Fostering Upper Elementary AI Education: Iteratively Refining a Use-Modify-Create Scaffolding Progression for AI Planning

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ABSTRACT

The growing ubiquity of artificial intelligence (AI) is reshaping much of daily life. This in turn is raising awareness of the need to introduce AI education throughout the K-12 curriculum so that students can better understand and utilize AI. A particularly promising approach for engaging young learners in AI education is game-based learning. In this work, we present our efforts to embed a unit on AI planning within an immersive game-based learning environment for upper elementary students (ages 8 to 11) that utilizes a scaffolding progression based on the Use-Modify-Create framework. Further, we present how the scaffolding progression is being refined based on findings from piloting the game with students.

1 OVERVIEW

Recent years have seen a growing awareness of the vital importance of fostering AI literacy among K-12 students [3]. Game-based learning holds significant promise for fostering AI education [2]. PRIMARYAI is a game-based learning environment that engages students in learning AI concepts through problem solving in a rich storyworld (Figure 1). Within the game, students are tasked with investigating the shrinking population of yellow-eyed penguins on the South Island of New Zealand. Students encounter a series of quests that revolve around AI-related challenges. One of the quests focuses on introducing AI planning concepts to students using a scaffolding progression based on the Use-Modify-Create (UMC) framework [1]. The initial design of the AI planning quest consisted of three missions (*Use*, *Modify*, *Create*). To evaluate and refine the UMC

scaffolding progression, we analyzed trace data from a pilot study with 21 fifth grade students playing the quest.
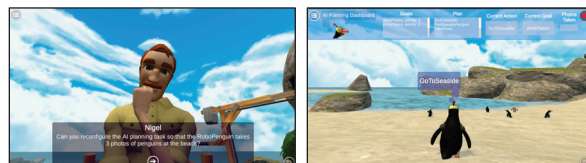

Figure 1: PRIMARYAI Game-Based Learning Environment

Results from the pilot showed that, overall, students were successful in completing the missions, but they struggled initially during the *Use* mission and when moving from the *Modify* mission to the *Create* mission. Based on these findings, the quest is being expanded to include additional missions for each phase of the scaffolding progression to support student learning of AI planning concepts more effectively. This poster will present details on the PRIMARYAI game, and the extensions being made to the UMC scaffolding progression for the AI planning quest.

REFERENCES

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