Social Aspect: Peer Support

From the findings, 76.9% of participants like to play digital game alone compare to 15.4% preferred having companies. Several studies show that older people like to play digital games with their family members and friends, which encourage social interaction and reduce the digital divide among the intergeneration [17, 18]. They changed

their perspectives when they had seen their family members or friends playing it. Responses from two participants regarding playing digital game (i.e. crosswords) together:

> *A: "... I notice my newspaper is part of the package that you get a guide in it and you get the crosswords. Now, at the moment, we have one paper - newspaper and if we both do the crosswords... I have to do in the little piece of paper before"*
> *B: "And one of us can do it online...that's true. I never thought of that"*

As described in Sect. 4.3.1, one of the reasons why older people like to play game using the console is because of the social aspects (interaction) it offers. Older people will perceive playing games with family members (i.e. grandchildren) and friends could be used as a social support (medium for social interaction). Another participant stated she enjoyed the social interaction with family members while playing games. *"I had played a console game before at my brother's house on Christmas day. I think it was very funny to play with them (playing tennis games). And we have a situation that is funny... ask another person to move a little bit... *laugh*".*

This is in line with the andragogical perspective, where adult learners are more interested in learning or do something that has immediate relevance to them (work or personal life). In other words, they prefer to engage in something that is important or beneficial to them. However, such perspectives can change based on our findings. As for example, 5 participants reluctance of using new technology such as games changed once they realised the benefits and observed the practice of others. One participant who mentioned had a knee problem and would not join game-play session (using console), changed her mind and joined the session once she saw her friends having fun and enjoying themselves. Other participants mentioned that they will play the game again as they find it fun and at the same time the game was perceived to stimulate their brain and lead body movement associated to some form of exercising.

5 Conclusion

The study shows that older people's initial perspectives and perceptions towards digital gaming are influenced by perceived difficulties, relevance and benefits. The results of our study indicate that there are three main components that should be considered when investigating the interaction and experience of older people with digital games; the perspectives of engaging with different platforms, views on digital games and the factors that could change their perspectives. However, there are other components, which are not addressed in this paper, i.e. challenges faced by the older people around ergonomics issues. The other components will be addressed in our future work, including the mapping of these components with our findings in this paper.

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