Review article

Custom-made video games for mental health assessment and treatment in young adults: a short narrative review

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ABSTRACT

Throughout history, video games have been stigmatized and often linked to mental health issues due to their misunderstood nature as modern products. However, these limitations hamper its potential for broader applications. Our review delves into the use of serious and personalized video games, specifically aimed at improving mental health among young adults. Using a narrative approach, we synthesize studies showing the explicit use of video games in therapeutic procedures. As mental health concerns continue to rise, the once-dismissed notion of using video games for the treatment of mental disorders has gained credibility. The studies revealed promising results, particularly in the management of anxiety and depression, highlighting the potential of augmented reality and virtual reality technology. Casual games also showed promising results in therapeutic plans, gradually breaking the stigma associated with their use. The integration of video games into daily life is gradually changing perceptions, indicating a significant change in the therapeutic landscape.

Keywords: video games, mental health, young adults

1. Introduction

The influence of video games on mental health has been increasing over the years [1], thanks to numerous research studies on the subject, their constant evolution [1], the popularity they gained due to the COVID-19 pandemic [2], and their omnipresence in the lives of children and adolescents [1], which may persist into adulthood. Likewise, we cannot forget the mental health of young adults, which was affected by the loneliness they felt due to the confinement caused by the pandemic [3] and although those days are behind us, many have not recovered from these consequences [3].

However, few of them address the process of creating video games for their application in mental health; instead, they focus solely on the results obtained from their use [4, 5, 6]. This is an important gap to consider due to the relevance of game design in achieving positive outcomes [7]. These are referred to as "serious games" oriented toward teaching and learning, which limits their design and potential [7]. Custom-made video games indeed hold promising potential in the treatment and evaluation of mental health for children, adolescents, and adults, as they do not present the limitations of the aforementioned games. Although research is scarce, most yield promising results [6], which should be given the importance they deserve, being more acceptable to individuals than traditional treatments involving pharmaceutical products [8].

The aim of our review is to determine the feasibility of personalized video games for the assessment and treatment of mental health, particularly in young

adults. During the COVID-19 pandemic, people were more inclined to seek psychological help due to concerns about their mental health [9]. It has also been established that video games, particularly aggressive ones, do not significantly impact the mental health of young individuals even when exposed to them at an early age [10]. With this, we intend to address questions such as: how should they be designed?, how viable are they for mental health treatment?

The methodology we follow is detailed in Section 2, where the process of searching, inclusion, exclusion and selection of articles for this review is described. Next, the thematic overview in Section 3 examines the themes and patterns found in the selected literature. The discussion continues in Section 4, where the results obtained during the review are analyzed and interpreted. Finally, the conclusion addresses the questions raised in the introduction and evaluates the hypothesis in Section 5.

2. Methodology

For the completion of this review, we employed a methodology allowing us to select the most relevant articles on the topic we are addressing. For article searching, we utilized the search engines Google Scholar and Semantic Scholar, which access databases such as Dialnet, CEPAL, DANE, SciELO, Redalyc.org, Dotec, Ideas, OpenLibra, DOAJ, Scopus, Latindex, ERIC, World Wide Science, and Refseek, aiming to obtain articles that meet our inclusion criteria. These platforms are recognized for their good reputation in providing articles of the highest quality.

We used the keywords "mental health", "custom-made", "video games", and "therapy", for example: "custom-made/video games/mental health", "custom-made/video games/therapy". For the initial screening of articles, we relied on the article being written in English and on a quick inspection of the title, abstract, and introduction, as these sections provide an overview of what the article will address. The quality of the articles we selected depended on whether the journals where they were published are indexed in the Journal Citation Reports (JCR) or Scopus, the number of citations, and their relevance in the field.

We utilized Mendeley as the software for article management and for the elimination of duplicates. The selection criteria for the articles included their quartile ranking, annual citations, and relevance to our topic. Initially, we screened 3,600 articles, discarding those published before 2008 or unrelated to our topic, which narrowed them to 200 articles. Further refinement involved excluding 99 articles not indexed in the JCR, 17 for not being in English, 34 for not ranking in the first quartile (Q1), 23 for having less than 15 citations per year, and 6 for lacking relevance after an in-depth review and unanimous agreement among the authors. For 2023 publications, the citation-per-year criterion was waived. In this category, one article was included for its relevance and rigor, according to the authors, de-

spite having no citations. Ultimately, this process led to the exclusion of 179 articles, culminating in a final selection of 21 articles for review. The methodology of this selection process is depicted in Figure 1, while the complete list of reviewed articles is presented in Table 1.

Our methodology was limited by the number of articles selected for this review, leaving out a wide margin of existing literature. Our methodology, however, is rigorous enough to have articles of the highest quality, according to our previously mentioned criteria.

3. Thematic Overview

By exploring existing research, the aim is to identify emerging patterns and trends in the research of the use of video games in depression and anxiety therapy. Through thematic analysis, the goal is to understand how video games have been integrated into existing therapeutic practices and how they have given rise to new intervention modalities, known as serious games. Serious games were categorized into eight types according to the therapeutic approach they provide: 1) exercises, 2) computerized cognitive schema games, 3) biofeedback games, 4) attention distraction games, 5) brain training games, 6) social skills training games, 7) exposure therapy games, and 8) psycho-education games [17]. Although games and other electronic interventions can be created with specific therapeutic goals in mind, it has been shown that commercially available games provide a wide variety of interfaces and experiences that can be used as a complement to therapy, aiding in attitude change, relaxation, pain management, motivation, and increasing client-therapist interaction [20]. This analysis not only examines the efficacy of video games in terms of therapeutic outcomes but also identifies patterns regarding potential limitations and the discussion surrounding their implementation in clinical settings and the cost-benefit they represent. In the following paragraph, the identified themes will be presented.

The standout theme regarding the potential of therapeutic video games lies within augmented reality and virtual reality (AR/VR) technology. VR games demonstrated high acceptability among users, with players considering these formats authentic and realistic [16]. Simulating new experiences for patients through the immersive attributes of this technology, which equate to worlds spanning hundreds of square kilometers (digitally) and inhabited by individuals and places that offer the player numerous interaction possibilities [22], facilitates better engagement in therapeutic processes and emotional management. It is recognized that VR has proven particularly useful for eating disorders, phobias, and post-traumatic conditions [19].

Regarding the psychological outcomes achievable through video games, a pattern in their effectiveness was observed. While game-based interventions do not replace psychopharmacological treatment and psychotherapeutic follow-up foundations for managing de-
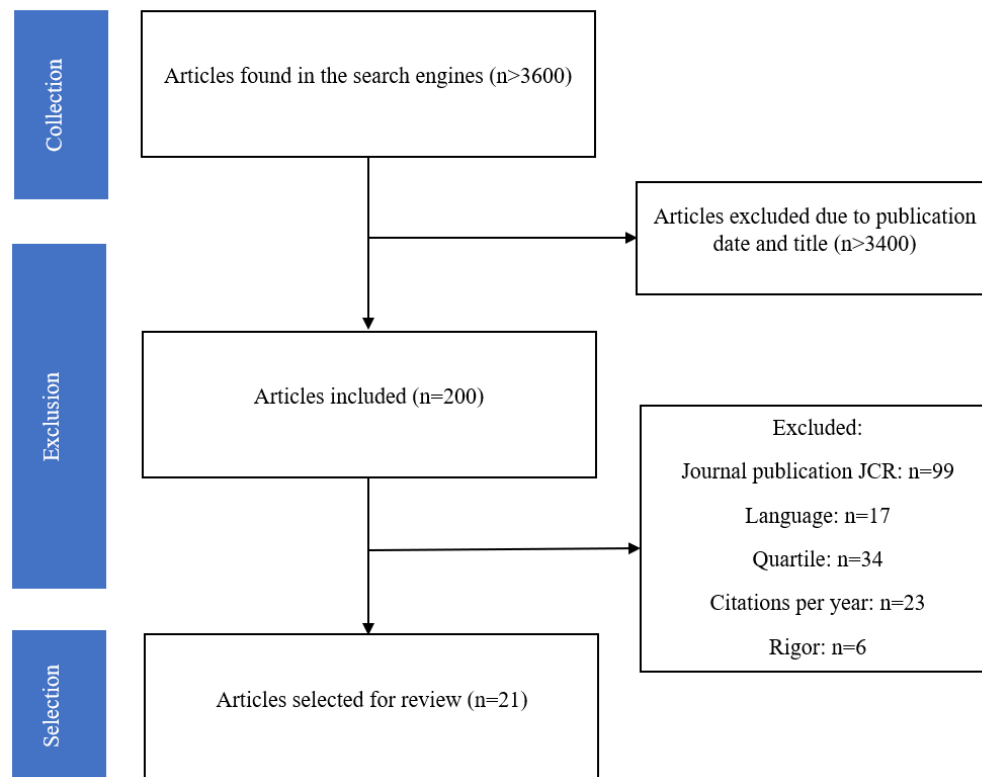
Figure 1. Diagram showing the process of collecting, excluding, and selecting articles for review.

pression [24], they can serve as a strong support due to their potential equivalence. A particularly promising game was Re Mission [4], which, in a study involving cancer patients, yielded results suggesting that an intervention using this video game targeted at behavior could enhance adherence to prescribed oral medication in young cancer patients [4]. Similarly, it was found that healthcare professionals might consider identifying a casual video game prescribed to complement existing medication or other treatment options [18].

One of the crucial yet scarce information areas is the design that therapeutic video games should have. It is known that aspects like design and management of stimuli within a game are vital for their acceptance. Subsequent studies on the use of video games as a therapeutic approach for mental health concerns could concentrate on two primary game categories: uncomplicated social games that are inclusive and enjoyable for individuals of all age groups, and online environments that provide a distinctive chance for narrative and immersive interaction with therapists and fellow patients [13]. However, the latter does not rule out the option of using horror or darker-themed video games.

A relevant gap in the analysis of the literature on this topic shows that there are neglected areas of research, such as the negative effects that video games can have on users. The COVID-19 pandemic caused mental distress to increase among a nationally representative group of American adults in late April 2020 compared to a similar sample in 2018 [9], causing many conservative researchers to continue to attribute all these negative emotions, stressful moods and emotional deficiencies to video games. It is true that the existence of Internet Gaming Disorder (IGD) among young people seems to be more prevalent every day. So it is vitally important to take care of the design of video games, because otherwise this can have a wide variety of consequences related to the users' health and relationships [25]. There is limited research addressing the attributes of video games for controlling negative emotions [15], reducing stress influence on individuals, and also failing to consider the existence of mixed emotions, thereby limiting our understanding of the range of emotions experienced while they play and how we can utilize it to our advantage.

Video games stand out as one of the most attractive technological approaches for creating programs aimed at alleviating stress and anxiety, given their motivating, immersive, and readily accessible nature [11]. Despite this encouraging information, video games do not seem to surpass conventional therapy but are also not defeated by it, possibly since younger patients might be familiar with this technology. One of the main obstacles preventing broader reach of custom-made video games is the involvement of non-experts in video game development. Consequently, they frequently develop products that neglect the fundamental element of engagement in games: enjoyment [1]. Added to stigma and resistance to learning, over time, individuals involved with

Table 1. The final list of articles used in this review, including information for title, year of publication and citation.

Title	Year	Citation
A video game improves behavioral outcomes in adolescents and young adults with cancer: A randomized trial	2008	[4]
Acceptance of Serious Games in Psychotherapy: An Inquiry into the Stance of Therapists and Patients	2016	[5]
Commercial off-the-shelf video games for reducing stress and anxiety: Systematic review	2021	[11]
Evaluating the Utility of a Psychoeducational Serious Game (SPARX) in Protecting Inuit Youth From Depression: Pilot Randomized Controlled Trial	2023	[6]
Mental distress among U.S. adults during the COVID-19 pandemic	2020	[9]
Mental health care for young people using video games: a pilot RCT on the development of a new intervention method toward Hikikomori and Futōkō	2022	[12]
Online Video Game Therapy for Mental Health Concerns: A Review	2008	[13]
Playing video games during the COVID-19 pandemic and effects on players' well-being	2021	[2]
Reach Out Central: a serious game designed to engage young men to improve mental health and wellbeing	2010	[14]
Serious Games for Psychotherapy: A Systematic Review	2017	[15]
Serious games, gamification, and serious mental illness: A scoping review	2020	[16]
The benefits of playing video games	2014	[1]
The Effectiveness of Serious Games in Alleviating Anxiety: Systematic Review and Meta-analysis	2022	[17]
The effects of casual videogames on anxiety, depression, stress, and low mood: A systematic review	2020	[18]
The Efficacy of Playing Videogames Compared with Antidepressants in Reducing Treatment-Resistant Symptoms of Depression	2019	[8]
The promise of the metaverse in mental health: the new era of MEDverse	2022	[19]
The Use of Electronic Games in Therapy: a Review with Clinical Implications	2014	[20]
Video Games in Health Care: Closing the Gap	2010	[21]
Video games, emotion, and emotion regulation: expanding the scope	2018	[22]
Videogames and Young People with Developmental Disorders	2010	[23]
Winning The Game Against Depression: A Systematic Review of Video Games for the Treatment of Depressive Disorders	2022	[24]

video games tend to see fewer drawbacks in using serious games in a psychotherapeutic setting [5]. Similarly, they remain a more comfortable option for patients who cannot overcome the stigma of psychological attention. Current studies on the connection between video games and emotions appear to adhere to a predictable and repetitive pattern, often failing to explore beyond the age-old inquiry of whether video games have positive or negative effects on children. However, those who do delve deeper establish that serious games are not only superior to a control condition in learning and behavior but also enhance knowledge about effective anxiety and anger management strategies, they also aid in dealing with symptoms of depression and stress [15]. Beyond the cheerful and colorful design that any game could easily adopt, the technology it employs is even more critical. Thus, the greatest bet continues to be on AR/VR technology, as its more immersive attributes have shown better results in patients with the aforementioned symptoms [19]. It has even become a game-changer for this medium, dispelling the notion that games must always have bright and stimulating designs.

On the other hand, video games implemented in the field of mental health are becoming an increasingly viable option [21], as they have aided in reducing mood disturbances, depression, and stress [22], helping certain patients regulate their emotions. It is worth noting that in the case of depression, while common discomforts were reduced, they did not disappear entirely [24], indicating that the implementation of serious games as a treatment would be more complementary [8]. There are other conditions for which these games can be implemented, such as in individuals on the autism spectrum, attention deficit hyperactivity disorder, and specific language impairment [23]. Additionally, it was noted that more appealing incentives are needed for research participants, as they easily lose interest when the concept does not seem relevant to them [14]. It has been demonstrated that younger individuals and those in their twenties find it unappealing to focus on their mental health due to various concerns that this may entail [12].

Broadly speaking, video games offer pleasure, greatly motivating chances for skill enhancement, and cognitive and imaginative stimulation. All of these represent particularly meaningful types of assistance for children dealing with developmental disorders [23]. One aspect that is being pursued and is more within the reach of science is the use of various platforms for diagnosing or monitoring patients who require services such as therapy [5].

4. Discussion

We reviewed research and articles on the use of video games in mental health treatment. Previous reviews have shown that the use of video games for mental health treatment, as well as the creation of video games for that purpose, have shown effective results [1].

The use of video games in the treatment of mental health has been proven to be effective and offers greater comfort compared to conventional methods [1]. Likewise, it has been shown that video games not only serve to entertain, but also have great potential in various psychological areas, ranging from learning to emotional control [22, 26, 27]. The focus extends beyond console and desktop gaming; AR/VR has also been implemented as a new experimental treatment that has shown very positive results [19]. Video games have been introduced to regulate emotional states due to their impact on emotions, suggesting that technology has the ability to satisfy psychological needs to some extent, which is why they could be a great tool [22, 26]. Our review illustrates how several investigations have previously shown that the use of video games and how others have previously investigated this topic arriving at the same point that is the efficiency and benefits it has, in different applications produced positive results [28] in the treatment of health mental, but unfortunately, they are not used as frequently as one would expect.

Review of the articles and findings show that there are numerous research studies and reviews that analyze the use of video games in mental health, how it can be used and how it is effective [28]. This has become a topic of great interest in both psychology and medicine, with the aim of facilitating and improving methods for mental health [1]. Several new strategies were identified that involve cutting-edge technologies used by video games for treatment, each one with different approaches.

A significant number of articles share certain similarities with our general findings. In general, we agree that experiments and studies have been carried out that have demonstrated their effectiveness and their way of acting with mental health; there are really many benefits they offer that can improve the way mental health is treated. Each article tends to focus on a specific topic or a more specific area. The articles present differences in themes; some illustrate how video games impact emotions [22], others highlight the positive impact of video games on mental health [1], emphasizing the importance of actively involving patients in the development of video games designed for mental health [1]. They suggest that a promising approach to improving the effectiveness of these games is to directly involve patients in the development process [1].

Due to the limited number of articles specifically addressing the creation of custom-made video games for the assessment and treatment of mental health, our article search had to focus more on the utilization of video games for mental health treatment and its findings. A question that remained unanswered was, "why are they not currently being used?". Most of the gathered documents discuss the usefulness of video games, but they do not specify the reasons for their limited utilization and integration alongside conventional treatments.

The significant potential demonstrated by video games in mental health is becoming an increasingly interesting topic for healthcare specialists. However, there are many uncertainties surrounding this. The most effective way to employ video games is a subject lacking sufficient research a relatively "new" treatment style, a definitive and straightforward method has not yet been identified to yield promising results. While a considerable portion of the population has accessibility to video games, certain new technologies like AR and VR are not accessible easily due to their high cost in the market. These technologies have proven to be valuable and functional tools in the mental health treatment [1]; efforts must be made to find new ways to make them more accessible to people.

Computer games, console games, and mobile games are feasible tools for mental health treatment and their effectiveness has been well demonstrated [27]. In some ways, they can make treatment easier and provide important help to people experiencing mental health issues. As mental health issues become more common, research on this topic is also trending in this area. Trying to find new treatments is one way to improve this situation and address the various mental health challenges.

5. Conclusion

Therapeutic video games are a good complement to the treatment of various psychological disorders or problems, since they can also relieve associated symptoms. Because mental health issues are very common globally, affecting 14% of the entire world population, it is necessary to reach a large number of patients, and one way to facilitate this is through these platforms or games [29]. On the other hand, the research also explores the use of other technologies, such as VR, to address these problems. Additionally, there are still unexplored areas and gaps in research, so it is expected that more will be learned in the coming years. It is also important to note that the lack of proper design of therapeutic video games and the involvement of non-experts in their development may hinder their wider use. The design of therapeutic video games must address different therapeutic methods such as exercise, cognitive programs, etc. Recognizing that commercially available video games can be useful as an adjunct to therapy emphasizes the importance of offering a variety of interfaces and experiences. Immersive technologies stand out for their ability to improve engagement and emotional management in therapeutic sessions.

The presented and explored results in the article stem from our analysis of the selected articles for review. Research on video games, their use, and influence in treating psychological disorders show promising results; it is known that video games influence the minds of players and can be used to guide their thoughts. The im-

plementation of these video games in young adults with various psychological disorders shows that, if used correctly, they can yield positive and promising responses. Patients demonstrate progress and improvements in certain areas affecting their daily lives, such as anxiety, depression, insecurities, difficulties in performing specific tasks, among others [30].

Managing psychological disorders with software, in this case, video games, has led many scientific areas to focus more on the subject. Both short and medium-term clearer answers are expected, and in the long term, programs or plans developed with a mental health professional are sought to optimize the quality of life and reduce the negative effects [17]. However, it is essential to remember that these video games are only a complementary tool for treatment and should not be considered a complete treatment or control for users. Consulting an expert is always necessary, as research is ongoing, and much remains to be clarified. It was also acknowledged that a high percentage of the population has easy access to video games due to the internet. Similarly, high percentages of the population experience different psychological disorders that could potentially be treated with favorable results. Consider-

ing the costs of this technology, which is quite expensive but has proven to be effective [31], it would be beneficial to explore ways to make it more accessible so that everyone has the same opportunity to access this new treatment modality for psychological disorders [32].

During the review of various articles on the use of video games, it was noted that most demonstrated the progress, achievements, and effectiveness of their use, but the reasons for not currently integrating them with existing mental health treatments were not found. This lack of information is probably causing a decrease in specialists' interest in the field, as there are very few articles specifically addressing the creation of custom-made video games for mental health, while those which do, have been conducted on a limited number of individuals. Interpreting results from small groups is not a statistically reliable information source. [17]. Similarly, it is unknown whether there will be long-term negative effects that may harm the patient's treatment [15]. Despite knowing that several benefits can be obtained from the use of custom-made video games, a simple and promising way to achieve this has not yet been definitively found.

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