Game Over, Trauma! Empowering Trauma Healing Through Gaming

Giulio Ammannato[1(✉)] and Francesca Chiesi[2]

[1] Istituto dell'Approccio Centrato Sulla Persona, IACP Roma, P.zza Vittorio Emanuele II, 99, 00185 Roma, RM, Italy
giulio.ammannato@iacpedu.org

[2] NEUROFARBA Department, University of Florence, Via di S. Salvi, 12, 50135 Firenze, FI, Italy

Abstract. The purpose of this paper is to propose the development of a serious game centered on psychological trauma that promotes awareness, informs about best treatment practices, instills hope, and provides basic tools to cope with possible symptoms related to trauma. The game will be designed using the Person Centered Approach (PCA) and the five pillars of Trauma Informed Care (TIC) as the theoretical framework. The study will use a mixed-methods pre-post design to evaluate the effectiveness of the game in increasing awareness of psychological trauma and improving players' sense of security. The game is expected to improve player awareness of psychological trauma, to increase their sense of security, and to encourage them to seek professional help when needed. Overall, this study has the potential to contribute to the development of effective interventions for psychological trauma using serious games.

Keywords: Psychological Trauma · Serious Games · Trauma Informed Care

1 Introduction

The aim of the current paper is to describe a project on the development of a serious game focused on psychological trauma, with the objectives of increasing awareness, educating on best treatment practices, providing coping tools, and fostering hope for those who lived this adverse experience. To achieve these goals, the game will be designed using the principles of the Person-Centered Approach (PCA) and the Trauma Informed Care (TIC). All these issues are detailed in the following paragraphs, as a premise to illustrate our serious game for trauma.

1.1 Video Games

Video games have become one of the most popular forms of entertainment worldwide, with a growing number of gamers playing on various platforms such as mobile devices, PCs, consoles, and handheld devices. According to a report by Newzoo, the number of gamers worldwide is estimated to reach 3.3 billion in 2023, up from 2.7 billion in 2020

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(Newzoo, 2021). Regarding gender distribution, there has been a shift towards a more equal distribution of male and female gamers. In 2020, the split was 54% male and 46% female, according to a study by Statista (Statista, 2021a). However, this varies by region and platform. For instance, in Asia, there are more female gamers than male gamers (Newzoo, 2021). The age range of gamers is also quite diverse. According to the same Statista study, the majority of gamers are between the ages of 18 and 34, representing 38% of the global gaming population in 2020. Nevertheless, there is a considerable number of gamers over the age of 35, with the 35–44 age group representing 26% of the gaming population (Statista, 2021b).

The increasing popularity of video games and their diverse player demographics have caught the attention of the scientific community, resulting in a growing body of research examining the impact of video games on individuals and society.

1.1.1 Serious Games

Serious games, also known as educational or instructional games, are games with a different purpose of pure entertainment and have gained increasing attention as a means of promoting learning in various domains. These games are designed with the primary goal of imparting knowledge and skills in an engaging and interactive manner. In recent years, the popularity of serious games has grown due to their potential benefits, which have been studied and documented in academic research.

One of the main advantages of serious games is their ability to enhance learning outcomes (Wouters, Van Nimwegen, Van Oostendorp & Van Der Spek, 2013). Research suggests that serious games can improve learners' knowledge acquisition, retention, and transfer, as well as their problem-solving skills and decision-making abilities. For instance, a study by DeSmet and colleagues found that students who played a serious game on physics concepts performed better on a post-test compared to those who received traditional instruction (DeSmet, Van Ryckeghem, Compernolle, Baranowski, Thompson, Crombez,… & De Bourdeaudhuij, 2014).

Another benefit of serious games is their ability to increase motivation and engagement among learners. Serious games are designed to be fun and challenging, and they offer immediate feedback and rewards to keep players engaged. This can lead to higher levels of motivation, which can improve learning outcomes. A study by Kiili and colleagues found that students who played a serious game on environmental issues reported higher levels of motivation and interest in the topic compared to those who received traditional instruction (Kiili, De Freitas, Arnab & Lainema, 2012).

Serious games also offer a safe and low-risk environment for learners to practice and experiment with new skills and knowledge. They provide opportunities for learners to make mistakes and learn from them without facing real-world consequences. This can lead to increased confidence and competence, which can transfer to real-world settings. For instance, a study by Michael and Chen found that surgical residents who played a serious game on laparoscopic surgery showed improved performance in real-life surgery tasks (Michael & Chen, 2005).

In addition to these benefits, serious games can also be used to promote social and cultural awareness, as well as to support behavioral change. Thus, serious games have been used to promote healthy behaviors, such as physical activity and healthy eating, as

well as to raise awareness about social issues, such as poverty and inequality. For instance, a study found that children who played a serious game on healthy eating and physical activity showed improvements in their knowledge, attitudes, and behaviors related to healthy eating (Baranowski, Baranowski, Thompson, Buday, Jago, Griffith,… & Watson, 2011).

Finally, video games show promising potential in enhancing health outcomes, specifically in the domains of psychological therapy and physical therapy (Eichenberg & Schott, 2017; Primack, Carroll, McNamara, Klem, King, Rich, & Nayak, 2012). For example, a meta-analysis of 9 studies found that serious games were effective in reducing symptoms of PTSD, depression, and ADHD (Lau, Smit, Fleming & Riper, 2017). These findings suggest that serious games have the potential to be effective tools for improving mental health and well-being in various populations.

1.2 Psychological Trauma

Psychological trauma is a significant public health issue that affects individuals across the lifespan. It can result from exposure to a variety of adverse experiences, such as abuse, neglect, violence, and disasters. The impact of psychological trauma on individuals can be severe, resulting in symptoms like anxiety, depression, post-traumatic stress disorder (PTSD), and other mental health disorders (Breslau, Davis, Andreski & Peterson, 1991; Kessler, Sonnega, Bromet, Hughes & Nelson, 1995).

Prevalence studies have indicated that a significant proportion of the general population has experienced some form of psychological trauma. For instance, a nationally representative survey conducted in the United States found that approximately 60% of men and 51% of women reported experiencing at least one traumatic event in their lifetime (Kessler et al., 1995). Similarly, a study conducted in the Netherlands found that 71.1% of adults had experienced at least one traumatic event in their lifetime (Knipscheer, Sleijpen, Frank, de Graaf, Kleber, Ten Have & Dückers, 2020). These findings suggest that psychological trauma is a prevalent issue that affects a significant proportion of the population.

Despite the prevalence of psychological trauma, many individuals are not aware of its effects, nor do they have access to tools to help manage their symptoms. This lack of awareness and resources can result in individuals not seeking treatment, which can lead to long-term negative consequences for their mental health and well-being (Bryant et al., 1998; McLean, Clauw, Abelson & Liberzon, 2005).

Therefore, there is a need for effective interventions that can promote awareness and provide tools to help individuals manage their symptoms related to psychological trauma. While traditional therapy approaches, such as cognitive-behavioral therapy, Eye Movement Desensitization and Reprocessing (Lewis, Roberts, Andrew, Starling & Bisson, 2020), and Person Centered Therapy (Joseph, 2015), have been shown to be effective in treating psychological trauma, access to these treatments can be limited by various factors, such as stigma, cost, and geographic location.

1.3 Person Centered Approach

The Person-Centered Approach (PCA), also known as Client-Centered Therapy, is a humanistic psychological theory developed by Carl Rogers in the 1950s. It is grounded in the belief that individuals possess the capacity for self-regulation, self-actualization, and self-awareness and hence the role of the therapist is to facilitate this process through an empathic and non-judgmental relationship. The PCA is characterized by three interrelated theoretical pillars: the person-centered theory of personality, the therapeutic conditions necessary for change, and the process of change.

The first pillar of the PCA is the person-centered theory of personality. This theory posits that each individual has an innate tendency toward growth and self-actualization, a concept derived from Maslow's hierarchy of needs (Maslow, 1943). According to Rogers (1951), individuals are always striving to become their best selves, and they do so by developing an accurate and positive self-concept. The self-concept is the set of beliefs and attitudes an individual has about themselves, including their values, abilities, and personality traits. Rogers argued that when an individual's self-concept is congruent with their actual experience, they experience a state of congruence or psychological health. Conversely, incongruence between the self-concept and actual experience leads to psychological distress and maladjustment.

The second pillar of the PCA is the therapeutic conditions necessary for change. Rogers (1957) identified three core conditions that must be present in the relationship for therapeutic change to occur: empathy, unconditional positive regard, and congruence. Empathy involves the therapist's ability to understand the client's subjective experience and communicate this understanding to the client. Unconditional positive regard refers to the therapist's acceptance and non-judgmental attitude toward the client, regardless of the client's emotions or beliefs. Congruence refers to the therapist's ability to feel his own inner world and the authenticity and genuineness in the therapeutic relationship. These conditions create an environment in which the client feels safe and supported, enabling them to explore their experiences and emotions more deeply and facilitating personal growth and change.

The third pillar of the PCA is the process of change. According to Rogers (1957), therapeutic change occurs when the therapist provides a facilitating environment that allows the client to develop a more accurate and positive self-concept. This process involves the client becoming more aware of their experiences and emotions, accepting and integrating previously denied or disowned aspects of the self, and developing greater self-trust and autonomy. The therapist facilitates this process by providing a non-judgmental, empathic, and accepting environment in which the client can explore and express their feelings and experiences.

Overall, the Person-Centered Approach is a humanistic psychological theory that emphasizes the innate capacity for growth and self-actualization in individuals. It posits that therapeutic change occurs when the therapist provides a facilitating environment characterized by empathy, unconditional positive regard, and congruence. This process leads to greater self-awareness, self-acceptance, and personal growth.

1.4 Trauma-Informed Care

Trauma-informed care (TIC) is an approach to healthcare that recognizes and responds to the pervasive impact of traumatic experiences on individuals' physical, emotional, and psychological health (SAMHSA, 2014). TIC emphasizes the need for healthcare providers to have a comprehensive understanding of trauma and its effects on individuals, families, and communities (Ford & Courtois, 2014). The theoretical pillars of TIC best practices include the neurobiology of trauma, the prevalence and impact of trauma, the principles of safety, trustworthiness, collaboration, choice, and empowerment, and the importance of cultural humility (Harris & Fallot, 2001).

The neurobiology of trauma refers to the changes that occur in the brain as a result of exposure to trauma (Ford & Courtois, 2014). Trauma can result in alterations in the structure and function of the brain, particularly in areas responsible for regulating emotions, cognition, and stress responses (Ford & Courtois, 2014). This can lead to a range of symptoms, including anxiety, depression, hyperarousal, and hypervigilance.

The prevalence and impact of trauma are significant factors in the development of TIC best practices. Trauma is a pervasive issue that affects individuals from all walks of life, with estimates suggesting that up to 70% of adults in the United States have experienced some form of trauma (Felitti, Anda, Nordenberg, Williamson, Spitz, Edwards & Marks, J. S. 1998). Trauma can have long-lasting and wide-ranging effects on physical, emotional, and psychological health, and can increase the risk of developing chronic health conditions (Ford & Courtois, 2014).

The principles of safety, trustworthiness, collaboration, choice, and empowerment are essential components of TIC best practices. Safety refers to creating an environment in which trauma survivors feel physically and emotionally secure. Trustworthiness involves building relationships with patients based on honesty, transparency, and consistency. Collaboration involves working with patients to develop treatment plans that are tailored to their unique needs and goals. Choice and empowerment refer to giving patients a sense of control over their healthcare decisions and supporting their autonomy (SAMHSA, 2014).

Cultural humility is also a critical pillar of TIC best practices (Ranjbar, Erb, Mohammad & Moreno, 2020). This involves acknowledging and respecting the diverse cultural backgrounds, beliefs, and experiences of patients and recognizing the impact of culture on their health and wellbeing (ibid.). Healthcare providers who practice cultural humility strive to be self-aware, open-minded, and respectful in their interactions with patients from different cultural backgrounds (ibid.).

In conclusion, the theoretical pillars of TIC best practices are grounded in a comprehensive understanding of the neurobiology of trauma, the prevalence and impact of trauma, the principles of safety, trustworthiness, collaboration, choice, and empowerment, and the importance of cultural humility. By integrating these pillars into their practice, healthcare providers can create an environment that promotes healing, recovery, and resilience for trauma survivors.

2 Developing a Serious Game for Trauma

To offer an accessible, engaging and interactive way of delivering information and promoting awareness while also providing tools for symptom management, the present project aims to develop a serious game focused on psychological trauma.

The primary objective of the game would be to provide an accessible and effective intervention for individuals affected by psychological trauma. The game is not intended to replace traditional therapy, but rather, to offer a safe space where individuals can become aware of possible traumatic experiences and work on personal safety, a fundamental aspect of treating this disorder. By doing so, the game aims to facilitate the contact between users and expert therapists, if necessary.

Overall, this project seeks to address the lack of awareness and resources for managing symptoms related to psychological trauma, with the aim of promoting greater well-being and improving the lives of those affected by this issue. To achieve this goal, the game will be designed using the Person Centered Approach (PCA) and the pillars of Trauma Informed Care (TIC) as a theoretical framework.

2.1 PCA in a Serious Game

The integration of the pillars of the Person-Centered Approach into the design of a trauma-focused video game has the potential to offer a profound means for individuals to explore and process their emotions and experiences related to trauma. By applying these principles, the game can create a supportive and empowering environment for players.

Drawing upon the Person-Centered Theory of Personality, the game can provide players with the opportunity to create a character that embodies their own identity and lived experiences. As players navigate through the game, they will encounter various environments and interact with diverse characters, each representing different facets of their self-concept. By engaging with these elements, players are encouraged to reflect upon their beliefs and attitudes about themselves, gaining insights into how these beliefs may have been shaped by their past traumas.

The principles of empathy, unconditional positive regard, and congruence can be particularly useful in the design a game about trauma.

Empathy could be incorporated in a serious games by creating realistic and relatable scenarios that simulate the emotional experiences of individuals who have suffered psychological trauma. This can help players develop greater empathy and understanding for individuals who have experienced traumatic events and promote greater emotional awareness and regulation.

Unconditional positive regard could be applied by providing players with a safe and non-judgmental environment to explore and process their emotions. This can involve creating a game that allows players to express themselves in a variety of ways, such as through creative writing, art, or music, without fear of criticism or rejection.

Congruence could be achieved by designing games that promote self-reflection and self-awareness. For example, a game could prompt players to reflect on their own emotions and experiences and provide feedback that encourages them to be more honest and authentic with themselves.

Finally, the game can facilitate the process of change by promoting self-awareness and fostering self-trust and autonomy. Through incorporating activities like journaling or meditation, players are prompted to reflect upon and better understand their trauma-related emotions. The game can also present players with meaningful choices that directly impact the progression and outcomes of the game, allowing them to exercise personal agency and make decisions aligned with their individual needs and preferences.

Incorporating these Person-Centered Approach principles into a serious game has the potential to provide individuals with a safe and supportive environment for exploring and processing their emotions. By promoting empathy, unconditional positive regard, and congruence, these games can help individuals develop greater emotional regulation skills, enhance their coping strategies, and facilitate their healing process.

2.1.1 Existing Games and PCA

While specific games may not explicitly identify themselves as utilizing the Person-Centered Approach (PCA), the principles and values of the PCA can be effectively integrated into the design of serious games, thereby creating experiences that prioritize player agency, personalization, and emotional engagement. Several noteworthy examples of games that embody the spirit of the PCA exist. Below some examples.

The "That Dragon, Cancer" provides players with a deeply emotional narrative that delves into the personal experience of developers Ryan and Amy Green as they navigate their son's battle with cancer. By immersing players in this heartfelt story, the game encourages empathy, reflection, and a greater understanding of the profound impact of illness on individuals and their families.

The "Journey" places emphasis on connection, exploration, and self-discovery. It presents players with a serene and contemplative environment where they embark on a metaphorical journey and encounter other players along the way. By promoting non-verbal communication and cooperation, the game fosters a sense of empathy, shared experiences, and emotional connection.

With its visually stunning design, the "Gris" focuses on the emotional journey of a young girl coping with grief. Through its evocative art style and atmospheric storytelling, it explores themes of resilience, personal growth, and the process of healing. By providing a safe and supportive space for emotional exploration, this game aligns with the principles of the PCA.

2.2 TIC in a Serious Game

One way to incorporate the neurobiology of trauma into a serious game for trauma would be to include educational modules that explain the effects of trauma on the brain and body. These modules could be presented in an interactive and engaging way, such as through mini-games, videos, or quizzes. By providing players with a better understanding of the neurobiology of trauma, the game could help them develop greater self-awareness and emotional regulation skills.

The principles of safety, trustworthiness, collaboration, choice, and empowerment can also be integrated into a serious game for trauma. For example, the game could be designed to provide a safe and supportive environment for trauma survivors to explore

and address their experiences. This could be accomplished by including features such as trigger warnings, personalized avatars, and access to supportive resources.

Collaboration and choice could be encouraged by allowing players to make decisions that affect the game's outcome and by providing opportunities for players to collaborate with other players or with virtual characters. Empowerment could be promoted by providing players with a sense of control over their virtual environment and by allowing them to track their progress and achievements.

Finally, cultural humility could be integrated into a serious game for trauma by acknowledging and respecting the diverse cultural backgrounds and experiences of trauma survivors. This could be accomplished by providing players with options to customize their avatar and by including culturally responsive content that is sensitive to the unique experiences of different communities.

2.2.1 Existing Games and TIC

As with PCA, there are currently no specific games that explicitly label themselves as using Trauma-Informed Care (TIC) principles. However, the concepts and values of TIC can be applied in the design of serious games to create experiences that align with trauma-informed approaches. By incorporating elements such as safety, trustworthiness, choice, collaboration, and empowerment, serious games can provide a supportive and healing environment for individuals affected by trauma. While there may not be direct examples of games explicitly implementing TIC, several games demonstrate elements of trauma-informed approaches in their design and content:

"Hellblade: Senua's Sacrifice": This game follows the journey of a Celtic warrior, Senua, as she battles both physical and psychological trauma. It sensitively explores themes of mental health and trauma through its narrative and gameplay. The game incorporates audio and visual techniques to depict Senua's experiences with hallucinations, delusions, and emotional turmoil, aiming to foster empathy and understanding of her psychological challenges.

"Celeste": While not directly focused on trauma, this platforming game explores themes of mental health and personal growth. The protagonist, Madeline, embarks on a treacherous journey to climb a mountain, symbolizing her own internal struggles. The game tackles topics such as anxiety, self-doubt, and resilience, offering players an opportunity to reflect on their own experiences and find inspiration for overcoming obstacles.

"Life is Strange": This episodic adventure game addresses sensitive topics, including trauma, mental health, and the consequences of choices. The game revolves around Max Caulfield, a student who discovers she can rewind time. As she navigates the story, Max encounters characters with various traumatic experiences, and the player's choices can influence the characters' well-being and growth.

While these games may not explicitly adhere to the full spectrum of TIC principles, they incorporate elements that align with trauma-informed approaches. They emphasize empathy, understanding, and exploration of personal challenges, inviting players to engage with characters and themes related to trauma and mental health.

2.3 Serious Games for Trauma and XR Techonologies

The utilization of extended reality (XR) technologies, particularly virtual reality (VR), can significantly enhance the efficacy of the proposed serious game for trauma. VR has demonstrated its effectiveness in treating PTSD through various applications, and its integration into the game can offer unique advantages over traditional VR simulations.

One example of the successful application of VR for treating PTSD is the exposure therapy approach. VR-based exposure therapy allows individuals to confront their traumatic experiences in a controlled and immersive virtual environment. By recreating specific trauma-related scenarios, such as combat situations or natural disasters, VR enables individuals to gradually and safely confront their fears and anxieties. This immersive and interactive nature of VR can evoke emotional responses similar to real-life situations, facilitating emotional processing and desensitization. Some notable titles that effecvielty used this approah are "Virtual Iraq/Afghanistan" and "Bravemind".

In contrast to traditional VR simulations that focus solely on exposure therapy, the serious game for trauma takes a comprehensive approach. By incorporating elements of gameplay, narrative, and interactive challenges, the game can engage players on multiple levels, fostering a deeper sense of involvement and motivation. Through gameplay mechanics, the game can provide a sense of agency and empowerment, allowing players to actively participate in their healing process.

Additionally, the serious game's focus on promoting awareness, informing about best treatment practices, instilling hope, and providing coping tools aligns with the person-centered approach (PCA) and the principles of trauma-informed care (TIC). The game can leverage VR technology to create a safe space where players can explore trauma-related themes, engage with educational content, and practice coping strategies within a supportive and non-threatening virtual environment.

Furthermore, the game's interactive nature allows for personalized experiences and tailored interventions. By incorporating branching narratives, decision-making opportunities, and personalized feedback, the game can adapt to individual player needs and preferences. This personalized approach enhances engagement and relevance, potentially leading to better treatment outcomes.

The game approach in the proposed serious game for trauma offers advantages over traditional VR simulations by combining therapeutic elements with interactive gameplay. By providing a compelling and engaging experience, the game can enhance motivation, sustain attention, and create a sense of enjoyment throughout the therapeutic process. These factors can contribute to increased treatment adherence, longer engagement periods, and improved overall efficacy in addressing psychological trauma.

Collaboration and choice could be encouraged by allowing players to make decisions that affect the game's outcome and by providing opportunities for players to collaborate with other players or with virtual characters. Empowerment could be promoted by providing players with a sense of control over their virtual environment and by allowing them to track their progress and achievements.

In conclusion, the integration of XR technologies, particularly VR, into the serious game for trauma can enhance its efficacy by providing an immersive, interactive, and engaging experience. By incorporating gameplay elements, the game approach has the

potential to improve treatment outcomes compared to traditional VR simulations, making it a promising avenue for the development of effective interventions for psychological trauma.

3 Methodology and Expected Results

The proposed study will use a mixed-methods pre-post design to evaluate the effectiveness of the game in increasing awareness of psychological trauma and improving players' sense of security. Participants will be recruited through online advertisements and will be randomly assigned to the experimental group (playing the developed game) and the control group (not playing the developed game).

Data will be collected using both quantitative and qualitative measures. Quantitative data will be collected using a pre- and post-test design, with measures of psychological well-being and awareness of psychological trauma. Qualitative data will be collected through open-ended questions at the end of the study, which will be analyzed using thematic analysis. Deep learning techniques will also be used to analyze data related to game performance, such as time spent playing, in-game choices, and other relevant variables.

Our mixed-methods approach, including both traditional psychological tests and deep learning analysis, will provide a comprehensive evaluation of the game's effectiveness. We anticipate that players may report increased feelings of empowerment, self-efficacy, and hopefulness following gameplay, as well as a reduction in symptoms related to psychological trauma.

4 Conclusion

In conclusion, this video game represents a unique and innovative approach to promoting awareness of psychological trauma and increasing a sense of security. By using the Person Centered Approach and the five pillars of Trauma Informed Care as theoretical frameworks, we would like to create a game that offers both education and empowerment to players. We hope that this game will serve as a useful tool for individuals who have experienced psychological trauma and that it will encourage them to seek professional help when needed. While our project is at an early stage of its development and several refinements steps are required, we believe that our mixed-methods approach will provide a comprehensive evaluation of the game's effectiveness, and we look forward to sharing our results with the scientific community.

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