EXPERIENTIAL DESIGN THINKING WITH EMERGING TECHNOLOGIES FOR WICKED PROBLEMS IN INTERIOR DESIGN EDUCATION

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Abstract

Design education is evolving in response to the exponential growth of technology and the complex, multifaceted challenges it presents. This paper examines how integrating Human-Centred Design with emerging technologies provides a novel pedagogical approach for Interior Design students to address real-world challenges.

The project was developed for a third-year studio course focused on reimagining a large, underutilized hospital atrium. Students were challenged to transform waiting from a passive, negative, and isolating experience into a dynamic and engaging opportunity. This transformation emerged through a collaborative, iterative problem-solving process that incorporated multiple experiential practices. The process involved hand sketching, modelling, precedent practice, 2D and 3D renderings and was later refined with AI-enhanced videos and Virtual Reality (VR) walkthroughs. Students, professors, and guests explored design solutions through these diverse approaches, which reframed the designs in multiple formats, creating opportunities to develop creative ideas and solutions from various perspectives and deepen their understanding of how communication techniques influence audience engagement in complex environments.

A shared digital research board became central to the design thinking process, which began as a collaboration across three course curricula. This board enabled students to cross-pollinate ideas and develop design thinking strategies, forming the foundation for their ideation sessions on reimagining the waiting experience. The results of this work were presented in traditional PowerPoint presentations, accompanied by detailed 3D models and 2D renderings. Building on critical feedback from peers and instructors, students advanced their approach by prototyping and testing the design with AI storytelling and VR experiences. These presentations combined animated walkthroughs, static visuals, and AI-generated scripts and narrations to convey the benefits of their redesigned spaces. Guests first viewed the marketing video and then immediately participated in an immersive VR walkthrough, transitioning from a passive conceptual interaction to an embodied exploration that often evoked a sense of awe.

Student feedback indicated enhanced spatial understanding and improved presentation confidence, as well as elevated critical thinking, which transformed traditional design methods and created a transferable model for integrating experiential learning with digital tools. By embedding technology tools into a human-centred design process, the course fostered rapid problem solving, radical creativity, and technological fluency while preparing students to address wicked human-centred challenges.

This interdisciplinary approach demonstrates how emerging technologies can transform traditional design methods by creating a transferable model for integrating experiential learning with digital tools in design education. The three-stage framework of a conventional presentation, AI-enhanced storytelling, and an immersive experience offers a transferable model that other design educators can adapt using accessible technologies, such as basic VR headsets, free AI tools, and standard 3D modelling software.

Keywords: Experiential, technology, design, innovation, education.

1 INTRODUCTION REFRAMING DESIGN EDUCATION

Rapid advances in artificial intelligence, immersive visualization, and digital collaboration tools are transforming design education. Traditionally, interior design studios emphasized aesthetic outcomes or client briefs, privileging surface ideas and quick fixes over systemic complexity. Yet today's challenges, particularly in healthcare, education, and public environments, require designers to confront what Rittel and Webber [1] termed "wicked problems": ambiguous, socially complex, and resistant to linear resolution.

This study investigates how embedding AI-enhanced storytelling and VR walkthroughs within a design thinking pedagogy supports students in engaging these challenges. The case presented is a third-year interior design studio in which students reimagined a hospital atrium as a space where waiting could foster comfort, connection, and community.

The central research question guiding this work is: **How can AI and VR, embedded in experiential design thinking, enhance students' ability to navigate wicked problems in design education?**

2 METHODOLOGY

2.1 Pedagogical and Theoretical Foundations

Wicked Problems in Interior Design. Wicked problems involve multiple stakeholders, conflicting priorities, and shifting constraints [1]. Hospital waiting areas exemplify this complexity: regulatory standards and codes shape design parameters, while patients, staff, and community members bring divergent expectations and emotions. As Buchanan [2] notes, design practice inherently intersects with social complexity and requires non-linear framing.

Experiential Design Thinking. Design thinking offers a flexible framework suited to wicked problems. Its five stages, empathize, define, ideate, prototype, test, support cycles of creativity and decision-making [3]. Experiential learning strengthens students' ability to work with ambiguity by enabling tacit knowledge through making and testing [4], [5].

Digital Immersion. Emerging technologies extended the process. Collaborative platforms like Miro, structured research, while AI tools (ChatGPT, ElevenLabs, MidJourney) supported visualization and storytelling. VR produced the most profound shift, moving audiences from observing projects to entering them at scale. Immersion fostered situated feedback and deeper understanding, consistent with research on VR in higher education [6], [7], [8].

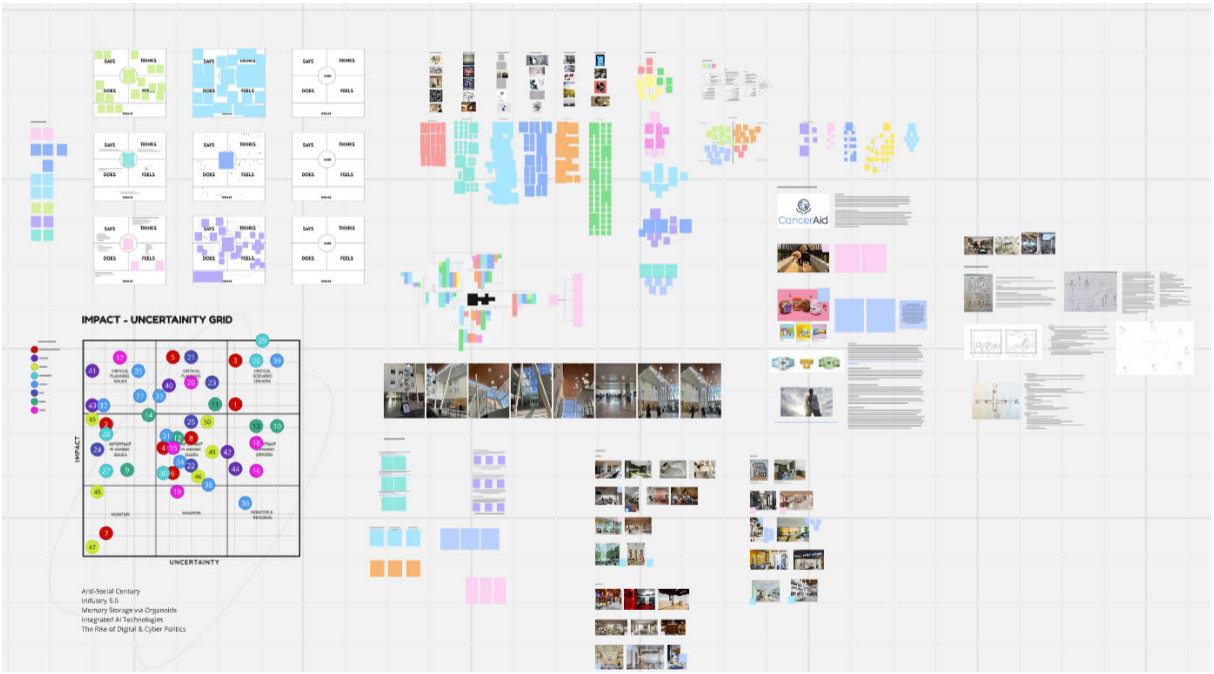

Figure 1. Group Miro Research Board

2.2 Studio Context and Project Brief

This case study was implemented in a 14-week fall 2024 studio with six third-year students enrolled in the Bachelor of Interior Design program at Georgian College, Canada. All participants were female and in the third of four years of study. Each student developed a unique solution to the problem of waiting in the Royal Victoria Hospital (RVH) atrium.

The guiding question: ***How can waiting be transformed from dread into growth, interaction, and fulfillment?***

Students considered four user groups: emergency patients, admitted patients, healthcare staff, and community members. The atrium's scale and openness presented both opportunities and challenges.

The studio was delivered in parallel with theory and digital communication courses, ensuring integration of research, design exploration, and technical skill-building.

2.3 Design Process and Tools

Students began with shared research and analog exploration; sketches, adjacency maps, precedent analysis. These evolved into digital models, then AI-generated narratives and VR walkthroughs. Feedback was iterative: peer critiques offered reflection, instructor reviews reinforced rigour, and guest comments from design and healthcare professionals grounded the work in real-world context.

All six students successfully completed each stage: (1) conventional presentation, (2) AI-enhanced storytelling, and (3) immersive VR walkthrough. This work was conducted within normal classroom time. While formal research ethics approval was not required, students provided informed consent for their work to be shared in academic contexts. Data sources for this case study included peer critique sessions, guest feedback, and faculty observations throughout the semester. These observations were documented as part of the assessment process and complemented by informal student reflections, gathered in the context of course improvement activities.

Figure 2. Student work from 2d flat renderings to an AI Movie clip to a VR Immersive experience

3 RESULTS

3.1 From Static to Dynamic Communication

Students moved beyond 2D renderings and slides to AI-driven videos and VR walkthroughs. Presentations became opportunities for testing rather than final outputs. Audiences' embodied responses provided feedback impossible to anticipate from drawings alone, reinforcing the role of communication as part of design itself.

Dynamic media also allowed time to emerge as a design element. Walkthroughs and videos conveyed rhythm and sequence, aligning with the project theme: waiting as lived experience.

3.2 Audience as Co-Creators

Immersive tools repositioned audiences from observers to participants. Guests experienced projects directly in VR, offering feedback grounded in lived experience. This experiential engagement fostered empathy and inclusivity, demonstrating how immersive communication extends the design process.

3.3 Student Reflections and Learning Outcomes

Spatial Understanding. Faculty and program leadership noted that students' designs expanded in volumetric complexity after engaging with VR. Initial concepts were primarily floor-based, but VR walkthroughs prompted attention to ceilings, vertical elements, and spatial layering. For example, one student explored how a narrow pathway might feel claustrophobic or, alternatively, create a moment of

wonder when opening into a larger, expansive space. Another tested how resting in a VR-modeled sleeping pod could influence feelings of security or vulnerability. These exercises illustrate how conceptual ideas were interrogated through embodied simulation.

Presentation Confidence. One student, who had never taken part in a creative presentation during her first two years of study, fully engaged in this project. The VR stage gave her a new medium that eased her anxiety and built confidence, making it the only creative presentation she delivered in her undergraduate education. Previously, her hesitation had extended beyond presentations, limiting how she contributed in class throughout the semester. By lowering the entry barrier, the project enabled her to participate more openly, showing how alternative forms of design communication can expand access for learners who struggle with traditional methods.

Technology Engagement. While not all students embraced technology equally, several demonstrated enthusiasm by experimenting with additional software and AI tools beyond the project brief. This indicated that the framework supported both baseline participation and advanced exploration.

Challenges. Some students hesitated due to concerns about VR sickness, while others encountered technical barriers when the required software exceeded available computing capacity. At one point, the school's IT department removed the software to manage system resources, disrupting workflow and highlighting infrastructure limitations. These constraints underscored the importance of scalability and institutional support.

Efficiency. Contrary to expectations, the integrated approach did not demand additional time. Because students were already developing detailed 3D models for rendering, shifting into VR and AI-based storytelling leveraged existing work rather than duplicating effort. This efficiency allowed students to engage with their designs in new ways without extending project timelines.

Faculty Observations. As evaluator, the instructor noted that students' work demonstrated a clear shift from aesthetic preoccupation to experiential depth. By walking through their own spaces in VR, students connected individual elements into coherent experiences, revealing design intentions that were less evident in 2D drawings.

These findings align with Makransky and Petersen's CAMIL model [8], where immersion supports cognitive and affective engagement. In this case, VR helped students perceive design relationships more holistically and fostered greater inclusivity in participation.

4 CONCLUSIONS

4.1 Implications for Design Education

This study provides early evidence that embedding AI and VR in experiential design thinking can reshape how students think, iterate, and communicate. The three-stage framework, traditional presentation, AI-enhanced storytelling, and immersive VR walkthrough illustrates a potential model for engaging with complexity in design education and points toward new ways of broadening participation and deepening learning.

4.2 Transferability, Challenges, and Future Directions

The model is scalable, requiring modest hardware and accessible software, and can be applied across contexts such as community design and service initiatives. Persistent challenges include inequitable access, uneven literacy, and faculty training needs. Addressing these requires partnerships, phased training, and hybrid analog-digital approaches.

Looking ahead, longitudinal studies could examine how immersive approaches influence student learning and practice over time. Building on the CAMIL model [8], this case suggests that VR not only supports engagement but also deepens students' capacity to interrogate design decisions through embodied experience. Future research might further explore how immersion fosters empathy, broadens perspective, and evokes awe as part of design pedagogy.

ACKNOWLEDGEMENTS

Statement on the Use of AI. AI tools were employed for formatting and language refinement. The authors take full responsibility for all ideas, concepts, and arguments, which remain their original work.

The authors thank the students of INDE 3008: Studio 6 Design for Health Winter 2025 for their valuable participation and contributions to this project.

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