Reducing 'superficial care' for the visually impaired: a new game design proposal

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Abstract. Nowadays, society does not truly understand the difficulties and challenges with visual impairments. The superficial care for people with visual impairment is rampant. Many games lack social care, and this "superficial care" phenomenon exists in game design for the visually impaired. This paper analyzes the issue of the current game design: it fails to inspire players to care for the visually impaired from the perspective of empathy and is only superficial in form. This paper also explores the existing games for the visually impaired in detail and examines their game design to find the problems. By analyzing a well-designed game, "Seeing," the paper explains its role in creating psychological resonance among players and summarizes 3 game design methods. Then, based on these 3 methods, the paper breaks down the game design into 9 sections and explains a new game design that attempts to solve the defects.

Keywords: Game design; Visual impairment; Discrimination; Game mechanics; Social equality.

1. Introduction

A new study published in The Lancet estimates that the number of blind people worldwide will increase to 115 million by 2050. [1] How to create a free and comfortable living environment for them is an essential concern for designers today. However, from the perspective of software construction, barrier-free design is still in the development stage. The relevant work faces several design challenges:

How to use graphics, colors, and zones to standardize the mobility routes in the space planning and design of accessible environments;

How to provide more accurate information for visually impaired people to ensure the integrity and safety of their spatial experience;

How to help visually impaired people according to the graphic guidance information;

How to reduce the difficulty index of visually impaired people during the travel period

At the same time, people with visual impairments still face challenges in their lives. The lack of "attention" from public opinion and unawareness of the visually impaired's challenges are common problems [2].In our lifestyle, the care for the visually impaired is superficial.

Specifically, the media often preaches support for a particular group of people. However, the act of helping does not have the desired effect. For example, the media calls for more excellent care for the blind, but the reality is that blind corridors are crowded, and guide dogs are banned from being carried. Other scenarios that hinder the blind are repeated. The focus on blindness should not only be on the exterior but also on solving the problems that blind people face.This scenario is also reflected in the design of related games for the visually impaired.

This paper first review the research on the design of games related to visual impairment, reveal the existed problem , then proposes corresponding solutions according to the problems. In the end, this paper proposes a new game design that aims to remedy the shortcomings of existing games.

2. Review of games related to the theme of visual impairment

Many games are designed for the blind, such as Blind hero, VBGhost, Puzzle games, Finger dance, and TapBeat, which is describe as Table 1. The interaction design of these games often uses tactile feedback, audio cues, Braille dot patterns, and out-of-picture instructions with voice-switching instructions and high-contrast graphics. In the game Game for the blind, binaural technology (out-of-picture instructions) is used; For the game Rock Vibe, Tactile queues are used. Few of these games

are entertaining, and most focus on music and education, but few do an excellent job of eliciting empathy for the blind. There is also IBLind Adventure, an engine designed specifically for the blind that hopes to fill the gap in this area. [3] And in terms of aesthetic design, Choirul Anam and others[4] have proposed unique design aesthetics that are also more friendly to the blind

Table 1. Design considerations of games developed for blind people

Game	Features
Blind hero	Sound cues/Haptic feedback
VBGhost	Sound cues/Haptic feedback
Puzzle games	Sound cues
Finger dance	Sound cues
TapBeat	Voice-over instruction/Sound cues/Haptic feedback
Game for the blind	Binaural technology
Rock Vibe	Tactile queues

In addition, some public service games help people experience the life and travel of the visually impaired; here is an example of the game SEEING produced by Tencent Games.

The game simulates the visual experience of the visually impaired, it allows players to experience the difficulties of the visually impaired in traveling, due to the lack of public facilities and social care caused by "superficial care", and calling for society's attention to this problem.

In this game, the player can play from the first person to the perspective of the visually impaired, so naturally has a strong sense of first-person immersion, which is not available in many other games of the same type. The difficulties that players encounter in this game is that visually impaired people are likely to encounter in real life, which strongly incentivizes players to feel sympathy for and empathy with the visually impaired.

In general, a good game for the visually impaired should incorporate the concept of "empathy" throughout the design concept, and only by truly "empathizing" can the so-called "superficial care" be avoided. "Maria C. C. Araújo et al. [5]proposed a feasibility assessment method for games played by the blind. Joyram Chakraborty[6] proposed a set of software guidelines as an incremental solution toward inclusive game design. We combine this with "empathy". We propose 3 approaches to address the theme of blindness in game design from the perspective of "empathy."

3. Approaches to solving the problem of superficial care in game design

3.1. Stimulating ordinary people's sympathy for blind people

During the game process, players should be stimulated to feel compassion for the visually impaired. Based on the 3 components of the MDA Framework, namely Mechanics, Dynamics, and Aesthetics, we aim to design positive and negative feedback based on the player's actions in the Dynamics stage. For example, given a large reward when the player has a positive impact on society or provide a penalty when the player fails to complete the level successfully.

3.2. Proactively reveal inequities

The player will experience sympathy for the visually impaired in the Aesthetics stage through the Mechanics and Dynamics stages, and discover the social injustice for the visually impaired on his own. When the visually impaired person encounters difficulties, make the player feel confusion and anxiety. When they overcome the difficulties independently or seek help from others to solve the problem, design appropriate mechanisms to promote positive feedback of the player's emotions.

3.3 Make players have a more immersive experience

The player's experience feeling is mainly related to the Mechanics stage, in which the interaction mode of the game should be mainly considered. Regular visual and auditory feedback, VR (Virtual

Reality), AR (Augmented Reality), and other technologies can be introduced to provide players with more physical and mental experience. The theory related to game design and narrative agency studied by Deb Polson et al. [7] provides ideas for the design of our visually impaired user experience.

4. A new kind of game design that tries to solve this problem

We split the game design into 9 sections - Platforms, Mechanics, Components, Dynamics, Aesthetics, Behaviors, Players, Costs, and Benefits. These aspects constitute the different elements of the game design, and each part is closely related to the other.(As shown in Figure 1)

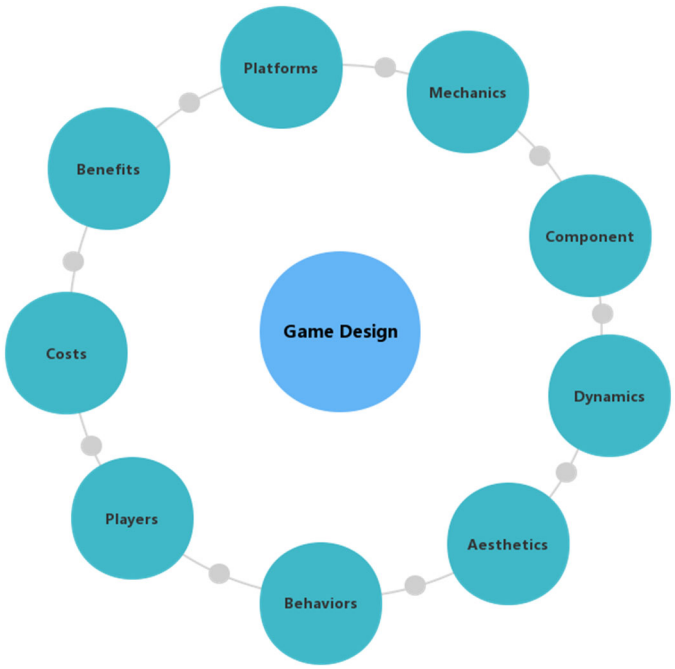

Figure 1. 9 sections in game designation

4.1 Platforms

Regarding platform selection, mobile (Android and IOS) and PC should be chosen. Ronny Andrade et al. [8]studied the unique appeal of digital games for visually impaired people and explored the accessibility of emerging technologies such as VR and AR. The development of VR versions of such games based on the original is beneficial to increase the game's attractiveness. In addition, mobile users are currently the most prevalent group globally, so mobile was chosen here as the central design platform.

4.2 Mechanics

In Mechanics, the game will be defined as an adventure story, showing a clear storyline, and the player will follow the hints given to complete one task after another. Through Chris Crawford's game design theory [9], adventure-based stories bring players a complete sense of acquisition and satisfaction, which is conducive to strengthening the aesthetic identity of the game output.

4.3 Components

In Components, it is essential to try to design the UI interface of the game in a minimalist style, and black will be the primary color of the game. There will be very little non-essential content on the game screen, and everything will be restored to the world faced by the visually impaired.

4.4 Dynamics

In Dynamics, we want to represent the interaction between the visually impaired and the world, similar to a simulation game where the player simulates the visually impaired people in the game world. We will design many traps and obstacles for the player. The player will fail within each level if the participant exceeds the number of incorrect actions.

Here we can refer to the acoustic design decision created by Mexhid Ferati et al. called AEDIN, which is easy to learn and remember architecture. [10] The paper applies it to our interactions.

4.5 Aesthetics

In Aesthetics, we take the 3 words - Expression, Challenge (Narrative), and Discovery from Marc Leblanc's 8 types of pleasure theory to develop.

The expression means that the game is characterized by self-discovery, which is precisely what current games of this type do not have. Suppose the player is free to explore every detail of the game's design and feel from these small elements. In that case, the player builds empathy for the visually impaired, thus reducing the superficial care for the blind in display life.

The game generates some negative feedback to the players to enhance the their sense. Suppose the player cannot experience the real challenges visually impaired people encounter and develop the same emotions. In that case, he or she cannot experience the joy of succeeding in challenging difficulties.

Discovery means the joy of exploring unknown territory, which is explored through an optical lens for other games. For visually impaired-themed games, the intrinsic property of visual impairment sets the tone of discovery. The fear of the unknown is the part with which gamers and visually impaired people empathize.

4.6 Behaviors

We expect the game to be operated using a joystick or direct contact screen. On the PC, the keyboard is also supported. However, we recommend using the joystick because of the vibration feedback that adds to the player's experience.

4.7 Players

The expected players of the game are the first group of people who are curious or sympathetic to the visually impaired and the second group of people who are researchers of the vulnerable groups. Certainly, since the game is focused on public service, the ideal players should be everyone in society. The paper hopes that all people experience the unique meaning of the game and change society.

4.8 Costs

We hope to cooperate with some large enterprises to promote the game for public welfare to reduce the project's monetary expenses. Also, perhaps the expenses are reduced by formalizing the game mechanics and using them to generate the game, as proposed by Mark J. Nelson et al. [11].

4.9 Benefits

There are 3 main benefits of games. (As shown in Figure 2)

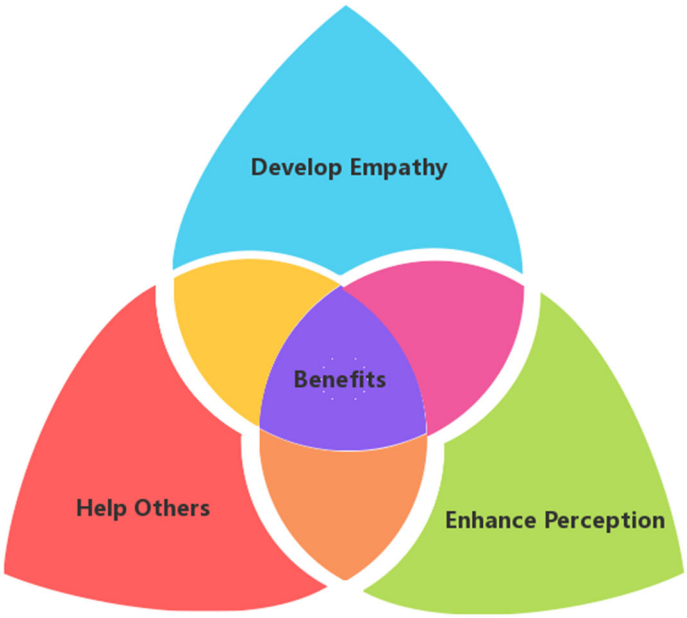

Figure 2. The benefits of the games

Although there is not sufficient evidence that games enhance players' cognitive abilities [12], players develop lasting empathy with visually impaired people through games

Players are motivated spontaneously to help people with visual impairment and to develop the motivation to help others.

To enhance the players' perception of social equality after finishing the game.

5. Conclusion

This paper introduces the problem of the visually impaired currently, namely the phenomenon of "superficial care" for the visually impaired, which is also present in gaming. Besides, this paper reviews the games for the visually impaired, analyzes their pros and cons, and points out that they lack genuine care for the visually impaired. The paper then appreciates one of the better games with a visual impairment theme and, in doing so, suggests 3 ways to address the issue of superficial care in game design. To inspire ordinary people to feel compassion for the blind, actively revealing injustices and giving players a more immersive experience.

Based on these 3 approaches, the paper proposes a new way to rethink about game design by breaking it down into 9 aspects and designing specifically in each element to try to solve this problem in game design. The expected benefits of such games are to make players empathize with people with visual impairment and raise their awareness of social equality, to make people care more for people with visual impairment, and inspire them to do something beneficial for the blind.

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