Enhanced Collaboration Through Group-Based Virtual Reality Experiences

Brayden Jenkins, Computer Systems Engineering
Mentor: Dr. Robert LiKamWa, Assistant Professor
School of Computing and Augmented Intelligence

The future of educational environments may benefit from virtual and physical toolsets that promote virtual and physical presence. This project seeks to provide virtual collaboration tooling and services for instructors and students to interact in virtual educational environments.

Introduction

This project was developed in FURI in collaboration with Learning Futures’ Immersive Creation Studio. Thank you to Dan Munnerley and Heather Haseley from Learning Futures. I would also like to thank the team of developers that contributed to the project and the Immersive Creation Studio for providing the team. I would like to thank Dr. LiKamWa for his guidance and mentorship.

Motivation

- Commercial devices are entering the age of 3D information, but instructors are limited to 2D-based multimedia
- Past studies indicate that students retain information better when using mixed reality education applications

Grouping

- Aligning coordinate spaces between users’ physical and virtual positions.
- Seamless addition of remote users at table

3D Multimedia

- Increase levels of engagement as users can freely navigate around content
- Ability to manipulate transform properties
- Spatial and temporal annotation capabilities
- More expressive way to take notes and share feedback in a spatialized manner

3D Drawing

- Instructor has agency to create different narrative stories that are spatially driven and interactive

Next Steps

This research creates a platform for engaging, guided experiences that foster learning and collaboration in virtual reality. The next steps are to start user research into usability and effectiveness.

- To measure collaboration, we will compare our system against traditional, non-VR classroom environments, having students perform group activity.
- To evaluate user engagement, we are going to have students fill out pre and post surveys for VR and non-VR methods to measure engagement levels throughout the collaborative experience.
- For future evaluations, we aim to evaluate various user interaction methodologies.

Acknowledgements

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- Past studies indicate that students retain information better when using mixed reality education applications
- We design our system to provide a suite of different interaction modalities and collaborative tooling that are not possible with existing educational toolsets e.g., ASU Canvas.
- With this platform, our research seeks to characterize improvements in user engagement and immersion in educational curriculum.
- To create a platform for collaborative engagement amongst students and instructors, we implemented a suite of specific features:
  - i) grouping,
  - ii) 3D multimedia viewing,
  - iii) 3D drawing,
  - iv) instructor-specific controls.

Approach

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