

## Chapter 21

# It's All in How You Play the Game: Increasing the Impact of Gameplay in Classrooms

**Shani Reid**

*ICF International, USA*

**Helene Jennings**

*ICF International, USA*

**Scot Osterweil**

*The Massachusetts Institute of Technology, USA*

### EXECUTIVE SUMMARY

*The purpose of this chapter is to describe a study of the online learning game Lure of the Labyrinth. The game is unique in that it is based on a model for how learning games can be effectively used in classroom settings. Key components of the model include identifying games appropriate for the classroom, incorporating the game in a way that maximizes instructional time, and reconstructing the role of the teacher in game play lessons. The model was tested by 29 teachers in 80 middle school classroom, where 1,549 students were exposed to the game and its associated resources. In a quasi-experimental study of the impact of the game on student outcomes it was determined that students in school districts that more closely followed the game implementation model performed better than their comparison group.*

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## OVERALL DESCRIPTION

*Lure of the Labyrinth* is a digital game for middle school pre-algebra students. It includes a wealth of intriguing math-based puzzles wrapped into an exciting narrative game that evolves over time. In the story, the player's avatar (the representation of the player in the game world) works to find their lost pet in a mysterious place called the Tasti Pet Factory, which is populated by monsters. By the end of the game, the player would have recovered his pet, freed other kidnapped pets, and destroyed the factory. The development of the game was funded by a U.S. Department of Education (ED) Star Schools grant awarded to Maryland Public Television (MPT). Key partners in the project were the Education Arcade at the Massachusetts Institute of Technology (MIT), FableVision, and ICF International.

*Lure of the Labyrinth* is a long-form game that might take students as long as 15 hours to complete. Throughout the game, players earn tokens that they can use to free pets. The game keeps track of players' progress and saves their place in the game on exit so they can continue exactly where they left off the next time. The game consists of 27 puzzles that teach students proportions, variables and equations, and number and operations—typical pre-algebra content.

One puzzle that teaches students proportions is the Employee Cafeteria. In this puzzle, students meet four monsters seated at a cafeteria table with partially filled trays in front of them. The items on the trays have numbers inserted. Through trial and error, students discover that (1) by pushing a button a new food item with a number value appears; (2) they can move the food item to any monster's tray; (3) if they move the item to the correct tray the monster responds favorably and they earn tokens; and (4) if they move it to the incorrect tray, the monster complains and the food is moved to the correct tray, but they lose several lights on their play counter. Once all the play counter lights are extinguished, the game ends.

Through puzzle play students eventually learn that there is a proportional relationship between the food items on each tray that players must determine (e.g., there must always be twice as much drumsticks than sushi on each tray), and a proportional relationship among the monsters' trays (e.g., Monster A eats half as much as Monster B). Tokens students accumulate throughout the game can be used for their pet rescue attempts. Students must successfully complete each puzzle three times to be able to move to the next, more challenging level (See Figure 1).

*Lure of the Labyrinth* is not only a learning game, but is a game based on a specific model for the effective implementation of games in classroom settings. In this chapter, we present a description of this model and describe how teachers implemented it in 80 middle school classrooms (grades 6 through 8). We then look at the effect the implementation had on student performance. The discussion of student performance is based on a quasi-experimental study conducted by ICF Interna-

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