Some rural high school students lack exposure to STEM curriculum. Educational gaps can lead to underrepresentation in future careers. VR can enhance engagement especially in STEM education [1]. Exposure to STEM curriculum through gamification could lead to:
- Pursuit of higher education
- Apprenticeships
- Agency in their future careers & adult life

Co-Design: A design approach in which developers work alongside students to involve them in the art of creation to better envision the final product [2]. Implemented with both local teachers & students. Helped identify:
- Local community culture & pop-culture
- Recognizable game tropes
- Popular art styles

Large number of ESL students identified – Result: symbology, limited text in game
Current curriculum shift to Problem-Based Learning – Result: puzzle-based game style
Limited number of technology courses in local schools – Result: focus on circuitry, simple introductory level

**Background in STEM and VR**

**Volt of the Pharaoh**

**Game Overview**
Set in ancient Egypt. Currently there is a single level in which the player is introduced to the mechanics of the game and learns how to interact with wires, resistors, and circuits.

**Key Feature: Visual Feedback**
- Green lamp light vs fire and smoke
- Particle systems appear around objects to interact with
- Current flow is shown on the ground with lightning bolts
- Floor tile designs show grid connections like a bread board

**Key Feature: Gameplay**
- Escape room style play area
- Only vital objects can be moved and interacted with
- Each room teaches additional circuitry principles, building on each other
- Completing the circuit is the puzzle to enter the next room

**CO-DESIGN RESULTS AND EFFECTS ON GAME DESIGN CHOICES**
- Large number of ESL students identified
  - Result: symbology, limited text in game
- Current curriculum shift to Problem-Based Learning
  - Result: puzzle-based game style
- Limited number of technology courses in local schools
  - Result: focus on circuitry, simple introductory level

**Future Work**
- Additional co-design sessions
  - Larger focus on game design
  - Iterative game testing & design
- User testing
  - Measure engagement
  - Meets education standards
- Full game development
  - Additional levels
  - Add story to game play
  - New gameplay mechanics

**References**


**Untapping Potential:**
Virtual Reality Circuitry Learning in Rural Midwest Communities
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