

Research Article

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Exploring the Effectiveness of Virtual Reality Role-Playing in Debating Repatriation of Artworks in Active Learning Art History Classes

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ABSTRACT

This paper addresses the pressing issue of repatriation debates for artworks, heightened by notable instances like the return of the Benin Bronzes and discussions around the Elgin Marbles. Given the challenges in conducting effective classroom debates on such sensitive topics due to the pandemic, generational shifts in learning preferences, and increased student anxiety, this study identifies a gap in the integration of active learning strategies in a virtual setting. The primary aim of this research is to examine the efficacy of virtual reality role-playing games (VR-RPGs) in enhancing student engagement, immersion, presence, and learning outcomes within a virtual learning environment (VLE). This is set against the backdrop of the potential advantages of VR-RPGs, which allow students to adopt different personas, thus potentially reducing direct confrontation and facilitating a more immersive learning experience. The research contributes to the pedagogical field by assessing the applicability of avatar-based VR-RPGs in VLEs and examining their correlation with improved understanding of cultural repatriation ethics, diverse perspectives, and alleviating student anxiety in groupwork. Our results indicate a notable positive relationship between VR-RPG activities and the aforementioned learning outcomes, signifying the importance of such approaches in contemporary art history education.

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Introduction

Games, when conceptualized as mechanisms for overcoming challenges, offer unique and engaging experiences. As articulated by Suits (1978, p.11), they present a “voluntary attempt to overcome unnecessary obstacles.” When employed in an educational context, role-playing games (RPGs) not only serve as tools for self-discovery but also foster empathy and socio-cultural understanding. Despite the traditional perception of RPGs being ‘just play’, their relevance has extended to domains as diverse as disaster preparedness, military training, and understanding global perspectives [1]. Furthermore, the educational potential of games extends beyond mere entertainment, offering learners environments conducive to ethical, moral, and social development [2, 3]. Within classrooms, role-playing techniques often facilitate a shift in perspectives, compelling students to assume different roles or ponder on ‘what-if’ scenarios [4, 5].

The advancements in virtual learning environments (VLEs) have brought forth promising avenues for pedagogical innovation, yet their full potential remains under-researched. While VLEs hold the capability of fostering student engagement analogous to traditional classrooms, the nuances of their immersive potential necessitate in-depth exploration. Recent studies indicate the potential of various technologies, such as augmented reality in enhancing teaching-learning processes in fields ranging from astronomy to chemistry

and botany [6-8]. However, their applicability in facilitating discussions on intricate topics, like artwork repatriation, within a controlled emotional setting remains a significant research gap.

Virtual reality (VR), by virtue of its immersive capabilities, presents an exciting proposition. Unlike traditional media, VR provides a consistent, controlled environment, ideal for eliciting specific emotional responses, thus simulating real-life scenarios [9]. The challenge, however, lies in leveraging VR to translate these emotions into meaningful learning experiences. Moreover, with the rise of AI systems like ChatGPT, there’s an expanding horizon for tech-enhanced learning, as evidenced by studies which underscore the significant applications of such AI in education [10-12]. The study, therefore, embarks on a twofold mission. Firstly, it seeks to bridge the aforementioned gap by examining the effectiveness of VR role-playing within VLEs, specifically in the context of art history debates. Secondly, it intends to ascertain whether these VR-RPG environments can foster nuanced understandings of complex topics, alongside ensuring emotional well-being. By doing so, we endeavor to contribute to the growing body of knowledge on immersive tech-enhanced learning, underlining the multifaceted problems our research addresses and offering relevant solutions for contemporary education.

In the evolving landscape of educational methodologies, our research intends to discern the pedagogical viability of integrating role-playing within a Virtual Learning Environment (VLE). A particular area of interest is how the customization of student avatars and immersion in historically pertinent settings can

influence various dimensions of learning, such as engagement, immersion, presence, and overall outcomes. Drawing from contemporary events and the heightened media spotlight on repatriation ethics, especially following the return of the Benin Bronzes and the passing of Queen Elizabeth II [13]. We devised a role-playing scenario. Students from two distinct sections of the History of Western Art to 1300 which spans from prehistory through the Renaissance were tasked with conducting a mock trial debating the repatriation of the Elgin Marbles housed in the British Museum.

The comparative methodology comprised of two settings: one class engaged in the debate within a conventional classroom, mirroring their typical learning environment, while the other utilized virtual reality headsets within the XR and Gaming Lab. An evaluation via student surveys, artifacts generated post-experience, and instructor feedback yielded significant insights. A prevalent sentiment across both groups was the role-playing exercise's efficacy in fostering self-reliance in learning, augmenting an appreciation for diverse perspectives, and providing a nuanced understanding of the multifaceted ethics concerning cultural heritage repatriation.

However, a pivotal distinction emerged in the virtual reality cohort's feedback. While technical challenges momentarily impeded some facets of the experience, the broader feedback underscored VR's potential in resonating with distance and asynchronous learners. Reflective essays penned by participants illuminated the unique advantage of VR: despite technical hitches, the immersive technology significantly mitigates barriers inherent in face-to-face dialogues. Furthermore, students noted the alleviation of anxiety and heightened comfort in collaborative settings. Therefore, this research addresses a nuanced gap in the literature, providing empirical insights into the symbiosis of role-playing and VR in fostering robust educational outcomes. Through rigorous methodology and comparative analysis, our findings underline the multifaceted advantages of integrating immersive technologies in addressing contemporary debates in the realm of art history and beyond.

Literature Review

Virtual Reality in the Art History Classroom

The exploration of technological interventions, especially virtual reality (VR), in education has evolved over the past decade. One field that has seen a particular uptick in VR incorporation is art history. The theoretical basis for utilizing VR in educational contexts stems from constructivist learning theories, which posit that learning is an active process where students construct knowledge based on their experiences [14, 15]. VR, by virtue of its immersive nature, offers experiential learning opportunities that align with Kolb's (1984) Experiential Learning Theory. Such immersive experiences allow students to undergo a concrete experience, followed by observation and reflection, leading to abstract conceptualization and, finally, active experimentation.

The adoption of virtual reality (VR) in art history education has seen a surge, driven by the increasing accessibility of the necessary equipment and software [16]. Initial research in this domain delved into the immersive, engaging, and instructional capacities of VR, highlighting its ability to enrich conventional art history lectures. For example, Casu, Spano, Sorrentino, and Scateni (2015) capitalized on the affordability of mainstream VR devices to create an educational application. This platform enabled the juxtaposition of artworks within virtual settings, granting educators the flexibility to embed diverse multimedia elements,

from audio to written narratives. A distinctive advantage of these digital realms is their capability to facilitate comparisons in settings that would be unfeasible in the tangible world. Pioneering VR platforms, like ArtRift, have been designed specifically for art history enthusiasts and educators. ArtRift lets users craft virtual museum spaces filled with curated art pieces and supplemented by rich multimedia annotations. Extending the application of VR to broader educational contexts, Brownridge (2020) suggested a curriculum wherein K-12 students embark on virtual excursions using Google Expedition (GE). Successive research has consistently evidenced an uptick in student engagement and enthusiasm upon the integration of VR into their curriculum.

Consistent positive associations between VR usage and improved learning outcomes have been validated in higher education research. Over the past few years, the adoption of immersive technologies in academic settings, especially within history and art history disciplines, has notably increased. [17]. highlighted the employment of such immersive tools in instructing the history of Western architecture. Using platforms like Google Earth VR (introduced in 2017), Ghida presented architectural monuments in a three-dimensional format, allowing students to perceive the structures at a true-to-life scale. In a parallel vein, immersive technologies were harnessed in a Renaissance art history course at the University of Indiana, Bloomington. Brennan (2018a), teaming up with expert Dr. Giles Knox, crafted four fresco cycles via the Unity game engine. Due to hardware constraints of the HTV Vive headset, requiring a desktop connection, the campus's virtual reality lab facilitated sessions for limited student groups outside regular classes. After traditional in-class instruction, students were immersed in the frescoes using a 360-degree photographic framework, navigating the virtual space through teleportation between distinct visual nodes. This virtual exploration was further enriched by embedded Smarthistory lectures, activated upon nearing specific artworks. Notably, though the application underwent several refinements post-playtesting to enhance user interaction, there was an absence of data collection pertaining to learning outcomes and taxonomic evaluation. A deeper probe into this realm is crucial to ascertain the full scope of immersive technologies in bolstering classroom engagement and learning efficacy.

More recently, have noted that educators and researchers alike have begun exploring the potential applications of this technology in the classroom and continue to discuss the pedagogical applications [16]. Central to this discussion are a few pressing questions: How does VR reshape student engagement and motivation in art history? What discernible effects can be observed on learning outcomes when VR is integrated into the art history curriculum? And perhaps most crucially, how can we fine-tune our teaching methods to fully exploit the myriad possibilities that VR offers for art history education?

This shift toward immersion is further supported by the empirical work of [18]. Through surveys, they showcased the pivotal role VR can have in fostering deeper learning experiences. Their findings linked VR use to heightened motivation and reinforced retention of knowledge among students. Yet, it was their subsequent study in 2022 that truly illuminated the interplay between VR and traditional teaching techniques. By using Bloom's revised taxonomy as a framework, they assessed the pedagogical efficacy of VR. Their research juxtaposed various teaching modalities, revealing that the optimal educational experience was achieved when students were first introduced to topics via VR, supplemented by other materials, and then delved deeper into the subject through

traditional lectures and discussions.

In sum, while there's undeniable enthusiasm around the transformative potential of the technology in the art history classroom, the journey of integrating it effectively has just begun. There's a compelling need to navigate the intricate relationships between established learning theories, modern pedagogical strategies, and the evolving technological landscape of VR. Bridging this research gap requires a holistic approach, one that marries foundational educational principles with the boundless possibilities offered by emerging VR technologies. As educators and researchers, the task ahead is clear: harness VR's promise to truly revolutionize the way art history is taught and experienced.

Virtual Reality and Active Learning

The role of virtual reality in enhancing the educational experience has been subject to extensive research, with overwhelmingly positive results. Salzman et al. (1999) provided a foundational model that illustrated how virtual reality can substantially improve conceptual learning, affecting both the process and outcomes of education. This model has been validated by a series of studies, including Bowman et al. (1998), which emphasized that virtual environments facilitate a seamless integration between symbolic information and experiential learning, thereby boosting comprehension and retention.

Moreover, a multitude of research has established a positive relationship between the use of immersive technology and various educational metrics. For example, studies on motivation enjoyment in learning, and deeper understanding and long-term retention all converge on the notion that virtual reality has the capacity to improve educational outcomes [19-21].

In the context of active learning—a pedagogical approach that values interactive and dynamic student engagement—virtual reality has emerged as an innovative tool. As Bekele and Champion (2019) articulated, virtual reality in active learning environments characteristically allows for the establishment of contextual relationships, promotes collaboration among users, and fosters deeper engagement with the material and the learning environment itself. These features pave the way for a rich, interactive educational experience that has the potential to redefine traditional teaching and learning methods.

Role-Playing Games

Role-playing games (RPGs) have evolved considerably over the past three decades and are now integrated into various forms of education, both in digital and non-digital formats [22]. Originating from the Dungeons & Dragons games of the 1970s, RPGs offer a wide range of experiences involving varying numbers of participants and diverse rule systems [23]. Defines an RPG as a framework in which players collaboratively build and navigate fictional or reimagined worlds [24]. According to the essence of RPGs lies in collective storytelling and identity transformation [25]. These games come in various formats, such as tabletop, live-action role-playing (larp), and online gaming, each focusing on different types of interactions. Their application in educational settings has shown promise in promoting active, communal, and social learning experiences.

Digital adaptations of RPGs are increasing in educational contexts, especially with the incorporation of virtual reality (VR) [26]. points out that MMOs (Massively Multiplayer Online Role-Playing Games) present a unique learning environment that encourages social interactions and problem-solving, particularly in the realm

of science education. Cox (2014) extended the application of RPGs to arts education, emphasizing the utility of such games for collaborative art production and personal reflection. RPGs are versatile tools that can facilitate deep emotional experiences, self-awareness, and a multitude of practical skills such as critical thinking, public speaking, and spontaneous problem-solving [21].

The Ethics Practice and Implementation Categorization (EPIC) Framework provided by Schreier (2015) offers another dimension to the application of RPGs in education, especially in teaching ethics. Using empirical data and thematic analysis, proposed a model that categorizes ethical decision-making processes in video games, encompassing reflection, information gathering, reasoning, and empathy-related skills [27]. This model offers valuable insights into designing educational scenarios that stimulate ethical thinking and decision-making. Moreover, the appeal of VR is not limited to specific groups. Research indicates that virtual environments can be particularly beneficial for introverts and individuals with autism spectrum disorder (ASD). A study by Amichai-Hamburger et al. (2002) suggested that such individuals find virtual interactions more genuine compared to face-to-face communication. More recent research by Vianez et al. (2022) and Suh and Ahn (2022) supports this by showing that VR can reduce social anxiety across different demographics. These findings indicate the therapeutic and educational potential of VR and RPGs, especially for individuals who find traditional social interactions challenging.

Methodology

The methodology of this study was designed to evaluate the effectiveness of using virtual reality (VR) in active learning and role-playing scenarios within an academic context. The sample population included 50 students enrolled in two General Education sections of "History of Western Art to 1300" at Lindenwood University, a private, four-year liberal arts institution in the suburban area of St. Louis, Missouri. These students were from diverse academic backgrounds, representing the Colleges of Education and Human Services, Arts and Humanities, Science, Health and Technology, and The Plaster College of Business and Entrepreneurship.

The study used a multi-pronged data collection approach that included:

1. **Student Surveys:** A pre-designed questionnaire containing both Likert-scale and open-ended questions to gauge students' perceptions and feedback.
2. **Instructor Feedback:** Post-experiment comments from the instructors regarding the students' engagement and participation.
3. **Short Essays:** Students were required to submit reflective essays based on their experience.
4. **Class Observations:** Data collected during class sessions to observe student interactions and participation.

To ensure the reliability and validity of the instruments, the survey was pilot-tested with a small sample before full deployment. The survey items were reviewed for clarity and coherence, and a Cronbach's alpha analysis was conducted to assess internal consistency.

The study was carried out during the Fall semester of 2021. The classes followed a hybrid format, blending face-to-face sessions with out-of-class assignments like readings, research, and recorded lectures. Students were assigned to research the arguments for and against the repatriation of the Elgin Marbles and role-play various positions in a trial. One class executed the trial in a

conventional classroom setting, while the other used a Virtual Learning Environment (VLE) in VR. Data was collected using Qualtrics to guarantee anonymity and privacy. The survey was available for approximately two weeks following the course's conclusion. Descriptive statistics were calculated to summarize and interpret the survey data. These results were then triangulated with qualitative data derived from reflection papers, assignments, and exams. The comparison aimed to offer comprehensive insights into the students' experiences and learning outcomes.

The mixed-methods approach was selected as the most appropriate methodology for this study for several reasons. Firstly, the research questions inherently required a multi-faceted approach to capture both objective and subjective data. Quantitative data, such as student engagement metrics and test scores, offer measurable outcomes, whereas qualitative data, like student and instructor feedback, provide context and depth to those outcomes. Secondly, by incorporating various types of data (surveys, essays, observations), the study aims for a more comprehensive understanding of the research problem. Lastly, the mixed-methods approach is particularly well-suited for educational research where the learning experience is influenced by various factors that cannot be fully captured through a single-method design.

Results

As we revisit the research questions that guided this study, it's worth noting that they were designed to explore student perceptions about the effectiveness of using virtual reality (VR) versus traditional face-to-face settings in active learning role-playing games (RPGs). We were also interested in how the chosen modality impacted student engagement and their understanding of the topic, and whether there were any limitations in either modality that could hinder learning.

1. How do students perceive the effectiveness of using virtual reality (VR) in active learning role-playing games (RPG) as compared to traditional in-person settings?
2. Does the modality (VR or face-to-face) impact student engagement and understanding of the topic of repatriation of the Elgin Marbles?
3. Are there any limitations or challenges observed in either modality that could inhibit student learning?

The demographics of our sample of 50 university students largely align with those in previous research [18,28]. Most were aged between 18-24 and were taking the course to satisfy General Education requirements. One of our more compelling findings pertained to student preparedness. While a high percentage of students—86.21% to be exact—in both the face-to-face and VR cohorts felt at least “somewhat prepared” for the exercise, the face-to-face group had nearly twice as many students who felt “very prepared.” This addresses our first research question and suggests that familiarity with the learning environment may play a role in student preparedness.

Addressing our second research question, we found noteworthy differences in how engaging the two groups found the experience. Although students in both modalities agreed on the exercise's overall value, those in the face-to-face environment were significantly more likely to find it “very” to “extremely useful” for understanding the topic at hand. Only a small percentage in the VR group felt the same, indicating that while VR has the potential for high student engagement, its actual impact may vary. Surprisingly, fewer students in the VR cohort felt the experience inhibited their learning, contrary to those in the face-to-face cohort. This counterintuitive finding partially answers our third

research question by pointing out that while VR may not offer as engaging an experience, it doesn't necessarily inhibit learning either. Complaints in both groups often revolved around the time and effort required for the assignment.

For academics and practitioners, these results are invaluable. They highlight that while introducing innovative technologies like VR can be beneficial, doing so without adequate student preparation can negate these advantages. Therefore, a balanced and well-planned approach to incorporating VR is recommended. Concerning the generalizability of our findings, although the sample was confined to a specific university and subject, the study's methodology is designed to be adaptable across various educational contexts. However, the limited sample size and diversity should be taken into consideration when applying these findings more broadly.

Additionally, both face-to-face and VR modalities were found to improve students' sense of responsibility for their own learning and their understanding of diverse perspectives. Interestingly, VR was lauded for its capacity to break down social barriers, though students also noted initial technical challenges. The findings thus make a significant contribution to the emerging research on the effectiveness of VR in educational settings. While VR offers promising avenues for enhancing student engagement and social interaction, these advantages are not guaranteed and depend on how thoughtfully the technology is integrated into the learning experience.

Discussion

The present study adds to the burgeoning literature on the use of social virtual reality (VR) in educational settings, with a unique focus on student perceptions and psychological outcomes. While existing research, such as the work by Barreda-Ángeles and Hartmann (2022), has examined the psychological benefits of VR, including spatial and social presence, the study offers nuanced insights into the relationship between these forms of presence and learning efficacy. Notably, the understanding that VR does not necessarily need to offer a highly engaging experience to prevent it from being a hindrance to learning is unique. This finding could be crucial for educators who might be reluctant to implement VR due to concerns about its potentially distracting nature.

In the broader context of mental health and well-being, our research presents timely findings, especially when considering the current global scenario of increased fatigue, anxiety, and depression due to the pandemic. Previous work has focused on the detrimental effects of prolonged video conferencing, commonly referred to as “Zoom fatigue” (Fosslien & Duffy, 2020). In contrast, our study highlights the potential benefits of VR-based educational experiences as an alternative to traditional online modalities. We offer initial evidence that social VR environments may alleviate some of the challenges faced by students, particularly those struggling with social anxieties, thus dovetailing with research by Coban, Bolat, & Goksu (2022), which emphasized VR's role in creating safe spaces for individuals with social anxiety, depression, or introversion.

What is noteworthy is the exploration of the potential of social VR for marginalized groups, such as those suffering from social anxiety or introversion, within an educational context. While other studies have mostly focused on the general populace, our research directly addresses a group that could derive the maximum benefit from this technology. We found that the controlled, customizable nature of social VR settings like Spatial, Horizons Workroom, and Meeting VR can enhance comfort and ease of engagement

among these students. This customization goes beyond the mere aesthetics of avatars and includes adaptable settings like minimal lighting and mutable soundscapes that contribute to a comfortable learning environment.

The uniqueness of our findings lies in the detail we provide concerning how different elements within VR can be fine-tuned to cater to different psychological needs. This advances the field's understanding of how to make VR more inclusive, a vital aspect given the technology's increasing integration into our daily lives. Respondents in our study noted a significant level of comfort when they could control these elements, suggesting that VR developers and educational technologists should consider such customization features as they develop the next generation of VR learning environments. The study expands the conversation around social VR by bringing educational contexts into sharper focus, emphasizing the experiences of marginalized groups, and exploring the nuances of how specific features within VR platforms can significantly impact users' comfort and learning effectiveness.

Conclusion

As the landscape of higher education evolves with the adoption of online, asynchronous, and hybrid learning models, the present study provides crucial insights that contribute to fresh understanding in the field of educational technology. Specifically, this research extends existing studies by exploring the utility of role-playing games in social virtual reality environments as effective tools for learning and engagement. This focus is particularly relevant for groups that may experience social anxiety or introversion.

The results of this study suggest that integrating role-playing elements within virtual reality not only creates an engaging platform for critical thinking exercises but also eases some of the initial discomfort associated with group formation and social interaction. This has particular relevance given the heightened levels of anxiety reported among students in the current generation, as documented in previous studies [29]. Therefore, the study offers insights into how role-playing games in social virtual reality can be transformative for remote learning by providing a more comfortable and efficient avenue for student engagement.

However, limitations of the current study must be acknowledged. The research focused on a specific subset of social virtual reality platforms and student demographics, which might not be fully representative of the broader student population. In addition, the study did not explore the impact of long-term engagement or its potential influence on academic outcomes. These areas present opportunities for future research that can delve into these aspects in a more detailed manner. Nevertheless, as the metaverse continues to rise in prominence, it opens new avenues for research. Understanding how social virtual reality and role-playing games can be optimized for a variety of educational settings gains importance as geographical limitations become increasingly less relevant in a virtually connected world. Further studies are essential for examining how student perceptions and learning outcomes evolve in these innovative educational landscapes.

Declarations

Ethical Approval

Internal Review Board approved study as defined by applicable regulations (45 CFR 46.102) and the Lindenwood Human Subjects Research Policy and Procedure.

Competing Interests

Not applicable

Authors' contributions

The authors confirm contribution to the paper as follows: study conception and design: Hutson, J., Olsen, T.; analysis and interpretation of results: Hutson, J., Olsen, T.; draft manuscript preparation: Hutson, J.

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Availability of Data and Materials

Data available upon request

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