

Designing a Collaborative Game-Based Learning Environment for AI-Infused Inquiry Learning in Elementary School Classrooms

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ABSTRACT

Recent years have seen growing recognition of the importance of enabling K-12 students to learn computer science. Meanwhile, artificial intelligence has emerged as a technology with the potential to profoundly reshape society. This has generated increasing demand for fostering an AI-literate populace. However, there is little work exploring how to introduce K-12 students to AI and how to support K-12 teachers in integrating AI into their classrooms. In this work, we explore introducing AI learning experiences into upper elementary classrooms (student ages 8 to 11). With a focus on integrating AI and life science, we present initial work on a collaborative game-based learning environment that features rich problem-based learning scenarios. This will enable students to gain experience with AI as it applies to solving real-world life-science problems.

KEYWORDS

Artificial Intelligence; K-12 education

1 INTRODUCTION

Inquiry-based learning approaches for computer science (CS) education have yielded encouraging results that demonstrate improved student engagement, student achievement, and student attitudes towards CS [2]. Similarly, game-based learning approaches that motivate students with compelling virtual worlds can be used to create engaging CS and AI learning experiences in K-12 classrooms [4]. Efforts are beginning to explore how to incorporate AI more intentionally at the K-12 levels [3]. Because problem-based learning [1] and game-based learning both have the potential to support student engagement and achievement, we propose that integrating these instructional approaches could offer significant potential for promoting AI education at the upper elementary school level.

2 OVERVIEW

Recognizing the need to provide all students with AI learning opportunities, we are creating PRIMARYAI, a collaborative game-

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based learning environment. In PRIMARYAI, students learn by engaging in problem solving with AI tools designed specifically to support inquiry-based life-science adventures (Figure 1). PRIMARYAI integrates AI-infused block-based programming to teach a range of AI methods including image recognition, machine learning, planning, and automated decision making.

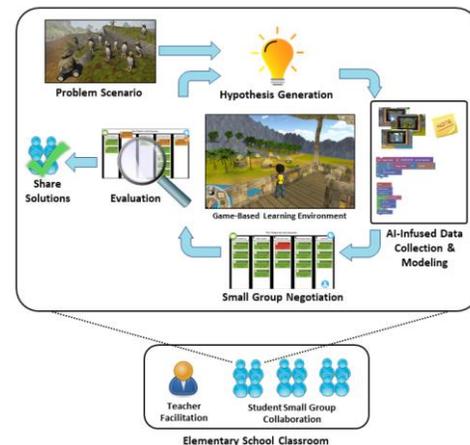


Figure 1: AI-Infused Collaborative Game-Based Learning

3 CONCLUSION

Integrating game-based learning and problem-based learning, offers significant promise for creating AI-infused learning experiences. This poster presents the theoretical framing of our work, insights from teacher interviews, and design of PRIMARYAI.

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