Mobility Games Ideation

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ABSTRACT

Mobility games ideation explores the types of games mobility device users would like to play and using their input to influence game development. It uses a type of focus group called Idea Jams to collect this data. The study explores the type of game genres and functionality (game objectives, characters, input/output, audience integration and rewards) mobility users would be willing to consider in a game. It also explores the impact of having users participate at early stages of game design and the functionality and priorities they would be interested in. This study serves as an example of how user input can aid in the construction of an entertaining game for the disabled user and how principals of the social model of disability can be applied in game design.

Author Keywords

Mobility, Human Factors, Accessibility, Games, Design, Idea Jam, Mixed-Reality, Product Development

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Human Factors; Design; Measurement.

INTRODUCTION

It is well known that people with disabilities want to play games. A study by Flynn et. al (2010) showed that approximately 24.7 million people in the USA have never been given the opportunity to play a video game because of a disability. Of the people who still play games despite their disability, 25.4% of them are unable to play most games, 21.2% are unable to play some of the games and only 18% had no trouble playing any games.

Clearly, there is a large market of gamers willing to play but are shut out of the market because of a disability. Currently, the literature signifies that the average age of a computer gamer is 34 years old with an average of 12 years of experience behind them (Barlet et. al 2012). Although computer games have become more accessible through keyboard shortcuts, close captioning and various interface developments, there is still much work to be done to include the disabled gamer.

The social model identifies systemic barriers, negative attitudes and exclusion by society, as the main contributors in disabling many individuals. While many people suffer from physical, intellectual or psychological limitations or impairments, the impairments themselves do not lead to a disability unless there are barriers within a society that prevent people with disabilities from participating because of these limitations (Carleton, 1998). These barriers could be attitudinal, physical, sensory, systemic, social, etc.

Part of living life to the fullest includes enjoyment and entertainment, and games can be one avenue towards that goal. However, because many games are not accessible, people with disabilities are excluded from this opportunity for enjoyment and entertainment for themselves as well as within their social circles. For people with mobility disabilities and drive powered mobility devices (PMD), such as powered wheelchairs and motorized mobility scooters, there may be an opportunity to play games that take advantage of their PMD. In this paper, we report on the results of five Idea Jams with people who drive PMDs. An Idea Jam is a user-centred approach to ideation and design. In these sessions we wanted to allow people who drive PMDs to explore the idea of mixed reality game play that would combine video game concepts (virtual component of the game) with using their physical devices and generate design ideas based on that premise.

METHOD

Research Questions

The following research questions were established for the Idea Jam sessions presented in this paper:

1. What game genres and functionality (game objectives, characters, input/output, audience integration and rewards) would participants be willing to consider and use in indoor/outdoor spaces?

2. What is the impact of having users participate at early stages on the design of game functionality and priorities?

To explore the research questions, participants were invited to an Idea Jam session where they were provided with an information and consent form. Once these documents were signed, participants were introduced to other participants

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and given a short (5 minute) presentation about what a game was and what we were hoping to discuss about games. Participants were also asked to fill out a pre-study questionnaire at this time. In the pre-study questionnaire demographic information such as age, gender, education attainment, computer and mobility device use, and past gaming experience were collected in 25 questions.

At this point, the video camera was turned on. Participants were then asked to discuss ideas around games they liked to play (this was not limited to video games) and what types of games could be feasible and fun to play with powered mobility devices. They were asked to come up with one main game suggestion and report back on their discussion to the rest of the participants. At the end there was a final discussion and by consensus determined the favorite game idea of the Idea Jam. Participants were then asked to complete a 20 question post-questionnaire, providing them with the opportunity to comment on their Idea Jam experiences, such as the type of games that were discussed and the impact the session had on them.

There were 21 mobility device users (9 female, 12 male) with ages ranging from 18-60 years. Three 1.5 hour Idea Jams were held in recreation or meeting facilities around the Greater Toronto Area. One Idea Jam involved the Toronto Powered Wheelchair Hockey League (TPWHL). The TPWHL had participants who used powered wheelchairs exclusively while the other two Idea Jams had participants who used both types of powered mobility devices (using either a wheelchair or a scooter), called mixed PMD groups in this paper. They were asked to come up with one main game suggestion and report back on their discussion to the rest of the participants. At the end there was a final discussion and by consensus determined the favorite game idea of the Idea Jam. Participants were then asked to complete a 20 question post-questionnaire, providing them with the opportunity to comment on their Idea Jam experiences, such as the type of games that were discussed and the impact the session had on them.

Data analysis

In this paper, we are reporting on the preliminary thematic analysis of the video data. Six different themes were initially identified by examining two of the three sessions (see Table 1 for themes and definitions). Two independent raters were then asked to evaluate 30 minutes from two videos to ensure reliability. An ICC above 0.9 was achieved for all themes. One rater then completed the analysis of the remaining video content.

RESULTS AND DISCUSS

Figure 1 shows the per capita frequency of occurrence for each theme from all of the Idea Jams. It would seem that topics classified under the themes of General and Specific Game Elements respectively were most discussed. There was a rate of 3.67 for the General Game Elements theme and a rate of 2.57 for the Specific Game Elements theme. Figure 1 shows the per capita frequency of occurrence for each theme from all of the Idea Jams. It would seem that topics classified under the themes of General and Specific Game Elements respectively were most discussed. There was a rate of 3.67 for the General Game Elements theme and a rate of 2.57 for the Specific Game Elements theme.

Table 1. Themes definitions used to analyze data.

Theme	Definition
Theme 1: Motivations for playing games	Why people like to play games, what they get out of playing games and how it affects them. Some examples include playing games for competition, fun, escape from reality and to keep in shape.
Theme 2: Specific game elements	Aspects of games and genres that someone liked and that could be incorporated into the game. Some examples include characters, scoring, artwork, weapons, objects and control types.
Theme 3: Social aspects	Consists of when individuals described playing with others to achieve game goals – it is not necessarily specifically designed into the game. Some examples include: "I like playing a game more when I am solving puzzles with a friend" or "I like the teamwork aspect of games".
Theme 4: Incorporating more inclusive aspects	Participant ideas on how games could be made more inclusive and accessible. Some examples include: "having different types of motor challenges for people with different levels of ability when driving their scooters. Game choice is very important. People know there own abilities the best, especially the disabled." or "Perhaps the ball could make a sound and that way I would know where it is when we are playing. Or maybe a vibration."
Theme 5: General/Generic game elements	General games or game types that people like to play. Some examples include genres of interest such as Science Fiction, random events, Star Trek, exploration, music, Wii games and dancing games.
Theme 6: Game behaviour aspects	How participants prefer to play games. Some examples include: "I am a more passive participant when it comes to game play" or "I like to see strategies emerge as I play other people in games."

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Nevertheless, these ideas served as an important foundation for more complex ideas to emerge later in the Idea Jam sessions. The story-telling process introduced participants to different game ideas, many of which were later transformed into broader game ideas, often linking game functions together. For example, one participant stated, "Since different people like different aspects of all these games maybe we could put them all together into one big game. For example, we could have golf and dominos as challenges in a scavenger hunt." The scavenger hunt and dominos would have been discussed at an earlier point in the Idea Jam and counted as two general game elements in the analysis stage. Since it was much easier to talk about past experiences and more difficult to speak about the social, motives and behaviours associated with gaming, a different approach to the Idea Jams in the future would be useful. It was also found that having a hands-on approach to the discussion by the Idea Jam researchers gave participants a greater ability to talk about more complex gaming subjects because there was an “expert” there to facilitate the discussion. As a result, having participant researchers/designers with knowledge and expertise in the domain is recommended for Idea Jams in the future.

For the mixed PWD group the total comment rate for the General Game Elements theme was 3.67 comments per capita and for the Specific Game Elements theme it was 2.57 whereas the TPWHL group had General and Specific Game Elements having equal total comment rates of 1.75 comments per capita. In addition, for the group with mixed PMDs, there were more comments for five of the six themes than for the TPWHL group (all but motivation which was similar for both groups).

One possible reason why the individuals in the TPWHL had fewer comments in general could be related to how they viewed their mobility device. These individuals had used their mobility devices from birth and seemed to indicate that they had a different perspective of using their mobility device in games. For example, they said that the longer a person used his mobility aid the more likely he was to consider the mobility device as being part of his identity.

As a result they tended to bring up more ideas on how their wheelchairs functionality could be used in the game, such as the speed or dexterity of the device as well as social aspects, which could be included in a game, rather than the Inclusive Aspects of the game or game behavioral aspects. An illustrative example from one TPWHL participant was, "it is games like hockey that work because it is all based on our abilities," suggesting that the participant would rather focus on his abilities than on his assistive/mobility device.

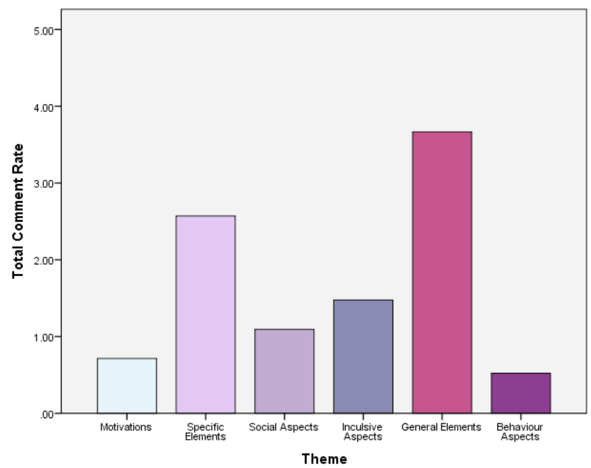

Figure 1: Total comment rate for all themes from all Idea Jams.

Since these participants viewed their mobility devices as an extension of themselves, they may have been less inclined to comment at all in their Idea Jam because they disagreed that their mobility device should play a central role in a game at all. Alternatively, the mixed PWD group had a wide variety of demographic characteristics such as age, educational level and computer experience compared with the TPWHL group which had a more homogeneous demographic; they were young, computer savvy individuals. This variety of demographic in the mixed PWD group may have allowed for different views and consideration of how their mobility devices could be used due to the diversity of life experience and knowledge. The mixed PWD groups were the most considered and open about the implications of using their mobility devices in a gaming role. In addition, because most of them were new to using a mobility device, they may have been able to divorce themselves from the device seeing it as a tool rather than a part of their identity.

Another notable difference is for the Game Behaviour Aspect where the TPWHL group had a total comment rate of 0.125 and the mixed PWD group had a total comment rate of 0.77 comments per capita. While these are still fairly small numbers it should be noted that the Game behavior aspects is a relatively complex game design concept. It requires the most complex thinking and conceptualization of game development to link seemingly different gaming functions together into a game design. That being the case, this is where the future use of a more hands on approach would be useful allowing a more experienced and professional game designer to lead the Idea Jam conversation. In this future Idea Jam, the professional designer could aid the participants with putting together their stories from past game play experiences, leading the discussion to produce more viable game prototypes.

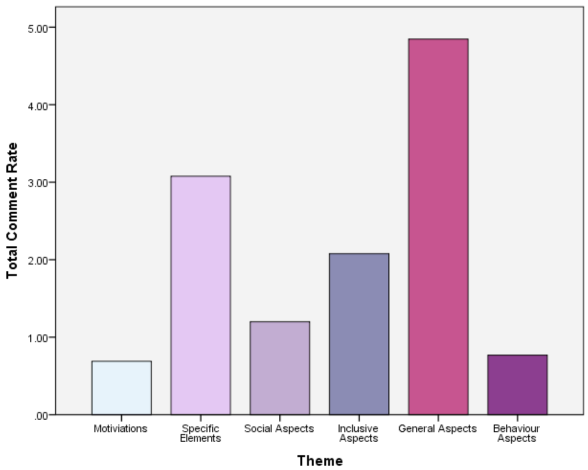

Figure 2: Total comment rate (comment per participant) for Idea Jams with either powered wheelchairs or scooter drivers.

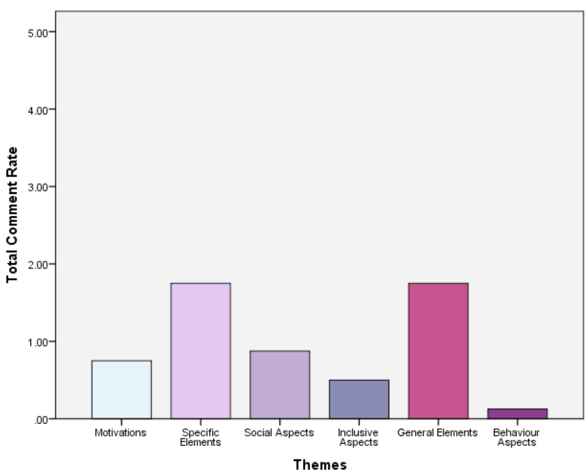

Figure 3: Total comment rate (comments per participant) for each theme for the Idea Jam with TPWHL.

The Inclusive Aspects theme provides a helpful consideration for the future game development process. All Idea Jam participants agreed that any game must be inclusive of as many different types of players as possible. Many participants referenced experiencing being left out of game play at some point in their lives. For example, one participant referenced his sisters birthday party and how being in his mobility device stopped him from participating from playing Dance Dance Revolution with his sister.

The results from the Idea Jam will be used to develop an inclusive game for the use by mobility device users. In the game, the functionalities of the various mobility aids will play a central role in the game, providing players to take advantage of their PMD in an unconventional and entertaining context.

LIMITATIONS

There were several limitations in this study that mainly centred on the low number of participants. No quantitative analyses or comparison between powered wheelchair and scooter users could be carried out so it is difficult to determine whether the variations and preferences articulated in the Idea Jams are generalizable to other PMD users and potential game players. Another limitation was that researchers took on the role of designers when it would have been more suitable to have professional designers participate in the Idea Jam sessions as they would have been able to make game suggestions and contributions based on their experience designing games. Finally, having more scooter users in the Idea Jams would have been useful for a more diverse sample of the PMD population.

CONCLUSION

It was found that participants spoke the most about general and specific game elements such as the genres, characters and rules they enjoyed in all of the Idea Jams, which was expected as all individuals have unique preferences on the types of games and game characters they prefer and it was easy to draw on their own game experiences in the discussions. However, the length of time a user had used their device seemed to have an impact on the different priorities for game development and participant's ability to imagine a game that would preference the use of powered mobility devices. As a result the Idea Jams served to bring these differences to the forefront and support participants in providing input for developing games for PMD users.

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