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MANAGEMENT (JISTM)**www.jistm.com**USER EXPERIENCE EVALUATION OF AN IMAGE-BASED
VIRTUAL REALITY SELF-THERAPY TOOL**

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**Abstract:**

User experience (UX) is essential for the success of interactive products such as virtual reality (VR) applications. VR is a technology or tool in multimedia created to induce user experience characteristics, allowing users to feel a sense of presence and immersion during their interaction with the VR tool. In medicine and health, VR has been utilised to treat psychological disorders with VR exposure therapy. Stress is also considered as a type of psychological disorder. One of the traditional psychotherapy methods for managing stress is Guided Imagery Therapy (GIT). Accordingly, this study proposes an approach for self-therapy using Image-Based VR (IBVR) that applies the GIT technique. With this approach, users with mild and moderate stress levels can undergo the therapy on their own without direct intervention from an actual therapist. This paper focuses on the user evaluation of the IBVR self-therapy tool, highlighting the user experience throughout their navigation in the virtual environment. The results indicate that the IBVR self-therapy tool can provide a good user experience and positively affect the user's psychology in managing stressful situations. Nevertheless, further investigation is recommended to improve the effectiveness and user experience of the IBVR self-therapy.

Keywords:

Virtual Reality, User Experience, Self-therapy, Stress

Introduction

User experience (UX) is an important concept that refers to the person's overall involvement when interacting with a multimedia or interactive product, especially regarding how easy or pleasing it is to use (Chilana, Ko, & Wobbrock, 2015). UX has become the core of the design of various multimedia applications such as games (Wong & Ghavifekr, 2018; Solano et al., 2019), mobile applications (Weichbroth, 2020; Yang et al., 2021), websites, augmented reality (AR) (Hashim et al., 2018; M. E. a. B. Hashim et al., 2021; M. E. A. Hashim et al., 2022) virtual reality (VR) (Chi & Idris, 2021). Mainly, VR is a technology or tool in multimedia created to induce user experience characteristics so that users can feel presence and immersion during their interaction with the VR tool (Chilana, Ko, & Wobbrock, 2015; Lin et al., 2012; Liszio & Masuch, 2017). The sense of presence in VR refers to the user's feeling of "being there" in a computer-generated virtual world environment (Mora, Martín-Gutiérrez, Añorbe-Díaz, & González-Marrero, 2016). It is considered one of the elements in generating and evaluating UX characteristics in VR applications (Tcha-Tokey et al., 2018; (Lorenz et al., 2018). With these characteristics, VR can increase user satisfaction and offer unique experiences compared to traditional computer interfaces (Shelstad, Smith, & Chaparro, 2017). Also, the sense of presence is one factor that influences the potential of VR to be applied in various fields, including health, medicine, science, education, cultural heritage, manufacturing and entertainment (Mora, Martín-Gutiérrez, Añorbe-Díaz, & González-Marrero, 2016). In medicine and health, VR has been utilised to treat psychological disorders with virtual reality exposure therapy, offering a secure and controlled setting at a reduced expense.

In the case of this study, the subject of the VR application is the problem of stress, which is also considered a type of psychological disorder. Stress originates from the perception of an expectation towards the environment, and that expectation needs to be followed up with proportionate action and effort actions (Mawanza, 2017). People who experience stress tend to have negative emotional responses that include depression, tension, anxiety and other biological reactions that can affect their health. It can also decrease work performance in various situations and further impact the productivity of an organisation or institution (Chilana, Ko, & Wobbrock, 2015). In education settings, academic-related stress can affect students' achievement and motivation and increase the risk of dropping out of school (Lebel, 2013). Therefore, it is necessary to manage stress more appropriately to avoid the occurrence of other psychological and behavioural disorders because of the stressful situation.

Stress is also classified as a psychological and physiological response that can cause a decline in health and human performance in daily activities. (Muhaiyuddin & Rambli, 2019; (Muhaiyuddin & Rambli, 2014; Muhaiyuddin & Rambli, 2014b). One of the traditional treatment methods implemented to overcome stress-related problems is a technique called Guided Imagery Therapy (GIT). Using this technique, the therapist guides the client to imagine a relaxing environment or a series of pleasant experiences to help the client feel calmer and reduce stress. However, there are also possibilities in which the patient misunderstood the therapist's instructions. This situation makes it possible for the patients to imagine inappropriate scenarios that will harm them otherwise (Diyana & Rambli, 2012b). In this situation, VR can be one of the alternatives to the use of imagination and memory by providing a soothing scenario in a virtual environment. This tool allows users to see the visuals provided in the virtual environment instead of using their imagination. This VR-mediated environment can also help users practice relaxation techniques to overcome stress.

Accordingly, this study proposes an application of Image-based VR (IBVR) for self-therapy that applies the spatial presence theory and the (GIT) technique. With this IBVR self-therapy tool, users can undergo therapy independently without seeing an actual therapist for a dedicated therapy session. This is especially true for those who have mild and moderate stress levels. They are expected to feel calm as they navigate through the virtual environment in the IBVR and hence reduce stress. This paper aims to evaluate the user experience (UX) of the IBVR self-therapy tool, focusing on users' perceptions of both the technical (pragmatic) and non-technical (hedonic) aspects. The following sub-topics briefly elaborate on the background of the study, methodology, result, discussion, and conclusion.

Literature Review

One of the traditional psychotherapy approaches to managing stress is by using imagery or imaginary therapy techniques (Latif et al., 2015; Robinson et al., 2025), which is also known as Guided Imagery Therapy (GIT). In this type of therapy, a therapist instructs and guides the client to imagine a relaxing scene or experience (Muhaiyuddin & Rambli, 2019; Diyana & Rambli, 2012b). However, there are instances where clients find it difficult to imagine scenarios or images that are depicted because of their mentally influencing life experiences. This situation, on the other hand, can cause them to feel uncomfortable. At times, clients may misunderstand the therapist's guidance, and as a result, they may create negative scenarios in their minds. Therefore, rather than relying on a client's imagination and memory, VR offers an alternative approach by providing images that promote relaxation and positive emotions. A calm virtual environment can help users relax and manage stress. Moreover, VR has been investigated for its effects on reducing psychological stress and other applications, such as in language learning (Pinto et al., 2019; Yang et al., 2021). Several studies have also proven that VR can help regulate stress levels and improve performance (Liszio & Masuch, 2017; Eswaran et al., 2018).

Generally, VR can be categorised into two forms, namely, geometry-based virtual reality (GBVR) and image-based virtual reality (IBVR). Although GBVR is technically capable of creating a high level of presence due to its high interactivity characteristics, the development process is time-consuming (Pallavicini et al., 2016). Thus, IBVR provides an alternative to GBVR as it requires less time for development. IBVR is a virtual environment with a 360-degree panoramic view developed by stitching together several images using specific tools and techniques. Although it does not use advanced geometric programming, users can still experience a realistic and high-quality virtual environment. Users can also feel a sense of presence in the IBVR environment, although the interaction function is limited compared to the GBVR application.

Accordingly, this study proposes an approach for self-therapy using IBVR that applies the GIT technique. With this approach, users with mild and moderate stress levels can undergo the therapy on their own without direct intervention from an actual therapist. A design model was constructed to serve as a guide for application developers and designers in building an IBVR self-therapy tool. The components for this model were identified through a content and comparative analysis of existing literature, which integrated elements of spatial presence and the GIT. Ultimately, a hybrid model combining spatial presence and GIT was developed and transformed into a prototype of IBVR self-therapy for user evaluation. This paper aimed to exhibit the user evaluation result, which was conducted quantitatively via an abbreviated version of the User Experience Questionnaire (UEQ). The evaluation seeks to measure the level

of user experience produced by the IBVR self-therapy tool, thereby providing insight into how good the IBVR is at creating a pleasant experience for the intended user. The following sub-topics briefly describe the design model and the methodology for conducting the user evaluation. Then, it is followed by the results, discussion, and conclusion of the study.

The Design Model for IBVR Self-Therapy

The design model for the IBVR self-therapy tool was developed based on the components of spatial presence and GIT. Through content and comparative analysis of existing studies, along with insights from expert reviews, four main components were identified that constitute the model, namely Structure, GIT, Spatial Presence, and VR system. Figure 1 presents a visual representation of the design model, highlighting these four components and illustrating the relationships among them with lines and arrows. Referring to Figure 1, the first component of the model is the Structure. It provides guide on the flow of the IBVR self-therapy tool which is divided into three parts: opening, content and closing. Elements for the Structure were primarily derived from actual GIT practices, ensuring a seamless integration of therapeutic techniques within the IBVR self-therapy tool. The GIT component indicates that the IBVR self-therapy includes a therapist guide presented through recorded voice instructions. This guide helps the user with deep breathing exercises and visualization of peaceful natural settings. It engages various senses by providing a range of detailed imagery. To ensure the effectiveness of GIT implementation in IBVR self-therapy, certain principles should be followed. The spatial presence component demonstrates that IBVR can evoke a sense of being in a space through calming panoramic views and natural sounds. This spatial presence can be enhanced through interactive features such as the panning function, standard menus, and buttons. Additionally, perceptual realism plays a role in creating a sense of presence. Including more objects, natural sounds, and animations can further enhance this realism. Lastly, the VR system component outlines the necessary hardware and software needed for the development of IBVR. This includes computers, software, and various input and output devices. Based on this design model, a prototype of the IBVR self-therapy was developed for user evaluation. The following section will discuss the methodology for this user evaluation.

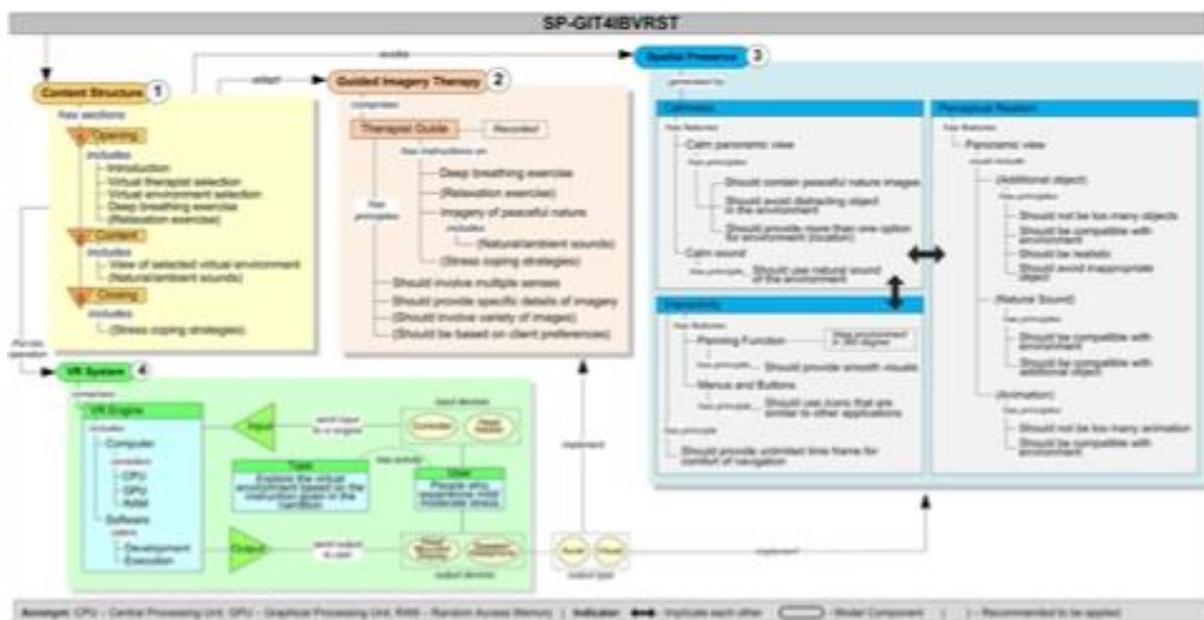


Figure 1: Design Model for IBVR Self-Therapy Tool

Methodology

The user evaluation was conducted on 100 students of Universiti Utara Malaysia during the study week. The students included undergraduate and postgraduate students. The postgraduate students were selected among those having a viva session soon. Participation was voluntary. Only those interested were invited to participate in this study. However, those with any physical disability or mental disorder were not included in the experiment. Before the experimental session, the participants were given a brief explanation of the procedure and purpose of the study. Then, participants were asked to sign a consent form and provide their demographic information. Initially, the participants were guided with a recorded narration for breathing and relaxation exercises. The purpose is to help participants feel relaxed before experiencing the virtual world. Then, participants were equipped with a Head-Mounted-Display (HMD) to experience the IBVR environment. The diagram in Figure 2 shows the flow of the experiment.



Figure 2: Flow Of Experimental Session

In this study, four environments were provided for participants to choose from when using the HMD controller, namely (i) waterfall, (ii) field, (iii) mountain, and (iv) beach. The four virtual environments are in the form of 360-degree videos. Participants were free to choose any environment they wanted based on their preferences. They were also free to watch the video in whatever position they felt comfortable. Through the HMD, the participants can enjoy every corner of the virtual environment by turning their heads to look around and listen to natural sounds through the provided earphones. Participants were also allowed to end their session whenever they felt uncomfortable to continue. Once the session ended, participants were asked to complete a user experience questionnaire (UEQ) to assess their experience while interacting with the IBVR self-therapy tool. For this study, the short version of the UEQ was used due to its promptness and simplicity in obtaining user feedback on their experience using the tool. The short User Experience Questionnaire (UEQ-S) is a fast and reliable evaluation framework for measuring user experiences of interactive products. It comprises eight items categorised into pragmatic quality and hedonic quality, as shown in Table 1. Pragmatic quality describes the user's perception of technical aspects of achieving goals in a product. Meanwhile, hedonic quality refers to the user's perception of non-technical elements linked to the user's emotions.

Table 1: UEQ-S Evaluation Item

Item	Evaluation		Scale
	Negative	Positive	
1	obstructive	supportive	Pragmatic Quality
2	complicated	easy	Pragmatic Quality
3	inefficient	efficient	Pragmatic Quality
4	confusing	clear	Pragmatic Quality
5	boring	exciting	Hedonic Quality
6	not interesting	interesting	Hedonic Quality
7	conventional	inventive	Hedonic Quality
8	usual	leading edge	Hedonic Quality

Answers for each item in the questionnaire were collected by assigning a value of 1 for the leftmost scale to a value of 7 for the rightmost scale option. The left side reflects the negative term, and the right side the positive term. Data was processed using the UEQ-S analysis tool. This tool adjusts the score value in each statement answer from a 7 Likert scale to -3 (the most negative value) and +3 (the most positive value). The result of the UEQ-S can be interpreted through the mean value for both scales in pragmatic and hedonic quality. Mean values between -0.8 and 0.8 represent a neutral evaluation of the corresponding scale, values >0.8 represent a positive evaluation, and values <-0.8 represent a negative evaluation. Additionally, the mean value was compared to benchmark data containing data from 14,056 people from 280 studies on different products (business software, web pages, web stores, social networks). Comparison of the results for the evaluated product with the data for the product contained in the benchmark allows conclusions about the quality of the evaluated product compared to other products to be made relatively.

Results and Discussion

The user experience evaluation results for the Image-Based Virtual Reality (IBVR) self-therapy tool are presented based on the descriptive mean values of the User Experience Questionnaire - Short (UEQ-S) items and scale scores, followed by a comparative analysis against established UEQ benchmark data. Accordingly, Table 2 presents the mean scores for the individual items of the UEQ-S. All eight items received positive mean scores, ranging from 0.7 (inefficient-inefficient) to 1.7 (complicated-easy).

Table 2: Mean Values for UEQ-S Item

Item	Mean	Negative	Positive	Scale
1	1.4	obstructive	supportive	Pragmatic Quality
2	1.7	complicated	easy	Pragmatic Quality
3	0.7	inefficient	efficient	Pragmatic Quality
4	1.0	confusing	clear	Pragmatic Quality
5	1.1	boring	exciting	Hedonic Quality
6	1.2	not interesting	interesting	Hedonic Quality
7	1.1	conventional	inventive	Hedonic Quality
8	1.0	usual	leading edge	Hedonic Quality

Table 1: Mean Values for UEQ-S Scales

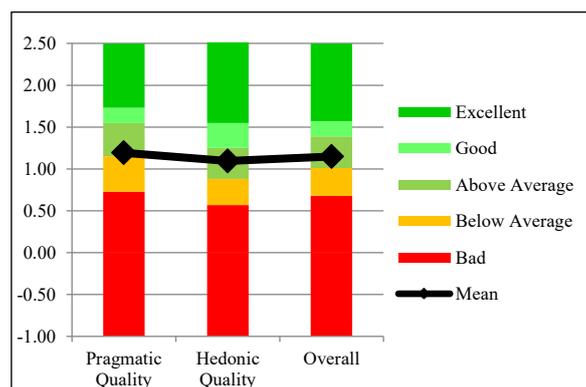
Scales	Mean
Pragmatic Quality	1.193
Hedonic Quality	1.095
Overall	1.148

Table 3 summarises the mean values for the UEQ-S scales. Both the Pragmatic Quality (M=1.193) and Hedonic Quality (M=1.095) scales, along with the Overall user experience score (M=1.148), achieved mean values significantly greater than 0.8. This outcome signals a clearly positive user experience across both functional (technical) and experiential (emotional) dimensions of the IBVR self-therapy tool. When compared with the UEQ benchmark dataset, the IBVR self-therapy tool was classified as above average for pragmatic quality, hedonic quality, and overall user experience (Table 4). These results suggest that, despite its relatively simple and image-based implementation, the system performs competitively when evaluated against a wide range of interactive digital products.

Table 2: Comparison of Results with Benchmark Data

Scale	Mean	Comparison to benchmark
Pragmatic Quality	1.1925	Above average
Hedonic Quality	1.095	Above Average
Overall	1.15	Above Average

Figure 3 visualises this comparison, showing that both pragmatic and hedonic quality scores consistently exceed the benchmark mean. This graphical representation underscores the strength of the user experience relative to the broader market of interactive systems. The positive evaluation is noteworthy because IBVR environments, by nature, possess limited interaction capabilities compared to fully immersive Geometry-Based Virtual Reality (GBVR) systems. The favourable user perception suggests that the core therapeutic elements—the calming panoramic views, natural sounds, and the integrated GIT elements—effectively overcame the technical simplicity of the IBVR platform.

Figure 3: Comparison Of Results with Benchmark Data

Overall, the findings indicate that the IBVR self-therapy tool successfully satisfies users' fundamental usability and experiential needs, albeit at a moderate level. The positive pragmatic quality scores demonstrate that users could interact with the system effectively and with minimal confusion, which is particularly important for self-therapy applications that aim to reduce cognitive load and emotional strain. From a usability perspective, this is particularly significant because excessive complexity may increase cognitive load and counteract relaxation objectives. The findings align with prior research suggesting that simplicity and clarity are critical factors in therapeutic and stress-reduction technologies as reduced complexity and navigational simplicity improve usability and user engagement in eHealth applications, and simplicity enhances perceived ease of use, trust, and intervention uptake in digital health contexts (Rotondi et al., 2017; Denison-Day et al., 2023).

Meanwhile, the favourable hedonic quality scores suggest that the system was engaging enough to sustain user interest and provide an emotionally pleasant experience. This is theoretically significant, aligning with prior studies demonstrating that a calming virtual environment can provide a viable alternative to subjective imagination, which is a common challenge in traditional GIT (Diyana & Rambli, 2012; Muhaiyuddin & Rambli, 2019). When compared with previous VR-based stress management studies, the results are consistent with findings that

virtual environments—particularly those depicting nature—can reduce perceived stress and enhance emotional well-being, as virtual natural exposure has been shown to significantly lower stress indicators and improve positive affect across clinical and non-clinical populations in controlled experiments and meta-analyses (Chan et al., 2021; Ahn et al., 2025; Gao et al., 2025). Besides that, the effective evocation of spatial presence through the 360-degree videos and natural sounds—a key element of the design model—is strongly implied by the positive hedonic rating.

However, the moderate nature of the scores can be partly attributed to the intrinsic characteristics of IBVR systems that rely on static or panoramic imagery and offer limited real-time interaction, which may constrain users' perceptions of efficiency, novelty, and technological advancement. Nevertheless, these limitations are balanced by several practical advantages of IBVR, including reduced development time, lower cost, and broader accessibility. The results of this study suggest that IBVR holds promise as a viable self-therapy medium capable of delivering meaningful psychological support while maintaining acceptable usability and engagement levels. Nevertheless, future work could explore the integration of additional sensory elements, guided interactions, adaptive content, or other mechanisms to strengthen both pragmatic and hedonic qualities. Longitudinal studies would also provide deeper insights into the sustained psychological impact and experiential effectiveness of IBVR in self-therapy contexts.

Conclusion

This study investigated the use of an image-based virtual reality (IBVR) approach for self-therapy aimed at stress relief, with a particular focus on user experience evaluation. The UEQ-S results indicate that the proposed IBVR self-therapy tool achieved positive and acceptable levels of pragmatic quality, hedonic quality, and overall user experience. These findings suggest that IBVR represents a feasible and user-friendly alternative to more complex virtual reality systems for self-administered therapeutic applications. Despite the limited interaction capabilities inherent in IBVR, the tool demonstrated the potential to support users effectively while maintaining satisfactory engagement. It demonstrates that an IBVR self-therapy tool grounded in GIT principles can deliver a positive and above-average user experience, supporting its potential as an accessible and cost-effective approach for stress management. Nevertheless, further studies are required to enhance the system through additional design elements and to evaluate its effectiveness across diverse user groups and over longer usage periods. Longitudinal and comparative studies involving GBVR or non-VR relaxation tools would provide deeper insights into the long-term psychological effectiveness of IBVR self-therapy.

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