ASCILITE 2024
Navigating the Terrain:
Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Media and Immersive Technologies in Higher Education: UNSW Present and Future

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Media and Immersive experiences in higher education provide students the opportunity to engage with course content in ways that were not previously possible. The Media and Immersive team at the University of New South Wales, Sydney (UNSW) was created to support academics in developing innovative solutions and to foster engagement from students with new forms of content delivery. This paper will outline the affordances and challenges of media and immersive applications at UNSW and examine the possibilities that artificial intelligence and open educational resources offer in overcoming some of the barriers to widespread adoption.

Keywords: Case study, virtual reality, digital media, immersive experiences, open education resources, artificial intelligence.

Introduction

The Media and Immersive team at UNSW are a centrally funded, in-house production unit that specialises in co-creating educational content and experiences for students. The team works with academic staff and educational designers from all disciplines who are looking to solve a particular problem for their students through the creation of a media or immersive resource. Studies have shown the effectiveness of media and immersive experiences on student learning and the results are promising (Ding & Li, 2022; Cicek et al., 2021; Radianti et al., 2020).

The team's experience supports this promise, with results from delivering video, simulation and XR content into courses proving to be very successful. Harnessing the specific affordances these media provide in the context of a particular piece of learning is critical but can be challenging. Given the complexities around bringing these experiences into classrooms, forming strong communities of practice and leveraging ideas like open education resources can help universities scale usage in a sustainable way.

Affordances – digital media

Digital media is widely used in higher education to allow students to flexibly engage with educational content anywhere, anytime (Allen & Seaman, 2013). Digital media is used in a variety of contexts and can encompass demonstrations, mini-lectures, welcome messages, interviews, scenarios, location shoots and 360° videos, all of which have their own unique affordances (Refer Figure 1). Demonstrations and mini lectures allow students to repetitively review content and welcome message videos create a sense of instructor social presence for the learner (Smith et al., 2020). Interviews allow students to hear from experts in a particular field and scenarios, location shoots and 360° videos bring students into environments that may not be able to experience first-hand. Many studies have been conducted on the use of digital media and results have shown to increase student engagement and motivation, enhance learning outcomes and student satisfaction (Deterding, 2012; Boelens et al., 2017). The Media and Immersive team at UNSW created over 566 media assets for 113 individual courses, across six faculties/divisions between Jan 2023 and June 2024 (Refer Figure 2).
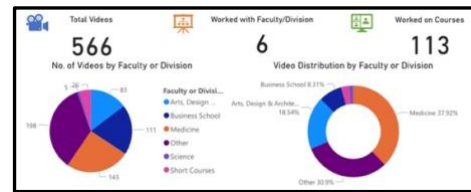
Figure 1. Media Examples

Figure 2. 2023-2024 Media statistics

Affordances — immersive technologies

Simulations and VR experiences can leverage their multimodal, multi-sensory nature to bring learners into interactive experiences that are more authentic and situated. Immersive technologies provide experiential opportunities to students that may be impractical or impossible to experience in a real-world situation (Elaish et al., 2024) and has been seen to improve empathy and preparedness (Hamilton et al., 2021). There have been many studies to evaluate the effectiveness of immersive experiences on student learning and whether student understanding is enhanced (McGee & Jacka, 2021). A literature review by Hamilton et al. (2021) concluded that more research was needed to identify the affordances of immersive experiences on learning outcomes but recognised that out of 24 studies analysed, over half showed a positive result (Farra et al., 2018). The Media and Immersive team explores these affordances through a range of projects covering disciplines across the university.

Interactive 360 media

One key form of interactive media is built around 360° images and video captured from the real world using 360° cameras. This can take on a variety of forms from filming locations for the creation of field trips to acted scenarios scripted and setup to present specific events. The Teaching and Learning Immersive Authoring (TALIA) (Refer Figure 3) has been developed that allows teachers and students to bring in 360° content which they can mark up with interactive hotspots for the player. The hotspots can navigate to other scenes, bring up embedded content like video, image libraries or PDFs and even embed more complex content. The intent here was to create a system that users could create interactive immersive experiences as simply as making a PowerPoint presentation. Several academics in science have used the platform to great effect in their courses, bringing students to virtual field trips in the Pilbara or New Zealand as well as having students collaborate to add their own findings and details to sites on the South Coast of NSW.

Riding with Amy (Refer Figure 4) is a scenario-based experience that presents positive and negative interactions for a person with a disability. This forms a key component around disability fluency for a Marketing project in Business. The My First Day (Refer Figure 5) scenario was scripted in collaboration with students to present the struggle new students might face on their first day. Both projects use actors and interactive elements to bring the action to life around the player. The students often reflect on how much empathy they feel in both these VR experiences, enhanced by simple ideas like being able to click on people in the scene to see what they are thinking.

Figure 3. Pilbara - TALIA

Figure 4. Riding with Amy

Figure 5. My First Day

Simulations

One of the key deliverables for the team have been a suite of more bespoke simulations specific to learning the details of disciplines and professions. The Eye Sim VR (Refer Figure 6) simulation was created for

Ophthalmology lessons for the Medicine program. The sim presents virtual locations distorted or overlaid with eye conditions that patients experience. The instructor is in control of what all the students see in their VR headsets. The students are then asked to describe the effect on their vision and then to self-diagnose from what they see as the academic guides them forward through the details. The level of empathy a student obtains from seeing these conditions from a patient's perspective and the transformational nature of virtual reality (VR) is invaluable to the student learning experience.

The team have also developed a simulated crime scene for a forensics course (Refer Figure 7). The students process a simulated crime scene in VR, marking up evidence, taking photos and filling out their journal. This allows the students to practice multiple times, to explore different approaches and to try their knowledge in different scenarios without staff needing to setup real rooms with fake evidence and reset them for every student. Additional sims have been created for Physiotherapy, Optometry and Civil Engineering (Refer Figure 8). These hands-on simulations allow students to learn by interacting with the scenario rather than just watching or reading about it.

Figure 6. Eye Sim   *Figure 7.* Forensics Sim   *Figure 8.* Construction Sim

AI integration

Addressing a desire from academics to immerse their students in scenarios centred on conversations relating to their disciplines the Media and Immersive team at UNSW created an AI Conversation Sim (Refer Figure 9). The sim brings a student into an AI powered conversation with an avatar setup to play a role specific to the lesson. The first application of the sim was with language learning practice and the first class was for Journalism, allowing students to practice interviewing in a pair of scenarios: a frustrating senator keen to cover their new bill while you are trying to uncover some nepotism and a dull celebrity where eliciting an interesting response can be challenging. Students reported feeling more confident about their ability to do these interviews in person following the simulation practice in VR. One student also felt very uncomfortable about asking personal questions of the celebrity and was rethinking the type of journalism they might pursue. Academics from across the university have engaged with the team to create similar use-cases from Emergency Medicine's Dr - Patient interactions to negotiation practice in the School of Business. Development of both the VR and web versions and initial authoring tools in conjunction with the evolving UNSW AI and Cyber guardrails continues.

Figure 9. AI conversation sim

Promotion and student life

The team brings these same skills and techniques to other projects. Working with the UNSW Orchestra and Choir (Refer Figure 10) on a special visualisation of their combined performance delivered an artistic VR experience used in O-Week and other welcome events. The Equity Diversity and Inclusion portfolio requested a VR game-like experience for high schools that was fun and reinforced UNSW values and self-reflection. Lift-Off brings together interactivity, fun, probing questions and a supporting narrative. Quantum Computing's mini sim (Refer Figure 11) offers visitors a glimpse into quantum entanglement and how it is used in research.

Using VR engages the players and stimulates conversations with other participants well after the experiences have been completed.
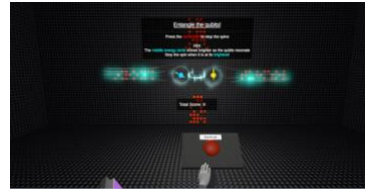

Figure 10. Orchestra Game

Figure 11. Quantum Computing Game

Challenges – media and immersive technologies

Developing media and immersive educational content for courses can be a time consuming, costly process impacting a particular cohort of students. The sustainability and scalability of these resources is dependent on the size and continuation of a team with the skillsets necessary for future iterations and the ability to adapt resources for a variety of contexts. Such constraints have had a significant impact on the widespread adoption of media and immersive content (Huang et al., 2019) and some studies have highlighted the difficulties in deployment for these resources (Radianti et al., 2020). To overcome these challenges, the Media and Immersive team are exploring the potential of utilising artifical intelligence and would like to advocate for the adoption of an open education policy in regard to XR apllications. The team have begun conducting research on student perceptions of the resources developed to determine whether the challenges of developing such resources are outweighed by the improvement to student learning.

Artificial intelligence
New developments in artificial intelligence could have a significant impact on the current challenges of producing media and immersive resources. Video creation tools like Dream Machine from LumaLabs, SORA by Open AI and image generation applications like Adobe Firefly, Midjourney or Dalle could be used in place of stock assets that are frequently used in promotional media resources. Developments in 3D mesh generators such as Masterpiece X and MeshAnything (Chen et al., 2024) have the potential to improve the time constraints of developing 3D environments for gaming and virtual reality applications. While such AI tools may assist with the development of media and immersive resources, the specificity of creating a resource for a particular course will still require specialist skills, time and funds. One solution to this problem could be open education resources (OER).

Open education resources
The OER movement began in the early 2000s, but the recommendations of the Paris OER Declaration of 2012 are yet to be fully realised. One such recommendation was to "Promote and use OER to widen access to education at all levels, both formal and non-formal, in a perspective of lifelong learning, thus contributing to social inclusion, gender equity and special needs education" (World Open Educational Resources, 2012) While many universities include these terms in strategic policies the intellectual property rights tend to outweigh the altruistic sentiments proposed. To ensure the cost and time to produce media and immersive experiences for students is not multiplied across universities, there needs to be more collaboration and sharing of these resources within the higher education sector. UNSW's new strategic focus on 'Progress for All' could be a catalyst for bringing the Media and Immersive Team's content to a wider audience and to realise, in part, the recommendations of the Paris OER declaration.

Concluding remarks

The integration of media and immersive technologies in higher education at UNSW has demonstrated significant potential in enhancing student engagement and learning outcomes. While challenges such as high development and resource costs persist, incorporation of AI and open educational resources offer promising

solutions. Collaboration within the higher education sector could be one approach to maximize the benefits and sustainability of these innovative approaches and ensure that universities can fully realise the possibilities these technologies can have on future student learning.

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