Sensoidvania: Increasing Awareness Towards Visual Disability Through Metroidvania Experience

Barış Öçal(✉) and Adviye Ayça Ünlüer

Faculty of Art and Design, Interactive Media Design Program, Yıldız Technical University, Istanbul, Turkey
{bocal,aunluer}@yildiz.edu.tr

Abstract. Raising awareness towards social issues through literary means have always been practiced but as a relatively new medium; the storytelling elements of video games which are being utilized to provide such an awareness raising effect, are still mostly unexplored. Separating from other non-interactive media, a video game that aims to achieve this must be designed to convey the message through both its story and its gameplay and mechanics, while keeping the entertainment factor of a video game. As it is designed to influence the player to thoroughly explore the game and its story beneath, the adventure platformer games, also known as Metroidvanias is a ripe genre to exploit in this context. In the scope of this study, a concept design for a metroidvania game, designed to raise awareness towards visual disability, while influenced by the mechanics of some popular titles of the genre, was created and evaluated through a series of surveys.

Keywords: Video game design · Raising social awareness · Visual disability · Genre-specific framework

1 Introduction

Video games have taken their place as a mainstream means of daily entertainment [1]. Ranging from "casual games" to "gamer's games", video games are being made for different purposes and different audiences [2]. Video games are usually defined by "genres" that are specified by either gameplay mechanics or graphics. One such genre, the "adventure platformer games", often called "metroidvanias", are a hybrid genre that is mostly 2D side scrollers which heavily emphasize exploration and curiosity elements. Metroidvanias mainly feature immense maps that are explored through gaining various abilities that let players reach more of the map, throughout the gameplay [3].

Using video games as a medium is a proven method to help improve upon an individual's mental condition [4] and can also be utilized to raise awareness towards social issues such as physical and mental conditions and traumas. Multiple studies have been made on this particular subject [5, 6] and many video game examples may be examined as examples by their references to social issues [7, 8]. Based on this; it can be

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2022
C. Stephanidis et al. (Eds.): HCII 2022, CCIS 1580, pp. 486–493, 2022.
https://doi.org/10.1007/978-3-031-06417-3_65

said video games can carry meaningful messages to raise awareness towards a subject, while still retaining their respective entertainment elements. With all this being true, utilizing metroidvanias' exploration and progression mechanics in raising awareness towards physical disabilities such as visual impairment is an area which requires further studying. The aim of this work is to create a metroidvania video game concept to raise awareness towards visual disability by featuring a main character with visual disability and simulating visual disability for players, while still maintaining the explorative and entertaining nature of metroidvanias.

2 Methodology

2.1 Dissecting Successful Metroidvanias

In order to create a robust foundation for the video game concept that will be created through this study, three successful examples of the genre were examined, and their defining mechanics were extracted. The three games (namely Hollow Knight, Dead Cells and Ori and the Will of the Wisps) were chosen according to their top user ratings [9] on Steam.

While each of these games carry some different gameplay elements, a considerable quality in each of these games was carrying out their story in an effective way, without using excessive text or dialogue. Therefore, it can be stated that in order to successfully convey a meaningful message; a game does not need to convey the story directly to the player; on the contrary, the story can reveal itself as the game goes on simply by encouraging the player to explore.

2.2 Defining Unique Video Game Mechanics to Simulate Visual Disability

In order to simulate the effects of visual disability throughout the gameplay, some new and original game mechanics need to be designed. As an example, since it's unlikely in a metroidvania environment to conduct a healthy gameplay experience without providing any visuals just to completely simulate visual disability; it was a rational choice to show players what the main character feels-via touching, hearing or other senses-by highlighting the objects, starting from the main character themself which can be seen as a concept drawing in Fig. 1.

In such a manner, it became possible to set foundations of an enjoyable gameplay and visual disability simulation. Following this; a framework for controlling the main character needed to be created, which mostly used generic 2D platformer controls. To make use of a mechanic to sense objects which is shown in Fig. 1., a separate arm controlling procedure needed to be implemented as well just like it is sketched out in Fig. 2.

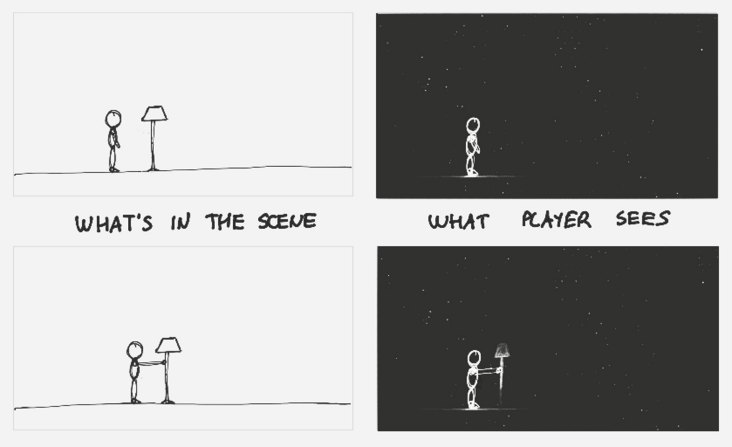


Fig. 1. Concept drawing showing the comparison between what is actually in the game scene and what player sees as they play the game.

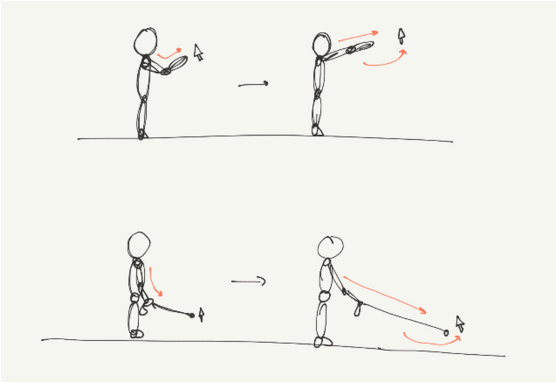


Fig. 2. Concept drawing showing direct arm manipulation via cursor movements.

As one of the fundamental aspects of the game, the main menu and navigation between different menus needed to follow the aesthetics of the game as well. This is settled by designing a user interface that replaces mouse cursor with main characters hand, as well as every instance of text with braille alphabet characters which will eventually reveal their Latin equivalents as player hovers over them with their cursor. The main idea behind this was to implement simulating elements of the game in the menus too, which would also contribute to the atmosphere of the game. A sketch of the initial main menu design can be seen in Fig. 3.

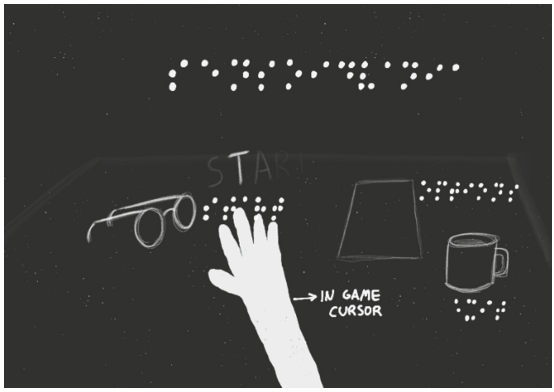


Fig. 3. Concept drawing of main menu design

Finally, as the defining elements of the genre, the metroidvania mechanics needed to be constructed. A list of unlockable abilities and objects throughout the gameplay which has been decided to be implemented in the game is listed in Table 1.

Table 1. Unlockable abilities and objects that contribute to metroidvania mechanics of the game in preferred unlock order.

Ability/Object	Acquisition	Contribution
Arm control	By failing to sense a hidden object and crashing into it	Ability to check surroundings
White cane	Finding it in main character's home	Ability to check a wider range and go outside
Friendly stranger	Losing your white cane	Ability to sense even a wider range as the stranger explains their surroundings
Vaulting	Getting encouraged by an event to vault over an obstacle	Ability to go over short obstacles
Service dog	Acquiring it after getting a recommendation	Ability to continuously sense the surroundings
Jumping	After successfully vaulting over a certain number of obstacles	Gaining ability to move freer
Echolocation	Getting trained in the subject	Sensing surroundings via echoes provided by objects
Technological device	Completing the main story	Ability to sense most of the things with ease

3 Prototyping and Testing

3.1 Developing a Video Game Prototype

As the video game was developed in Unity and the main character was created in 3D in MakeHuman and converted as 2D sprites, while the other game elements were hand drawn.

Alongside fundamental mechanics such as walking and camera controls, some of the mechanics that have been discussed as concepts has been included in the prototype for sake of allowing testers to get a better feeling of the concept; one of which is revealing hidden objects via sensing them. To tie this mechanic with the gameplay it has been made so discovering hidden objects via sensing them allows the player to interact with them or pass by them which otherwise would be impossible due the object being a hidden obstacle. Another mechanic that has been included is the one which allows the player to control the main character's arm via their cursor.

3.2 Evaluation Through Player Survey

A survey has been created to evaluate the concepts and creations that have been designed up to this point, which consists of three main parts and has been answered by 43 responders all of whom have previous experience with video games.

First section asks for basic information which will be later used for cross referencing with the answers from other sections that includes responders' age, their experience with the metroidvania genre and their awareness towards visual disability.

Mechanical evaluation part of the survey presents responders with two distinctly different implementations of some game mechanics and asks them to choose either one of them or choose one of them to be default option and the other as an unlockable method by metroidvania mechanics. Grouping those choices as two different groups, responders' tendency to choose unlockable alterations over single choices can be determined and its relationship with responders' metroidvania experience can be observed (see Fig. 4).

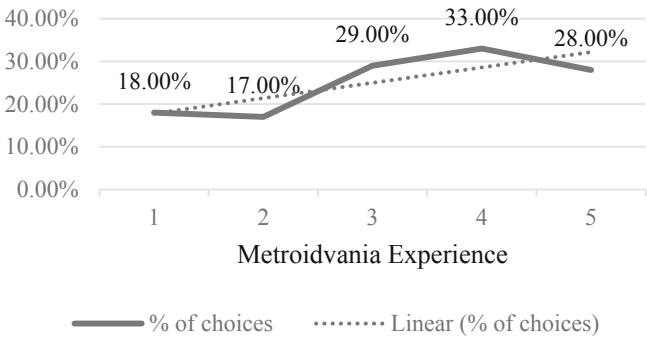


Fig. 4. Chart showing percentage of choices that feature unlockable alterations of a single mechanic in relation with responders' experience with metroidvania video games.

As it is clearly shown in the chart, even though the percentage of the choices increase with experience level, it is highly insignificant and as this data suggests, creating new mechanics as unlockables is more preferable than altering existing ones. Responders have also been asked if they either prefer this game to be action or puzzle focused and their preferences in relation to both their metroidvania experience and visual disability knowledge can be seen in Fig. 5.

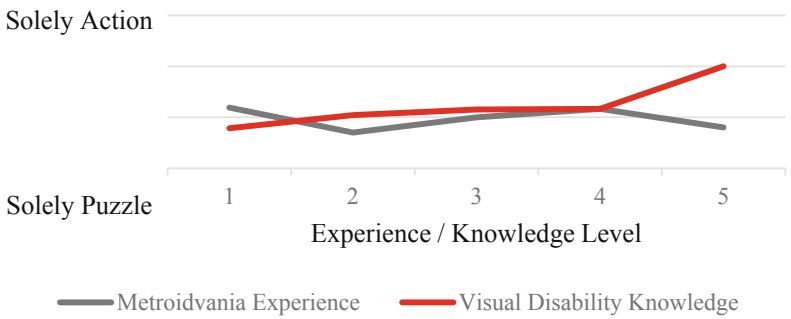


Fig. 5. Chart showing responders' preferences of gameplay style in relation to their experiences and knowledge about the topic

While there is no clear result whether the game should be solely puzzle or action, responders' choices tend to lean towards the game being a puzzle game generally shared by both categorization criteria. This data can be interpreted as the best course of action is to create a puzzle heavy metroidvania with mild action elements in it when working with visual disability.

Last section allows responders to declare their opinions on conceptual parts of the prototype as they see concept designs and visuals from the prototype. First question in this section was to decide whether the player should know the main character has visual disability in the very beginning of the game or the fact should be revealed later. Responders mostly decided that the fact the main character has visual disability should be revealed to the player as the game goes on, which can be seen in Fig. 6.

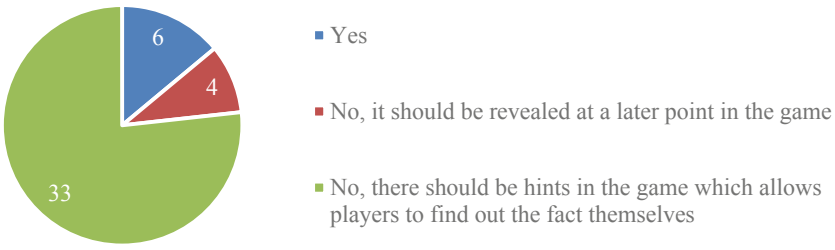


Fig. 6. Number of answers for the question: "Should the main character be revealed have visual disability in the very beginning of the game?"

This data helps on the decision-making progress when structuring the very beginning of the game as it is stated by responders, keeping players in the dark and encouraging them to explore the game is way more preferable than the other options when it comes to this game's storytelling. When responders have been asked if they found the content they saw fitting with the theme and atmosphere of the game, most of them returned positive answers (see Fig. 7).

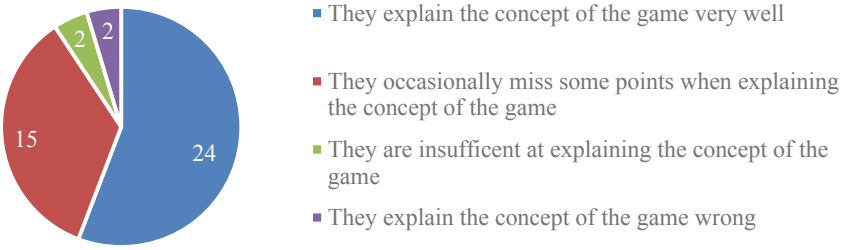


Fig. 7. Number of answers for the question: "How well the content you've seen explain the concept of the game and fit with the theme and atmosphere?"

4 Conclusion

All things considered; the design progress of the metroidvania game that is being worked on in this study may be deemed successful according to the answers of responders as they mostly found the concept and mechanics fitting, pointing out a few oversights in the process that should be tackled during future work. Future studies also include designing remaining parts of the game such as a more compelling story, levels, puzzles, character and ability designs.

References

1. Vorderer, J., Bryant, K.M., Weber, P.R.: Playing video games as entertainment. In: Vorder, P. (Ed.) Playing Video Games: Motives, Responses, and Consequences, pp. 1–7, New York (2006)
2. Manero, B., Torrente, J., Fernández-Vara, C., Fernández-Manjón, B.: Investigating the impact of gaming habits, gender, and age on the effectiveness of an educational video game: an exploratory study. IEEE Trans. Learn. Technol. **10**(2), 236–246 (2017)
3. Oliveira, B.P., da Franco, R., da Silva, J.W.F., de Carvalho Gomes, F.A., Maia, J.G.R.: A framework for metroidvania games. In: Proceedings of SBGames 2020, pp. 836–844 (2020)
4. Baranowski, T., Buday, R., Thompson, D.I., Baranowski, J.: Playing for real: video games and stories for health-related behavior change. Am. J. Prevent. Med. **34**, 74–82 (2008)
5. Reinaldo, N., Pulungan, S., Darmadi, H.: Prototyping "color in life" EduGame for dichromatic color blind awareness. Proc. Comput. Sci. **179**, 773–780 (2021)
6. Cangas, N., et al.: Analysis of the usefulness of a serious game to raise awareness about mental health problems in a sample of high school and university students: relationship with familiarity and time spent playing video games. J. Clin. Med. **8**(10), 1504 (2019)

7. Cuevas, A.: The creativity process behind GRIS. In: CHI PLAY 2019: Proceedings of the Annual Symposium on Computer-Human Interaction in Play, p. 3 (2019)
8. Sandra, N.P.A.A., Mutiaz, I.R.: The embodiment of Kübler-ross model through game elements in GRIS and its impact on player experience. In: Proceedings of the ICON ARCCADE 2021: The 2nd International Conference on Art, Craft, Culture and Design (ICON-ARCCADE 2021), pp. 252–260 (2021)
9. Steam Search: Valve. https://store.steampowered.com/search/?as-reviews-count=75000-&tags=1628&category1=998. Accessed 15 Mar 2022