ANALYZING UNDERGRADUATE PHYSICS PROBLEM-SOLVING VIA AI CHATBOT DIALOG

Syed Furqan Abbas Hashmi & N. Sanjay Rebello

Purdue University, West Lafayette, IN, 47906

INTRODUCTION

- Problem Solving is critical in physics education
- Traditional assessments capture outcomes, not problem-solving processes
- AI chatbots offer scalable insights into student problem solving.

CHATBOT DESIGN

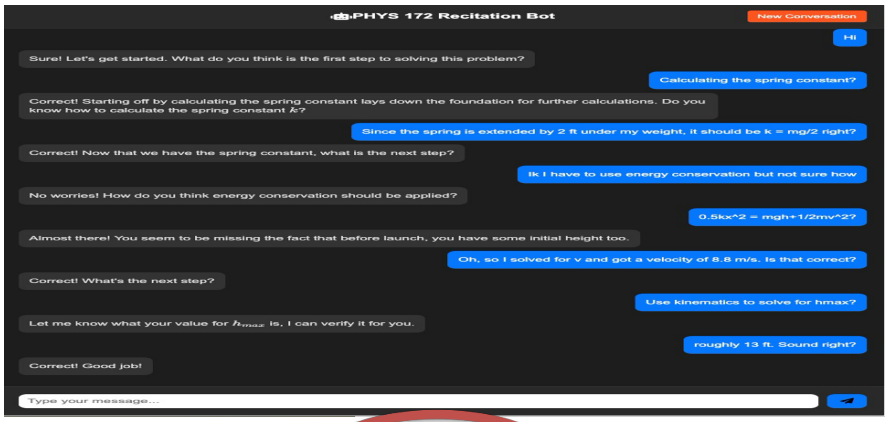
- ChatGPT 4o at backend
- Doesn't give full answer in one go
- Designed to guide students by asking Socratic questions
- Accessible to students via internet link.

METHODS

- Study conducted in an introductory calculus-based physics at a large, public Midwestern University
- Designed to guide students by asking Socratic questions
- Accessible to students via internet link
- Student responses collected via Qualtrics Survey.

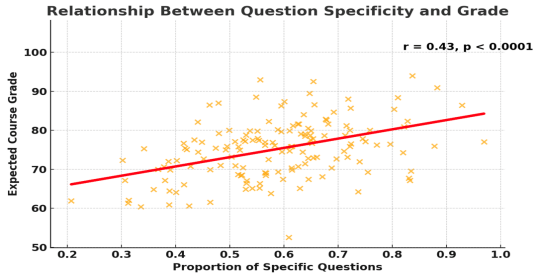
RESEARCH QUESTIONS

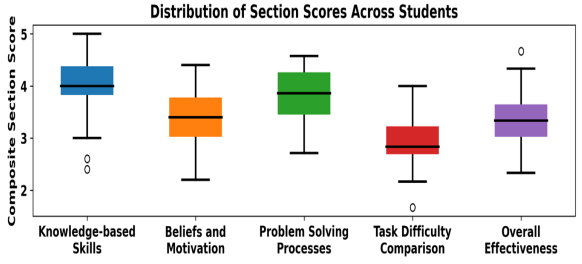
1. How do AI chatbots impact students' problem-solving in Physics?
2. How can student-chatbot dialogues reveal problem solving behaviors linked to course performance?

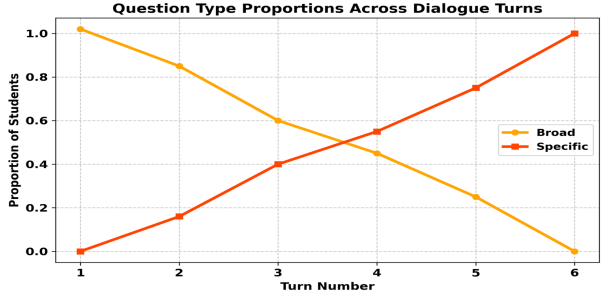


Module 1: Momentum | **Module 2: Energy** | **Module 3: Angular Momentum**

AI Chatbot Created → **Deployed in Physics Class** → **Chatbot Used in Class** → **Collected Transcripts & Survey Data** → **Annotated Question Type** → **Analyzed Question Specificity Over Time**







RESULTS

- Students had an overall positive response to the chatbot
- Students started with broader questions but moved to more specific ones.
- Higher performing students asked questions that were more specific.

ACKNOWLEDGEMENT

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