

# Exploring The Potential Of Virtual Reality In Offender Rehabilitation: A Literature Review

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## **Abstract:**

*Companheiro IPSS, a Portuguese nonprofit organization dedicated to the rehabilitation and reintegration of inmates, ex-inmates, and their families, endeavors to stay abreast of innovative methodologies for enhancing its interventions. This article conducts a literature review to explore the potential contributions and challenges of implementing Virtual Reality (VR) in intervention protocols within penitentiary contexts and post-imprisonment. Despite initial acquisition costs, VR offers the ability to simulate real-life scenarios without adverse consequences, thus revolutionizing crime prevention and recidivism reduction efforts. Through an analysis of completed projects, this review assesses the impact and implications of integrating VR technology into offender rehabilitation programs.*

**Keywords:** *Offender rehabilitation, crime prevention, virtual reality*

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## **I. Introduction:**

The landscape of social reintegration in Portugal is marked by significant challenges and systemic deficiencies, characterized by insufficient investment in structures capable of facilitating adequate treatment for both incarcerated individuals and those re-entering society. Prisons often operate with insufficient resources, both human and material, functioning more as punitive institutions rather than centers for rehabilitation. Post-imprisonment, the lack of support mechanisms further complicates the reintegration process. Companheiro IPSS stands as a beacon amidst these challenges, offering specialized intervention services for inmates, ex-inmates, and their families. Despite the prevailing dearth of support and investment, Companheiro IPSS strives tirelessly to empower its clients towards dignified and fulfilling lives. Each year, hundreds benefit from the organization's array of services, spanning from residential facilities and food aid to vocational training and psychological support. While comprehensive rehabilitation encompasses various facets, this article primarily delves into the realm of psychological intervention and the unique challenges posed by this population. It explores the potential of Virtual Reality (VR) as a pivotal tool in criminal rehabilitation and prevention, particularly within the context of addressing psychological needs and overcoming barriers to reintegration.

Evidence-based Strategies for working with offenders:

Effective rehabilitation of offenders hinges on interventions that target behavior change, ultimately aiming to prevent criminal recidivism by addressing criminogenic factors. Janssen (2018) highlights two proven intervention models: cognitive-behavioral therapy (CBT) and the risk/need and responsiveness (RNR) model. Additionally, the Good Lives Model (GLM) integrates cognitive-behavioral strategies and the RNR model, emphasizing offenders' strengths, interests, and aspirations (McGrath et al., 2010). Key principles for successful intervention include: 1) Targeting criminogenic factors: Interventions should focus on factors predictive of criminal behavior; 2) Behavior-Oriented Programs: Utilize behavior-oriented approaches rooted in Personality and Social Psychology theories to address criminal behavior; 3) Prioritizing High-Risk Offenders: Allocate resources towards interventions with individuals deemed high-risk. CBT emerges as a cornerstone strategy, demonstrating empirical validity across various pathologies and mental health issues, including criminal behavior (Ticknor & Tillinghast, 2011). It effectively addresses behavioral problems, antisocial attitudes, anxiety disorders, and other common mental health issues among the forensic population. Moreover, CBT therapeutic programs successfully reprogram maladaptive cognitive processes in offenders (Janssen, 2018). Notably, CBT-based interventions exhibit replicable results across different offender types, including domestic, sex, and drug-related offenders (Manita, 2008; Ribeiro, 2018; Marques, 2001).

It's commendable that Companheiro IPSS is dedicated to supporting inmates and ex-prisoners regardless of their background or circumstances. Adopting the Personal Change model as a transversal approach can indeed

be beneficial given its focus on facilitating shifts in individuals' conceptual systems or assumptive worlds. This approach acknowledges the complexity of the target population and recognizes that successful interventions often require addressing underlying beliefs and perceptions. By providing ongoing training in various areas of interest, Companheiro IPSS equips its workers with the tools and knowledge needed to promote more successful interventions. This approach not only helps workers understand the diverse needs of the population they serve but also allows them to adapt their interventions accordingly. The emphasis on personal change as an adaptive process for managing distress and promoting psychological well-being aligns well with the challenges faced by inmates and ex-inmates. Many individuals in this population have experienced traumatic events and significant life transitions, which can profoundly impact their mental health and well-being (Janoff-Bulman & Schwartzberg, 1991). By facilitating personal change, Companheiro IPSS can help individuals develop coping strategies, build resilience, and ultimately improve their quality of life. Continued investment in ongoing training and the integration of models like Personal Change demonstrate a commitment to providing effective support and interventions for this vulnerable population. By addressing underlying assumptions and promoting adaptive change, Companheiro IPSS can contribute to positive outcomes and the successful reintegration of inmates and ex-inmates into society.

What is still missing?

In the context we've provided, several aspects are still missing or not fully understood: 1) Mechanisms of change: While various therapeutic approaches have shown efficacy, the specific mechanisms through which they bring about change are not always clear. Understanding these mechanisms can help tailor interventions to individual needs and improve overall effectiveness; 2) Factors influencing change: Personal change is influenced by a multitude of factors including individual characteristics, social support, environmental influences, and the nature of the problem itself. Further research is needed to better understand how these factors interact and impact the process of change; 3) Differential treatment response: While some individuals may benefit from psychotherapeutic interventions, others may experience personal change without formal help. It's important to identify factors that predict differential treatment response to better match individuals with appropriate interventions; 4) Long-Term outcomes: Research often focuses on short-term outcomes, but understanding the sustainability of change over time is crucial. Longitudinal studies tracking individuals' progress and relapse rates can provide valuable insights into the nature of personal change; 5) Integration of perspectives: The field could benefit from integrating insights from various disciplines such as psychology, neuroscience, sociology, and anthropology to develop a more comprehensive understanding of personal change processes; 6) Cultural considerations: Cultural factors play a significant role in shaping individuals' beliefs, attitudes, and behaviors. Further exploration of how cultural context influences the process of change is needed to ensure interventions are culturally sensitive and effective; 7) Client-Centered approaches: While certain therapeutic modalities have demonstrated efficacy, there's a growing recognition of the importance of client-centered approaches that empower individuals to drive their own change process. Research exploring the effectiveness of such approaches is warranted; 8) Prevention Strategies: Understanding the early signs and risk factors associated with various issues can inform targeted prevention strategies aimed at promoting personal change before problems escalate. By addressing these gaps in understanding, clinicians and researchers can better support individuals seeking personal change and enhance the effectiveness of intervention programs.

The points we've raised highlight several important considerations in understanding the dynamics of personal change, particularly in the context of working with offenders: a) Context Nature of change: Change is not a one-size-fits-all process. It depends on various factors including the individual, the nature of the problem, and the specific situation or context in which change is occurring. Recognizing this complexity is essential for tailoring interventions to meet the unique needs of each individual; b) Role of the self in change: The self-concept can act as both a barrier and a catalyst for change. Individuals may resist change in order to maintain the integrity of their self-image, but they can also use aspects of their self-concept as motivation for positive change. Understanding how the self-influences behavior and attitudes is key to facilitating effective interventions; c) Discontinuous and non-linear process: Change is often characterized by discontinuity and non-linearity, particularly in response to life transitions and traumatic events. These transformative experiences can lead to profound restructuring of psychological dimensions. Acknowledging the complexity of the change process and being prepared for its non-linear nature is important for effective intervention. D) External pressure and motivation: External pressures, such as judicial obligations, can initiate change, but sustaining it without intrinsic motivation can be challenging. Many offenders may lack intrinsic motivation to engage with intervention programs, which can hinder the promotion of personal change. Understanding the underlying motivations and addressing them is crucial for fostering lasting change; E) Psychosocial factors and motivation: Various psychosocial factors, such as unstable family environments, attentional deficits, and poor emotional regulation, are established predictors of offending behavior. However, their influence on motivation to engage with intervention programs is not well understood. Exploring the association between these factors and motivation can

provide valuable insights into how to effectively engage individuals in the change process. These limitations require a multifaceted approach that considers the individual, their unique circumstances, and the complex interplay of internal and external factors influencing motivation and behavior. By understanding the contextual nature of change, recognizing the role of the self, and addressing psychosocial factors, interventions can be better tailored to meet the needs of offenders and promote meaningful personal change (Craig, Gannon, & Dixon, 2013; Leschied, Chiodo, Nowicki, & Rodger, 2008).

The instrumentalization of interventions by offenders, driven by the desire to obtain benefits such as sentence reduction or extinction, is indeed a significant consideration in the field of offender rehabilitation. This phenomenon can be understood within the framework of social desirability, as proposed by Paulhus (1984), who delineates two dimensions: impression management and self-deception.

- 1) Impression management: This dimension involves the conscious effort to present oneself in a favorable light to others. Offenders may engage in impression management by portraying themselves as compliant, remorseful, or rehabilitated in order to garner favorable treatment from authorities or to meet the expectations of treatment providers.
- 2) Self-Deception: The self-deception dimension of social desirability involves unconscious defense mechanisms against thoughts and feelings that threaten the self-concept. In the context of offender interventions, individuals may engage in self-deception by denying the severity of their actions, minimizing their responsibility, or rationalizing their behavior as justified or excusable.

Both dimensions of social desirability can have significant implications for interventions with offenders:

- 1) Resistance to treatment: Offenders who are primarily motivated by instrumental goals may exhibit high levels of resistance to treatment, as their primary focus is on achieving external benefits rather than internal change. This can undermine the effectiveness of interventions and make meaningful progress difficult to achieve.
- 2) Feasibility of Interventions: The presence of social desirability mechanisms can pose challenges to the feasibility of interventions with offenders. Treatment providers may encounter difficulties in accurately assessing individuals' genuine motivations and engagement levels, which can impede the development and implementation of effective intervention strategies.

Addressing social desirability in offender interventions requires a nuanced approach:

- Motivational Enhancement: Interventions should aim to foster intrinsic motivation for change by helping offenders recognize the personal benefits of rehabilitation beyond instrumental goals, such as improved relationships, enhanced well-being, and increased opportunities for reintegration into society.
- Cognitive-Behavioral Strategies: Cognitive-behavioral techniques can help individuals challenge distorted thinking patterns and develop more realistic perceptions of themselves and their behaviors. By addressing underlying cognitive distortions, treatment providers can promote greater insight and self-awareness among offenders.
- Structured Assessment: Utilizing structured assessment tools and techniques can help mitigate the impact of social desirability on treatment outcomes by providing objective measures of progress and identifying areas of concern that may require further attention.

In summary, the instrumentalization of interventions by offenders, driven by social desirability mechanisms, presents significant challenges to the effectiveness and feasibility of offender rehabilitation efforts. By addressing these challenges through targeted intervention strategies and structured assessment approaches, treatment providers can enhance the likelihood of meaningful change and successful reintegration for individuals involved in the criminal justice system.

The prevalence of psychopathology, including mental health disorders and personality disorders, among the forensic population presents a significant obstacle to successful personal change processes. These disorders can complicate interventions and increase the risk of recidivism. While there may be a lack of studies specifically focusing on the Portuguese reality, data from the National Commission on Correctional Health Care in 2002 provides insights into the prevalence of certain mental health disorders among inmates. The reported incidence of anxiety disorders among federal and state inmates underscores the significant burden of mental health issues within correctional facilities. Moreover, individuals suffering from PTSD are at higher risk of engaging in substance abuse and committing criminal offenses such as drunk driving, assault, and domestic violence. These findings highlight the complex interplay between mental health disorders and criminal behavior, emphasizing the importance of addressing underlying psychological issues in interventions with offenders. Effective intervention strategies must recognize and address the presence of psychopathology, providing appropriate mental health support and treatment alongside efforts to promote personal change and rehabilitation. This may involve implementing comprehensive mental health assessments, offering access to therapy and medication, and integrating mental health services into correctional facilities. By addressing the underlying factors contributing to criminal behavior, interventions can better support offenders in their journey toward successful reintegration

into society and reducing the risk of recidivism. In conclusion, the multitude of factors discussed, including the instrumentalization of interventions, the presence of psychopathology, and the challenges associated with risk assessment, contribute to the complexity of working with offenders. These factors often introduce uncertainty into decision-making processes and make it difficult to predict outcomes accurately. However, there is potential for innovative approaches such as virtual reality (VR) to complement existing practices and address some of these challenges. Virtual reality offers a unique opportunity to create immersive and interactive simulations that can replicate real-world scenarios relevant to offender rehabilitation and risk assessment. By allowing individuals to experience and practice coping strategies, decision-making skills, and social interactions in a controlled environment, VR can enhance therapeutic interventions and facilitate skill-building. Moreover, VR can provide a safe space for risk assessment, allowing professionals to observe behavior and responses in simulated situations without the risks associated with real-world testing. This can lead to more accurate assessments and inform decision-making regarding treatment plans and interventions. While virtual reality is not a panacea for the complexities of working with offenders, it has the potential to supplement traditional approaches and offer new avenues for promoting personal change and reducing recidivism. Continued research and development in this area may uncover additional benefits and applications of VR technology in offender rehabilitation and risk management.

#### Augmented Reality and Virtual Reality

Augmented reality (AR) can be described as an interactive visualization system (a head-mounted display, a computer, a game console, a smartphone, or a tablet) allowing the merging of digital contents with the real environment surrounding the user (Riva et al, 2016). AR allows the augmentation of our real experience blending both real-world and virtual elements. The additional information offered by AR can be a powerful tool for personal change, because it can support and improve the sense of self-reflectiveness and personal efficacy of its users. A possible example of how AR can be used to support experiential learning in relation to clinical change is the treatment of a specific phobia. At a initial stage, the subject observes the phobic object in the “here-and-now” offered by AR. This experience is the basis for observation and reflection: the subject is able to consider the actions (e.g. avoidance) and emotions (e.g. fear) experienced and to think about his/her behavior in previous similar experiences (generalization). At this stage, the role of the therapist is important and generalization questions can be used to facilitate abstract conceptualization and to identify recommendations supporting the next exposure. During the new exposure, AR can support, in real time, the subject, offering real-time information about his/her status (e.g. the level of emotional arousal). Moreover, AR can enhance the process of change throughout the entire treatment, for instance, Botella et al., (2011) used an AR-based game in a mobile phone in order to facilitate the exposure treatment. The goal of this game was reducing the level of fear and avoidance before the AR exposure session and promoting the over-learning after the AR exposure session as a homework assignment. In this way, AR facilitates personal change through a cyclical interaction of experience, thought, and reflection. In other words, AR is the perfect experiential learning tool. On one side, it allows real-time interactivity in an ecological setting improving concentration and motivation (Di Serio & Ibanez, 2013). On the other side, it provides targeted suggestions and guidelines that help subjects to develop skills and knowledge in a more effective way.

If AR adds digital information to the real-world environment, VR completely replaces it with a virtual one. VR is defined as “an advanced form of human–computer interface that allows the user to interact with and become immersed in a computer-generated environment in a naturalistic fashion” (Schultheis, 2011). From a psychological perspective, VR is a subjective experience in which the individual is illuded that he/she is there. More specifically, VR is different from other media because it induces the sense of presence or the feeling of “being there” inside the virtual experience produced by the technology.

The sense of presence offered by VR can be a powerful tool for personal change because it offers a world where the individual can stay and live a specific experience (Riva et al., 2015). Following the personal change models discussed before, VR allows a level of self-reflectiveness that is higher than the one provided by memory and imagination, and it is more controlled than the one offered by real experience.

One of the main advantages of VRT is the fact that it applies the tools and strategies already used in CBT, but in a virtual environment, providing the possibility of training and exposing subjects to situations that would be impossible to reach, or situations that are dangerous for them and for others (Ticknor, 2018; Ticknor & Tillinghast, 2011).

Other features often available with VR could also be useful. Anything that occurs in the virtual environment can be recorded. This allows facilitators the ability to provide feedback after the role-play, which can be used to correct behavior and resolve any misunderstandings. The recordings can also be used for opportunities to provide reinforcement for adaptive behavior.

### Virtual Reality Therapy

Virtual Reality Therapy (VRT) has been used in a wide range of areas, such as schools, the military, criminal justice (soldiers, police, offenders and victims), psychology and medicine (Ticknor, 2018), with very positive outcomes.

If we take Psychology area, in a stricter context, Trahan, Smith, Traylor, Washburn, Moore and Mancillas (2019) reported VRT applications in working skills training, mental health interventions, empathy training, cognitive and emotional training, substance abuse treatment, socialization skills training, crisis intervention training, medical applications and teaching contexts, as VR can also play an important role in enhancing learning (Vieira, et al., 2014). It is also possible to use therapeutic strategies such as classical conditioning, exposure therapy (VRET) and a wide range of cognitive behavioral therapy (VR-CBT) techniques (Ticknor & Tillinghast, 2011) as discussed before.

In VRT, patients are exposed to virtual environments that simulate life common situations (Carvalho, Freire & Nardi, 2008) and these VR applications can trigger responses as intense as if they were exposed to real situations (Fromberger, 2018) but in a safer and more secure way. Therefore, considering the barriers that those who are incarcerated face, namely the lack of opportunity to train and apply the skills and other knowledge acquired in traditional interventions, VRT could be a way of overcoming this constraint.

Virtual reality therapy can also be a treatment option for violent offenders, because it is a tool that allows justice practitioners to refine their risk assessments, and also ensures an intervention without danger or threat to third parties (Benbouriche et al., 2014). Group interventions are often not suitable for certain violent patients and VR can help with initial treatments so that they can later be integrated into therapy groups in prisons (Wellton, 2015).

According to Ticknor and Tillinghast (2011), virtual environments have proven to be effective in treating various psychiatric disorders. Also, in the case of those with special needs, the use of VR is considered appropriate for their assessment and treatment, allowing the development and implementation of specific treatments adapted to each type of offender and their respective needs (Ticknor & Tillinghast, 2011). This treatment technique can be used in offenders with specific characteristics: with anxiety disorders, ADHD, post-traumatic stress, history of substance abuse (alcohol and drugs), trauma, female offenders (previously victims of abuse) and male offenders. (Ticknor & Tillinghast, 2011; Nicholls et al., 2019).

On the other hand, offenders in correctional institutions can obtain several benefits from VRT, such as learning a variety of vocational and social skills. TRV can be a means of social reintegration, helping them to learn and apply rules of pro-social behavior, as well as reducing the fear and anxiety that emerge from the first contacts with conventional social contexts (Schultheis & Rizzo, 2001 cited by Ticknor & Tillinghast, 2011). VRT also offers benefits in acquiring skills in vocational training, providing opportunities to learn and train essential skills for obtaining employment after release.

### Implementing Virtual Reality

Depending on the needs of the organization, virtual reality can be easily achieved. A basic semi-immersive system can be implemented requiring the corresponding cost and technical expertise as new computer would require. A fully immersive system can cost more than €200,000 (Riva, 2009). Nevertheless, the financial cost of VR is beginning to decline, because some developers are sharing software free of charge (Gregg & Tarrier, 2007). Researchers and academics are also deploying point-and-click VR systems that are becoming widely available.

One hurdle to VR implementation is the technical ability of both the practitioner and the participant. Time must be spent upfront in the creation of avatars and in learning to navigate the virtual world (Baker et al., 2009). In addition, there is the necessity and additional cost to train practitioners on how to set up and customize each virtual simulation. Even though, most VR systems provide a user-friendly administrative environment and the level of participation required to interact with the virtual environment can be adjusted for each participant's skill set.

Last, there are some potential physiological side effects for users of virtual environments. Due to the realism of a virtual environment, some participants experience physiological responses like those associated with motion sickness. Sickness developed within the virtual environment is referred to as cybersickness. Symptoms of cybersickness include eye strain, headache, paleness, sweating, dryness of the mouth, disorientation, and vertigo. Most individuals do not experience problems during a virtual simulation, however, as with any treatment, practitioners should be aware and prepared to address issues associated with negative side effects.

In conclusion, Virtual Reality (VR) offers unique and promising possibilities within the criminal justice system. Researchers can utilize VR to enhance experimental control, address issues such as replication and sample size, and develop objective measures that improve the validity and reliability of social science research. Therapeutic techniques like exposure therapy and Cognitive Behavioral Therapy (CBT) can be enhanced through

the immersive and interactive nature of VR, leading to successful treatment outcomes for disorders such as anxiety, PTSD, and substance abuse.

Moreover, VR enables practitioners to tailor interventions to the specific needs of individuals, providing an environment where participants feel more open to expressing themselves. Features like immediate social feedback and the feeling of "being there" allow for fast learning and personal change. The use of VR in both assessment and treatment can greatly enhance outcomes for special populations within the criminal justice system.

Despite initial costs, VR offers numerous advantages as a complementary approach. It is reported to be more attractive and engaging than traditional interventions, especially when presented in a gamified manner. Furthermore, VR simulations can realistically recreate various situations without posing any danger to offenders or others, promoting the development of cognitive, emotional, and social skills in an ecologically validated context.

In summary, Virtual Reality Therapy represents a powerful tool for enhancing interventions within the criminal justice system, offering innovative solutions to longstanding challenges, and facilitating personal change and rehabilitation. Continued research and implementation of VR interventions have the potential to transform the way offenders are assessed, treated, and reintegrated into society, ultimately contributing to safer communities and improved well-being for all individuals involved.