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Player Agency and Content Retention in Educational Games

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Abstract

Games are now prevalent enough in the mainstream entertainment culture to be an inevitable inclusion in classrooms seeking to motivate and engage students. This study proposes to investigate how educational games can be developed to be more effective instructional tools by examining the effects of individual game design components on learning outcomes. To that end, the proposed experiment will test an agency supporting game condition against a game condition which diminishes agency to determine what effect, if any, player agency has on the retention of educational content and the play experience in educational games.

Introduction

Gaming is now prevalent enough in mainstream culture that it is an inevitable inclusion in the classroom as we seek to engage students and improve learning outcomes. In order to create effective educational games, we need to understand how game design elements impact aspects of learning.

Player agency, best defined as "the ability to change the course of one's experience" (Thue et al, 2010), is an important game design element to investigate because it has the potential to increase a player's sense of immersion in the game environment. Early research suggests that this immersion has positive implications for learning in educational games (Jabbar & Felicia, 2015). Player agency may also influence motivation and attention of students if it increases the play experience of the educational game.

Current Study

The current study seeks to investigate 1) whether player agency has an effect on retention of educational content in an educational game and 2) if the inclusion of elements which support player agency affect the play experience of educational games.

Experimental Conditions

We developed two versions of a short role-playing game designed to teach a middle school earth sciences class about hurricane formation by having them take the role of a meteorologist who is responsible for monitoring oceanic weather conditions from an observation lab on a small fictional island in the Atlantic (see Figure 1). In both games, students will research hurricane formation, collect atmospheric data, conduct weather simulations, and interview residents. However, the games differ after the initial introduction of the content as we used the narrative of the game to manipulated the amount of support for player agency in each condition.

In one version of the game, we promoted player agency by having the player choose whether to issue an evacuation order or shelter in place on the island. The player then makes additional decisions while coordinating the evacuation or shelter preparation sequence. These later decisions also have narrative consequences for some of the island's residents. In the second version of the game, the player merely reports their data to their superiors at the fictional National Weather Authority and the narrative follows a linear path as they are ordered to carry out an evacuation. The player decisions during the evacuation are replaced with fetch-quests which do not include overt player choices.

The two experimental game conditions will be administered alongside a control condition. In the control condition, the students will use two interactive online activities developed by NOAA ("Hurricane Tracks for Idealized Environmental Flows," n.d.) to help students understand hurricane formation. These online activities are what the cooperating teacher is currently using in the weather unit and represent business as usual in the classroom.

Figure 1: Screenshot example of the experimental games showing the main character researching hurricane formation in the observation lab.

Methods

The participants will be 120 eighth grade science students, randomized at the classroom level, from a suburban middle school in the greater Twin Cities area. The content of the game has been tailored to match what is typically covered in the cooperating teacher's unit on weather systems and will be administered as part of the normal unit activities.

After completing the game or online activity, the students will complete the Play Experience Scale (Pavlas et al, 2012) which will be used to assess player agency and the overall play experience. Students will then complete a brief content assessment on the atmospheric conditions necessary for hurricane development. The content assessment will be re-administered one week later and a comparison of the scores will be used to assess content retention. Additionally, a selected group of students will be interviewed about their play experience to assist in identifying avenues for further development of the game.

Predictions

We predict that students playing the game designed to support player agency will retain more of the educational content than those playing the game which has diminished player agency or the control condition. We also predict that the students in the agency condition will report a better overall play experience than those in the other conditions.

References

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