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Navigating the Terrain:

Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Navigating the Virtual Environment: Enhancing Student Engagement with 360-Degree Immersive Technology

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In the ever-evolving landscape of higher education, the intersection of learning spaces and technology presents unprecedented opportunities to enhance student experiences. This poster highlights the effective use of 360-degree technology to create immersive digital learning experiences across various STEM disciplines in an Australian University.

This poster demonstrates the implementation of Universal Design for Learning (UDL) principles in virtual laboratory tours. Our 360-degree virtual tours embody UDL's core principles (Meyer et al., 2014) by offering multiple means of engagement through immersive experiences, representation via diverse media formats (textual overlays, audible descriptions, graphical elements, and interactive hotspots). By adhering to digital accessibility guidelines (Ismailov & Chiu, 2022), it ensures that our virtual laboratory inductions cater to a wide range of learning preferences and needs, potentially enhancing the effectiveness of STEM education for diverse student populations.

Traditional induction processes are often delivered face-to-face, facing challenges like time constraints, safety concerns, and limited accessibility. The COVID-19 pandemic has further highlighted the need for flexible, remote learning solutions (Rapanta et al., 2020). 360-degree virtual tours overcome barriers by immersing students in a digital environment, allowing them to become familiar with procedures before entering physical space (Tan & Tan, 2021). This technology also supports dynamic learning environments, enhancing teaching effectiveness and student engagement (Christopoulos et al., 2018).

The effectiveness of 360-degree virtual tours has been demonstrated across various areas, from hospitality education to construction safety training (Pham et al., 2018; Patiar et al., 2017). Virtual tours offer numerous benefits, including cost-effectiveness, accessibility, and enhanced engagement. They also support authentic, experiential learning without time or location constraints, potentially improving knowledge retention and attitudes toward learning (Cardona et al., 2023).

A key benefit of 360-degree technology is its web-based implementation, making experiences accessible across a wide range of devices and operating systems. While implementation may require some initial investment in hardware and expertise, the availability of consumer-grade tools and simple workflows makes adoption increasingly feasible for educators (Tan & Tan, 2021).

This poster outlines the process of developing, implementing, and evaluating 360-degree virtual tours. The development phase began with the implementation of virtual tours in ten laboratories with large enrollments. Using specialised cameras (Insta360 X3), we captured spherical photographs of these laboratories, allowing students to virtually explore as if physically present. To enhance interactivity and educational value, we integrated various elements such as hotspots, videos, and quizzes using SharePoint Space and H5P platforms.

The implementation phase involved incorporating these virtual tours into the online laboratory induction process. We seamlessly integrated the tours with existing course management systems to ensure easy access for students.

For evaluation, we focused on qualitative assessment methods to gain insights into student

experiences and perceptions on aspects such as ease of navigation, perceived realism, and overall utility of the virtual tours. This assessment was conducted through surveys and informal discussions, offering valuable feedback on the virtual tours' effectiveness in preparing students for physical laboratory work.

Keywords: learning experience, immersive experience, learning technology, 360-degree virtual tours, accessibility, Universal design for learning (UDL), virtual tour

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