



# Motion Controls for a natural Experience in a Virtual Learning Environment

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# Abstract

- The current state of virtual classrooms lacks user participation and natural motion controls.
  - Our goal was to have students be able to interact and feel immersed in the virtual classroom so that learning becomes the priority
- Over the 4 month period
  - Researched the problem and current state
    - Incorporating hand raise, nodding, and head shake functions have been found to further the student's immersion and simplify controls
  - Conducted bodystorming to validate and gather ideas
  - Developed our base prototype
  - Conducted user testing and gathered feedback
  - Further Iteration of our prototype



# Introduction

- From the studies of virtual reality learning in both science and english classrooms,
  - Had very positive effects on both the achievement and engagement of students
  - Students enjoyed the technology and though it was easy to use
- Researched sources gave insight into how previous studies on the subject have been handled
- With VR becoming more accessible, it is not out of the realm of possibility to imagine a classroom taking place entirely in virtual reality, with each student owning a headset with an app that propels the students learning

# Methods

## Rough Prototyping/Researching

- Researched the current problem and solutions
- Concepting solutions with paper and sketching

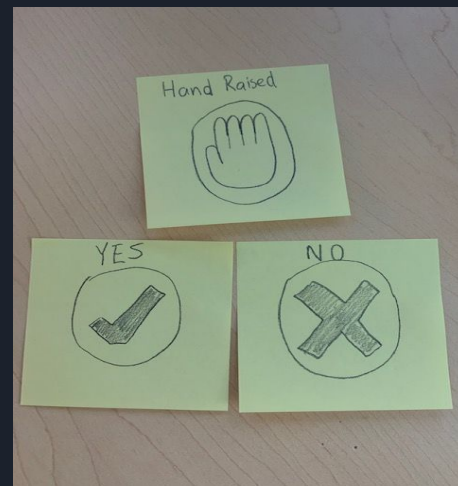
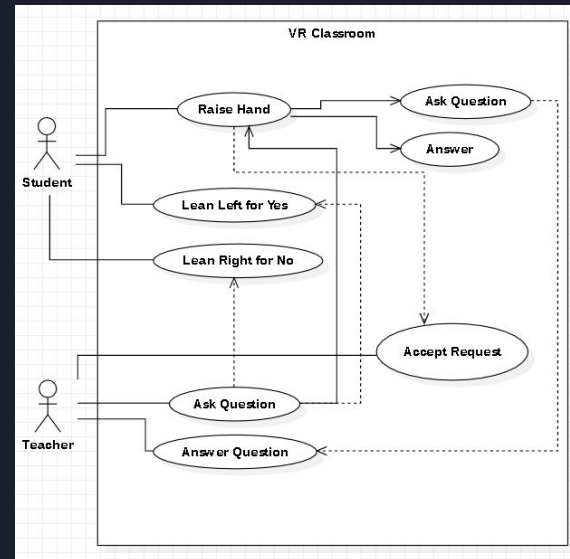
## ○ Bodystorming

- Developed a use Case and Persona for guidance
- Created 2 different situations
  - Student learning and participating in a virtual classroom
  - A student writing a quiz or test in a VR classroom setting
- Lead to our initial prototype with VR functionality
  - Recorded feedback from that prototype

## ○ Questionnaire Based Testing

- Recorded feedback using Sus, NASA TLX, and PQ
- 6 total participants

## ○ Aiming for feedback to reiterate on our final prototype



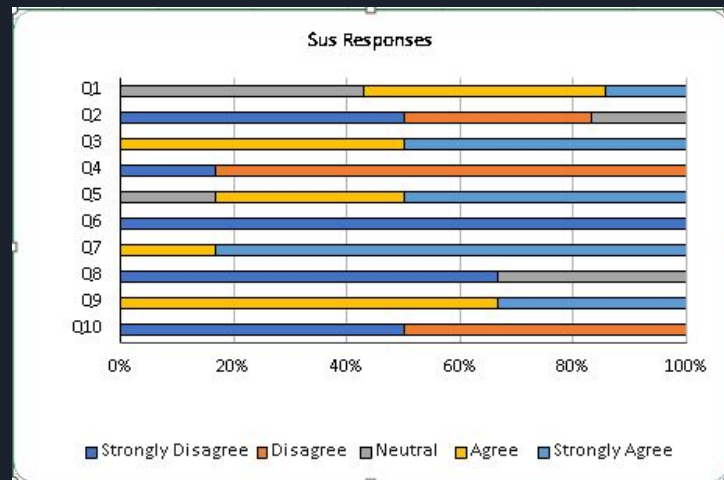
# Results

## After our first user testing period (6 participants):

- 85.4% on our SUS rating
  - Head lean felt unnatural, cumbersome
  - Would not be used often from participants
- PQ and NASA TLX
  - Overall very positive results
  - Physically demanding in some areas
- Open Feedback
  - Requests for a confirm action button
  - Text/Pop up issues
    - Reading text could be difficult
  - Head nod / Shake needed

## Our Final product (after our iteration period):

- Head shake implemented, lean removed
- Visual classroom Updates (Easier to see)
- UI/Text accessibility Improvements
- Confirm Action Button Implemented





# Discussion and Conclusion

- Research conducted proves the need for further research
- Each feedback session was vital to the prototypes iterations
- Future goals:
  - Adding a teacher-side to the VR implementation
  - Transform the prototype into a downloadable VR application that could be used in place of applications such as Zoom or Google Meets
  - These goals require a large amount of resources, but with this prototype we have proved that it is possible and we hope research in this field will continue
- Overall takeaways:
  - How to bodystorm effectively
  - Effective VR interactions
  - Overall VR knowledge and implementation

Join us for a **Live**  
**Demo** After

**Thanks for Listening**