Journal of Gambling Issues

Open Access Protocol

Virtual Reality and Augmented Reality Treatment for Behavioural Addictions: A Scoping Review Protocol

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Citation: Chiew, F.X.R., Li, G.H., Shi, J. (2025). Virtual Reality and Augmented Reality Treatment for Behavioural Addictions: A Scoping Review Protocol. Journal of Gambling Issues, 56s, 61-73.

Editor-in-Chief: Nigel E. Turner, PhD

ISSN: 1910-7595

Received: 01/21/2024
Accepted: 01/15/2025
Published (Online first): 02/21/2025

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Abstract: Background: Help-seeking among people who have behavioural addictions is low due to multiple factors including accessibility and stigma. Making treatment resources for behavioural addictions available through the internet is one way to reduce the impact of these factors. The use of virtual reality (VR) and augmented reality (AR) to address addictive behaviours such as substance use disorders and gambling disorders has been growing. However, little has been done to explore the use of VR and AR in the treatment of other behavioural addictions. This scoping review aims to provide an overview of existing literature on VR and AR interventions for behavioural addictions. Methods: This scoping review will be conducted based on the framework first proposed by Arksey and O'Malley, later refined by Levac et al., and further outlined in the JBI Manual for Evidence. The literature will be searched in the following databases: CINAHL, PsycArticles, PsycInfo, PubMed and Web of Science, with Google Scholar complementing the search. Studies will be screened by two independent reviewers based on inclusion criteria; discrepancies will be resolved by a third reviewer. Data will be extracted in a data extraction table and presented through a conceptual analysis as a narrative summary. Discussion: The findings of this scoping review will be beneficial to researchers and practitioners who are interested in exploring the use of VR/AR to deliver treatment for behavioural addictions.

Keywords: Behavioural Addiction, Virtual Reality, Augmented Reality, Interventions, Gambling, Video Gaming.

Background

Behavioural addictions, as defined by International Classification of Diseases 11th Revision (ICD-11), involve repetitive and rewarding behaviours that interfere with personal functions, which do not include substance-use disorders or sexual behaviours (World Health Organization [WHO], 2019). Currently, the ICD-11 includes two medically recognised behavioural addictions – gambling disorder and Internet gaming disorder (WHO, 2022). Although much debate surrounds the inclusion of video gaming in the ICD-11 (Aarseth et al., 2017; van Rooij et al., 2018), a wide range of problematic behaviours have emerged in the literature and treatment centres. Exercise addiction (Trott et al., 2021), problematic digital device use (Bsisu et al., 2021), and compulsive pornography use (Camilleri et al., 2021) are examples of some problematic behaviours. For the purposes of this paper, we shall refer to all problematic, disordered, compulsive, and overuse behaviours that do not involve substances as behavioural addictions.

Systematic reviews and meta-analyses have suggested that the global prevalence of gaming and gambling disorders to be around 3.05% (Stevens et al., 2021) and 1.29% (Gabellini et al., 2023), respectively. This result may be comparable to some substance use disorders (SUDs) (2.6%) (Degenhardt et al., 2017). The World Health Organization (WHO) presented on these two topics with alcohol and drugs at two WHO international forums in 2017 and 2019 (Abbott, 2020) which shows that behavioural addictions have since become a globally significant health issue.

Internet gaming disorders could lead to adverse effects such as decreased academic performance, sleep deprivation (Kim et al., 2018), interpersonal relationship problems, and impacts on career prospects (Schneider et al., 2017). Gambling disorders could affect relationships (Tulloch et al., 2023), and affect employment. It also affects health and well-being, impacting self-care, fitness activities, social activities, social isolation, and night-time wakefulness (Muggleton et al., 2021). In recent years, there has been a notable increase in the development of preventive interventions, assessment, and treatment approaches for gaming and gambling disorders.

Current Practices and Gaps

Traditionally, cognitive behavioural therapy (CBT) has been the main treatment for people who have behavioural addictions. CBT has been effective in reducing addictive behaviours by helping clients develop motivational and cognitive strategies to elicit change and prevent relapse Additionally, CBT also provides skills training for emotional regulation and problem-solving (McHugh et al., 2010).

The use of augmented reality (AR) and virtual reality (VR) to address mental health issues such as anxiety, substance use disorders and gambling disorders has also been growing. AR creates a computer-generated environment that evokes a unique perception of reality, where real and virtual objects are perceived with one another, which operates interactively and in real-time (Bakır et al., 2023). An example of a therapy that incorporates AR technology is an AR-based smart training to perform toothbrushing training to improve oral hygiene for individuals with intellectual disabilities (Jeon et al., 2021). VR is a more advanced technological innovation that uses computer graphics, motion sensors, and 3D display technologies to immerse users in realistic 3D simulations (Velev & Zlateva, 2017). VR therapy was effective in reducing craving and managing self-control in substance use disorders through exposure to stimulating cues ranging from photos of items to stimulating environment contexts (Kim & Kim, 2020). Examples include providing a virtual environment of the presence of cigarettes on the table in a bar with avatars smoking (Giovancarli et al., 2016). Additionally, VR has been effective in treating anxiety by providing a virtual anxiety-inducing environment as a form of exposure therapy. Providing exposure therapy virtually also reduces possible exacerbation of symptoms which may be caused by direct exposure, making it safer. Preliminary searches revealed that there were no existing scoping reviews done on the use of VR and AR in the treatment of behavioural addictions, with the exception of Segawa's systematic review that examined only VR in the assessment and treatment of broad addictive disorders (Segawa et al., 2019). Furthermore, no existing reviews on VR/AR in behavioural addictions have included grey literature.

Study Aim & Research Questions

A scoping review can be carried out to identify available evidence, clarify key concepts, identify gaps in research and to be a precursor to a systematic review (Munn et al., 2018). Additionally, it can be undertaken when an area of study has not been reviewed comprehensively (Arksey & O'Malley, 2005). Thus, this review will consolidate the current literature in this field and identify and synthesize knowledge gaps for future research.

Methods

Overview

A scoping review will be guided by the methodological framework first proposed by Arksey and O'Malley (Arksey & O'Malley, 2005), later refined by Levac et al. (Levac et al., 2010), and further outlined in the JBI Manual for Evidence Synthesis (Peters et al., 2020). The framework has six stages described in the following sections.

Stage 1: Identifying Research Questions

Identifying relevant and broader research questions is the first step in the process of a scoping review. Supplementing our study aim stated above, our review questions are as follows:

1. What are the interventions conducted through the use of AR/VR in the treatment of behavioural addictions?
2. What behavioural addictions are currently being treated using AR/VR therapy?

Stage 2: Identifying Relevant Studies

A comprehensive search of identified electronic databases will be conducted to locate relevant studies. Our search will include the following databases: CINAHL, PsycArticles, PsycInfo, PubMed and Web of Science. Additionally, Google Scholar will be included. The search strategy aims to identify studies published in English in the last 10 years, and where full text publications are available.

To identify relevant literature, a three-step search methodology in accordance with JBI manual will be employed. First, selected databases will be searched using keywords (see Appendix A) as consulted with an academic librarian. Second, new keywords found in identified articles will be included in subsequent searches across all databases. Lastly, the references of all articles and reports will be hand-searched for additional studies to ensure comprehensive identification of literature.

Stage 3: Study Selection

Studies will be selected based on the inclusion and exclusion criteria to meet the scope of the inquiry.

Inclusion Criteria

This review will include literature published in peer-reviewed journals using all types of methodologies (e.g. qualitative, quantitative, mixed methodology, or protocols). Grey literature relevant to the topic will also be included to minimize publication biases. This will be done through Google Advanced Search using the keywords in Appendix A, after which the first 10 pages will be screened. Only literature published in English will be screened due to the language expertise of the reviewers. Exclusion criteria excludes reviews and conference abstracts.

The inclusion criteria will be in line with the scoping review questions, addressing the population, concept, and context as follows:

Participants. Studies that involve people who exhibit behavioural addictions at any age will be included. Studies that are conducted with people without behavioural addictions will also be included if there is an intention of using VR/AR for treatment to treat behavioural addictions, especially if the study's intention is to help people with behavioural addictions. Research that studies pornography addiction and compulsive sexual behaviours will be excluded.

Concept. Concepts of VR/AR interventions that can be used in treating behavioural addictions will be included. This includes assessments, perspectives, and outcomes that are conducted to measure these interventions.

Context. Sources of evidence from any country will be eligible for inclusion where VR/AR therapy is available for behavioural addictions.

Study Identification

The study selection will first consist of two reviewers screening titles and abstracts according to the inclusion and exclusion criteria. Next, if titles and abstracts are aligned with the inclusion/exclusion criteria of the scoping review, a full-text review will commence. A third reviewer will be consulted for ambiguities until a consensus is reached.

Two reviewers will independently review and extract relevant articles before importing them into Zotero, an open-source reference management software. Zotero's built-in functionality enables collaboration between reviewers, and documents can be gathered and organized into different folders to aid analysis. Additionally, it enables the elimination of duplicate items retrieved from multiple databases before screening. Disagreements on study inclusion between the reviewers will be resolved by inviting third and fourth reviewers for discussion. Reasons for exclusion of full-text studies that did not meet the inclusion criteria will be recorded and reported in the scoping review. The search and screening processes will be presented through a PRISMA-ScR flow diagram (Tricco et al., 2018) in the final review paper.

Stage 4: Charting the Data

Data will be extracted from selected articles and inputted into a data extraction table (see Appendix B) in accordance with the methodology of scoping reviews developed by Peters et al. (2020). The data extraction table, aligned with the review objectives will be used to collate the extracted data based on identified data fields. These data fields in the data extraction table may be further refined as the review progresses.

Stage 5: Collating, Summarising, and Reporting the Results

Results will be described and collated according to the PRISMA-SCR checklist (Tricco et al., 2018) and JBI manual for scoping reviews (Peters et al., 2020). A conceptual analysis will then be carried out. Firstly, common characteristics of included studies will be identified and then comparisons will be made between these studies under each identified concept. These will be presented as a narrative summary of findings.

Stage 6: Consultation Exercise

A consultation exercise will be conducted based on the identified preliminary literature findings from Stage Five with identified stakeholders, including academics, digital developers, and clinicians, to seek their opinions regarding the research. These experts may be in the fields of AR/VR technology development/research, behavioural addictions treatment/research, or mental health treatment/research. Those who contribute to this stage will fill out our Conflict of Interest Disclosure Form and be offered an acknowledgment in our paper (see Appendix C).

Discussion/Conclusion

This scoping review will identify how VR/AR is used for the treatment of behavioural addictions. Literature from the listed databases will be identified and synthesized in terms of participant characteristics, behavioural addiction, aims, treatment, control group (if any), frequency/duration, outcome measures, and results. This review will also help identify knowledge gaps so that future research can target these gaps in current evidence.

Limitations of this scoping review are that we will not be evaluating the quality of the evidence, nor will we be assessing the efficacy of the treatments. This scoping review aims to capture a large breadth of literature on this emerging topic as a preliminary scope of the extent of the literature (Grant & Booth, 2009). Articles not published in English, particularly with a high prevalence of gaming disorder in Asian and Southeast Asian countries (Chia et al., 2020; Liao et al., 2022; Clement, 2024), are another limitation of this scoping review. However, considering the large scope of our search, we hope that this demographic will be captured.

We expect that our findings will be useful to researchers and practitioners who are interested in exploring the use of VR/AR to deliver treatment for behavioural addictions. As further research progresses, this review hopes to encourage the continuous development of treatment options that advance with technology.

Ethics approval
Not Required.

Acknowledgements and Funding
No funding was received for this project. Authors would like to acknowledge support from Singapore Institute of Technology's library staff**.**

Relative Contributions
All authors contributed to the conception of this project. FC and GL wrote the first draft of this protocol. All authors edited and approved the final manuscript.

Competing interests
The authors declare that they have no competing interests.

Research Promotion
The use of augmented reality (AR) and virtual reality (VR) to address mental health issues has been growing. However, research exploring the use of AR/VR in the treatment of behavioural addictions has not been consolidated. The findings of this scoping review will benefit researchers and practitioners interested in using VR/AR to treat behavioural addictions.

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VR/AR	Therapy	Online addictions
"VR" OR "virtual reality" OR "AR" OR "augmented reality"	"therap*" OR "treatment*" OR "intervention*" OR "program*"	"internet addiction*" OR "behavio* disorder*" OR "behavio* addict*" OR "internet behavio* disorder" OR "internet behavio* issues" OR "online behavio* addiction" OR "internet behavio* addiction" OR "problematic internet use" OR "internet gaming disorder" OR "gaming disorder" OR "gaming addiction" OR "internet gaming addiction" OR "online gaming addiction" OR " gaming dependency" OR "internet gambling addiction" OR "online gambling disorder" OR "gambling disorder" OR "problem gambling" OR "gambling addiction" OR "online gambling addiction" OR "online shopping addiction" OR "online shopping disorder" OR "internet shopping disorder" OR "internet shopping addiction" OR “compulsive shopping” OR “impulsive buy*” OR "social media addiction" OR "social media disorder" OR "social media overuse" OR "internet overuse" OR "gaming overuse" OR "gambling overuse" OR "video gaming addict*" OR "video gaming overuse" OR "video gaming disorder" OR "problem video gaming" OR “compulsive buying” OR “buying disorder”

Appendix B

Sample of Data Extraction Form

Authors	Year of publication	Location of study	Participants (N, Age, M/F)	Behavioural addiction	Aim of study	Treatment	Control	Frequency and duration	Outcome measures	Results

Appendix C

Conflict of Interest Disclosure Form

Name: _____
Affiliation: _____
Email Address: _____

Conflict of Interest Disclosure
Please check the box that applies:
☐ I/we have no conflicts of interest to disclose.
☐ I/we have potential conflicts of interest to disclose (provide details below).

Details of Conflict:

- Financial (e.g., intellectual property, grants, employment, stock, honoraria):

- Non-financial (e.g., personal/professional relationships):

Do you wish to be acknowledged in the manuscript submitted for publication?
☐ Yes
☐ No, I prefer to remain anonymous

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