

# Art and Nature: Enhancing Well-Being and Cognitive Recovery Healthcare Environments Through Immersive Nature-Inspired Interventions in Malaysia

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## ABSTRACT

Over the years, healthcare environments have evolved to improve patient health by implementing non-invasive methods that can alleviate stress, anxiety, and cognitive fatigue, all of which have a significant impact on patients' outcomes. As hospitals tend to have a sterile and impersonal environment, it is critical to explore alternative therapeutic tools. This conceptual paper explores the potential of immersive media art as a therapeutic intervention in the healthcare environment to promote well-being and enhance patient outcomes through immersive nature-inspired experiences. The paper draws qualitative data from semi-structured interviews with healthcare professionals (doctors, nurses, and art therapists), patients, and industry experts, artists or designers, as well as observational data from the installations within healthcare environments can positively impact patient mental health and recovery. This study synthesizes insights from Stress Recovery Theory (SRT), Attention Restoration Theory (ART), and Flow Theory (FT) in psychology to develop a comprehensive framework for understanding how immersive nature-inspired interventions can enhance cognitive functioning, reduce stress, and improve emotional well-being in healthcare environments. The finding reveals that immersive media art can help to reduce stress, and these findings provide support for the idea that interactive media art is an effective means not only of cognitive restoration but also of attaining a flow state enabling emotional resilience. It also emphasizes the design of healthcare environments where biophilic and patient-centered spaces enhance and potentiate virtuosity in media arts interventions. This study contributes to the literature on art-based interventions in healthcare by highlighting the value of immersive, interactive environments that bridge the therapeutic qualities of nature and art. These findings provide insights for healthcare providers and policymakers seeking to implement alternative, patient-centered approaches to well-being. It provides an illustrative framework that could guide healthcare providers and designers in applying media arts to support holistic patient care conditions. Future research should explore diverse patient populations and examine long-term impacts on clinical outcomes.

**Keywords:** Immersive Media Art, Nature Environment, Healthcare Environments, Recovery Theory (SRT), Attention Restoration Theory (ART), Flow Theory (FT)

## INTRODUCTION

Globally, there has been a growing debate over the past few years about how the environment affects health and well-being. Aside from this, the numbers of mental disorders such as depression or chronic diseases are increasing rapidly and so is stress-related problems. According to World Health Organization (2022), depression would become the leading cause by 2030 of disease burden globally. Growing populations, technology exposure, and disconnect from nature have escalated these issues. Previous studies show that exposure to natural environments can improve human health by reducing stress and increasing cognitive function, as well as promoting general physical, emotional, and behavioral well-being (Ulrich, et al., 1991). Meanwhile, healthcare environments have become increasingly sterile and impersonal, raising concerns

about their impact on patients' mental and emotional health. As a result, there is a growing interest in incorporating nature and digital technology into healthcare treatments to enhance patient outcomes and experiences.

Media art has emerged as an appropriate choice, merging the sensory, immersive, and aesthetic elements of art with the therapeutic benefits of natural environment. The use of advanced technology to create natural environments in hospital environments, immersive media art may convert sterile areas into immersive, calming atmospheres that enhance patient recovery and well-being. These solutions are based on biophilic design concepts, emphasizing the psychological and physiological advantages of human-nature connections (Kellert & R., 2008). The breakthroughs in virtual and augmented reality, together with interactive installations, are widely acknowledged for their potential to enhance well-being in hospital environments through immersive media art. This paper aims to explore the use of immersive media art as a therapeutic instrument to cultivate a feeling of immersion in nature inside hospital environments, hence boosting well-being and improving patient outcomes.

## RESEARCH GAP AND OBJECTIVES

Despite the growing recognition of the therapeutic benefits of nature and interactive media art, a significant gap remains in the research concerning the systematic integration of digital simulations of natural environments into healthcare settings. Existing studies primarily concentrate on the advantages of real nature or isolated digital art interventions in specific contexts such as museums or public spaces, but there is a dearth of research on the intentional design of interactive media art to replicate nature in healthcare environments, especially in Malaysia. Furthermore, while international studies have provided promising evidence, the cultural and contextual relevance of these interventions within the Malaysian healthcare system remains underexplored. This research aims to address these gaps by examining how interactive media art, designed to evoke natural environments, can be used as a therapeutic tool in healthcare settings. The specific objectives of the research are as follows:

1. To explore the role of immersive media art through nature-inspired interventions in the healthcare environment in promoting well-being.
2. To analyze the potential of immersive media art through nature-inspired interventions in reducing stress and anxiety in healthcare environments.
3. To propose a framework for implementing immersive media art through nature-inspired interventions in the healthcare environment.

## LITERATURE REVIEW

### Defining Immersive Nature in Healthcare Environment

The approach of immersive nature in the healthcare environment is about incorporating natural elements into digital using interactive art to create engagement and experience for the user or patients to enhance patient well-being. This approach is a combination of art and technology to replicate natural environments in healthcare through sensory experiences, including visual and natural sound. In healthcare, immersive media art has increasingly become an attractive mode of bringing new experiences for patient care and experience. These immersive installations use a combination of art and technology to transform a calming healthcare environment into nature-based to promote positive emotion and well-being and reduce stress and aid in recovery. Rather than just observing nature, immersive media art takes this relationship a step further by making it an interactive, active and engaging experience. With technologies like virtual reality (VR), augmented reality (AR), and multimedia installations, patients and visitors can immerse themselves in calming virtual landscapes, natural sounds, and other soothing stimuli. This interaction goes beyond traditional art or nature exposure by encouraging people to engage with these environments, which often leads to a stronger emotional and mental impact. Additionally, interactive media is adaptable, allowing for personalized experiences that meet the unique needs of each patient or setting. Numerous studies, like (R. S.

Ulrich, 1984) reveal that spending time in nature has been found effective in reducing stress and anxiety and relief from negative emotions. Interactive media art that reproduces or even enhances natural environments might further amplify these effects, creating context specific and immersive forms of expression than induce states of relaxation and control with patients reportedly feeling better overall about themselves.

Recent research has focused on the role of interactive art and virtual nature in promoting well-being, especially in healthcare settings. The selected studies emphasize that virtual and media-based representations of nature provide substantial therapeutic benefits, especially in environments where access to real nature is limited.

Table 1 Literature Review

Author(s)	Year	Title	Method	Key findings
Raja Eda Shabina et al.,	2024	Media Art in Healthcare Environments: Enhancing Student's Well-being and Mental Health	Qualitative, interviews	The use of media art installations in the healthcare environment promotes positive well-being and mental health among students, patients, and staff.
K. Sansal, A. Simsek, S.Aktan et al.,	2024	Restorative Effects of Virtual Nature on the Emotional Well-being of Community-dwelling Older Adults	Quantitative	The study found that viewing virtual nature significantly improved positive affect and decreased negative affect among the participants, whereas the urban video had the opposite effect. Nature scenes were perceived as more restorative, enhancing emotional well-being, even for those with limited prior nature exposure or virtual reality experience. Interestingly, individual differences in nature connectedness and outdoor visit frequency did not significantly influence the emotional outcomes of the virtual nature experience.
Sarah Hian May Chan et al.,	2021	Nature in virtual reality improves mood and reduces stress: evidence from young adults and senior citizens	Virtual reality (VR) intervention	The study found that exposure to nature through virtual reality significantly improved mood and reduced stress levels in both young adults and senior citizens. The VR nature experience was effective in lowering stress-related physiological markers (e.g., heart rate) and improving self-reported emotional states.
M. White, L. Elliott, M.Gascon et al.,	2020	Blue space, health and well-being: A narrative overview and synthesis of potential benefits	Narrative review	The review concluded that greater exposure to blue spaces is positively associated with improvements in mental health and well-being. Living near or having a view of water is linked to better self-reported mental and general health, particularly in lower-income populations.

Raja Eda Shabina et al., (2024) have explored the impact of interactive media art installations on well-being and mental health, specifically on students in healthcare settings. The media art installation is an interactive

work thoughtfully illustrated to immerse users to engage and interact with the installation while waiting for treatments in the hospital. The studies have shown that incorporating media art with combining natural elements including natural sounds into healthcare settings may improve patient outcomes and even potentially promote well-being and mental health and enhance a pleasant healthcare environment.

Similarly, studies by Şansal et al., (2024) demonstrated that participants in the study were generally new to virtual reality (VR). The results showed that immersive virtual nature, compared to urban video, significantly improved mood, reduced anxiety in participants, and provided more restoration effects and positive outcomes. Both studies suggest that virtual nature, whether through art or VR, are effective intervention for improving well-being and mental health.

The studies by Sarah Hian May et al., (2021) showed that young adults and senior citizens who have been walking in virtual forests reported experiencing reduced negative affect and improved positive affect due to enhanced nature connectedness after the virtual walk and a reduction in stress levels, as measured by heart rate.

This is consistent with findings from White et al., (2020) in "Blue Space, Health and Well-being: A Narrative Overview and Synthesis of Potential Benefits," which explored the restorative effects of virtual and real water-based environments (blue space). These studies emphasize that natural elements, particularly water, can provide significant mental health benefits when integrated into digital media or virtual reality. Together, these findings suggest that virtual nature, particularly when incorporating water, can effectively reduce stress and enhance emotional well-being. This highlights the therapeutic potential of immersive virtual environments in healthcare settings.

### **Theories Supporting the Therapeutic Potential of Immersive Media Art through Nature-Inspired**

There are numerous theories that underpin the therapeutic potential of immersive nature and interactive media in healthcare. Firstly, theory is Attention Restoration Theory (ART), which suggests that spending time in natural environments helps restore mental energy by relieving cognitive fatigue. According to ART, natural elements like flowing water or rustling leaves gently draw our attention, giving the mind a chance to rest and recover from mental exhaustion (Kaplan & Kaplan, 1989). Interactive media art that incorporates these soothing natural elements can bring the same restorative benefits of nature into healthcare spaces.

Another theory is Stress Recovery Theory (SRT), by R. Ulrich, (2023). This theory suggests that exposure or incorporating to nature can help in reducing stress level. Ulrich's research found that even just looking at natural landscape and integrate with soothing natural sound like birds chirping, water flowing reproduce this reducing stress and helping the patients cope with anxiety, stress and depression in healthcare setting.

Biophilic Design, the theory by Kellert & R., (2008), also supports the idea of incorporating nature into healthcare environments. This approach posits that integrating nature into built spaces will enhance well-being by leveraging our natural connection to the environment. Therefore, interactive media art provides a creative approach to incorporate nature-inspired elements into healthcare environments, particularly those with limited access to real outdoor nature, while also offering a digital alternative that can still promote well-being.

The last theory which is Flow theory by Csikszentmihalyi & Mirvis, (1990) that concerned with interaction experience is also importance. According to this theory, people who experience deep focus and involvement in their activities will feel more focused and contented over time which could foster well-being as well reducing stress. Interactive media art, especially when personalized and interactive, can help create a flow state, which is particularly useful in therapeutic settings. Engaging patients in an immersive environment can distract them from pain, anxiety, or negative emotions, thereby promoting a more positive mental state during their hospital stay.

## CONCEPTUAL FRAMEWORK

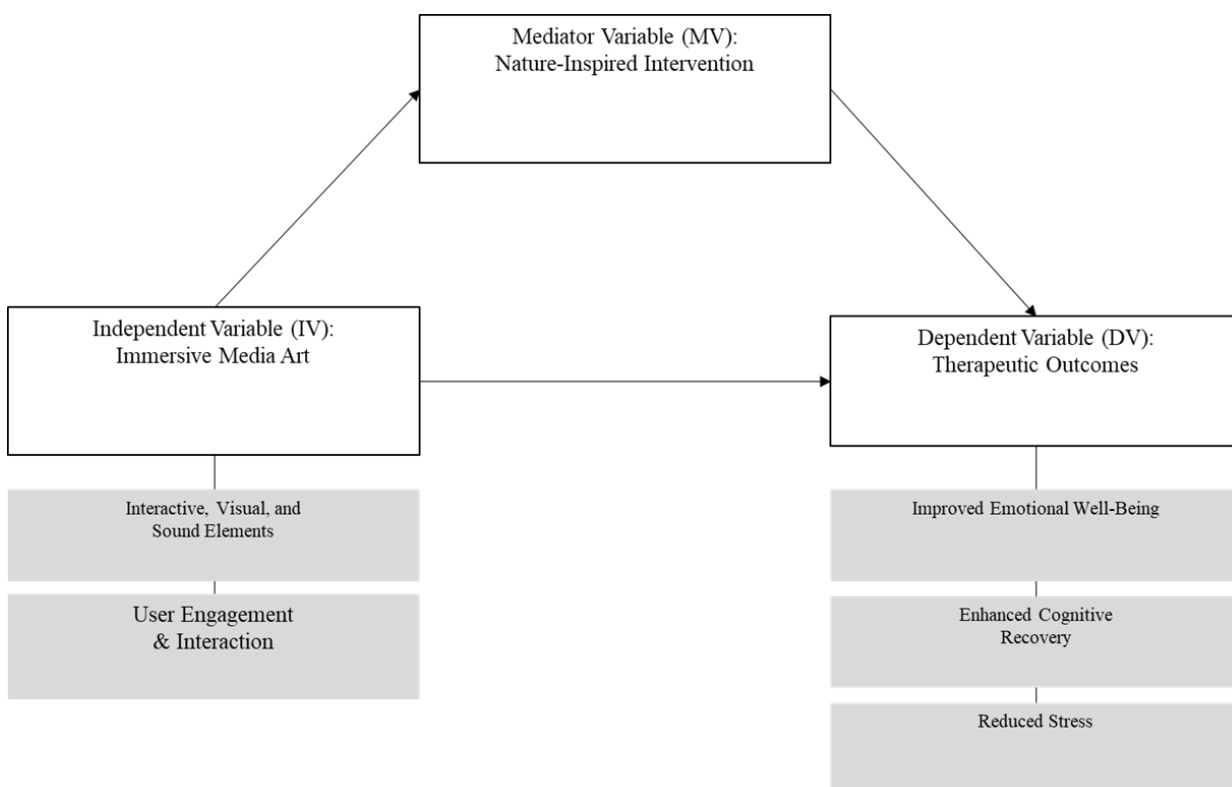


Fig. 1 Conceptual Framework

The conceptual framework for this study shows how the integration of immersive media art through nature-inspired interventions can influence holistic therapeutic outcomes in the healthcare environment. There are three primary constructs which is independent variable (IV), is using immersive media art that includes interactive, visual and natural sound designed to create engagement and interaction with user in the environment. Second is Mediating Variable (MV) is nature inspired intervention such as natural landscapes, sky, water, forests that embedded in the immersive art. MV is a bridge between IV and DV that explains how and why the IV influences the DV. Finally, is dependent variable (DV) being therapeutic outcomes that including improved emotional well-being, enhanced cognitive recovery and reduced stress represent the final effects or changes that are being measured in the study. This DV is aim to improve the immersive media art experience with nature-inspired interventions in the healthcare environment.

## METHODOLOGY

1) *Research Design:* This study adopts a qualitative research design and synthesizes insights from Stress Recovery Theory (SRT), Attention Restoration Theory (ART), and Flow Theory (FT) in psychology to develop a comprehensive framework for understanding how the integration of immersive media art through nature-inspired art can function as a holistic therapeutic tool outcome in the healthcare environment.

2) *Population:* The study targets healthcare professionals (doctors, nurses, and art therapists), patients, and industry experts, artists or designers who specialize in immersive media art. The inclusion of multiple perspectives ensures a comprehensive understanding of how immersive nature-based media art impacts patient care and well-being.

3) *Sampling Method:* The sample size consists of 20 to 30 participants, including healthcare professionals (doctors, nurses, and art therapists), patients, and industry experts, artists or designers. As recommended by Creswell & Guetterman, (2021), sample size depends on the qualitative design being used. In this study, a purposive sampling method is a non-probability sampling technique where the participants or individuals are



selected who are the most knowledgeable about the topic and can provide the information to achieve the study objective (Palinkas et al., 2015). Data collection continued until data saturation was reached, defined as the point at which no new themes or insights emerged from additional data collection (Kathy Charmaz, 2006).

4) *Data Collection*: Data were collected through semi-structured interviews and observation of immersive media art installations in the healthcare environment. Semi-structured interviews were conducted to capture participants' detailed experiences and perceptions, while observational data allowed for contextual insights into patient interactions with the art installations (Kallio et al., 2016). Each interview is expected to last between 30 to 60 minutes, and all sessions will be audio-recorded with the participants.

5) *Data Analysis*: Thematic analysis was employed to identify patterns and themes in the data qualitative by using NVivo 12. According to Braun & Clarke, (2006) there is six-step framework for thematic analysis began with familiarization data, generate initial codes, searching themes, review themes, defining themes, and reporting.

## POTENTIAL IMPACT

The potential impact of this study reveals that immersive media art based on the theories Stress Recovery Theory (SRT), Attention Restoration Theory (ART), and Flow Theory (FT) have significant potential for enhancing well-being and cognitive recovery in healthcare environments through immersive nature-inspired interventions. The immersive art as an intervention, non-medical, and low-cost intervention that reduce dependence on medications for stress and anxiety management in the recovery process. By integrating visual and sound elements, this intervention not only promotes relaxation, enjoyment, and a sense of calm but also contributes to fostering positive attitudes and emotional resilience. Besides that, by integrating immersive art into healthcare environments which are waiting rooms, recovery areas, or other spaces, the healthcare environment become more therapeutic and also transforms the typically sterile atmosphere of healthcare settings into a more pleasant and calming space, ultimately enhancing the overall well-being to patients' or staff for better experiences and recovery.

## CONCLUSION

This study focuses on the significant impact of immersive media art through nature-inspired interventions combined with interactive media art in promoting well-being and cognitive recovery in a healthcare setting. By integrating elements of nature, with interactive engagement or virtual reality representations of natural landscapes and sounds, these interventions reduce stress, improve mood and improve cognitive function. Findings show that both patients and healthcare staff can benefit from immersive environments, offering therapeutic and restorative experiences, which can lead to better mental health outcomes and faster recovery in healthcare settings.

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