11th International Conference of the Immersive Learning Research Network
Practitioner Proceedings iLRN2025

DOI: https://doi.org/10.56198/yc3axa58

Transforming Higher Education Through Virtual Reality: Implementation, Faculty Engagement, and Pedagogical Impact

Aundrea Frahm[1]

[1] University of Nevada - Las Vegas, Las Vegas, US
aundrea.frahm@unlv.edu

Abstract. The integration of virtual and augmented reality (VR/AR) technologies in higher education has gained significant momentum, driven by advancements in immersive learning and institutional investments in emerging technologies. At Southern Utah University (SUU), the establishment of a dedicated virtual reality sector became a strategic priority following the award of a substantial grant. This paper examines the systematic development and implementation of a comprehensive extended reality (XR) program within a university setting, detailing the structured approach undertaken at SUU. Key components of the initiative include the creation of an Innovation Studio, the establishment of an agnostic VR/AR classroom, the formation of a faculty XR cohort to encourage interdisciplinary adoption, and the launch of a national conference—the XR Southern Summit—to promote collaboration among educators, industry leaders, and researchers. This study provides an analysis of implementation strategies, curriculum integration, faculty engagement, and technological infrastructure development. Additionally, it outlines assessment strategies designed to measure the program's impact on student learning and engagement. The discussion also addresses challenges and opportunities, including funding allocation, faculty training, scalability, and long-term sustainability. This paper serves as a framework for institutions seeking to establish or expand immersive learning programs. It highlights the potential of extended reality to enhance pedagogical approaches and experiential learning in higher education.

Keywords: Education, Technology, Virtual Reality, Higher Education, Faculty.

1 Introduction

Virtual reality has been integrated into higher education in various ways, enhancing both teaching and research methodologies. Universities have adopted VR through initiatives such as the development of digital twin campuses, exemplified by Morehouse College [1], the incorporation of VR-based applications to support faculty instruction in online courses [2], and Arizona State University's Dreamscape Learn, which utilizes immersive experiences to enhance student engagement and comprehension [3].

Southern Utah University has focused its VR integration on developing physical spaces that support faculty research, software development, and immersive learning in face-to-face curricula. These spaces serve as hubs for experimentation, collaboration, and implementation, providing students and faculty access to emerging technologies.

In addition, SUU established a faculty cohort to promote interdisciplinary collaboration, enabling educators to share best practices, innovative teaching strategies, and research on VR's impact in education. The university also launched the national XR Southern Summit, fostering academic-industry connections to advance VR in education and research. These initiatives aim to demonstrate VR's applications in higher education while systematically assessing its effectiveness and impact. By evaluating VR resources, instructional strategies, and institutional support, this study contributes to the broader discourse on immersive technology's role in higher education pedagogy and research.

2 Development and Implementation of VR/AR Spaces: A Case Study in Higher Education

As the founding director of the VR/AR initiatives, the primary vision was to establish a highly integrated and interdisciplinary ecosystem that would engage faculty, students, and researchers in the exploration of immersive technologies. A key aspect of this initiative was the strategic design and development of physical spaces that would support both instructional applications and research endeavors. This required a careful assessment of spatial needs, technological infrastructure, and pedagogical objectives to ensure optimal utilization of resources.

2.1 Innovation Studio and Agnostic VR/AR Classroom: Expanding Immersive Learning

The Innovation Studio was established as a hub for experimentation, development, and interdisciplinary research in VR/AR. Equipped with high-performance computing systems, a ZSpace computer, and a diverse range of head-mounted displays (HMDs), the studio provides faculty and graduate students with the tools to develop, test, and refine immersive educational applications. To date, it has facilitated the creation of three original VR applications and supported faculty-led research in immersive pedagogy and technology-enhanced learning, offering access to advanced resources for students who may not otherwise have them.

The agnostic VR/AR Classroom was designed for large-scale immersive learning, accommodating over 20 VR headsets with 32-inch display monitors for content mirroring. The term agnostic classroom refers to adding any applications can be added to the headsets, the classroom is not vendor specific. Faculty integrated more than 15 educational VR applications into various disciplines, enhancing student engagement. To maintain organization and collaboration, students were assigned structured spatial positions over numbers on the floor, allowing multiple learners to participate simultaneously while others observed mirrored content. This setup promoted interactive and observational learning in a controlled classroom environment.

2.2 VR Headset Checkout System: Expanding Accessibility

To extend VR access beyond the classroom, a VR headset checkout system was implemented in the university library, allowing students to borrow Meta Quest 3 headsets to use in the library during operating hours. This initiative provided on-demand access to course-specific VR applications, supporting self-directed learning, skill development, and research. By integrating VR into the library infrastructure, the university broadened accessibility and fostered interdisciplinary collaboration.

3 Establishing a Faculty Cohort for Integrating Extended Reality in Higher Education

A VR/AR faculty cohort program was established at the university to foster interdisciplinary collaboration and expand the adoption of XR technologies in higher education. This initiative aimed to engage faculty across diverse disciplines and departments, equipping them with the necessary resources and support to integrate XR into their curricula as a pedagogical enhancement. By embedding immersive learning experiences into traditional coursework, the program sought to enhance student engagement, facilitate experiential learning, and drive innovation in instructional methodologies.

Over a two-year period, the faculty cohort program was implemented in two cycles, each spanning an academic year. The first cohort included 15 faculty members, while the second comprised 14 participants, totaling 29 faculty members actively involved in the initiative. To incentivize participation and acknowledge the additional time commitment, each faculty member received a stipend for their involvement. The program followed a structured meeting schedule, with bi-monthly meetings during the first semester, transitioning to monthly meetings in the second semester. These gatherings provided a platform for faculty to exchange best practices, collaborate on curriculum development, and explore innovative applications of XR in their respective disciplines.

A key outcome of the cohort was the emergence of cross-disciplinary collaborations, leading to joint research initiatives, co-authored publications, and conference presentations that showcased the transformative impact of immersive technologies in higher education. Through this initiative, the university established a network of pioneering faculty committed to integrating virtual and augmented reality into their teaching methodologies. The impact of this program was substantial, with XR technologies incorporated into nearly 50 courses, reaching an estimated 4,000 students who engaged with VR-enhanced learning experiences.

This faculty cohort model demonstrates an effective institutional strategy for scaling XR adoption, fostering a community of practice, and sustaining innovation in immersive education. Future research will explore the long-

term impact of faculty development initiatives on student learning outcomes, faculty engagement, and the broader institutional adoption of extended reality technologies.

3.1 Integration of Virtual Reality Applications in Higher Education Pedagogy

Faculty integrated VR applications into their curricula to enhance student engagement, experiential learning, and discipline-specific skill development. Key applications included Human Anatomy VR, Arkio, Bodyswaps, Virtual Speech, Gravity Sketch, Wander, and Moth & Flame, offering interactive, hands-on experiences beyond traditional instruction—pedagogical approaches varied by discipline. Human Anatomy VR facilitated 3D exploration of anatomical structures in health sciences, while Arkio allowed engineering and construction management students to visualize BIM models in virtual space, enhancing spatial reasoning. In sociology and communication courses, Bodyswaps and Virtual Speech provided students with simulated environments for soft skills and public speaking practice.

Faculty also experimented with innovative VR-based teaching strategies. The “Field Trip Fridays” initiative enabled students to take virtual excursions using Wander, exploring otherwise inaccessible cultural and historical sites. Another project involved 3D scanning students' heads, allowing them to design and customize virtual masks, integrating digital fabrication and artistic expression.

These VR applications illustrate the potential of XR to transform learning, promoting active participation, interdisciplinary collaboration, and skill development. Future research will assess its impact on engagement, knowledge retention, and cognitive outcomes, informing best practices for sustainable VR integration in higher education.

3.2 Development of an Institutional Review Board Study on Extended Reality Integration

As part of the faculty cohort initiative, a structured research study was developed to examine the impact of XR technologies on teaching and learning. To maintain a rigorous and ethical approach to data collection, faculty collaborated on designing a comprehensive IRB-approved survey and interview framework for both cohorts. The study evaluated key dimensions of student engagement, motivation, comprehension, learning outcomes, and challenges associated with integrating XR into higher education curricula.

A critical component of this research effort was the development of a VR-specific assessment scale, created by two faculty members within the cohort. This scale, which remains unpublished at this time, was designed to provide a standardized measure of student experiences in VR-enhanced learning environments. The scale fills gaps in existing assessment tools by providing a more precise evaluation of VR's role in higher education learning.

While the data collection process has been completed, the analysis phase is still pending. Once analyzed, these findings will contribute to the growing body of research on immersive learning, offering insights into the effectiveness of VR integration in university classrooms. Additionally, the results will help refine best practices for faculty adoption of XR technologies and inform future curriculum development, faculty training programs, and institutional policies related to immersive education.

4 The XR Southern Summit: Advancing Collaboration in Extended Reality Research and Application

SUU established and developed the XR Southern Summit, an annual conference dedicated to advancing extended reality technologies in both industry and higher education. This event was created to serve as a platform where industry professionals, educators, researchers, higher education students, and XR enthusiasts can engage in meaningful discourse, share cutting-edge developments, and foster interdisciplinary collaboration.

Since its inception, the XR Southern Summit has attracted notable figures from across the nation, including leading XR developers, academic researchers, corporate innovators, and policymakers. The conference functions as a pinnacle think tank, providing a space where emerging trends, challenges, and future directions in XR technology are explored in depth. By facilitating networking, workshops, and keynote presentations, the summit strengthens academic-industry partnerships, encouraging innovation that bridges technological advancements and educational applications.

5 Challenges and Opportunities in Implementing a VR/AR Initiative in Higher Education

5.1 Challenges

The implementation of a large-scale VR/AR initiative in a university setting presented several challenges related to infrastructure, faculty engagement, research design, administrative support, and software development. These challenges required strategic problem-solving and long-term planning to establish a sustainable and scalable program.

One of the primary challenges was configuring the IT infrastructure necessary for the VR/AR classroom to function effectively. The integration of high-performance computing systems, VR-compatible networking configurations, and software accessibility required collaboration with IT specialists, faculty, and instructional designers to ensure seamless operation. Identifying and resolving compatibility issues, managing hardware maintenance, and providing adequate technical support were essential components of this process.

Another significant challenge was securing faculty participation in the initial cohort. While immersive technology holds great potential for education, some faculty members were hesitant to integrate VR/AR into their curriculum due to technical unfamiliarity, concerns about pedagogical efficacy, or time constraints. Overcoming this resistance required targeted outreach, hands-on training, and demonstrations of VR's potential to enhance learning outcomes.

In addition, developing research questions and assessment tools that were widely accepted by faculty proved to be a complex process. Given the interdisciplinary nature of the initiative, faculty members from different fields had varying research priorities, methodologies, and assessment needs. Establishing consensus on key evaluation metrics, such as student engagement, comprehension, and learning impact, required extensive dialogue and refinement of survey instruments and assessment frameworks.

Another challenge involved securing long-term institutional funding. Initially, the program relied on soft money, such as grants and external funding sources. However, for the initiative to be sustainable, it was critical to transition funding into the university's permanent budget. Achieving this required demonstrating proof of concept through measurable data, which necessitated time to collect, analyze, and present findings on the effectiveness and impact of VR-enhanced learning.

Lastly, software development proved to be a slow-moving process. Faculty members often proposed innovative VR-based learning applications, but the development cycle for these tools was constrained by resource availability, programming complexities, and iterative testing requirements. While faculty had strong conceptual ideas, the process of translating these ideas into fully functional, educational VR applications required significant time, expertise, and funding, often leading to delays in implementation.

5.2 Opportunities

Despite these challenges, the initiative presents numerous opportunities for expansion and innovation in higher education. As VR technology continues to advance, an increasing number of educational applications are becoming available, allowing for broader adoption across multiple disciplines. This expansion facilitates greater accessibility, enabling faculty from diverse academic backgrounds to integrate VR-enhanced experiences into their courses.

VR has the potential to serve as a bridge between online and in-person learning, fostering hybrid instructional models that offer students immersive, interactive learning experiences regardless of location. This capability positions VR as a powerful tool to enhance remote learning, supplement traditional classroom instruction, and provide equitable access to hands-on learning opportunities for students in diverse educational settings.

Moreover, the continued adoption of VR encourages faculty to explore more creative and innovative pedagogical approaches. By leveraging immersive simulations faculty can redefine instructional methods and engage students in dynamic, participatory learning environments. This potential for pedagogical transformation not only enhances student engagement but also positions VR as a catalyst for academic innovation and interdisciplinary collaboration.

6 Conclusion

The integration of extended reality technologies at Southern Utah University SUU has established a sustainable model for immersive learning, research, and interdisciplinary collaboration. Through the development of dedicated VR spaces, faculty training programs, and curriculum integration, this initiative has expanded

experiential learning opportunities and enhanced faculty-driven research. Despite challenges related to IT infrastructure, faculty engagement, research standardization, and administrative support, the program successfully integrated VR into nearly 50 courses, impacting over 4,000 students and fostering faculty collaboration across disciplines. The SUU model provides a framework for institutions seeking to implement extended reality technologies, offering insights into both the challenges and opportunities of immersive learning in higher education.

Acknowledgements

We recognize Dr. Jamie Spinney for mentioning his “Field Trip Fridays” project and Matthew Pedersen for his Gravity Sketch 3D project. We recognize Kirsten Graham and Crystal Koenig for mentioning their scale for measuring VR learning.

References

1. Morehouse College, https://news.morehouse.edu/inside-morehouse/morehouse-college-gives-a-glimpse-of-the-future-of-education-virtual-reality, 2021/03/11.
2. Shen, H., Li, L.: Influence of Self-Regulated Strategy Development on the Performance of Virtual Reality-Based Teaching in Online Learning. International Journal of Emerging Technologies in Learning *17*(11), pp. 312–324 (2022).
3. Nagy, C. J.: Immersive Technologies: Shaping the Next Generation of Teaching and Learning. School Administrator, *81*(7), pp. 26–31, (2024).