Experiential learning through Immersive Virtual Reality (IVR): Virtual fieldtrip experiences to complement sustainability and environmental education

The project explores using immersive VR to create high-engagement experiential learning activities in higher education, offering a campus-based alternative to logistically challenging field trips to remote sites.

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1. Introduction

This project involves development of an immersive Virtual Reality (VR) based tour of a bioenergy power plants located in UBC Vancouver (400 km from UBC okanagan). Using 360 degree stereoscopic camera and spatial microphones to collect pictures/video and audio, the tour was then developed using Unity game engine. It was visualized in the Visualization and Emerging Media Studio (VEMS). The tour was incorporated in a 3rd year Sustainability course as a "field-trip", in which student groups navigated the plant using a controller, and answered questions attached to a field-trip assessment.

Challenges to conventional fieldtrips:

- Accessibility of remote sites
- Resource and logistical constraints
- Harder to incorporate in regular courses due to practical and seasonal uncertainties

2. Objective

To explore how immersive VR field-trips can enhance experiential learning in sustainability education.

Related literature

Immersive virtual reality (VR) is increasingly recognized as a powerful tool for experiential learning, offering students embodied, place-based experiences that traditional classrooms often cannot replicate. The Cognitive Affective Model of Immersive Learning (CAMIL) provides a theoretical foundation, emphasizing that immersion enhances learning by fostering emotional connection and offering agency. Studies have shown that immersive environments can improve spatial awareness, deepen conceptual understanding, and support memory retention.

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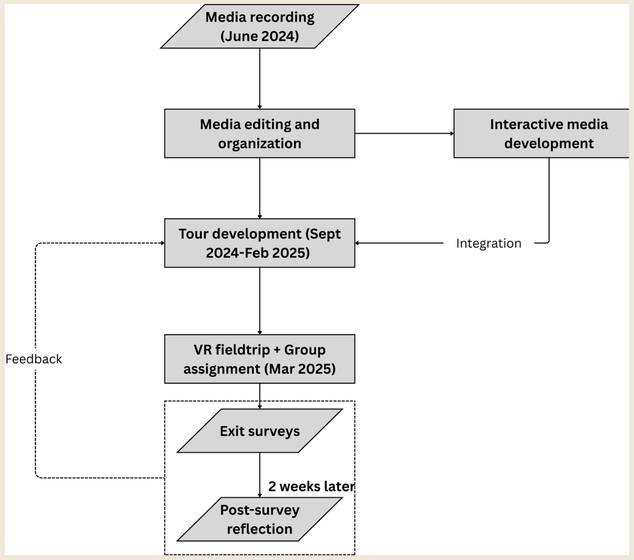
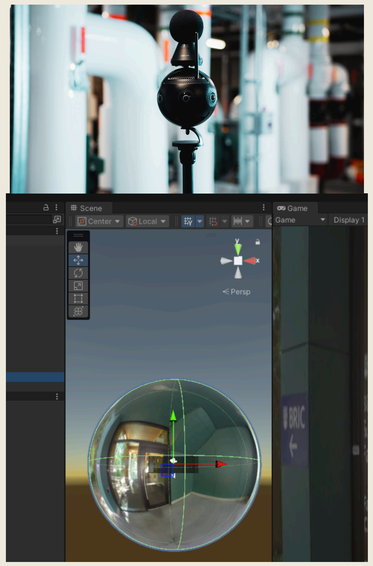
Project team:

- **Kailee Fawcett (Student), Bachelor of Media Studies**
- **Anna Clare Danby (Student), Engineering**
- **Joel Thiessen, UBC Studios**
- **Garth Evans, UBC Studios**

3. Methodology

The project had a technology development component, and a instruction component. The flow chart below outlines these components chronologically. The technology phase created the virtual field trip, while the instructional phase integrated it into the course. Pedagogically, the project was guided by an action research approach, allowing for iterative implementation, feedback collection, and reflection to enhance both the technological and educational outcomes.



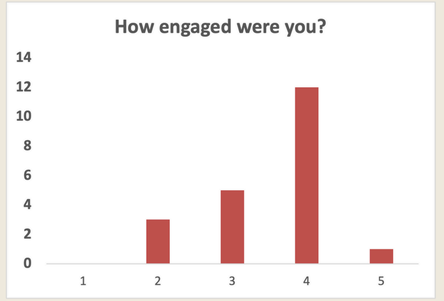


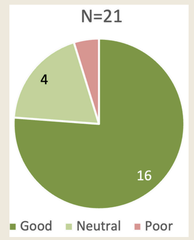
4. Output

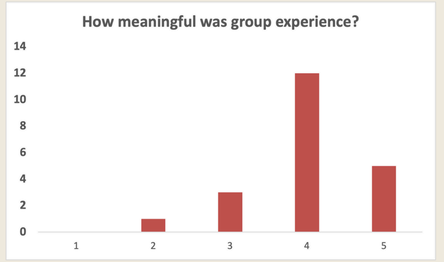
The project resulted in creation of the field-trip that was incorporated as an experiential learning activity in the 3rd year Sustainability course (SUST 300). The students physically went to the VEMS space and virtually visited the power plant. They navigated the tour using a controller, and were handed a physical copy of a group assignment (learning activity) they worked on during the trip.

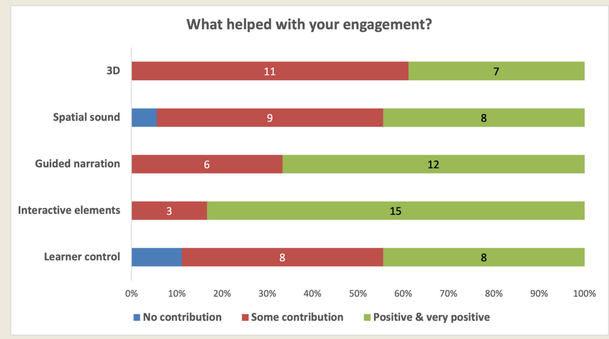
5. Insights

Right after the field-trip, the students were handed an exit survey that they filled out individually. The results from those surveys are shown below:









6. Conclusion

This projects acts as a demonstration of how emerging technologies like immersive VR could help integrate highly engaging experiential learning into regular courses. Campus scale technology assets are crucial for using VR in "group-based" learning, thus acting as an appropriate substitute for physical field-trips to remote sites.

[A canvas version of the tour is in development.]