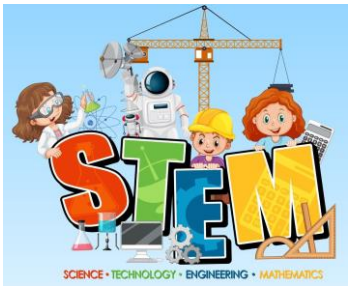
Can Bio-Inspired Robots Support Integrated STEM Education?

ECR Hub
EDU Core Research

2422459 - Use of a Bio-Inspired Educational Snake-Jaw Robot to Enhance STEM Engagement

Background

Integrated STEM education requires drawing connections between natural and applied sciences → *Bio-inspired robots can help draw connections between Biology and Engineering Sciences*

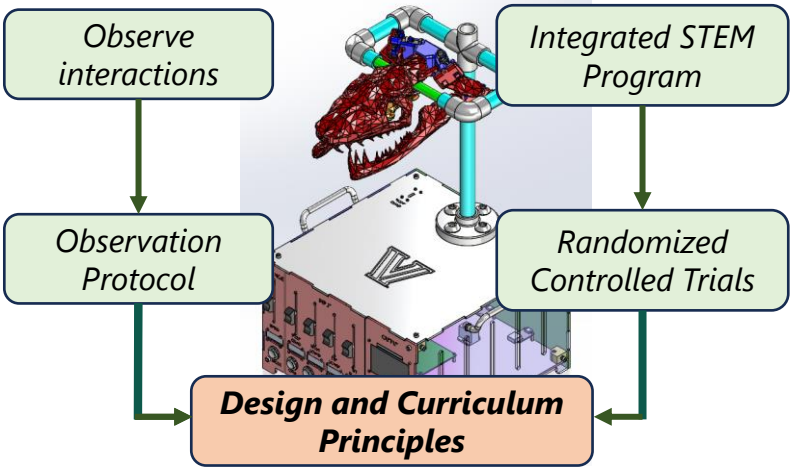


What is Not Yet Known

*Little is known about how to **design**, **implement**, and **evaluate** bio-inspired educational robots for integrated STEM education.*

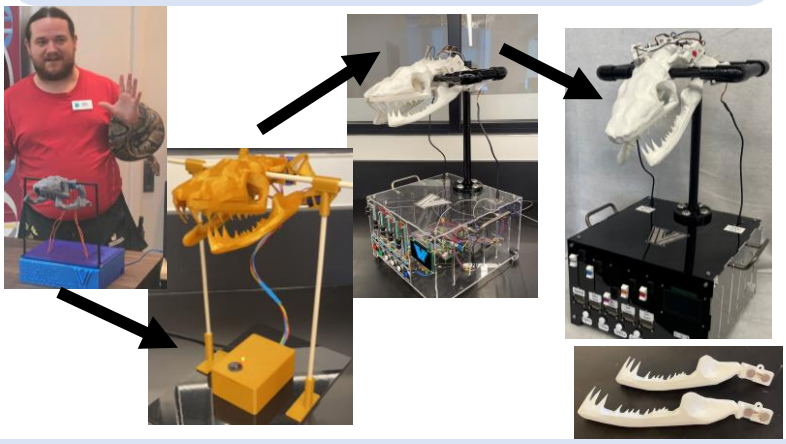
Approach

Integrate observations, design, and experimentation to explore learner-robot-interaction and curricular principles for bio-inspired robot-centered integrated STEM education.



Progress

- Multiple design iterations completed
- Replicated robot systems manufactured
- Initial usability studies completed
- Educator feedback received (multiple rounds)
- Informal observations underway



Methods

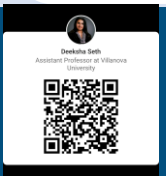
Mixed-methods | Design-based-research

- Video recordings and written observation protocol
- Pre-and post-program engagement survey + robot feedback
- Educator reflections and interview
- Thematic analysis, descriptive/inferential analysis
- Between-group comparisons

Challenge Area

Measurement

- Research with minors and program-aligned data collection
- Bridging engineering, education, cognitive science, and museum studies
- Assessing integrated STEM understanding
- Understanding how engagement translates into meaningful STEM learning outcomes



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