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Application of Integrated Pest Management Skills Through a Board Game Simulation

Abstract

University of Idaho educators have developed an educational board game simulation titled *Pest Friends.* This board game focuses on the principles of Integrated Pest Management (IPM) and the consequences associated with a variety of management tactics. One hundred percent of players have indicated that it is more engaging than traditional trainings on this subject. The purpose of this article is to show the value of game-based learning in agriculture, with an emphasis on IPM.

Introduction

Integrated Pest Management (IPM) is the practice of using strategies to maintain a pest population under economic thresholds of crop damage. For production agriculture, a pest is defined as any organism that can cause significant economic damage to a crop or commodity. Producers should use a variety of tools including pest monitoring, proper

identification, habitat modification, physical control, biological control, and chemical control to have an effective pest management plan.

Pest management educators typically carry out programming through the use of workshops or state pesticide re-certification presentations. Presenters develop slide shows discussing important principles, and learners are encouraged to ask questions and listen carefully to learn. In 2020, our team developed an educational board game to provide learners with an alternative and immersive experience where they practice IPM through consequential learning. Learners practice IPM by taking on the role of a pest manager in a fictitious crop. During this process, they must make tough decisions about how to spend their limited time and money to produce the healthiest crop possible while managing pest populations. The game can be played in groups or as individuals. Players will typically spend just over an hour to learn and play the game.

Methods

Once the initial concept was synthesized, we produced a playtest copy of the game. One team member developed graphics and components, and then ordered a physical copy through the *GameCrafter* website. The process of creating the board game included several revisions to the gameplay in response to feedback provided by play testers. To date, more than 250 individuals have played the game. Most players are agricultural professionals from the Magic and Treasure Valleys of Idaho. Before playing the game, we informed players to take note of any difficulty playing and ways to improve the game. After gameplay, we held a debriefing period where players could expound on what could be improved in the overall game experience. Players were asked what they would consider a traditional pest management training. The most common example described was a slide show presentation. The gameplay duration is one hour and is played in one of two ways – as an individual or as a team with no more than twenty in a group. Both methods require a facilitator. Integrated pest management concepts that players utilize in gameplay are scouting, research, habitat modification, pesticide application pest control, and non-pesticide pest control. The gameplay is composed of

rounds that correlate to the months during a growing season. In each round players are allowed to take a defined number of actions to manage pests. Players take actions based on intuition and information that is received through gameplay. We asked participants how engaging *Pest Friends* was to play, and whether they learned more in comparison to what they considered to be a traditional pest management training. They were also asked if they planned to implement changes to their pest management strategy following the experience. Players were surveyed on the question: “Was playing *Pest Friends* a better learning tool and more engaging compared to traditional training?”

Figure 1: Cover art of *Pest Friends*

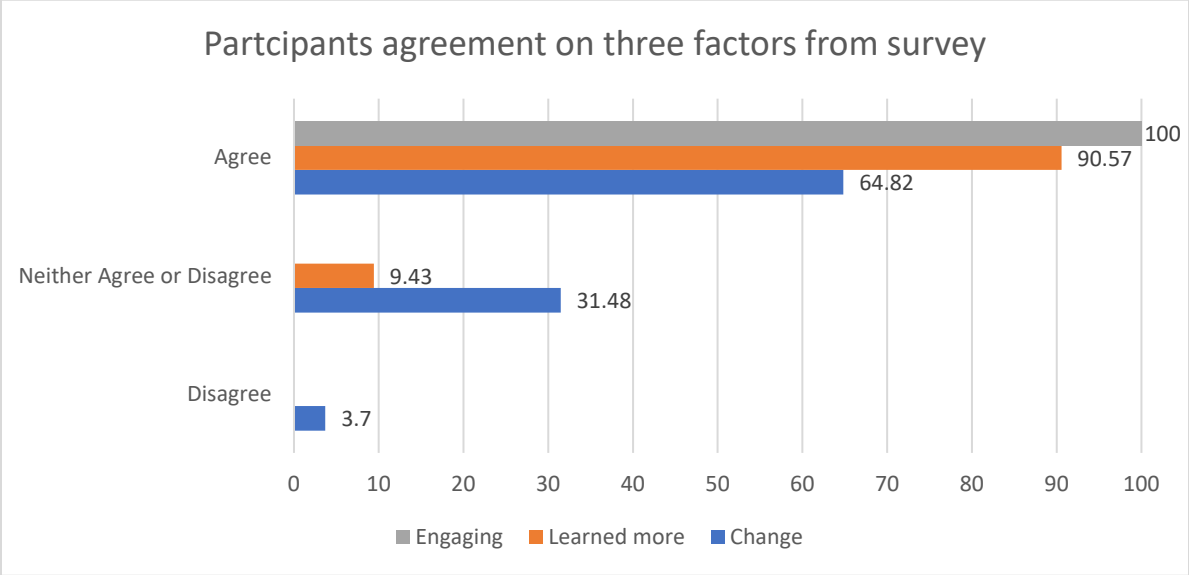
Results

A total of 56 participants responded to our survey after playing. This is lower than the total participants that have played the game, because some played in teams and not all participants responded to the survey. One hundred percent of participants who

responded to the survey felt that the board game was more engaging. Ninety percent felt they learned more this way, and 64% indicated that they planned to implement changes to their pest management strategies because of this experience.

Table 1 shows the results from surveyed players on whether they felt the board game was a better learning tool and more engaging compared to traditional IPM training. The change category indicates the percentage of participants who planned to implement changes to their pest management strategies following this training.

Table 1: Survey responses.



Discussion

It has been well-documented that learning through gameplay increases the engagement of students (Ifenthaler et al., 2012). This survey was designed to indicate if this board game had a significant educational value compared to traditional slide show presentations. The survey was not designed to give empirical evidence that there is a significant difference between learning experiences. The scope of the study was to

assist in the game design by improving concepts that provided higher engagement. We received data that confirms that our students felt that this game was also more engaging than a traditional presentation on the topic of Integrated Pest Management, which is similar to other studies observing the engagement of game-based learning (Pho and Dinscore, 2015). Some considerations that may influence the level of engagement are the post-play assessment tools. As part of the gameplay of *Pest Friends*, facilitators hold a debriefing period where they explain the interactions in the game and how it influenced the students' end score. This sequence of dialog between students and facilitators allows the students to deepen their understanding of the principles of IPM by assessing how they managed the agricultural scenario with the actions that were available and selected. We had mixed results in response to the specific changes that participants are likely to incorporate with their behavior based on playing the game, this is a common result in game-based learning (Hussein et al., 2019). Further investigation is needed to prove if one method of learning is more engaging than another.

To get a copy of the board game reach out to the authors at pestfirends@uidaho.edu. You can also access a short video on gameplay by visiting this link: https://www.youtube.com/watch?v=boCyaw2Kric&t=61s

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