

Educational Game Analysis: Lure of the Labyrinth

I. Game Summary

Overview

In Lure of the Labyrinth, you explore a factory with three wings each consisting of numerous rooms containing math-related puzzles. Solving a puzzle unlocks the map to the next puzzle; solving a puzzle three times unlocks the map to a more advanced version of that puzzle. Amongst the rooms are pits that contain blocked cave entrances. Each cave can be unblocked using a different item from the factory store. Unblocking a cave releases some number of imprisoned pets. The objective of the game is to solve all of the puzzles and free of all the pets.



Triangle Wing with Pit

Timing

I would estimate that the whole game would take at least 14 hours to play. Due to this length, it would be difficult to incorporate the game into a larger curriculum unless students played at home. The creators, aware of this limitation, also provide independent access to the individual puzzles. One puzzle typically took me between five and 15 minutes to complete. Although students would likely require more time than this, individual puzzles could be completed during a single class period. Thus, the individual puzzles can much more practically be included in a larger curriculum.

Number of Players

Both the game and the individual puzzles are designed for single players. However, in the full game mode, a teacher can create teams of students who can communicate with each other using an in-game messaging system. The creators also recommend having students work in pairs or small groups to solve the individual puzzles.

Learning

Lure of the Labyrinth aims to teach pre-algebra math skills. Math learning is essential to the game actions. The puzzles require math to solve and it is usually not possible to succeed unless you both understand the mathematical pattern and can perform the calculations accurately. Further, solving the puzzles is the primary activity of the game; the secondary activity of freeing pets requires first solving puzzles.

The narrative and context of the game are fantastical and largely unrelated to math. The themes of the factory wings and the maps used to find rooms do have math concepts associated with them, but it is possible to navigate without any real grasp of this. In general, the unrealistic nature of the game does not detract from learning. However, the puzzles themselves are also unrealistic. One disadvantage of this is that the game does not necessarily help students appreciate why these skills are useful in the real world.



Square Wing (Proportion Puzzles) with Door Numberings

II. One Minute Gameplay Summary

In a typical minute of gameplay, the player might:

- Look up the location of a puzzle using the “Maps” feature of the menu interface
- Walk through the factory to the appropriate wing
- Navigate through the wing (by foot or by boat) to the desired room and enter it
- Read a comic strip introducing the context of the room (e.g., helping an armless monster get a snack out of a vending machine)
- View the scene and attempt to deduce the objective of the puzzle (e.g., determine the numerical values of three unlabeled coins and use combinations of three coins to obtain snacks of different prices)
- Interact with on-screen elements to see what actions they permit (e.g., if I put one of each coin in the vending machine, what happens?)
- Use feedback to update idea of the objective and form a plan for solving (e.g., a snack worth 16 was dispensed from the machine, a display records that the coins I just inputted add up to 16)



Lounge Puzzle

III. Narrative

Summary

While you are buying pet food, your pet is lured away by a mysterious stranger. You follow it into a sewer system, where you encounter a fairy-looking woman named Iris who tells you that monsters have your pet and that you will need to infiltrate their factory to find it. She disguises you as a monster, and she gives you one of the PDAs used in the factory and a bag of magic beans, which she asks you to plant in every room you visit. You enter the factory, which apparently makes pet food, posing as a new employee. The puzzles are your various work assignments throughout the factory. Each time you complete a puzzle, a bean is added to that room. After three successful completions, the beans sprout into massive vines and destroy the room. Destroying a room sometimes reveals more of the narrative about what is happening in the factory.



Introductory Comic Strip Narration

Analysis

The overall story is somewhat intriguing but not very central to the game. Although each puzzle introduces the monster that works in that room and how that room contributes to the factory, this information contributes very little to the overarching narrative. The narrative is delivered using a comic strip format, and the puzzle introductions in particular tend to include a lot of dialogue. Since the dialogue was neither amusing nor very informative, I found reading the strips tedious. The narrative is linear, and you do not impact it in any way except by triggering the next part of the story. If, as I did, you try all of the puzzles once before repeating any, it will be quite a while before the narrative is advanced. I was curious about the storyline, but not enough to want to finish playing the game.

IV. Interface Summary

The controls are entirely point-and-click, including your movement through the factory. The main screen gives a fairly close view of your location in the factory. The menu is accessed by clicking the image of your PDA in the corner. Progress is saved automatically, which is convenient for a browser-based game.



Menu (PDA) with Room/Map List

The game is not difficult to learn. When you begin, very little of the world will interact with you, so you just have to click on everything until something happens. However, the fact that virtually no instructions are given at any point in the game can leave the player feeling lost about their objectives or next steps.

V. Rule Base

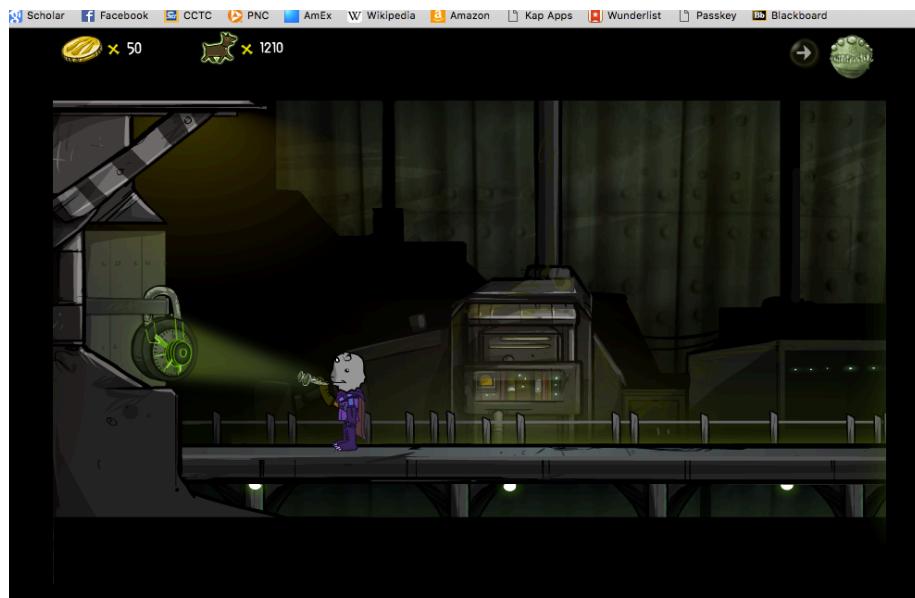
Interactions

At the start of the game, most of the screen elements do nothing when clicked and very few areas of the factory are accessible, so the only option is to use the map you have been given to locate your first room assignment. During the puzzle solving, choices are also usually limited, as only some elements of the screen can be manipulated and there is always one correct solution. After you attempt each puzzle, you are given the map for another puzzle, so your choices are to replay the puzzle or to move to the next one.

As you solve puzzles, you are able to move more freely around the factory and gain the ability to jump immediately to any previously visited room from the menu. You can also enter the pits located around the factory (because the game sends you from one room to another and you cannot enter rooms you do not have a map for, it was awhile before I even tried entering a pit).

Economy and Scoring

You earn money for completing each puzzle (100 for winning and a smaller amount for losing). Money buys items from the factory store, and these items unblock the pits throughout the factory where pets are imprisoned. The scoring system is based on the number of pets released, which is different for every pit and only revealed when the pets are released. If there is a pattern to how many pets are in each cave, I could not identify it.



Unblocking a Cave Using X-Ray (?) Goggles

Feedback

Throughout the game, feedback is often very ambiguous, which is one of my biggest complaints about the game. The puzzles are left intentionally vague so that players have to experiment, but given that you usually do not know what the conditions of the puzzle are or what your specific objective is, the lack of clear feedback can be infuriating. Some puzzles will signal immediately if you make a mistake, but in others, you do not find out until the very end of the puzzle. There may be no feedback about how many times you have to perform the task successfully to win or how many mistakes you are allowed to make.

Objectives

For some puzzles, the relevant math knowledge is evident and solving the puzzle requires at least implicit understanding of those concepts. These puzzles seem likely to support the

intended learning objectives. However, some puzzles can be solved without using the corresponding math standards, and it is unlikely that a player would use the suggested math concepts if they were playing the game outside of a classroom. For at least one puzzle, I could not even guess the intended objective. For this reason, the game can support far more learning objectives when used as part of a larger curriculum than it can as a stand-alone game.

VI. Assessment

Assessment is provided to the extent that you earn a bean for a correctly completed puzzle. If you do not receive a bean, you have not performed the puzzle correctly. However, puzzles vary in how much feedback they provide about why you were unsuccessful. It is possible to make mistakes that have nothing to do with your ability to perform the math, and the game does not discriminate between these in any way, which makes the assessment less informative. The game is designed to encourage adjusting play style because you must replay the puzzles multiple times.

VII. Implementation

Ease of Use and Technical Requirements

The game is designed to be learned through experimentation, and it generally leads the player down a narrow path through which they will figure out how the game works. Anyone who has played a point-and-click game before will be able to learn how to play relatively easily. The technical requirements are not restrictive; game is free, browser-based, and worked smoothly even on my incredibly slow laptop.

Guidelines for Educational Use

The best feature of Lure of the Labyrinth is the support provided for classroom teachers. The game has obviously been designed specifically for this purpose. The game website contains extensive suggestions and resources to help teachers implement the game as part of a larger math curriculum, including a chart of the alignment of each puzzle with Common Core State Standards, a planning guide, options for various classroom configurations, and multiple lesson plans for each puzzle.

The suggestions for classroom use are more conducive to using individual puzzles than the full game, because they require all students to be working on the same puzzle at the same time. My recommendation would also be for this version of play. The full game would have to be played outside of class time in most circumstances, and as a stand-alone game, it will be less educationally effective because the game does not make the connections to particular math concepts explicit enough and because it is somewhat possible to play without using them. The game elements (e.g., the narrative, the structure) are not particularly engaging, so there is little sacrifice of interest or fun by playing the puzzles individually instead.

VIII. Engagement Analysis

Hooks

The primary hook of the game, according to the creators, is that players must use math to solve fun puzzles. "Fun" should probably be understood relatively. Some of the puzzles are clever (although a few are rather full), but I did not find them particularly fun. I somehow doubt that being less experienced with math would make the puzzles substantially more fun. However, the puzzles are probably more fun than other classroom activities students are used to, and to that extent, the hook is effective. I have a hard time imagining a student spending many hours playing this game in their free time, though.

The creators also cite the game's "strong story line" as a hook, but I disagree. The story line is not that compelling, and the game often feels very disconnected from that story line. The puzzles usually make little narrative sense, so the story line ends up feeling somewhat arbitrary.. The objective of releasing pets is a more effective hook, since figuring out which items from the store will unblock each cave creates another puzzle. Not all of the cave/item match-ups are equally well-designed, however, and sometimes the only way to figure out which item to use is to try everything in your inventory.

Learning Opportunities

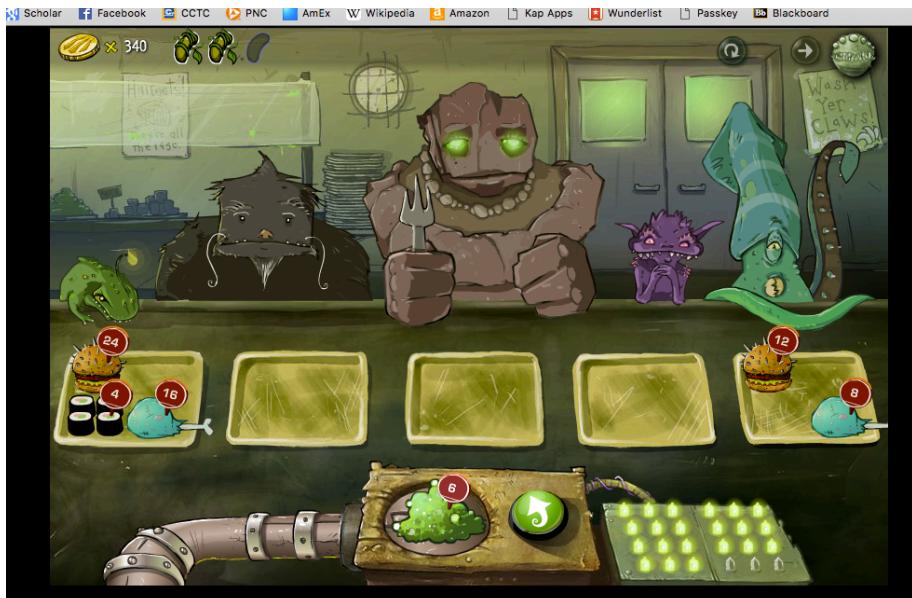
The objective of math learning is fairly overt in this game. The creators imply that students will use math without realizing it, but this seems unlikely to me, as every puzzle is explicitly labeled with numbers. However, the game does not overtly suggest that using certain math concepts will be advantageous and does not provide a space for formalizing the math being used. This actually seems like a serious missed opportunity for learning. If the game rewarded you for grasping the abstract pattern instead of requiring you to do all the rote calculations, students could get excited about the ways that math makes tasks easier. Learning is the main source of engagement, but the game has potential for even greater learning and engagement that is not realized.

Frustration Points

Ambiguity of Puzzles: I found the lack of instruction or even visual cues within the puzzles quite frustrating. For example, in the Cafeteria puzzle, you are simply told to serve food to the customers. The initial state of the game does not give you enough information to form any kind of hypothesis about how the food is to be distributed, so you have to guess randomly just to determine your objective. You may or may not receive useful feedback from making a mistake, and you may have to guess randomly multiple times before you have enough information to form an actual strategy. Now, exploration and experimentation can be appealing, and the creators advertise this as a positive feature. However the puzzles in this game are inflexible – there is a single solution – and unforgiving of mistakes, which does not encourage an open and exploring approach. Instead, the lack of information provided feels unfair. I consistently found myself saying, "How was I supposed to know that?", a distinctly unpleasant feeling.

Excessive Repetition: A second frustration in the full game is how many times you have to complete each puzzle. You generally need to play at least twice to solve the puzzle initially, and then you have to solve it twice more to advance to the next level of the puzzle. Sometimes the second version of the puzzle is genuinely more interesting or difficult than the first, but other times the puzzles are virtually the same. You have to solve this version three times, and then you have to solve a third version three times! This repetition to force students to practice, but once you've figured out the pattern for the puzzle, completing it multiple times feels just like any other math drill. It may be good for learning, but it is not enjoyable, and I can easily imagine students quitting rather than do the same puzzle over again, especially if the math involved has gotten challenging.

Cluny: The game is also a bit clunky. The method for moving around the factory is tedious, the in-puzzle animations take too much time, and some of the puzzles seem to have glitches so that your actions are not registered properly or the puzzle is unsolvable. However, some clunkiness is to be expected in a free, browser-based game, and these were not the biggest points of frustration.

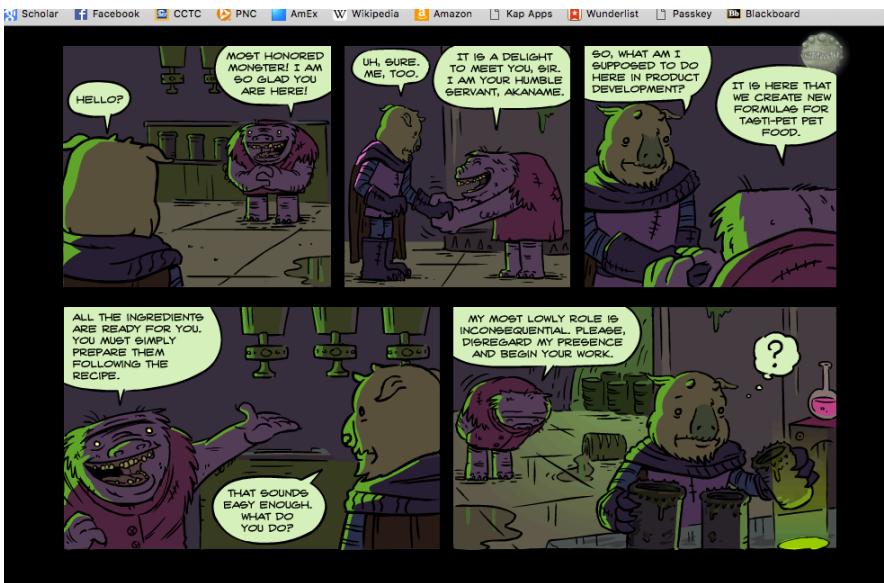


Ambiguous Objective, Tedious Calculations, No Abstraction

IX. Audience

The audience is fifth through eighth grade students. Because of the math knowledge required by this game, younger students would probably not be able to play unaided. The primary value espoused by the game is that math is both useful and fun, which seems generally appropriate. The game is also slightly anti-corporation, since the storyline involves monsters who are using a global pet food company to take over the world, though this is a common value in children's media.

The monsters are based on mythological creatures from around the world. The game provides informational blurbs about the backgrounds of these characters, but as they are only based on real mythological creatures, the potential for cultural education is largely lost. Although the inclusion of creatures from outside the Western canon is positive, a few of the monsters are represented using ethnic stereotypes.



Ethnic Stereotype in Monster Depiction

X. Instructional Materials

As mentioned above, the game comes with extensive supporting instructional materials. The guidelines for implementing that game in the classroom and the lesson plans I perused were clear and reasonable. The materials strongly advocate that teachers plan to use the game as carefully as they would any other instructional materials, and they provide recommendations for being, during, and after gameplay. The game has explicit pre-algebra learning goals that are aligned with Common Core State Standards, such as:

- Recognize and represent proportional relationships between quantities.
- Add and subtract fractions with unlike denominators
- Evaluate expressions at specific values for their variables.

XI. Conclusions

The great strength of Lure of the Labyrinth lies in the careful thought given to how teachers can implement the game in their classrooms. The creators have gone to great lengths to ensure that teachers will feel comfortable teaching with this game, even if they are not experienced gamers themselves. If used as directed, this game has the potential to be an effective, engaging teaching tool.

As a stand-alone game, Lure of the Labyrinth is less successful. Although math is embedded in the gameplay, the game is not ideally structured to teach these concepts without supplementary instruction. Some puzzles can be solved without using the related concepts. In other puzzles, the game misses opportunities to allow students to benefit from the abstraction of math by instead forcing them to perform rote calculations. Providing an option to solve the puzzles abstractly, especially at the more advanced levels, would improve this game in terms of both learning and use, since it would make the game less repetitive and time-consuming.

Most importantly, the game is not that fun. The storyline is weak and only loosely tied to the puzzles themselves. The puzzles, while interesting enough to solve once or twice, become

punishing when you have to solve them nine times in order to advance the story. Lure of the Labyrinth offers an appealing alternative to traditional classroom activities but is unlikely to captivate players who encounter it outside of that environment.