A Review of XR Classrooms in Institutions of Higher Education

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This talk will review the literature and examine existing physical spaces using virtual reality (VR) and augmented reality (AR), often referred together as extended reality (XR), to teach learners in an academic setting. Attendees will better understand best practices and ways of addressing potential challenges when designing a physical XR classroom space for higher education. A physical XR classroom provides institutions with a dedicated space for educational courses and workshops, which utilize XR for both one-off sessions and an entire semester (Pirker, Holly, and Gütl 2020). The talk will help answer the question, why a dedicated XR classroom?

The authors identified 13 XR spaces through a literature review and recommendations from a local interest group. Data were extracted from nine XR space manager/leader interviews and four academic articles (Liu, Wang, Lei, Wang, and Ren 2020; MacIntyre et al. 2016; Sams and Leither 2021; Young and Manson 2018). They extracted data including location, classroom dimensions, XR equipment, furniture, room set-up, and funding model.

The talk will include an overview of the existing XR classroom spaces in higher education. The authors will report on findings from the data collected, including highlighting images of other spaces and quotes from leaders, so attendees can "learn from the experts" (Patterson and Casucci 2021). It will detail five effective ways to design XR classrooms, which include:

- Providing an area for discovery and priming before engaging in classroom activity
- How a space should be multi-functional and modular
- There should be ample room for moving around with safety being emphasized
- In designing the space, it's important to balance need and demand
- A technology-based classroom requires ease of use and available support to be successful

After reviewing existing XR classrooms and lessons from the expert managers of these existing spaces, the authors will provide possible solutions to address common challenges for those planning and using these spaces. In higher education XR classrooms, some challenges including, a lack of clear hardware leaders in the space (what should we support?), little support from the industry to develop for educational purposes, creating XR content from scratch, and access to paid applications in stores and how to share them with multiple users simultaneously

The authors have used these data to create a temporary XR classroom to begin experimenting with room setup and support. This talk will showcase the progress and changes within that space. The authors will discuss how they are trying to avoid the common challenges for these spaces and their vision for the future. There is a lot of potential growth in this area of educational XR. Some of the opportunities for future development and exploration that will be included in the talk are developing an open access software repository for educational content, investing in a device management system to help collect and push content, partnering to create training workshops for teaching and content creation, hosting consistent open houses to orient new users, and supporting research and educational outcomes using XR hardware and supported software.

Dedicated XR classrooms can provide instructors and students a seamless integration of this technology into the curriculum. Through focused and deliberate planning and implementation, these classrooms can revolutionize education and provide a new method for learning and educational experiences.

Fig. 1. Students utilizing XR technology in a classroom

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II. References

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