Autonomy Illusion in Immersive Virtual Learning Environments

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Abstract. With the prevalence of virtual reality (VR), new research has focused on its applications in various fields, including education. The notion of presence has been touted as advantageous for learning in the virtual environment; however, there has been little research on the subject concerning learning. This paper examines one of the themes from the interpretive phenomenological analysis (IPA) of a pedagogical informed virtual learning experience simulating the local solar system through the lens of five grade nine students. Data for this study was gathered through semi-structured interviews and video observations of the experience to understand the relationship presence has on learning in virtual environments. This paper highlights the sense of autonomy participants felt that led to a phenomenon identified as autonomy illusion. Autonomy illusion is the feeling of control over learning brought on by the removal of conventional classroom delimiting factors in place of environmentally designed delimitations, creating the illusion of freedom described as a symbiotic dichotomy of two opposing features, pedagogical freedom and environmental imposed delimitations, which help define the illusion.

Keywords: Virtual Reality, Virtual Learning Environments, Presence, Pedagogy, Learner Autonomy.

1 Introduction

This paper is based on a work-in-progress thesis investigating the lived experiences of grade nine students as they explored an intentionally designed immersive virtual environment. The purpose of the environment was to recreate an authentic depiction of the local solar system using virtual reality (VR), designed around a specific learning objective, the scale of local space. Central to the investigation was the concept of presence or the psychological reaction to the virtual environment resulting in the cognitive suspension of disbelief [1]. Presence has often been cited as beneficial for learning in virtual environments; however, there has been limited research on the relationship between presence and learning [2, 3, 4]. It was believed that the examination of presence and learning through a phenomenological lens could help VR-learning move beyond technological novelty by establishing a

foundation of pedagogically informed data to direct practical applications and further research.

2   Method

The original research utilized interpretative phenomenological analysis (IPA) to frame and illuminate its conclusions through a constructivist and experiential learning lens. IPA is a form of qualitative research that investigates how people make sense of life experiences using phenomenology, hermeneutics, and idiography [5, 6]. Due to IPA's elaborate and time-consuming data analysis, a homogeneous convenience sample of five grade nine students was established [5]. Potential participants were selected based on having sufficient VR experience to be able to participate without a new orientation, possible compliance with school district COVID regulations, and guardian approval. Data collection was broken into three consecutive days for each participant:

- Day 1: Engagement in VR experience.
- Day 2: Semi-structured interview.
- Day 3: Member check.

Data was scrutinized case by case, cross-examined, and compiled into group experiential themes based on convergence and divergence of the theme, which is in line with best practices outlined in IPA studies [7].

Table 1. Participants.

Participant (Pseudonym)	VR Experience	Self-Reported Learning Preference
Adam	High	Self-exploration of materials
Frank	Mid-Level	Hands-on
Sonia	Minimal	Lectures and textbook
Zara	Minimal	Reinforcement and memorization
Netta	High	Construction of concept through creation

3   Results

A theme resulting from the original study was a sense of autonomy. All participants cited a profound sense of freedom as they explored the experience. At first, this phenomenon was attributed to the capabilities of the experience, as users could manipulate all spatial

dimensions, moving freely throughout the simulated space. *"I think it was just being able to go... anywhere, right? Like I was in my own spacecraft, which I could control"* (Sonia).

However, it shortly became apparent that while spatial freedom enabled a perceived sense of autonomy, it was not the sole contributor. Part of the pedagogical approach for this experience was the removal of conventional didactic learning strategies, resulting in the disposal of a specific set of linear instructions often given to learners to come to a prescribed solution. Frank directly felt this freedom, remarking, *"I was trying to learn an outcome but it wasn't like follow this specific set of instructions... it just felt like I could do whatever I wanted"* (Frank). Other participants reported this pedagogical autonomy to different degrees, with Zara highlighting the construction of her learning, *"...it was more me learning myself and like, figuring it out as I went..."* (Zara), and Sonia conveying a sense of freedom, *"...it felt really good to just be in control and just.. be free..."* (Sonia). Adam further pushed the idea of pedagogical freedom by stating, *"...it wasn't like a worksheet where it's like you have to answer this question... you get to explore on your own time... see[ing] different things"* (Adam).

Furthermore, all participants spoke to the experience being less stressful than traditional classroom structures. Frank was particularly vocal about his frustrations in the classroom, declaring, "*...we're more stuck to a strict schedule, we have to go through the curriculum... in a certain order*" (Frank). While others like Sonia spoke about the pressures she feels because of these expectations: *"[I] try to get so much done that I just feel like sometimes it's too much... so when I did that, it felt really good to just be in control"* (Sonia).

Discussion

The findings demonstrate that participants experienced a sense of autonomy enabled by the pedagogical scoping being delegated to the virtual environment rather than the classroom. To better understand this phenomenon, let us look at a traditional classroom in the K - 12 system, where the teacher must articulate a learning objective to various learners with different needs and levels of knowledge. A teacher may implement classroom management strategies to limit the scope of the lesson through artificial delimitations, such as limiting inquiry to a specific learning objective or encouraging a specific methodological approach. These interventions are designed to ensure the success of most learners; at the same time, they require learners to conform their learning to the specific approach used in the classroom. The data suggests that learners begin to feel like passive observers in their learning rather than active participants resulting in stress and disengagement.

Using an intentionally designed virtual environment can remove the requirement for the teacher to create delimiting strategies in the classroom. As in the original research, a pedagogically designed virtual environment can establish boundaries for learning by the purposeful inclusion or exclusion of different entities, actors, and interactions. When learners engage in the environment, their engagement is naturally limited by the limitations

of the environment as opposed to a prescribed set of classroom expectations. This approach allows learners to explore their learning naturally, akin to an authentic learning environment [8].

This sense of autonomy is both real and illusionary. Real in the sense that learners have more control over their learning activity. However, this freedom is an illusion as the environment limits the scope of interactions, resulting in a symbiotic dichotomy that helps inform this phenomenon's moniker, autonomy illusion. Autonomy illusion is inspired by Slater's place and plausibility illusion [1] as they also focus on the qualia of the virtual experience and the construction of a user-specific facsimile of the perceived reality.

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