Promoting AI Education for Rural Middle Grades Students with Digital Game Design

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ABSTRACT

The demand is growing for a populace that is literate in Artificial Intelligence (AI); such literacy centers on enabling individuals to evaluate, collaborate with, and effectively use AI. Because the middle school years are a critical time for developing youths' perceptions and dispositions toward STEM, creating engaging AI learning experiences for middle grades students (ages 11 to 14) is paramount. The need for providing enhanced access to AI learning opportunities is especially pronounced in rural areas, which are typically underserved and underresourced. Inspired by prior research that game design holds significant potential for cultivating student interest and knowledge in computer science, we are designing, developing, and iteratively refining an AI-centered development environment that infuses AI learning into game design activities. In this work, we review design principles for game design interventions focused on middle grades computer science education and explore how to introduce AI learning experiences into interactive game-design activities. We also discuss results from our initial co-design sessions with middle grades students and teachers in rural communities.

1 OVERVIEW

Recent years have seen growing recognition of the need to integrate AI learning into K-12 education [7]. Prior research suggests that engaging students in creating digital games holds great promise for cultivating student interest and knowledge in computer science [2] as well as broadening participation in computing [3, 5]. Building on design principles identified in prior research, we are iteratively designing and developing the AI Play learning environment that will enable students to learn AI concepts and practices while creating gameplay experiences using AI-driven techniques such as machine-generated content, search-based pathfinding, non-player character reasoning, and natural language processing-based interactions. Activities within AI Play are informed by emerging curricular guidelines for K-12 AI education [4, 6, 7] as well as core computer science practices delineated in the K-12 Computer Science Framework [1]. AI Play activities are being designed to be culturally relevant and engaging for the rural, middle grades students who comprise the regions we are targeting with this intervention. Therefore, preliminary work on this project focuses on the implementation of co-design sessions with students and teachers. In this poster, as we look to foster AI literacy among rural middle grades students and teachers, we present initial findings from these co-design sessions that explore the participants' background with and understanding of game-design, computer science, and AI. In brief, teacher participants were unable to provide an explanation of AI and stated they did not teach coding directly. Students had a range of responses to 'what is AI?' that included conflation with general computer use to knowledge of doorbell cameras and self-driving cars. Additionally, students' background with coding was extracurricular in nature, and all students stated they played digital games.

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