PRIMARYAI: Co-Designing Immersive Problem-Based Learning for Upper Elementary Student Learning of AI Concepts and Practices

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ABSTRACT

There is growing awareness of the central role that artificial intelligence (AI) plays now and in children's futures. This has led to increasing interest in engaging K-12 students in AI education to promote their understanding of AI concepts and practices. Leveraging principles from problem-based pedagogies and game-based learning, our approach integrates AI education into a set of unplugged activities and a game-based learning environment. In this work, we describe outcomes from our efforts to co-design problem-based AI curriculum with elementary school teachers.

KEYWORDS

K-12 AI Education; Problem-Based Learning; K-12 Education

1 Introduction

Integrating AI education into K-12 learning is recognized as a critical endeavor [2]. Using participatory co-design, we have partnered with elementary school teachers to collaboratively design PRIMARYAI, which integrates AI into life science [1].

2 The PRIMARYAI Environment

The co-design process has yielded a 2-week unit for teaching AI concepts introduced in the game-based learning environment (Figure 1). We start with the problem: New Zealand's yellow-eyed penguin is endangered, and students are asked to use knowledge about AI to help. The unit integrates life science, AI concepts, and AI ethics. As students play PRIMARYAI's first quest, they formulate AI planning problems to help an autonomous RoboPenguin perform investigations.

3 Findings

Results from 20 students in grade 5 revealed relatively strong performance for AI planning (M=8.7; SD=2.7). We also examined separate competencies, observing highest scores for *Preconditions* and *Postconditions* and identifying *Possible Actions*. We observed the lowest scores for *Prioritization* and naming *Initial States*.

Figure 1: AI Planning Problem in PRIMARYAI

4 Conclusion

Integrating AI with engaging life science problem solving offers significant promise for preparing students to thrive in a future where AI is ubiquitous. This poster presents our co-design process for developing PRIMARYAI, the lessons learned as we explore integrating AI education into life science, and initial steps toward assessing students' progress in understanding AI concepts.

REFERENCES

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