Engineering Education with Extended Reality (XR)

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Introduction

- **COVID-era highlights the challenge of remote education**

- **Piloting UAlbany's first XR Lab**

- **Immersive and Experiential Learning**

Agenda

- **Background and Context**
- **Problem Statement**
- **Methodology**
- **Key System Requirements**
- **Logical Design**
- **Physical Design**
- **System Demonstration**
- **Limitations**
- **Future Work**
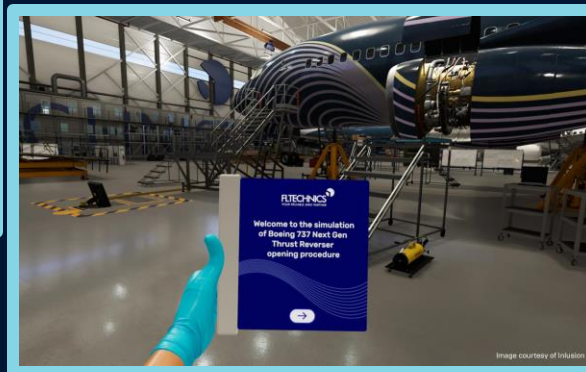- **Individual Contributions**
- **Questions**

Background and Context

Revolutionary

Evolving landscape of education and technological advancements

Applications

Effective in other STEM fields

Problem Statement
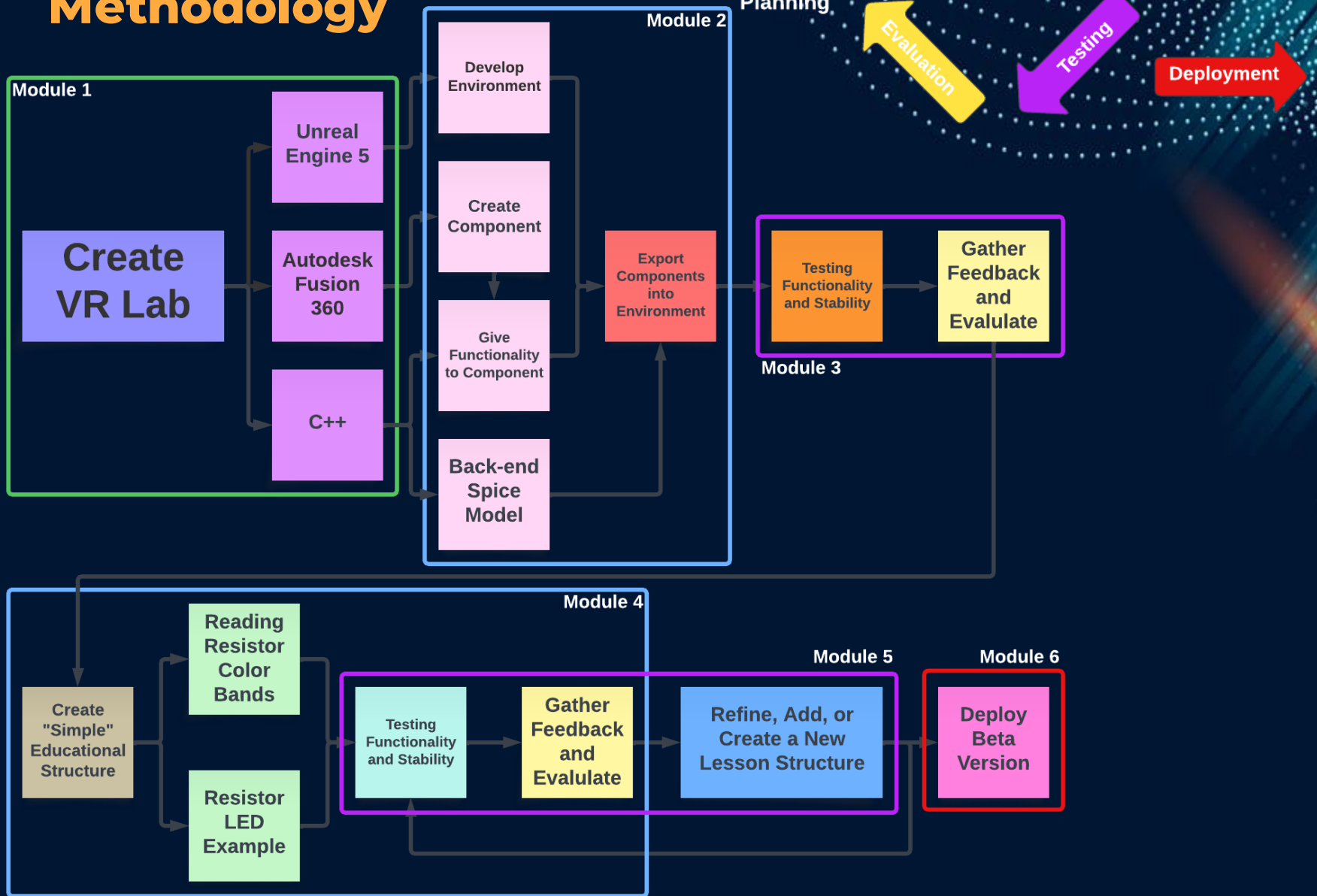
HANDS-ON

Learning through experiment

REMOTE LEARNING

Mandatory lab components

Methodology

01

Key System Requirements

02

Logical Design

03

Physical Design

01 Key System Requirements

Functional Requirements

- User Interactions – Intuitive Controls
- Simulation Mechanics – Object Interactions
- Environment Progression – Lessons
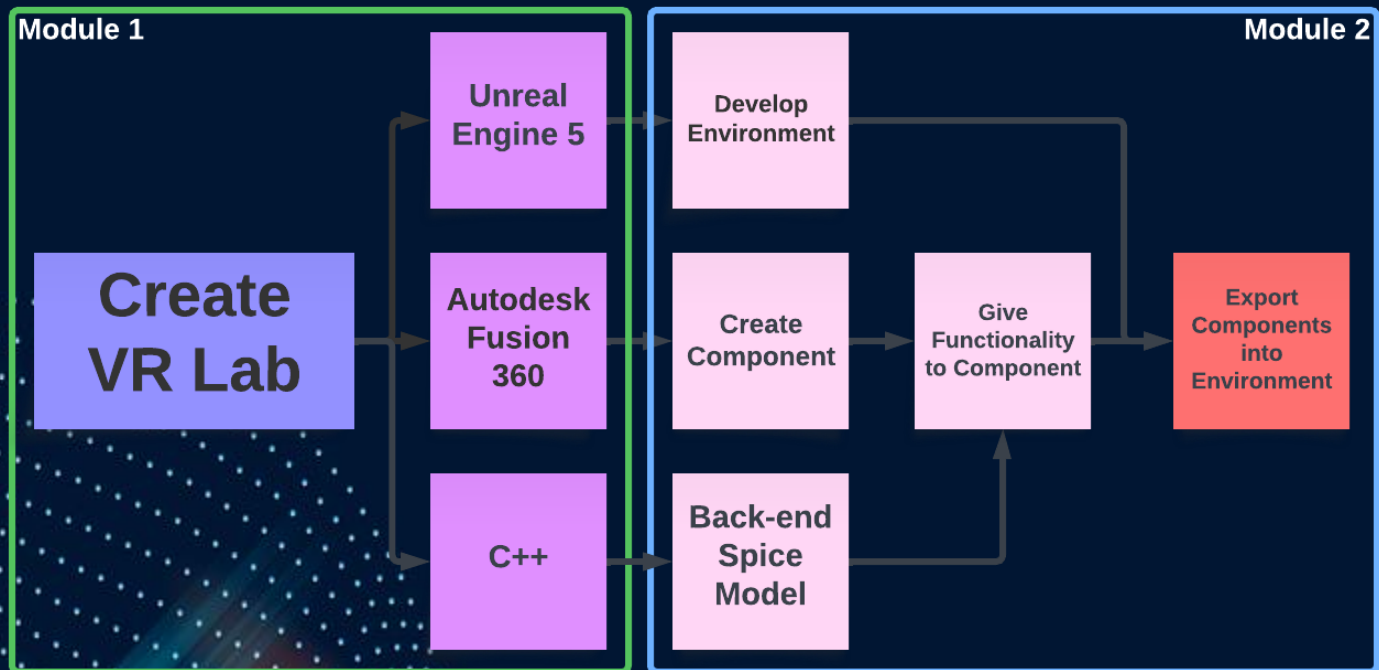- Optimization/Monitoring – Optimize Assets

Non-Functional Requirements

- Performance – Convenience
- Compatibility – Hardware and Platforms
- Reliability – Stability

02 Logical Design

Design Concept
Components
Relationships

03 Physical Design

System Components

Meta Quest 2
Unreal Engine 5
Fusion 360

Alternatives

Mixed Reality
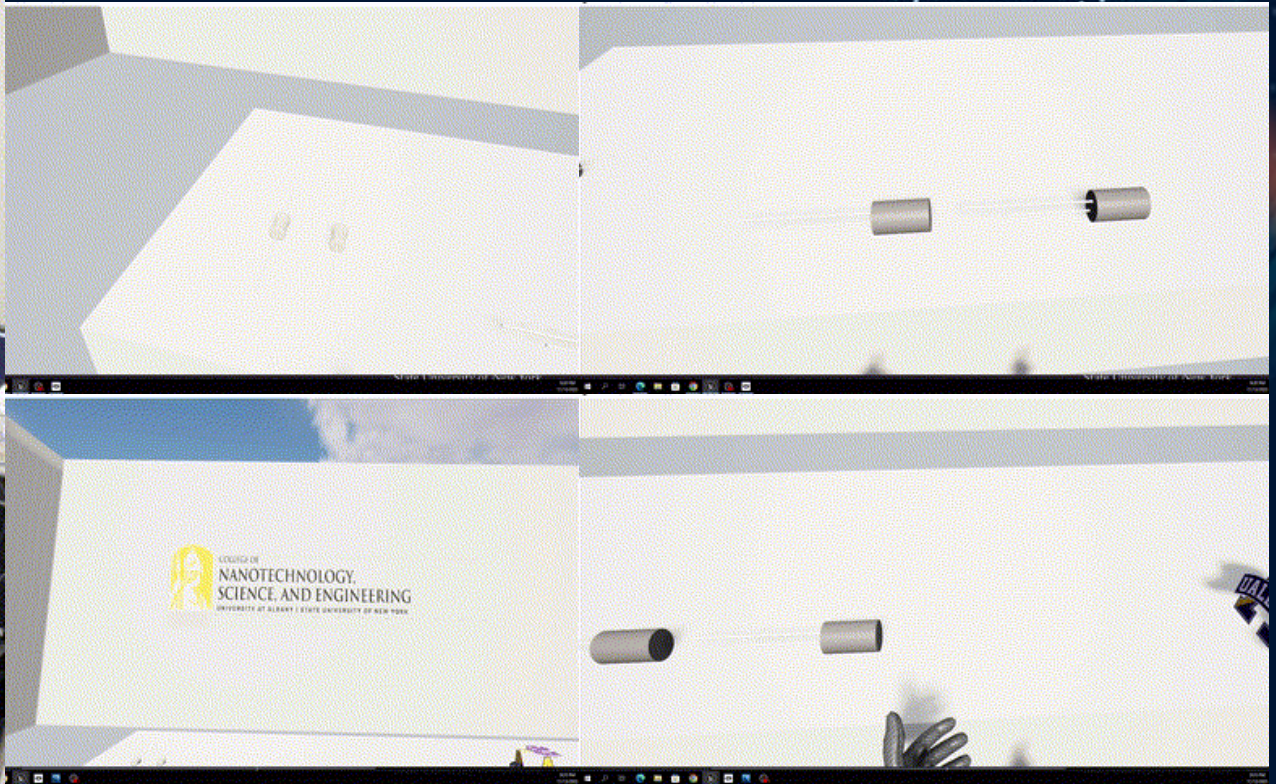AR
Hand Tracking

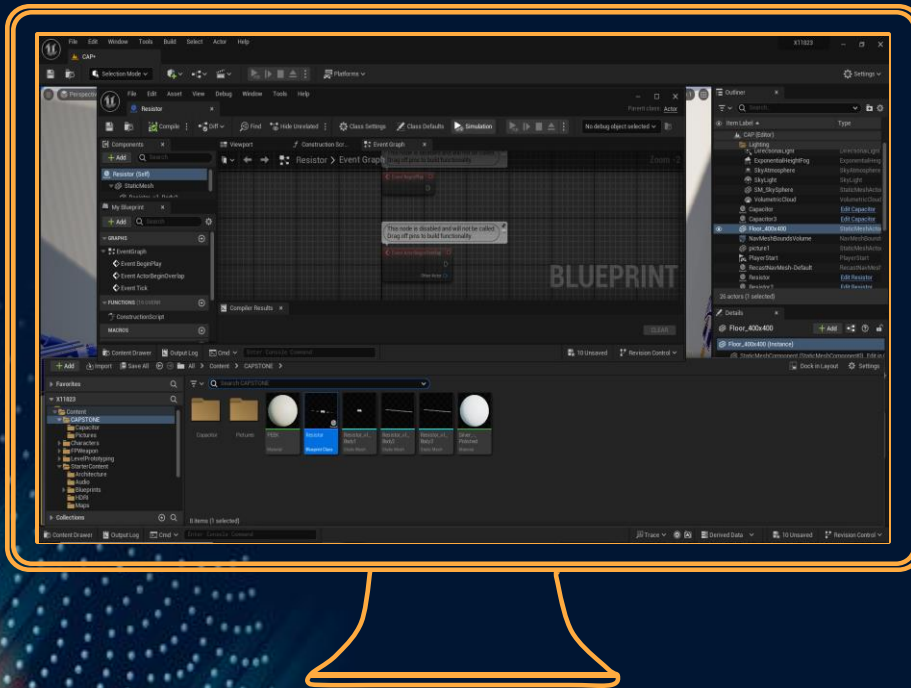## Justification

Documentation
Simplistic
Realistic

Implementation Plan

Piecewise
Constant Revision
Documentation

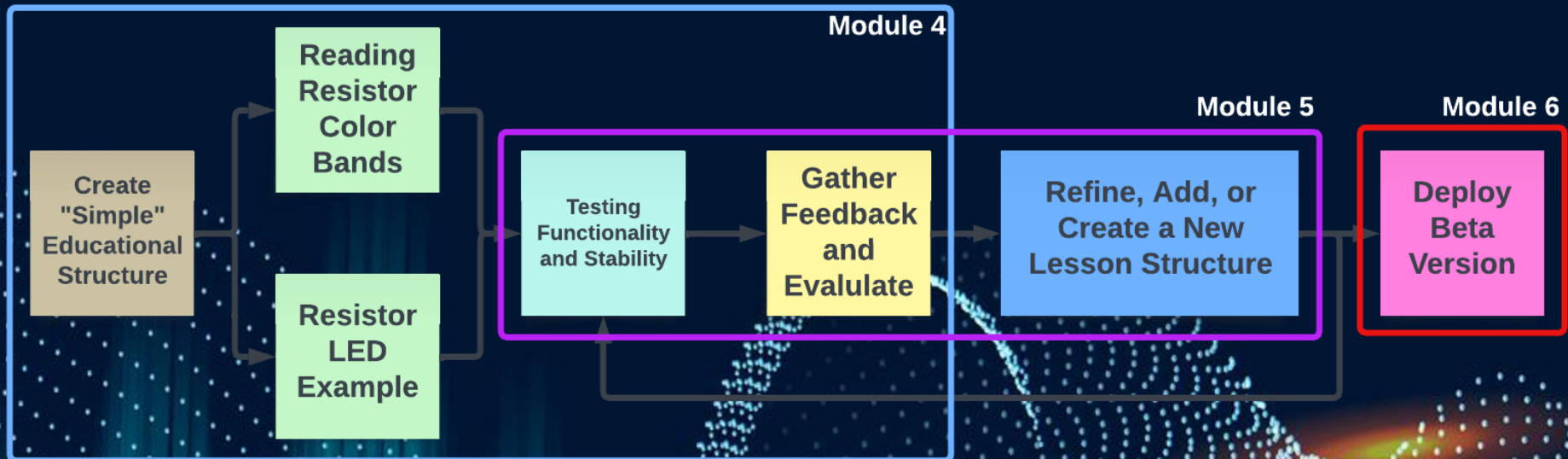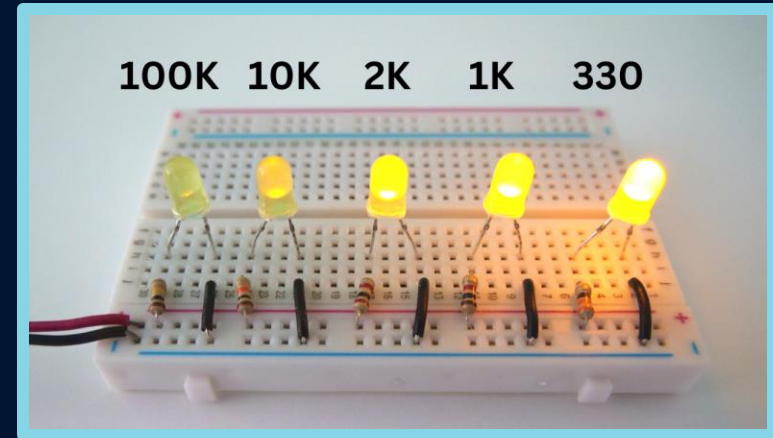# System Demonstration

Limitations

Hardware:
Processing Power

Software:
High Learning Curve

Recommendations for Future Work

Spring Plans

Future Work

     - More Structural Lessons

     - Deploy Beta

100K   10K   2K   1K   330

Module 4

Module 5

Module 6

- Create "Simple" Educational Structure
- Reading Resistor Color Bands
- Resistor LED Example
- Testing Functionality and Stability
- Gather Feedback and Evaluate
- Refine, Add, or Create a New Lesson Structure
- Deploy Beta Version

Individual Contributions

Joren Cruz
- **Support Roles**: Archivist, Scheduler
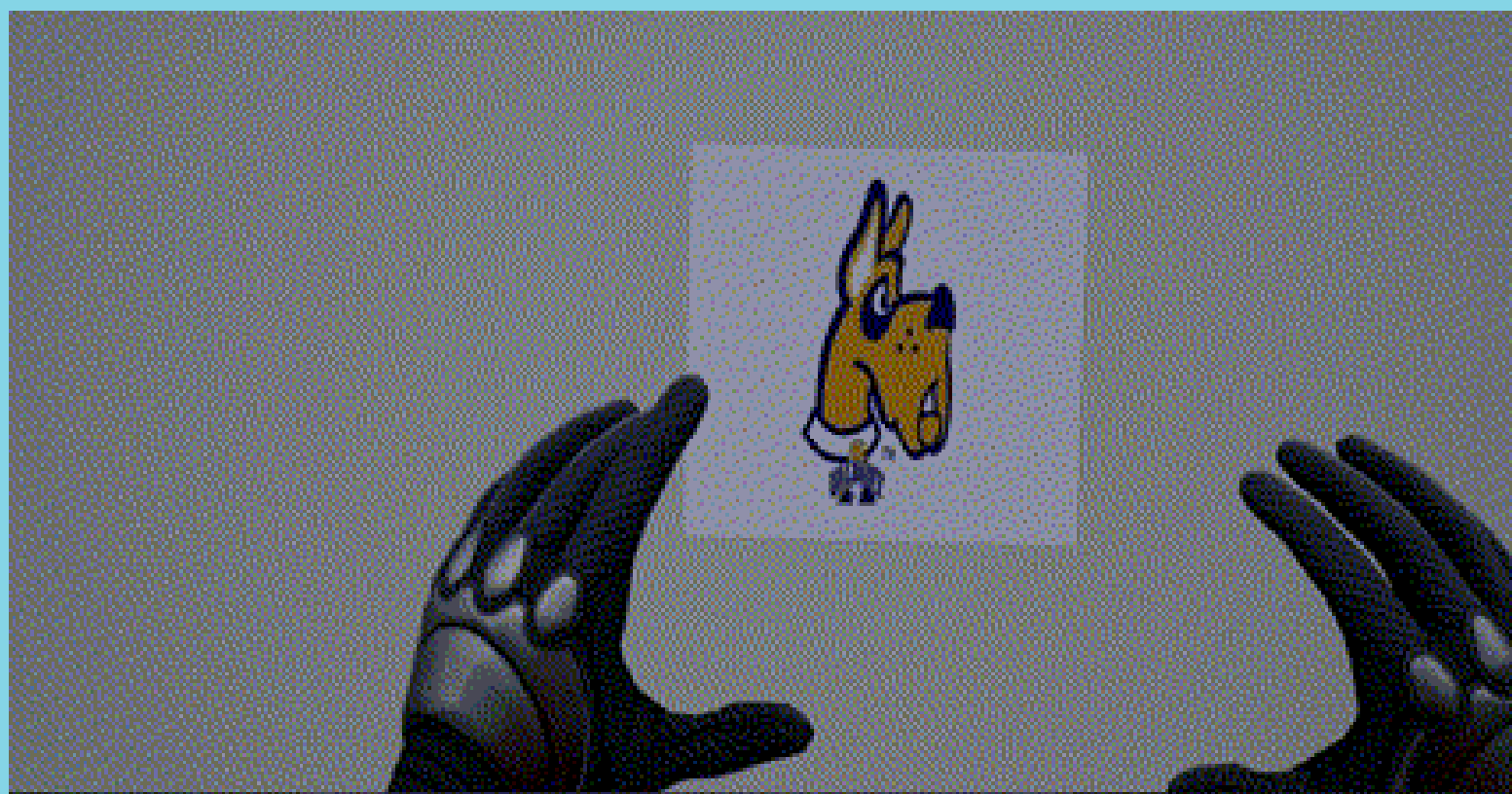- **Most Significant Contribution:** GitHub Repository, Documentation, Unreal Research

Diego Tapia
- **Support Roles:** Point of Contact
- **Most Significant Contribution:** Documentation, Skeleton Assets

Daniel Wang
- **Support Roles:** Editor, Treasurer
- **Most Significant Contribution:** Environment Development, GitHub Repository, Diagrams, and Documentation

Thank You!

Questions?