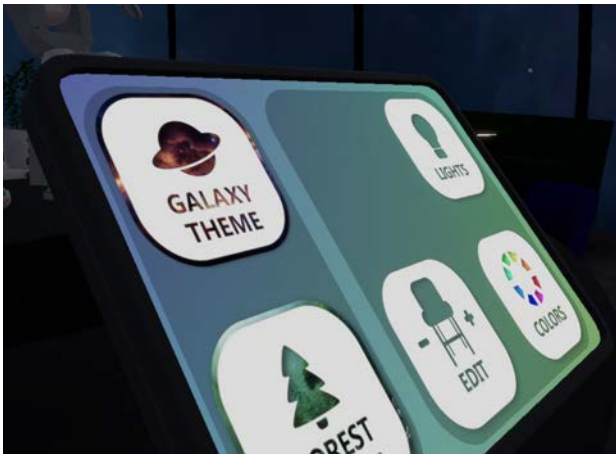


TESTING OF ELEMENTS INFLUENCING USER EXPERIENCE IN VIRTUAL SPACES

Introduction

This study aimed to understand which elements contribute to the pleasantness and quality of virtual environments and their effects on user experience. Additionally, the study sought to evaluate the importance of specific elements in enhancing the perceived pleasantness of the tested virtual space.



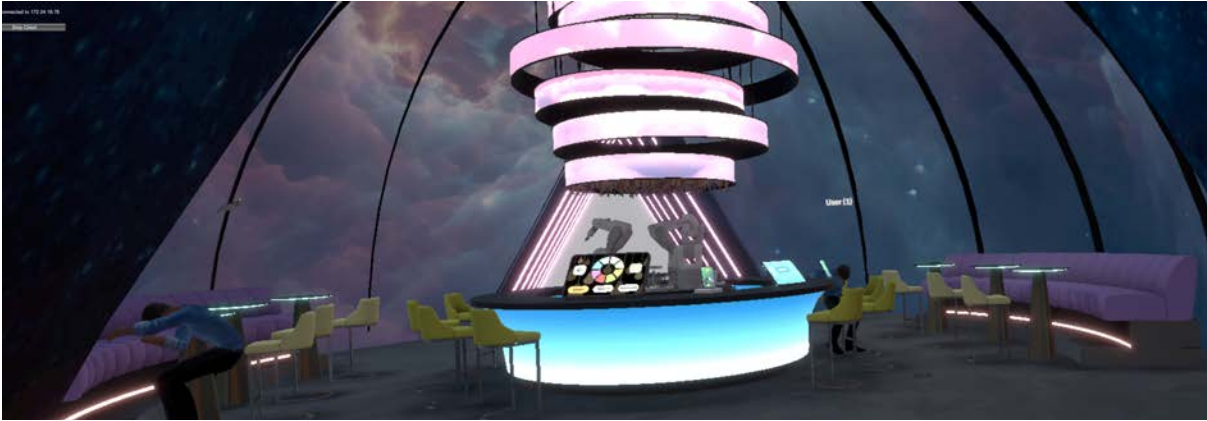
Methodology

The study was conducted at Turku University of Applied Sciences (Turku AMK) in collaboration with the institution's researchers. Forty students participated, with some testing individually (7 participants) and others in groups—four groups of three and three groups of five.

The test focused on a virtual restaurant "lobby" room, designed by Dsign and implemented by Turku AMK. Participants explored the space wearing VR headsets and used controllers for movement and interaction. The environment

allowed customization of elements, such as lights and colors, and featured a robot from which users could order drinks. After exploring the space, participants completed a survey assessing user experience and the room's pleasantness.

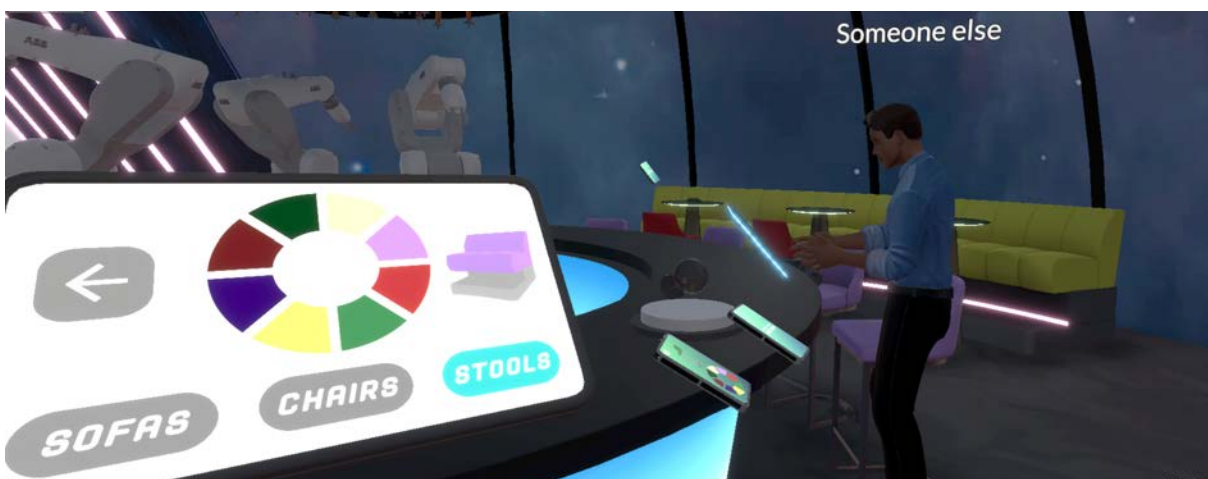




Results

The findings of the study revealed that the elements within the virtual environment had a generally positive impact on user experience. Participants found that the various features of the virtual room enhanced their overall enjoyment, particularly when social interaction was involved. Group settings allowed for collective experiences that many participants reported as enriching, contributing to a sense of connection and shared engagement in the virtual space.

Emotional responses to the environment were varied. Some participants experienced frustration or confusion when unsure of how to proceed with certain tasks, particularly when they encountered technical difficulties or limitations in the room's functionality. However, positive emotions were frequently reported and were often linked to specific activities, such as interacting with others in the space, customizing the environment, exploring different features, and discovering new aspects of the room. These positive emotions often stemmed from the interactive elements and tasks designed into the environment.



The perceived realism of interactions within the virtual room also emerged as a factor influencing the overall experience. Participants had mixed responses to the authenticity of virtual interactions. For some, the realistic functionality of certain elements added to their enjoyment, creating a more immersive experience. Others, however, felt frustration when interactions did not fully replicate

real-world actions, which led to a sense of disconnection and occasional dissatisfaction with the virtual space.

Visual and spatial features of the virtual room contributed to the experience, though they were not as prominent as the functional elements. While participants appreciated the design and layout, these aspects tended to be secondary in impact. If the test were repeated, it would be interesting to focus more on visual and spatial elements.

The room's dimensions also played a role in shaping usability. Participants in groups of five reported feeling that space around interactive elements was restricted, which impacted their ability to move freely and interact fully with the environment. This observation highlighted the importance of designing virtual room size and layout to accommodate the number of users and functions.

The study noted behavioral differences in how participants behaved in the virtual environment compared to how they might act in a physical space. For example, some participants wanted to throw objects, which might be less common in physical environment. This finding implies that virtual spaces can encourage unique behavioral responses, indicating a different approach to virtual versus physical environments.

Finally, materials and natural elements within the virtual space were less influential on the user experience than elements like lighting and color. This may have been due to the lack of tactile feedback, as materials are often appreciated through touch, a sensation that was not available in this virtual context. Natural elements in designed visual themes, did not strongly or consciously enhance the experience, possibly because nature is typically perceived through multiple senses beyond just sight. This could also be influenced by personal interpretations of what constitutes "natural" elements, as these perceptions can vary widely among individuals.



In summary, the study's results pointed the importance of functional, social, and spatial features in shaping a positive user experience in virtual environments. These insights suggest that designers of virtual spaces may wish to prioritize these aspects to enhance immersion, emotional engagement, and usability.