Developing Empathy towards Experiences of Invisible Disabilities Through Games

Maria Jose Vilches Gonzalez
University College London
maria.gonzalez.21@alumni.ucl.ac.uk

Leya George
University College London
leya.george.14@ucl.ac.uk

Lidia Miteva
University College London
lidia.miteva.20@alumni.ucl.ac.uk

Aneesha Singh
University College London
aneesha.singh@ucl.ac.uk

ABSTRACT

Hidden or invisible disabilities are invisible to the onlooker and can be physical, mental, or neurological conditions that limit a person's movements, senses or activities. As a result, they can lead to misunderstandings, false perceptions, and judgments. Developing an understanding of the conditions and the limitations they impose on people who have these conditions might help to develop empathy and reduce stigma and misunderstanding. We investigate the use of games for this purpose. This paper reports a first qualitative survey study with 56 participants about their experiences of interacting with a paper prototype of a game about living with chronic fatigue syndrome (CFS) and then answering questions regarding their perceptions of the game with respect to their own experiences. The study aimed to understand if we can unify the design of games for barriers faced by people with invisible disabilities. The prototype was redesigned based on the findings of the first study. Study 2 involved a playtesting session with 8 participants who did not have invisible disabilities engaging with the digital prototype. Their empathy quotient was measured before and after playing. While the study's results did not yield any statistically significant findings, they do offer some evidence that playing computer games can be a useful way to increase empathy towards people with invisible disabilities and provide design considerations for such games.

CCS CONCEPTS

• **Human-centred computing**; • **Human-computer interaction (HCI)**; • **HCI design and evaluation methods**;

KEYWORDS

Invisible disabilities stigma, empathy, game design

1 INTRODUCTION

Individuals diagnosed with "invisible" disabilities do not present with obvious outward signs of disability and have to manage their condition alongwith navigating the social stigma that often comes with their disability [15], such as being perceived as malingerers or hypochondriac, rather than as individuals attempting to manage a debilitating chronic condition. Interventions to raise awareness of and empathy for the challenges faced by individuals diagnosed with invisible disabilities are one way of addressing the social stigma [43] and one strategy that has worked in the past for developing empathy for other marginalized groups that may be effective for invisible disabilities involves the use of serious video games that aim to invoke empathy for the target demographic [53]. However, there is not much research that seeks to assess the effectiveness of these games. This research leverages a game developed for promoting empathy towards individuals living with chronic fatigue syndrome (CFS) from other people around them, including healthcare professionals. In this paper, we test the game with people with other invisible disabilities, for its suitability. This is because people with other invisible disabilities may barriers that are similar to those faced by people with CFS and we wanted to investigate what aspects in designing for empathy generalised across other invisible disabilities. We then test the game with others who do not have an invisible disability to test if the game is successful in increasing empathy. Thus, this paper will present two studies. Study 1 is a qualitative survey with 56 participants with invisible disabilities interacting with the game and answering questions with respect to their personal experiences of living with their conditions. The purpose of this study was to develop an understanding of what people wanted to be understood by others about their lived experiences. Study 2 involved *participants without invisible disabilities* interacting with a redesigned prototype of the game to promote empathy towards experiences of invisible disabilities based on Study 1.

2 LITERATURE REVIEW

2.1 Empathy Games

The most relevant video games that may promote support and understanding of individuals diagnosed with invisible disabilities, are empathy games [3], which encourage the player to inhabit the emotional world of their character. Such games can overlap with other genres such as puzzle games or shooters but are fundamentally distinguished by the intentional foregrounding of emotional experiences in the context of other, more traditional elements of the

video game experience [30]. For example, one of the best-known, paradigmatic examples of the empathy game is the award- winning Papers, Please [37], in which the player masquerades as a border patrol agent in a fictitious Cold War era country of the Eastern bloc. The circumstances of the game encourage the player to develop an awareness of the desperation and despair in the final days of the collapsing Soviet Union [46]. Upon completing the game, the player is left with grief and sympathy for the character whose challenges are presented and developed over the course of the game [16].

Many empathy-oriented video games seek to promote specific political or social ends [23]: in the popular game Path Out, the player plays as Abdullah, a young Muslim who seeks to make his way out of the Syrian forests during the country's civil war [8]. The player experiences the complexities and horrors of the Syrian civil war and its fallout through the game. Other empathy-oriented video games have focused on medical or personal conditions, such as "That Dragon, Cancer," in which the player takes on the identity of a young couple who have recently lost their son to cancer [12]. Experiencing this game helps the player understand and appreciate the challenges of navigating the complex world of grief and feelings of abandonment upon the loss of a loved one to a condition like cancer. Indeed, this game is so effective that it is used as training material to promote robust empathetic attitudes among staff towards patients and families [44]. Such games provide a safe environment where players experience certain situations but with a sense of detachment and suspension of disbelief that allows for reflection.

What are the mechanisms that make certain video games successful at inducing empathy? The capacity for video games to influence emotional states is well-known and broadly accepted by scholars and mainstream society alike [22]. Indeed, empathy induced by playing video games is the flip side of the more standard and highly publicized concern that playing video games can actively promote anti-social and pro-violent attitudes [35]. Research into the empathy- induced potential of video games highlights that this capacity for video games to promote empathy is simply an instantiation of a broader capacity for works of art to do so [4, 29]. In theory, video games go even further in their empathy-generating potential due to the specific interaction between the game and the player [53] in which the player directly participates in the construction of meaning and is required to actively "choose" and directly participate in the development of the game and its narrative [5, 41]. Not only that, games can create a more direct and meaningful connection between the player and the perspective of the character that they are embodying [18], providing the opportunity for promoting empathy for complex situations. Previous work has developed frameworks to understand different perspectives on empathy-centric design beyond embodiment of the character. For instance, Kors et al., [27] delineated three perspectives to empathetic engagement by understanding how the player is placed in relation to the intra-diagetic (in-game universe) victim – whether they embody this victim role directly; are a partaker in the universe who is able to interact with the victim, or a passive observer. Thus, there are various avenues to designing for empathy in nuanced ways through games.

2.2 Video Games and the Challenge of Invisible Disabilities

The capacity for video games to promote empathy in the context of invisible disabilities follows directly from their capacity to promote empathy in general [49], through highlighting the significant challenges experienced by individuals in navigating the conditions of their everyday life with an often debilitating condition. Games can actively encourage players' perspectives in developing the meaning of what it is like to live with an invisible disability [11], giving first-hand experiences of living with the challenges of significant disability, but also of facing others who do not take one's disability seriously. An example is "Under The Rock", a game to promote understanding of and empathy for advanced hearing loss [36], a condition that disadvantages people considerably but does not usually invoke similar levels of empathy available to those with a more obvious disability [42]. The game encourages players to experience the challenges associated with this condition and playing the game showed improved empathy in players for this condition [36]. In theory, any type of invisible disability can be addressed through the medium of games [28, 38] which can be powerful tools for empathy.

3 STUDY 1: INSIGHTS INTO EXPERIENCES OF THOSE WITH INVISIBLE DISABILITIES

3.1 Methods

Ethical approval for this study was provided by the UCL Interaction Centre ethics committee. The study involved 56 participants (34 female, 7 non-binary, 6 male, 2 genderfluid and 2 autigender. 5 preferred not to say) aged 18 and above (41,7% were 25-34 years old, 27.8% between 18- 24 years old, 25% between 35-44 years old, 2.8% between 45-54 years old and 2,8% between 55- 36 years old)) who had some sort of invisible disability, including physical, mental, or neurological conditions. Ethnically most of them identified as other white (58,3%) or having a mixed cultural background (19,4%). Recruitment was through purposive sampling via social media. P# denotes participants' responses. A prototype of an existing game for generating empathy for living with CFS [32] was set up on Gorilla, an online experiment building platform along with an information sheet, consent form, eligibility criteria form, demographics questionnaire and post-gaming session qualitative survey with 6 open-ended questions (see A. 1). When participants clicked on the link to the study, they were shown an information sheet and consented to their data being used anonymously. Inclusion criteria for the study were that the participants were over 18 years and have an invisible disability. Participants were asked to play the game followed by the survey about their thoughts on the game in relation to their invisible disabilities and their own experiences (see A.1).

The first question in Study 1 asked, what is the one thing you would like other people to know about living with an invisible disability? Table 1 shows the frequency distribution of each phrase with the percentage of participants that selected each response while playing the game. These phrases corresponded to the scenarios in the game that participants felt resonated with their experience. Based on the statistical data, it can be determined that all the potential conditions presented in the game were common experiences

Table 1: Frequency distribution table of phrases signifying participants' feelings about the game

Description	Frequency	Percentage
Explaining my condition to a friend	45	80
Having a bad experience at the doctor's	32	57
Having to cancel plans because of my condition	38	67
Having my ability to do certain tasks limited due to my condition	45	80

for the majority of survey participants, all of whom live with some invisible disability.

3.2 Thematic Analysis

The studies were conducted by the first author. The analysis of the qualitative data in the survey was led by the first author following Braun & Clarke's six steps for thematic analysis [6]. Initial codes were identified and grouped into themes using affinity mapping. Themes were discussed with all authors and reviewed, before finalising and writing up.

We discuss the three major themes identified in the qualitative analysis.

3.2.1 Developing Connection to and Resemblance with Characters in the Game. Participants were presented with a prototype of a game to understand their experiences in living with an invisible disability. The construction of this game served as an attempt to understand how it resonated with people with a variety of conditions. These participant responses show that most participants connected their own conditions and the one presented in the game. "*I experience frequent severe pain and constant fatigue.*" (P39, PCOS); "*...these are common issues.*" (P42, Chronic pain); "*Nobody sees the pain of my arthritis, [...]. People expect me to do things that are really painful for me. I have to take lots of pills. Some of them make feel tired, dizzy, and give stomach ache[s] so I have to run to the toilet.*" (P54)

Different invisible disabilities can share some similar experiences in different contexts. In one instance, the game portrays a scenario where the doctor dismisses the character's condition by putting them in contact with a psychiatrist, an experience considered realistic by most of the participants. P4 explained how people's patronising attitudes minimised their experiences,"*I've experienced people telling me I don't look sick, saying 'We all get tired' or 'Welcome to adulthood' [..]. I've experienced doctors dismissing the impact of symptoms because of stigma around my diagnosis. I've experienced the loss of relationships due to my reduced ability to socialize.*" Most participants shared that their social relationships have been adversely affected by their experiences and that they drift toward isolation. Their family and friends do not understand their conditions, and this worsens their mental health. The existing literature also supports the notion of tiredness, laziness, and laxity (as shown in the game) as a source of multiple adversities [9]. Research studies also present that even educational faculties are not exempt to negative viewpoints about invisible disabilities [21,51].

Participants commonly reported feelings of guilt due to not being able to properly explain their conditions [40]: "*I have told a friend I was not feeling well to go to a paint-and-sip event (the day of) one [year]. [...] I don't think she ever got over it...*" (P55). Extreme fatigue

and dizziness are characteristics typically disbelieved by others, as for the character in the game. Explaining actions was tiring: "*... just because other people can't see why and I fear people will think I'm being flaky, uncaring, and high-[maintenance].*" (P30). Often the disclosure of their disability has led people to experience negative consequences both in their personal and professional lives [45]. Almost all participants agreed that what was shown in the game accurately reflected their experiences in that their condition is most likely taken for granted and stigmatized.

Most participants felt there were identical attributes between them and the main character. Almost all the situations that the main character faced reflected their own experiences. In terms of symptoms, similarities related to tiredness, fatigue, and frustration and inability to successfully explain to others for understanding. P38 said, "*Yes. I felt very empathetic towards the main character. I was able to put myself in their shoes*". Many participants have struggled to make others understand the severity of their condition. The pessimistic viewpoints of society and close ones can making them frustrated, anxious, and stressed. "*..., blue circle is my exact life and it pissed me off that he just stood there so passively. Like bruh, walk away, make better buds online. Don't entertain dudes like that. Can't spare the energy.*" (P44)

Nine participants indicated some similarity to the character but not identical. The commonality was in the context of the flippant approach and misunderstanding of others but other aspects were found to be dissimilar. While situations differed, the final result in the game resembled many participants' experiences: "*My disabilities are different, but the end result was very similar. I get frustrated because I wanted to pick the 'rude' options and tell people I needed help, but like in real life, I felt I had to be nice. I couldn't bring myself to tell the truth, even in a game.*" The dissimilarity was primarily in the physical symptoms, the types of disabilities, severity and level of fatigue. Some participants had a similar personality, "*... I chose some options based on curiosity rather than what I say. But I related to the main character a lot.*" (P39)

Four participants felt no similarity with the main character. One reported that the main character in the game presented as a victim, and the content in the game was overly pessimistic: "*... it felt like the main character was playing the victim instead of dealing with her illness.*"(P31). Related to this, a few people felt that the music was pessimistic and passive, and neutral music would be more suitable. "*The music was too sad. It's not a happy situation, we agree on that. I would rather a more neutral sort of music.*" (P53). They felt that music should have changed between scenes. A minority of participants did not relate to the protagonist, due to discrepancies between their symptoms and that of the character: One participant stated, "*I did not see myself as the main character but as someone else with similar*

experience, I had sympathy for them. but their symptoms are different from mine." (P43). P40 said, "*I would be a lot angrier with people for such responses.*"

3.2.2 Dealing with lack of support and empathy from others. Invisible disabilities vary: for example, they can have a physical cause or not, or be episodic or permanent [39] and diagnosis and treatment also vary. The game play aimed to discover the areas of concern for people with invisible disabilities. Most participants recommended changes like the addition of more characters, as they felt a single character did not adequately portray the diversity of experiences. One participant suggested: "*You could bring in someone who thinks that they know what they are talking about. They then lecture the blue circle about how they can't have CFS.*" (P22) A character like this was suggested to make the game more realistic: "*Add another character who means well or starts out sympathetic and then becomes antagonistic. Many have good intentions but end up saying rude or frustrating things.*" (P26). Another aspect highlighted by many participants was the inclusion of a scene where the protagonist disconnects from rude people to avoid explanations, "*I would have walked away from the rude person the [second] time they told me off.*" (P29). People with invisible disabilities sometimes find it difficult to adjust to changing social contexts [33], such as educational institutions and workplaces which can play supporting and debilitating roles simultaneously. This context was considered more demanding and missing. "*I would include school. My [university] refused to accommodate me and told me to take a year off and come back when better and refused to listen when I spoke about my condition.*" (P49) The game was criticised for lacking gender-specific content, "*When you're a woman, people believe less in your pain. It causes the problem of economy/illness, the stress [that you] can't handle most jobs, [and problems] with romantic relationships*" (P33). Participants also felt most segments were pessimistic, focusing on the negative aspects and lacked supportive or encouraging content. "*There could have been a portion, that provided online sources for information about the illness or how to manage it (shows how the person goes online to find connections)*" (P37). People can be supported by social and personal support from family or peers, and seek a supportive network [26]. Some participants found the game relevant, and reflective of their experiences, "*It's pretty good as it is!*" (P21)

People with invisible disabilities often experience situations where their physiques and behaviours are policed and assumptions made [30,49]. They want others to ask them questions instead, "*[A] perfect response: 'Oh, okay. What do I need to know about that?*'" (P26). Further, they wanted people to, "*...to accept the information we disabled people give them—we're not making it up.*" (P21). Participants explained that more commonly, people make invalid assumptions that usually make light of their condition [2] and rely on how they looked, "*Looking good does not equal feeling good.*" (P29) Our participants agreed that the realistic approach is a perspective of respect. "*Asking about my needs, like 'Ok, is there anything I should do differently?' or 'so is there another way this would be better for you?' would be nice.*" (P45) Participants overwhelmingly doubted the intentions, attitudes, and behaviors of other people with regard to their illness.

3.2.3 Developing Sensitization and Empathy toward Invisible Disabilities. Empathy is one of the most valuable tenets of interacting with people with invisible disabilities [25], ensuring one's capability to potentially understand others' emotions, feelings, and state of mind and ultimately understand their point of view [16]. Participants expected empathy for the issues faced by people living with invisible disabilities as it is not always possible to know who is affected, "*It can happen to anyone. [Y]ou could develop an invisible disability tomorrow, but you also likely interact with friends, coworkers, and acquaintances daily who have invisible disabilities.*" (P26) This relates to the concept of Common Humanity within compassion [50]. Realization and an empathetic approach are the key elements to becoming effective allies. It is crucial for therapists and other support systems to be positive, stay away from stereotypes, and empathize in order to understand the real situation [14]. As P38 stated, "*You don't know what I am going through, so please have some compassion. Sometimes I can't do certain things and feel helpless. I just want to be taken seriously.*" (P38). As invisible disabilities are often episodic, they naturally bring about fluctuations in people's life patterns. Such a scenario creates doubts about them or their abilities in the minds of others, which can create disbelief - "*Questions are fine; questions of authenticity are not.*" (P44). P52 reflected, "*I actually had stage 1 cancer (synovial sarcoma) and doctors believed me and had plans to fix it, but they refuse to diagnose my CFS, even though my entire family has it.*" (P52) Supportive attitudes are valued [14].

4 GAME REDESIGN BASED ON FEEDBACK

Based on the findings from Study 1, a redesigned prototype was created. The aim of this redesign is to broaden the scope of the previously created paper prototype in order to reflect the experience of invisible disabilities patients more accurately and generate empathy in people without invisible disabilities by creating a new digital prototype that incorporates reflections derived from thematic analysis. Ideation involved going through the thematic analysis and writing down pain points and opportunities. Five main areas were chosen to be redesigned according to the participants' feedback. For each, a crazy 8 session was conducted to come up with ways in which the patient's opinions could be reflected in the game's narrative. Later, the new scenarios were storyboarded to make sure they would fit the narrative and style of the game.

4.1 Redesign choices

Realism: One of the main antagonists in the game constantly reacted negatively to the main character's struggles. Many participants suggested subtle changes reflected in their experiences. - "*For me it is most painful when someone is understanding but expects things of me that I can't do.*" (P43). Thus, a new character was introduced, Friend 2 (Figure 1) following design guidelines for conflict [13] who acted in a well-meaning but misguided way to add more authenticity. **Disengagement**: Many participants voiced frustration with the main character's passivity, "*I would have walked away from the rude person the [second] time they told me off.*" (P29) Thus, the option to walk away from situations was added.

Financial burden: Several participants highlighted that educational institutions and workplaces often fail to implement adequate adjustments for patients with invisible disabilities, thus affecting their finances. Thus, we redesigned a scenario in the game where
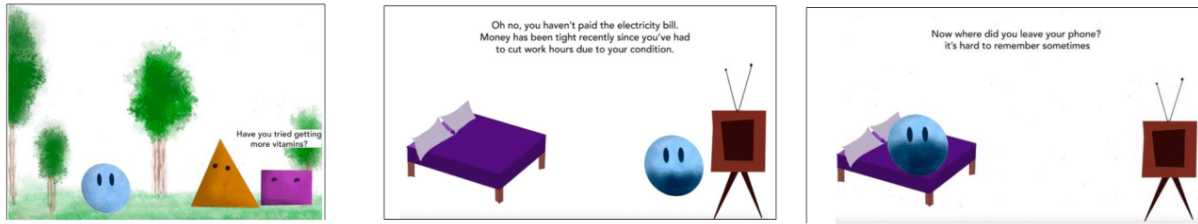
Figure 1: (left). Main character on left with two friends; (center) scenario for financial issues (right) scenario of memory issues

the main character cannot watch television due to not paying the electricity bill in time (see Figure 1).

Mental burden: Often, participants disclosed that mental symptoms were particularly hard to explain. To address this, a scenario where "*mental fog*" is portrayed was added to the game (see Figure 1).

Pessimism: Many felt that the tone of the game was pessimistic, and perpetuated beliefs that people with invisible disabilities constantly play victim. The ending was changed to reflect peoples' ability to build a community of support.

5 STUDY 2: PLAYTESTING

This study aimed to have participants without invisible disabilities interact with the redesigned prototype to test if their Empathy Quotient (an empathy measuring tool developed by Baron Cohen [1]) increased.

5.1 Methods

The study involved 16 participants (11 female, 5 male) aged 18 and above with no invisible disability (including physical, mental, or neurological conditions). Recruitment was done through convenience and snowballing approaches.

A redesigned digital prototype of the game used for Study 1 [32] was set up on Gorilla, an online experiment building platform. Additionally, a PowerPoint presentation about what it is to live with an invisible disability and general information about the topic was prepared that contained 10 slides and lasted approximately 5 minutes, used as a control. An online playtesting session with 8 participants was set up through the online video conferencing platform zoom. Participants were given a link to the study where, they were presented with an empathy quotient questionnaire after which, the researcher shared their screen and started the prototype of the game. Participants chose between the options they were given by raising their hands. On finishing the game, participants filled in the empathy quotient questionnaire again and submitted both scores on the Gorilla website. The other 8 participants who acted as a control group, were sent the PowerPoint presentation, and filled in the empathy quotient questionnaire before and after going through it. Participants in both conditions were given an empathy measuring questionnaire derived from [1] to fill before and after the intervention. Answer choices on the questionnaire involved a four-point Likert scale measuring level of agreement with a series of statements about emotions and general affect. Each respondents' questionnaire score was tabulated for both conditions and results were analyzed to identify significant differences associated with the test and control conditions.

5.2 Analysis

Statistical analysis was conducted in Microsoft Excel. Independent samples t¬ -test for mean empathy score in the pre-test condition confirmed that there was no statistically significant difference between the pre-test game group at significance α = 0.05 (M = 48.125, SD = 8.741) and the pre- test PowerPoint group (M = 47.25, SD = 8.225), t(7) = 0.206, p = 0.839. Paired t¬ -test for means for the power point group revealed no significant difference between the pre-test and post-test conditions at significance α = 0.05 (M = 0, SD = 2.45), t(7) = 0, p = 1). Paired t-test for means for the game group also revealed no significant difference between the pre-test and post-test conditions at significance α = 0.05 (M = 1.875, SD = 2.59, t(7) = 2.05, p = 0.08). Of note, this result is significant at α = 0.1. Also of note, no statistically significant difference was detected in a two sample mean t- test comparing the post-game condition (M = 50, SD = 8.26) and the post PowerPoint condition (M = 47.25, SD = 8.23) at significance α = 0.05, t(7) = 0.667, p = 0.258.

5.3 Discussion of Findings

The original goal of this analysis sought to determine whether or not the use of a computer game could be an effective tool for promoting greater levels of empathy directed towards individuals who suffer from invisible disabilities. Since conditions involving invisible disabilities usually do not present with obvious external signifiers, people who suffer from invisible disabilities are often forced not only to deal with the direct suffering associated with their respective conditions, but frequently find themselves forced to navigate social situations where sympathy and support for their condition is severely lacking. Consequently, the development of effective stratagems for consistently promoting improved empathy of conditions of invisible disabilities is of considerable interest to patients and advocates alike.

This study specifically hypothesized that the use of a computer game to promote empathy may be superior to traditional, education-based empathy interventions, on the grounds that the use of computer games to evoke empathy requires a greater degree of perspective-taking than traditional educational initiatives. Whereas educational interventions require the audience to passively absorb information, computer game-based interventions require the audience to take on a more active role, insofar as these interventions require the player/audience to take initiative and responsibility for

making choices throughout the game. In light of these considerations, it was hypothesized that a game which requires a player to make active choices in the context of invisible disabilities would result in greater levels of empathy for patients who have invisible disabilities than would standard, education-based initiatives.

No statistically significant results were obtained when comparing pre- and post- scores for both conditions, and post- scores across conditions, an increased difference was observed for the games condition compared to the text condition. Due to a small sample size, it is difficult to conclude anything substantial, and more testing would need to be done.

6 GENERAL DISCUSSION

In this paper, we report two studies. In the first study participants played a game for developing empathy towards invisible disabilities. The main themes identified from participants' responses to a survey about experiences of playing the game relate to if and how people with invisible disabilities identified with the characters and scenarios in the game in their lives, their experiences of dealing with lack of empathy from others and the importance of developing empathy and sensitisation towards invisible diseases. These results have led to interesting insights for empathy-centric design specific to invisible disabilities. In particular, engaging with individuals with invisible disabilities in study 1 developed our understanding of specific game elements to focus on and how to design game content to better reflect their experiences adding more realism and reducing pessimism, making the main character less passive, and introducing real-life scenarios of the financial and mental burdens of living with an invisible disability.This includes the design of non-player characters, incorporating more character agency to reflect realistic responses in the real-world (e.g. the option to walk away from characters), and including narrative scenarios that reflect real systemic issues that affect access to work/educational institutions, thus leading to financial difficulties.

The emotional tone of the game is an important consideration that can enhance empathy but also perpetuate stereotypes of 'playing victim'. In reflecting on their experiences through the game, people reflected on the types of dealings they had with others: situations where they felt a lack of empathy and understanding. One of these was the need for being civil and even nice to people who were rude and disrespectful of their situation. As highlighted in results, one participant *wanted to pick the 'rude' options but felt they had to be nice and could not tell the truth even though this was a game.* This brings up several interesting contrasts between the behaviours of the other person and the person with an invisible disability and also their desired vs real response. Why do (some) people experiencing invisible illnesses feel that they have to be understanding and show an empathetic response towards someone who did not show empathy towards them? This could be due to many reasons, such as feeling that they have a responsibility to educate others about their conditions and the challenges they face, and showing empathy towards others can be a way to initiate that conversation [7]. However, the implications of this dynamic vary. It can be emotionally exhausting and unfair and people may feel that they are constantly having to advocate for themselves and educate others about their illness, which can be frustrating [10, 31,52]. They

may also feel isolated and misunderstood, leading to feelings of depression and anxiety. Additionally, if they are constantly trying to be understanding and empathetic towards others who do not show the same level of understanding and empathy towards them, they may be at risk of experiencing burnout and emotional exhaustion [34] - this is also related to the constant decisions of whether and how much to reveal their condition [20] and its consequences, such as facing stigma and lack of empathy. The literature refers to changes in empathy in people with invisible disabilities (e.g., chronic pain) due to their condition as well as the situations they find themselves in socially and emotionally [7, 48], which can lead to reduced empathy: thus this account is not true of all people with invisible disabilities at all stages but it is important to consider in terms of whether reducing the burden on people with invisible disabilities can reduce these changes.

In our study some participants felt that the main character presented as a victim and some of the content felt "*overly pessimistic*". This is interesting, as it reflects a trade-off between the desire for empathy and being perceived as needing pity or sympathy. Another participant mentioned, "*I had sympathy for [the main character]*" Thus, there is a tension between feeling sympathy for a similar character and empathising with them? How does sympathy and empathy relate to each other in this case? Empathy and sympathy are often conflated and used interchangeably in research and everyday interactions [24]. Sympathy can be a reaction to something, generally negative, that happens to another person [19]. [47] state that "The crucial distinction between the term empathy and those like sympathy, empathic concern, and compassion is that empathy denotes that the observer's emotions reflect affective sharing ('feeling with' the other person) while compassion, sympathy, empathic concern denotes the observer's emotions are inherently other oriented ('feeling for' the other person)" (p. 84). Sympathy may focus more on the *'self'* perspective and motivate people to help the other person to feel better about themselves. It may follow from empathy inducing encounter [47]. However, some researchers have indicated Sympathy may slide into a feeling of pity which has negative connotation painting the object of sympathy as a "*victim*" or blameworthy [17].

Designers need to consider the implications of their choices; how does it actually present the person with an invisible disability, and how would this character be received? There appears to be a trade-off between empathy and empowerment. Focusing solely on the negative aspects of the condition may not serve the purpose of provoking empathy but may run the risk of removing nuance of the person's lived experience, instead objectifying them and creating pity.

7 CONCLUSION

The original hypothesis guiding this study was based on well-documented phenomenon observed in the available scholarly literature reflecting the relative superiority of computer game-based interventions over education-based interventions for promoting greater levels of empathy towards individual living with invisible disabilities. While the results of this study failed to identify statistically significant results at traditional levels of significance, the results provide evidence to support the idea that computer games

are an effective means for greater levels of empathy towards individuals with invisible disabilities. Future research can support and expand upon the preliminary results presented in this study primarily by including larger sample sizes. This may lend statistical significance to the finding that computer games are an effective means of promoting empathy in the general public towards people with invisible disabilities. Further research may also benefit from analysis aimed at comparing different styles of computer games, to further develop practices in the creation and design of computer games designed to promote empathy among player audiences.

REFERENCES

[1] And what is an invisible disability? (August 2021). Retrieved June 17, 2022 from https://invisibledisabilities.org/what-is-an-invisible- disability/
[2] Simon Baron-Cohen and Sally Wheelwright. 2004. The empathy quotient: an investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. 34(2): J Autism Dev Disord 163-75.
[3] Joy E. Beatty and Susan L. Kirby. 2006. Beyond the legal environment: How stigma influences invisible identity groups in the workplace. Employee Responsibilities and Rights Journal 18, 1: 29-44.
[4] Jonathan Belman and Mary Flanagan. 2010. Designing games to foster empathy. International Journal of Cognitive Technology 15, 1: 11.
[5] Joy G. Bertling. 2015. The art of empathy: A mixed methods case study of a critical place-based art education program. International Journal of Education & the Arts 16, 13.
[6] Barbaros Bostan, Önder Yönet, and Vugar Sevdimaliyev. 2020. Empathy and choice in story driven Games: a case study of telltale Games In Game User Experience And Player-Centered Design, Bostan Barbaros (eds.). Springer, Cham, 361-378.
[7] Derek J. Burks , and Amy M. Kobus . 2012. The legacy of altruism in health care: the promotion of empathy, prosociality and humanism. Medical
[8] education 46, 3: 317- 325.
[9] Caren Chesler. 2022. Can video games teach people to be more empathetic? Maybe. Retrieved July 20, 2022 from https://www.washingtonpost.com/health/2022/06/25/video- games-empathy/
[10] Candace Cortiella and Sheldon Horowitz . 2014. The state of learning disabilities: Facts, trends and emerging issues. New York: National center for learning disabilities 25, 3: 2- 45.
[11] Gideon Dishon and Yasmin B. Kafai. Making more of games: Cultivating perspective-taking through game design. 2020. Computers & Education 148: 103810.
[12] Shoshana Eilon. 2018. That dragon, cancer: Video game as art form [leading edge]. IEEE Technology and Society Magazine 37, 2: 16-17.
[13] Karen P. Eriksen and Garrett J. McAuliffe. 2006. Constructive development and counselor competence. Counselor Education and Supervision 45, 3: 180-192.
[14] Patrick J. Flink. 2017. Invisible disabilities, stigma, and student veterans: Contextualizing the transition to higher education. Journal of Veterans Studies 2, 2: 110-120.
[15] Paul Formosa, Malcolm Ryan and Dan Staines, Papers, Please and the systemic approach to engaging ethical expertise in videogames. Ethics and Information Technology 18, 3: 211-225.
[16] Sarah Gibbons. 2015. Disability, neurological diversity, and inclusive play: An examination of the social and political aspects of the relationship between disability and games. Loading... 9, 14.
[17] Michael E. Goodwin. 2020. Making the Invisible Visible: Let's Discuss Invisible Disabilities. HAPS Educator, 62-73.
[18] Jane Goudge, Lucy Gilson, Steven Russell, Tebogo Gumede and Anne Mills. 2009. Affordability, availability and acceptability barriers to health care for the chronically ill: longitudinal case studies from South Africa. BMC health services research 9, 1: 1-18.
[19] Tobias Greitemeyer. 2013. Playing video games cooperatively increases empathic concern. Social Psychology 44, 6: 408.
[20] Abbie Hartman, Rowan Tulloch, and Helen Young. 2021. Video Games as Public History: Archives, Empathy and Affinity. Game Studies 21, 4.
[21] Susan E. Jackson and Aparna Joshi. 2004. Diversity in social context: a multiattribute, multilevel analysis of team diversity and sales performance. Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior 25, 6: 675-702.
[22] Connie Johnson. 2011. Disabling barriers in the person- centered counseling relationship. Person-Centered & Experiential Psychotherapies, 10, 4: 260- 273.

[23] Shanna K. Kattari, Miranda Olzman, and Michele D. Hanna. 2018. "You look fine!" Ableist experiences by people with invisible disabilities. Affilia 33, 4: 477-492.
[24] Tammi R. A. Kral, Diane E. Stodola, Rasmus M. Birn, Jeanette A. Mumford, Enrique Solis, Lisa Flook, Elena G. Patsenko, Craig G. Anderson, Constance Steinkuehler, and Richard J. Davidson. 2018. Neural correlates of video game empathy training in adolescents: a randomized trial. npj Science of Learning 10,1: 1-10.
[25] Tuuli Lähdesmäki and Aino-Kaisa Koistinen. 2021. Explorations of Linkages Between Intercultural Dialogue, Art, and Empathy In Dialogue for Intercultural Understanding, Maine Fiona and Virikki Maria (eds.). Springer, Cham, 45-58.
[26] Petri Lankoski. 2007. Goals, affects, and empathy in games. Philosophy of computer games, 1-10.
[27] Susan Lingsom. 2008. Invisible impairments: Dilemmas of concealment and disclosure. Scandinavian Journal of Disability Research 10, 1: 2-16.
[28] Lidia Miteva. 2021. Playing Against Stigma: Increasing Empathy Towards Patients with Chronic Fatigue Syndrome through Branching Decision- Based Games. Dissertation.
[29] Rebecca Muir, Kim M. Thompson, and Asim Qayyum. 2019. Considering "atmosphere" in facilitating information seeking by people with invisible disabilities in public libraries. Proceedings of the Association for Information Science and Technology 56, 1: 216-226.
[30] Federica Pallavicini, Alessandro Pepe, Chiara C. Caragnano , and Fabrizia Mantovani. 2020. Video games to foster empathy: A critical analysis of the potential of Detroit: Become Human and The Walking Dead. In proceedings of International Conference on Human-Computer Interaction, 212–228.
[31] Jesslyn Parrish. 2022. Seeing the Unseen: Interactive Narrative as a Tool for Understanding Invisible Disabilities. Ph.D Dissertation. University of Central Florida.
[32] Lucas Pope. 2013. Papers, please. Version 1: 65.
[33] Sydney Pratte, Tang Anthony, and Oehlberg Lora. 2021. Evoking Empathy: A Framework for Describing Empathy Tools. In Proceedings of the Fifteenth International Conference on Tangible, Embedded, and Embodied Interaction, 1-15. https://dl.acm.org/doi/10.1145/3430524.3440644
[34] Michael J. Prince. 2017. Persons with invisible disabilities and workplace accommodation: findings from a scoping literature review. Journal of Vocational Rehabilitation, 46, 1: 75-86.
[35] Janet Rankin. 2017. Conducting analysis in institutional ethnography: Analytical work prior to commencing data collection. International Journal of Qualitative Methods 16, 1: 1609406917734484.
[36] Brian Ruff, Mandi Mzimba, Simon Hendrie and Jonathan Broomberg. 2011. Reflections on health-care reforms in South Africa. Journal of public health policy, 32, 1: S184- S192.
[37] Isaac E. Sabat, Alex P. Lindsey, Ashley Membere, Amanda Anderson, Afra Ahmad, Eden King, and Balca Bolunmez. 2014. Invisible disabilities: Unique strategies for workplace allies. Industrial and Organizational Psychology 7, 2: 259-265.
[38] Alecia M. Santuzzi, Pamela R. Waltz, Lisa M. Finkelstein and Deborah E. Rupp 2014. Invisible disabilities: Unique challenges for employees and organizations. Industrial and organizational Psychology 7, 2: 204-219.
[39] Gareth R. Schott. 2017. That Dragon, Cancer: Contemplating life and death in a medium that has frequently trivialized both. In Proceedings of the Digital Games Research Association Conference (DiGRA), 1-10.
[40] Miguel Sicart. 2019. Papers, please. How to Play Video Games 1: 149.
[41] Dorothy E. Smith . 2005. Institutional ethnography: A sociology for people. Rowman Altamira.
[42] paula S. Sterkenburg and Victorita S. Vacaru. 2018. The effectiveness of a serious game to enhance empathy for care workers for people with disabilities: a parallel randomized controlled trial. Disability and health journal 11, 4: 576-582.
[43] Humphrey Taylor. 2002. Workplace discrimination against, and jokes about, African Americans, gays, Jews, Muslims, and others. New York: Harris Interactive.
[44] Linda P. Thurston, Cindy Shuman, Jan B. Middendorf and Cassandra Johnson. 2017. Postsecondary STEM Education for Students with Disabilities: Lessons Learned from a Decade of NSF Funding. Journal of Postsecondary Education and Disability 30, 1: 49-60.
[45] Sarah S. Von, Valerie Malzer and Susanne Bruyère. 2014. Perspectives on disability disclosure: the importance of employer practices and workplace climate. Employee Responsibilities and Rights Journal 26, 4: 237-255.
[46] Gabriela Walker and Weidenbenner V. Jeni. 2019. Social and Emotional Learning in the age of virtual play: technology, empathy, and learning. Journal of Research in Innovative Teaching & Learning 12, 2: 116-132.
[47] Ossy D. E. Wulansari, Johanna Pirker, Johannes Kopf, and Christian Guetl. 2019. Video games and their correlation to empathy. In Proceedings of the International Conference on Interactive Collaborative Learning, 151–163.
[48] Nnoi A. Xaba, Mapheko D. Peu, and Salaminah S. Phiri. 2012. Perceptions of registered nurses regarding factors influencing service delivery in expanding programmes in a primary healthcare setting. Health SA Gesondheid 17, 1: 1- 12.A

A   APPENDICES

A.1   Survey Questions, Study 1.

Table A1: Survey questions of Study 1

Questions

---

1. Did any of the scenarios presented in the game resonate with your experience? Please elaborate how and why.

2. Did you see yourself as the main character while making the choices during the game? Describe why or why not.

3. What changes would you make to the game to reflect your own experience?

4. What do you want or expect from other people when disclosing your condition?

5. Is there anything you disliked about the game? What improvements do you think could be made?

6. What is the one thing you would like other people to know about living with an invisible disability?