XR-enabled STEM Curriculum for Teachers

Faculty: Eliot Winer, Kimberly Zarecor, Evrim Baran, Tom Daniels, and Merate Barakat
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Title: XR-enabled STEM Curriculum for Teachers
Short title: STEM XR
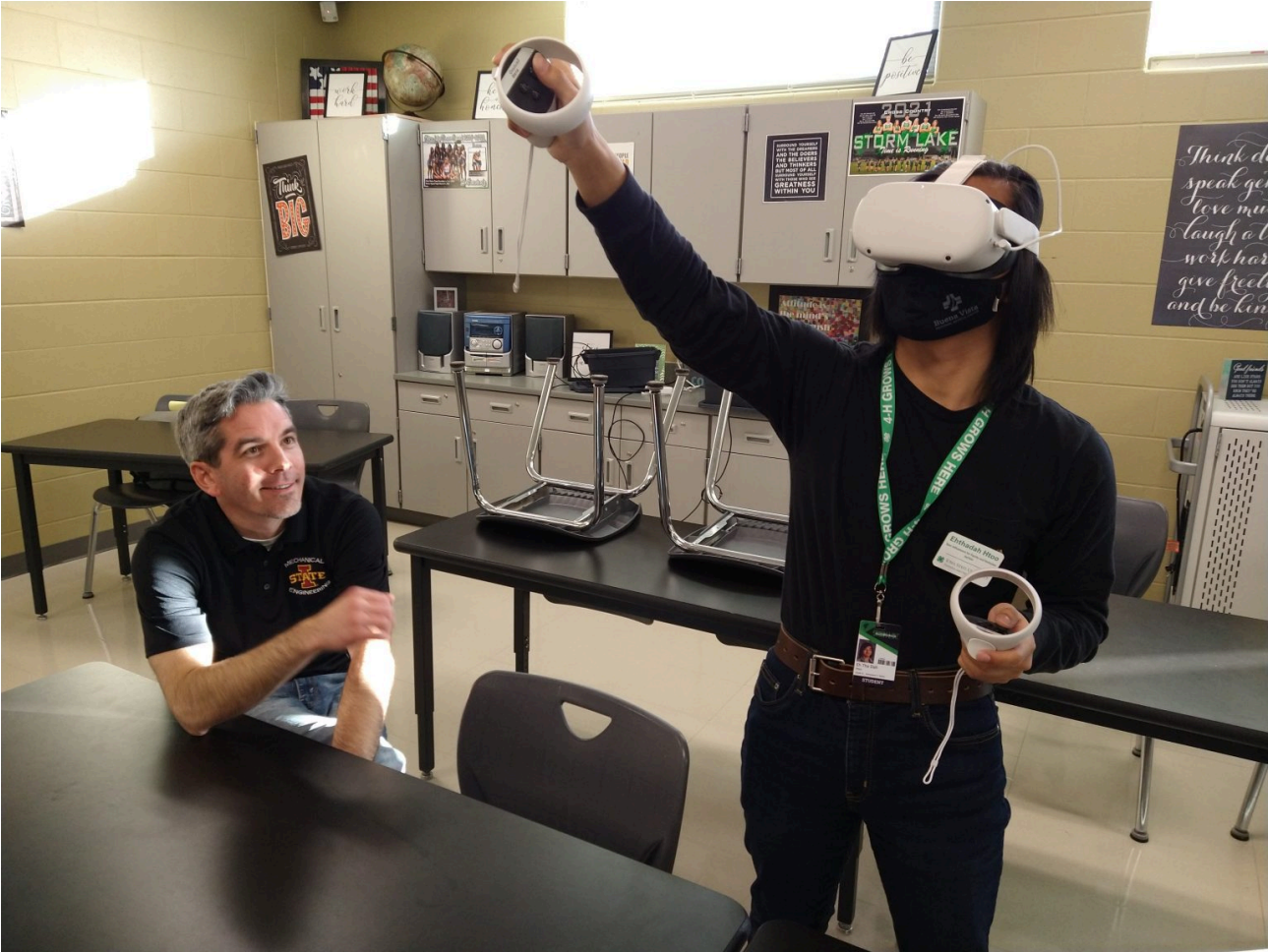**REU Interns:** Alee Winters, Andrea Torres, and Rodney Whitney

Summary

The overarching goal of the project will be to take a disciplinary curriculum taught in a classroom setting at the elementary, middle, or high school level and evaluate how different fundamental concepts from the curriculum can be "converted" from traditional in-class instruction to an XR environment to increase student's engagement, knowledge transfer, and skill retention.

Detailed Description

Interns will facilitate discussions with students and teachers from local high schools to determine a list of candidate disciplinary curriculum that have challenges in student learning and engagement. Three to five example disciplines (e.g., STEM, engineering, architecture) will be recommended, and the interns will identify one to implement based on their research from literature and with students and teachers. Interns will conduct a comprehensive background investigation into the chosen discipline with regards to educator curriculum and accredited university admissions. This investigation will include collecting traditional classroom instruction materials for lesson(s) as well as student and teacher feedback. Interns will identify ways that the disciplinary curriculum lessons can be taught using extended reality (XR) technologies such as virtual and augmented

reality. Text instruction and code cannot simply be shown on a user interface element in an XR environment. The primary research challenge will be utilizing 3D objects into an interactive 3D scene to teach concepts from the chosen discipline to excite students while also instructing them. Interns will create a Unity project with different scenes for each lesson and deploy the environment to multiple XR devices. Interns will then collect feedback from students and teachers about the XR-enabled STEM Curriculum.