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Is it Real? An Exploratory Case Study of Empathy in a Virtual Game

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Abstract: The purpose of this exploratory case study was to determine what characteristics in a virtual game could motivate participants to feel empathy. Participants were invited to play an allegorical educational game that was staged with fictional fantasy characters in a simulated underwater endangered environment. The study design utilized was an exploratory case study to examine the participant responses to components of the game that had the potential for promoting empathy. The participants were educators attending a virtual conference in Second Life. Data collected included a questionnaire of avatar competency and experience, an Interpersonal Reactivity Inventory survey, and open-ended narratives. Results indicated that four conditions needed to be present in participants and the environment for empathy to occur: 1) if player participants had high competence and high experience in the virtual environment, 2) if they identified strongly with their avatar, 3) if the environment was designed with high realism, and, 4) if the topics in the game were relatable.

Introduction

Learning is problematic even under the best of circumstances, but when it is mediated by technology, it can give rise to additional challenges. Digital devices mediate a substantial portion of our lives by facilitating communication, information exchange, and creative and productive sharing. During the pandemic, we depended on digital devices to mediate more aggressively for us because we could not be together in the same physical space. While it solved a lot of problems, it also brought up questions on whether it distanced us further as humans or caused feelings of isolation that complicated communication. Even the convenient video conferencing tool which allowed us to stay connected became a problematic overload of the senses and caused fatigue (Ofgang, 2021). In education, this type of technology-mediated learning brought with it new challenges in pedagogy because the online environment was not the same as the face-to-face environment. A type of social-emotional distance became apparent in virtual classrooms, where positive relationships, social awareness, and even the ability to feel empathy were somehow diminished.

Yet, web-based communication and learning have not been the only alternatives over the last twenty years. Virtual environments and virtual reality have also been drawing attention not just from the gaming and entertainment industry, but also from other professions that seek more immersive and interactive experiences, either for learning, interaction, or as an alternative to the video conferencing tool (Tuzun, Bilgic, and Elci, 2019). Because many of these virtual environments are avatar based, there is a whole line of research that explores the avatar as an extension of the self (Hofer, Husser, and Prabhu, 2017; McCreery et al, 2013). A virtual learning environment was worth exploring in order to determine how the interplay between the avatar and the virtual environment may shrink the social emotional distance. This opportunity, staged in a virtual game, provided a close-up lens on empathy, which is essential for making connections, collaborating, and engaging with others, both personally and professionally.

Literature Review

When examining the literature on empathy and virtual environments, several constructs appear to be intertwined. The first is presence, or the feeling of being there and identifying with an avatar. The second is immersion, which explores how a virtual environment can make you feel more involved and present to the point where engagement and attention are heightened. The third is empathy, which examines the emotional connection and perspective-taking of the avatar toward others in simulated situations. Indeed, Xu, Kang, and Yan, (2021) suggested that these elements of virtual environments overlap due to their 'genuineness, authenticity, ownership and

being real.’ (p. 105). Combination studies that examine all three have found that participants who experience high levels of presence are more likely to feel empathy, and as a result, become immersed in the experience (Shin, 2017).

Immersion engages the senses through stimuli in virtual environments, such as the extent to which a sense of reality is conveyed to, and believed by, the participant (Coban and Kayserili, 2021). Studies on immersion establish key components, such as an overlap of presence, which create higher motivation and engagement in tasks (Huang et al., 2020). This heightened motivation and engagement also has been found to be ideal in immersive virtual environments, in particular with more pronounced presence (Janssen, Tummel, Richert, and Isenhardt, 2016). Others suggest that the realistic components of the environment and social interactions create a greater immersion (Lomanowska and Guitton, 2014). While these studies do not directly look at how immersion may affect empathy, they do touch upon the affective elements of virtual experiences and how avatars connect to each other through experience or motivation. This development of self suggests conditions that can also produce perspective taking, especially as far as they can potentially remove the figurative line between reality and participants (Shin and Biocca, 2018). Other studies do look at the interaction of empathy with immersion. Barbot and Kaufman (2020) investigated empathy as perspective taking, and they determined that with heightened immersion and avatar autonomy, it is possible to empathize, though they were unable to determine if immersion causes empathy or vice versa.

In some instances, the length and relationship to an avatar may increase the sense of presence for those immersed in virtual environments (McCreery et al., 2013). In many cases, presence studies begin shortly after the virtual world of Second Life® opened its virtual doors in 2003. It changed the conditions of experiences for learning and social interaction with the introduction of three dimensional, highly customizable avatars and user-created experiences and environments. The capabilities of customization have extended the potential for feeling ‘present’. In turn, it has been examined and found to have reciprocal elements between presence felt by the avatar and the context and experience in the virtual environment by the participant. In another study, empathy in a virtual simulation indicated that teachers demonstrate empathic joy more often than empathic stress (Garcia-Perez, Santos-Delgado, and Buzon-Garcia, 2016). A study that looked specifically at perspective-taking aspects of empathy found that virtual immersion created greater positive attitudes that lead to positive action (Herrera et al., 2018). A mixed reality game also demonstrated that visceral experiences heightened empathy through perspective taking (Kors et al., 2021), and Barbot and Kaufman (2020) indicated that virtual environments can encourage taking other’s perspectives to understand their circumstances better.

There is still a tremendous gap in the literature that reviews empathy in virtual environments. The intervention used in this study proposed to capitalize on the psychological effects possible in virtual environments, through a virtual game that appealed to adult professionals and lifelong learners: one that allegorically presented environmental issues.

The Study

The Exploratory Case: A Virtual Allegorical Game

To determine to what extent empathy was displayed by an individual using an avatar in a virtual environment, the game, ‘The Queen’s Heroes in the Five Kingdoms’ was set up as part of the background activities for a virtual conference. The allegorical game was set in a virtual underwater area in the virtual environment of Second Life®. The game was staged as an immersive experience in a virtual conference to attract adult educators and those experienced in navigation and communicating in this environment through an avatar. The game contained a story of five queens attempting to save their kingdom, and it featured various environmental issues related to oceans. It was an educational game, intended to determine if it would bring awareness to the environmental crisis in our oceans. The game began with a call to action in which heroes were needed to save the five kingdoms from human-made destruction. The game utilized a heads-up display (HUD), which was attached to the computer screen as the ‘game board’. The attached HUD kept the progress of the participants’ exploration through the five kingdoms, and the found items that revealed different underwater ecological crises.

The five locations in the game constituted five chapters of the allegorical game, which focused on different aspects of underwater ecology, including coral reef bleaching; endangered mangroves with limited capacity to turn carbon dioxide into oxygen; the threat to the abyssal water column due to exploration and mining; ocean acidification which endangers clam exoskeletons; and ocean warming endangering the kelp forests. Using an allegorical narrative structure, the five environmental crises were personified by five queens protecting their home and their ‘children’. Figure 1 illustrates the five queens in the game. This narrative with its not-so-hidden moral

dilemma intended to humanize and personalize the issue by giving each of the five queens a narrative voice from which to appeal to the participants. They were set up as non-player characters (NPCs) with pre-recorded messages and text transcript. This personalization was set to determine if participants as heroes could empathize with game characters in a narrative setting, and by extension, the environmental crises described.



Figure 1: The five NPC queens in the allegorical game.

Methods

This qualitative case study was exploratory in nature, to determine what aspects of the game and avatar experience had the capacity to incite empathy in player participants. Yin (2009) described an exploratory case study as one that investigated the unknowns of a case. Empathy in games designed to be educational is an unexplored area in the literature. This study was small and took a snapshot of the participants and their engagement with the game, with the intention of learning what mattered the most for staging games for empathy at a larger scale, with students.

This study described each individual player as an avatar, as well as elements of the game that connected them empathetically to the situation. The expectation was that the participant experience of playing the game would provide an explanation of how the game produced empathy, potentially with the influence of presence and immersion. As a result, the following two research questions guided this research:

- What avatar characteristics provide a predisposition toward feeling empathy in a virtual game?
- What conditions in game design could provide a catalyst for empathy in avatars?

Data Collection and the Chain of Evidence

Participants invited to participate in the study were adults with Second Life accounts who had experience navigating the virtual world of Second Life. They all identified as educators, though they did not indicate in what context. When the game launched, thirty-two individuals played the game, but seven consented to participate in the study: two men and five women. Of the seven that gave consent, only six completed all activities in the study and were, therefore, included in the study. While participants engaged with the game in the virtual environment, web-based links launched from clickable items in-world, so that participants could give consent. My university's Institutional Review Board approved the research to utilize Qualtrics, a survey and research tool, as the consent and instrument launch application. As a result, all gathered data were asynchronous, using the following instruments:

- **Survey of Avatar Experience:** This brief questionnaire asked participants to describe their experience in Second Life, as well as their connection to their avatar. This was a way to determine if participants were predisposed toward feeling presence in the virtual environment, and thereby be more inclined to feel empathy.
- **Interpersonal Reactivity Index (IRI):** The second instrument participants completed was the Interpersonal Reactivity Index (IRI), validated by Davis (1980a; 1983b). This survey provided items that measured four distinct types of situational empathy: perspective taking, fantasy, empathic concern, and personal distress. The validated instrument consisted of twenty-eight items, but for this study, it was abbreviated to twenty items to better fit the game environment.
- **Personal Participatory Diary:** This diary was an open-ended narrative where each participant could write their emotional impressions of the game and reactions to the virtual environment. The idea was that their open-ended narratives would provide further confirmation of what the survey and the IRI revealed.

Data were collected and analyzed through a chain of evidence that established validity and reliability. First, construct validity was established through the multiple sources of evidence that were utilized to triangulate the findings. In the chain of evidence outlined in Figure 2, the multiple data collection efforts occurred in a sequence. The second part of the chain of evidence followed data analysis methods by tracing how the data were derived from research as far as they answered the research questions and led to conclusions (Yin, 2009). This is a way to establish reliability in the evidence, so that it had potential replicability (Ferreira and Almeida, 2020).

Figure 2: Exploratory Case Study Chain of Evidence for Data Collection and Analysis

Findings

The findings of this study were descriptive layers of the avatar players and the game environment. As a result, each data set was analyzed separately, and then triangulated. Below is a breakdown of this process.

Second Life Proficiency and the Avatar Experience

In the analysis of the first instrument, Survey of Avatar Experience, the avatar competence and experience were determined through the number of skills and level of proficiency the participant reported, including how they felt about their avatar. These were taken descriptively, even if participants selected from scaled responses. The six skills participants rated were communication, teleporting, movement, object interaction, HUD attachment, and HUD use, as indicated in Figure 3. The numerical values on the left of the chart designate the following: five is Extremely Competent, four is Somewhat Competent, and three is Neither Competent nor Incompetent.

The avatar profiles were meant to determine how proficient and experienced player participants were in the virtual environment of Second Life. This is a vital component of studies that engage individuals in this environment because it is often described as having a high learning curve. The avatar's experience can color the way they interact with the game and the virtual situations with the NPCs, as higher stress over difficulties in the environment can also diminish the ability to immerse in the environment (Chen, 2018).

Figure 3: Second Life Experience and Proficiency

Figure 3 shows that competency in using Second Life was higher when the player participant had more experience using the virtual environment, rating themselves extremely competent in all skills. The less consistent experience the less competent they rated themselves.

Additionally, participant players also indicated in this same questionnaire to what extent they identified with their avatar through comfort and representation of self, as indicated in Figure 4.

Figure 4: Avatar Identity

Most participants seemed to also identify very strongly with their avatar. In this case, even some of the less experienced felt comfortable with their avatars. However, it is important to note that none of the participants were novices. The minor variations in the way they identified with their avatars seemed to be due to other factors not recorded here, such as sustained experience and interaction. What does matter is that this demonstrated that they were predisposed to feel presence in the virtual environment, and as a result feel immersed. These conditions are important for feeling empathy because they already have a sense of being present as an individual in the environment. Experience counted toward a predisposition to empathy.

Interpersonal Reactivity Index (IRI)

The IRI analysis was conducted by first determining the measures of central tendency for each of the four

types of empathy. Table 1 describes the IRI scales. The numerical scale was intended to determine to what extent each participant felt the four types of empathy: perspective taking, fantasy, empathic concern, and personal distress.

Numerical Scale	Descriptive Scale
0	Does not describe me
1	Describes me slightly well
2	Describes me moderately well
3	Describes me very well
4	Describes me extremely well

Table 1: Interpersonal Reactivity Inventory Scale

The results of the IRI, summarized in Table 2, used the mean of each type of empathy rated. Generally, those that measured a mean of 3 or 4 were considered to demonstrate high levels of empathy, while those at the mid-range, or at 2, showed moderate empathy. Any rating mean below either demonstrated incidental to no true empathy. By looking at the means of each type of empathy, the types of empathy most commonly felt by the player participants became clear. All participants rated perspective taking the highest of all categories even though only three demonstrated it at high levels. A critical aspect of the ability to feel empathy was being able to take on the perspectives of others and adopt their views. Therefore, perspective taking was one of the most significant empathy markers in this study. Felhofer et al. (2013) also utilized the IRI instrument in their study, and they also found perspective taking to be one of the more predominant types of empathy in their virtual environment study.

N	Perspective Taking Mean	Fantasy Mean	Empathic Concern Mean	Personal Distress Mean
1	3.4	2.2	2.4	0.6
2	3	2.8	2.8	1
3	2.6	2	2.6	1
4	1.6	0.8	2	1
5	2.4	2.2	2	1
6	0.6	0.4	1	1.8

Table 2: Ratings from the Interpersonal Reactivity Index survey

The next type of empathy that player participants rated moderately to very well was empathic concern. The idea of sympathy is not the same as empathy, but in empathic concern, it is a combination of both, where the individual can orient their own feelings toward sympathy and concern for those who may be more unfortunate. Taken together with the ratings on fantasy empathy, where most player participants also felt moderate empathy, this seems to suggest that they did feel marginal empathy for others, such as the NPCs in the game, although not at strong levels. Fantasy empathy was the ability to identify with fictional characters, and to feel what the characters were feeling. This did not seem to suggest that the characters were relatable or real enough to them to feel fantasy empathy or even personal distress.

Personal Participation Journal Narrative

The narratives from the Personal Participation Diary were analyzed using the categorization of common themes from responses. In this case, the narratives were reviewed to determine what thematic pattern might emerge in the words and phrases the player participants chose to use to describe their experiences with the game. Certain key ideas would suggest some level of empathy, and so phrasing where player participants focused on affective elements were more closely mined in the data. However, what became clear was that participants were not always willing to demonstrate affect, but they were willing to talk about the environment, and the staging of the game itself. As a result, the themed categories that emerged included the following: affective connection to characters, affective

connection to virtual environment, connection to environmental topic, and game mechanics. Table 3 collected quotes from the player participants, organized around the four themed categories.

Themed Categories	Player Participant Quotes
Affective Connection to Characters	<p>“I totally identified with the plight of the characters.”</p> <p>“The game has just begun so I'm not sure I'm entirely emotionally invested or anything, but I can certainly relate to Queen Coral's dilemma.”</p>
Affective Connection to Virtual Environment	<p>“I feel sad whenever I think of these types of problems and that we don't do anything to fix them.”</p> <p>“The destruction of the coral reefs is heartbreaking, and so unnecessary.”</p> <p>“I loved the setting of this story, under the sea was so beautiful!”</p> <p>“I love the ocean as I live within walking distance of a marine sanctuary.... My avatar is a mermaid as I play because I love being under the water and being able to interact with a beautiful under the ocean location.”</p>
Connection to Environmental Topic	<p>“The challenges of dealing with refuge [sic] is a particularly dear topic to me.”</p> <p>“I try to live my life in ecologically sound ways.”</p> <p>“The content is something that is very important to me as an environmentalist. What a powerful way to teach important information!”</p> <p>“I'm also aware of the problem of plastic particles getting into the bodies of fish and I am sickened by this reality.”</p> <p>“The first chapter's problem: a dying environment, concerns everyone. In this case the message was preaching to the choir.”</p>
Game Mechanics	<p>“The HUD and notecard with directions was direct and very helpful!”</p> <p>“not much reaction other than that I had some difficulty identifying the path.”</p>

Table 3: Quotes from Player Participants Organized into Themed Categories

Of the four themed categories that emerged, two stood out the most: those related to connections to the environment created in the virtual environment. The virtual setting of the game seemed to cause those connections, but playing the game may not have been as significant. Indeed, five out of the six participants mentioned connections to the environmental topic, but only two mentioned affective connections to the characters and to the virtual environment, though not the same two. This also indicated that while the virtual game may have reminded them of their connection to the environmental topic, the characters themselves were not the direct influencers of empathetic feelings. It was their prior experience with the topic that the environment described.

Discussion of Exploratory Research Questions

The findings in this exploratory study demonstrated some promising directions, which can best be described in context of the research questions originally identified in this study. What follows is a response to each question.

What Avatar Characteristics Provide a Predisposition Toward Feeling Empathy in a Virtual Game?

Overall, this question can best be answered in two ways. First, high competency in the environment was connected to high experience were vital avatar characteristics in a predisposition toward feeling empathy. In this case, the longevity indicated participants were easily immersed in environments that produced high realism. McCreery, Schrader, Krach, and Boone (2013) came to a similar conclusion in their study where they determined that presence was influenced by the relationship the participants already had with their avatars. Second, how strongly player participants identified with and felt comfortable with their avatar demonstrated a propensity toward feeling presence in the virtual environment. This was a second characteristic of avatars more likely to feel empathy. Presence created connections to virtual environments and virtual individuals, and feeling empathy was a way of understanding and demonstrating connections, such as in the results of the IRI where participants showed high perspective taking. This is much like what Barbot and Kaufman (2020) found in their study that ‘the illusion of virtual body ownership (IVBO)’ was a strong indicator of empathy in participants.

What Conditions in Game Design Could Provide a Catalyst for Empathy in Avatars?

The conditions that appeared to be catalysts for empathy in avatars were the environmental high realism and the relatable topics. Kors et al. (2021) and Gillespie et al (2021) found similar situations where simulations created strong connections for the topic or issue, as well as realism as the catalyst for empathy. The gameplay was a reminder, but it was not necessarily the main catalyst. In this study, the participants exhibited some empathy, though it seemed to be more connected to the amount of experience in the environment, as well as their prior connection or feelings toward the environmental topic. Shin (2017) likewise found that predispositions to empathy were predictors of immersion and presence, provided the individual could contextualize the environment to the avatar. As such, the game provided visual stimulus for reminding the participants of the issues related to environmental crisis, but the environment seemed to have taken greater significance than the fictional queens who were personifying the problem.

Conclusions and Limitations of the Exploratory Research

Exploratory studies do have limitations, but they also point to promising directions. While various gathered data confirmed the results, what they could not do is determine how the results would be different if the participants came with much more varied levels of experience and connection to their avatar. Could the realistic environment wholly have been responsible for creating empathy if some participants were novices to Second Life? Second Life has a documented trail of evidence and literature regarding its learning curve (Chen, 2018). Given this limitation, how would novices to the environment have responded to difficulties? Could they focus on empathy given these complications? This is not a question that can be answered here, but it is a direction that this exploratory research revealed.

Virtual games have the potential for taking an individual into a simulated place, and this game connected most participants to their prior knowledge of environmental problems. However, this study also demonstrated that experienced avatars bring their own prior connections to the gameplay, so the two cannot be easily separated. What seemed to be lacking was the realism of the NPCs, which garnered the least empathy, even though the situation was connected allegorically to them. The immersion in the environment did not fully require connection to characters, just connection to reality. This study demonstrated that some aspects of empathy are tied to immersion in the virtual

environment, so that there is promise in using virtual games with vivid, three-dimensional environments to encourage participants' feelings of being there and feeling empathetic (Beckem, 2012; Herrera et al., 2018).

The game's non-player characters, however, did not seem to play a significant role in feelings of empathy exhibited. Rogers (2011) also found that programmed non-player characters were not as valuable as the realism of the environment. However, was this due to the vast experience of the participants? Would novices in the virtual environment been more predisposed to feelings of empathy if more relatable non-player characters populated the game? This study suggested that experienced avatars only need a realistic and vivid design of the virtual environment, especially since they already brought with them a sense of presence. Further exploration of novice players may reveal otherwise. Would empathy markers and narratives have been more focused on the NPC's if they were more relatable and realistic, rather than fantastical in nature? Clearly, this study does raise more questions, but that is the nature of exploratory research. To ignore these questions is to blind ourselves to future possibilities.

Ultimately, the expression of empathy is a critical aspect of diminishing social emotional distance between individuals because it makes us much more proficient at most professions in our socially connected world. It is also a vital component of being human, of being able to express compassion and develop values that are aligned to highly social professions, like education. Rather than allowing technology to mediate just what we do and not what we feel, we must look to innovative approaches that place empathy at the forefront, not in the background. Using virtual environments as a means to strengthen empathy may provide opportunities for immersing the individual into a highly realistic situation and physically seeing a manifest version of themselves as an avatar. With a strong presence, the avatar can be a powerful extension of the self and can enable the individual to project empathy even in simulated situations.

We may ask, is this real? If the emotion is real, the connections are real, and the responses are real, then it is real enough.

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