Fossil Quest

Game Design Documentation

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Version One
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Introduction

Game Title: Fossil Quest

Designer: Erin Weaver

Subject Area: Paleontology, Science

Summary:

Fossil Quest is a simulation style game that invites players to journey through time and help preserve a rare dinosaur for future generations.

Target Learners:

The target audience for this game is children ages 10 and up. A basic understanding of computer operation is required to play, including how to use a mouse, and utilize keyboard controls. Familiarity with introductory digital game mechanics such as maneuvering characters with keyboard controls is also required. No specialized subject knowledge is required. This game is most appropriate for players who are motivated by achievement, those who like exploration, and those who enjoy story immersion and narrative-based games.

Objectives & Goals

Learning Domain:

Fossil Quest seeks to enhance players' cognitive skills through the application of rules-based knowledge. Simulated role play and examples are used to teach players the conceptual relationship between factors that affect fossilization (such as oxygen, pressure, environment, and specimen composition) and the preservation of a specimen.

Learning Objectives:

Primary
By the end of this game, players will be able to identify the relationship between factors that affect fossilization (oxygen, pressure, environment, composition) and the fossilization process by successfully analyzing a challenge scenario and selecting options that lead to the successful preservation of a specimen.

- In order to demonstrate this learning objective, players will choose the ideal factors that lead to fossilization from several given options in order to successfully fossilize a dinosaur specimen presented in the scenario.
- This objective will be scored on a pass/fail basis. A player that successfully chooses each of the correct options, will advance, a player that does not will be given feedback and an option to retry.
- This objective aligns with the subject areas chosen because fossilization is a key concept in paleontological study and an understanding of factorial relationships is vital to the study of science. The primary objective connects to a rules-based knowledge learning domain by testing

player knowledge of the relationship between the concepts of fossilization and factors that affect it.

Secondary

Construct a diagram that illustrates the relationship between time and the fossilization process by completing a drag and drop interaction with 100% accuracy.

- In order to demonstrate mastery of this learning objective, players must successfully drag and drop 7 tokens to the correct location on a provided diagram template.
- This objective will be scored on a pass/fail basis. A player that successfully places all tokens in the correct spot will advance; if the player incorrectly places a token they will be given feedback and an option to retry.
- This objective aligns with the subject areas chosen because fossilization is a key concept in paleontological study and an understanding of factorial relationships is vital to the study of science. The primary objective connects to a rules-based knowledge learning domain by assessing players' understanding of the relationship between fossilization concept and time.

Game Goal:

The two main goals of *Fossil Quest* are to successfully preserve a dinosaur specimen and to summarize experimental findings in a diagram. Players win the game when they have completed both of these tasks. Secondary goals include, completing experimental scenarios to build knowledge and collecting nine specimens for study.

Game Description

Game Concept:

Cause and effect relationships can be difficult concepts for learners to understand outside of scenario based learning. The ability for users to interact with objects that would be difficult or impossible to recreate in a classroom and “see” the results of those interactions can aid in understanding the relationships between concepts (Kapp, 2012). Due to the complex nature of fossilization as a paleontological concept, *Fossil Quest* seeks to utilize this interaction to help players to build an understanding of both the process of fossilization and the factors that can affect the likelihood of the process occurring.

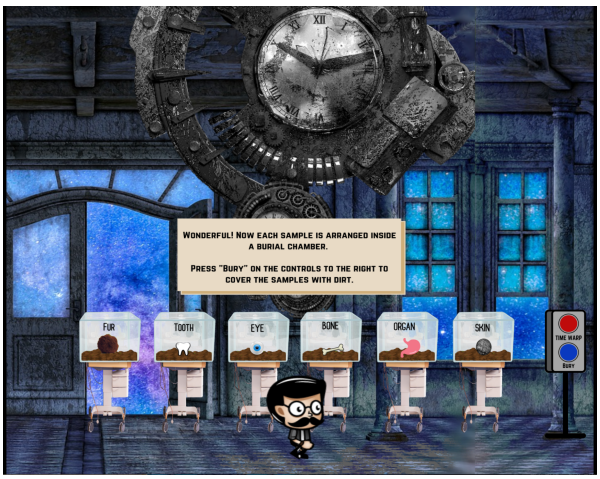
Environment:

Fossil Quest begins in a cartoonized version of a natural history museum (Figure One). Introductory text and a summary of game controls will be displayed at the bottom of the screen. An arrow in the bottom corner prompts the player to continue to another room of the natural history museum- this one containing a time machine. Once players “enter” the time machine they will be transported to a second setting- the inside of the time machine lab. The lab is cartoonized with a dark blue background, decorative gears, and clocks that give it a fantastical spacey atmosphere (Figure Two). All of the experimental stages of the game will take place here with

various objects and explanatory texts appearing and disappearing as necessary for players to successfully accomplish their tasks.

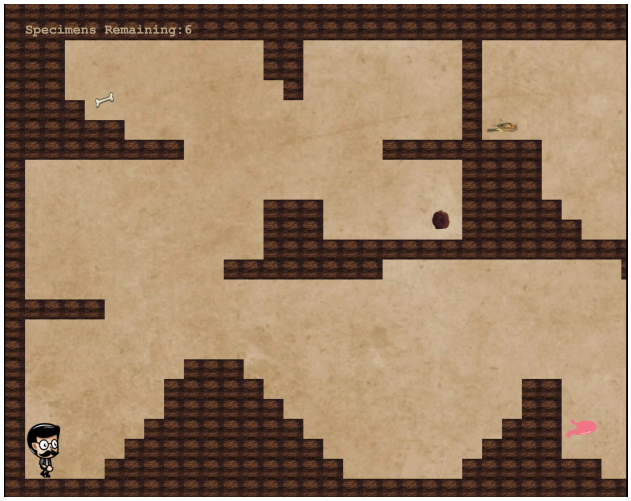
Figure One
Natural History Museum

Figure Two
Time Machine Lab



An intermediary setting that exists "inside" of the time machine allows users to enter a "specimen closet." This setting consists of a tan background and decor with dark brown platforms that players can walk and jump on. Various "specimens" will be placed throughout the closet on different platforms (Figure 3). Text in the top left corner of the screen will display the number of specimens the player still needs to collect before continuing.

Figure 3
Specimen Cabinet



During the first challenge, players will begin in the laboratory. They will then be transported to a prehistoric environment to "catch" a dinosaur and tag it. The setting will be a platform based environment similar to figure 3 above, but instead of a tan background a large field will be displayed. After catching their dinosaur, players will enter a new environment chosen from one of three options: a lake bottom, a field with a volcano, or a rainforest. Each

background will consist of a cartoonized version of the typical characteristics of the physical environment described. Introductory and explanatory text will be displayed, and various objects will appear and disappear as necessary for advancement. When players complete this stage they will once again visit the time machine lab setting to complete the final challenge, and eventually return to the initial setting described- the natural history museum.

Narrative:

In the introductory scene of *Fossil Quest* players are introduced to a conflict- there exists a dinosaur so rare that no specimen has ever been fossilized. No one has ever been able to view it's fossilized remains and learn from it. Players are invited to use a time machine to go back to the past and ensure that the dinosaur's remains are preserved for display in the museum.

Fossil Quest consists of two distinct parts- an "experimental" stage and a "challenge" stage. The "experimental" stage of the game represents the rising action of the narrative. During this stage players will enter a simulated lab environment inside of the time machine. They will be instructed to test out methods of fossil preservation before they go back in time. They will collect specimens, and manipulate variables such as burial speed, oxygen level, pressure, and environmental factors using lab machines. Players will observe the changes that occur in fossilized samples as a result of the changes they make and establish an understanding of the relationship each variable has to the fossilization process.

The "challenge" stage of *Fossil Quest* represents the climax of the narrative. In this stage, players will be invited to "catch" their own dinosaur and tag it with a tracker. They will wait for it to die naturally and then to put their experimental findings to the test by analyzing a scenario and selecting options that lead to the successful preservation of a dinosaur specimen. Players will choose an environment to place their dinosaur in, and manipulate variables to create the ideal environment for fossil formation. After the successful preservation of their dinosaur, players will be prompted to name their dinosaur species.

The falling action of the narrative begins with the second challenge. Players are invited to summarize their research findings into a diagram for future paleontologists to use. The resolution of the game will take players back to visit the natural history museum to view their dinosaur on display.

Characters:

The main character represented throughout *Fossil Quest* is the paleontologist that the player of the game embodies. The paleontologist is a short cartoonish man with black hair, large glasses, and a perfect mustache that makes him look like he's always smiling. He wears black pants, black boots, and a dark gray jacket with a lighter gray shirt underneath.

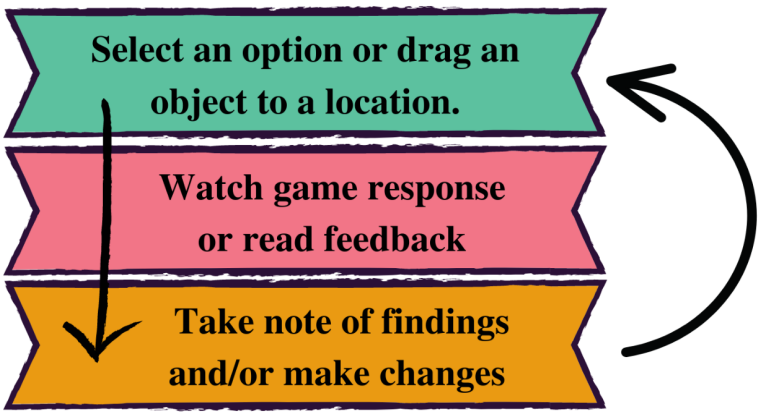
One non-player character represented in the game is the "rare dinosaur," a large happy beast with a green body and blue eyes. The final non-player character found in *Fossil Quest* is the assumed "narrator" who tells the larger game story and gives instructions to the player throughout the game. This character is never defined beyond the voice of narration.

Gameplay

Core Loop:

The primary core loop that learners encounter while playing *Fossil Quest* is outlined in Figure 4 below.

Figure 4
Core Loop Diagram



Core Dynamic:

There are two primary core dynamics at play in *Fossil Quest*. The first is "exploration." Players spend a large portion of the game experimenting with different aspects of the laboratory setting in order to seek new knowledge that will help them later in the game.

The second core dynamic at play in *Fossil Quest* is "solution." The overarching game goal invites players to solve a problem by acquiring knowledge. Players seek to figure out how to successfully preserve the rare dinosaur specimen. These two core dynamics are applicable to the learning objectives because they aid players in analyzing relationships between variables related to fossilization

Scoring, Rewards, & Assessment:

The achievement of learning objectives is assessed by the player's ability to successfully complete the two challenge levels presented at the end of the game. Learning objective one is met if players succeed in preserving their dinosaur specimen at the end of challenge number one. Learning objective two is met when players choose and place each diagram component in the proper place on the diagram to complete challenge number two. Successful completion of both challenges results in meeting the learning objectives, and not completing both challenges results in not meeting the learning objectives.

All of the activities in the game are driven by progression through levels. During the specimen cabinet sublevel, a "scoring" system exists that tracks user progress in collecting the

required number of specimens. This was included to allow users to easily see how many more specimens they have left to collect before level completion.

The motivation within the chosen assessment/scoring system is provided by game rewards. The key "reward" players receive is text feedback and encouragement driven by level completion. Feedback occurs both in the responses to variables that players manipulate during experimentation and when successful/unsuccessful in the two end-of-game challenges. Additional surprise responses to exploring the game environment and clicking on new objects will also exist to motivate players.

Replay is encouraged by allowing players several options to complete experiments and challenges and by encouraging exploration. Upon unsuccessful completion of objectives replay is encouraged by providing positive feedback to drive the user to try again.

Application of Gee's Principles:

Fossil Quest addresses two of Gee's principles of learning in games- interaction and production (Gee, 2008). Interaction is addressed because the player communicates with the game through manipulating objects and receiving feedback for actions. Production is addressed because the interaction that players have with the game helps to further the narrative. Player interaction leads to level completion which leads to story progression.

Construct 3 Core Loop Implementation

Prototype Link:

https://eweaver.itch.io/fossil-quest

Core Loop Representation:

The prototype version of *Fossil Quest* includes the overall narrative of the game, two of the experimental levels, and simplified versions of "challenge one" and "challenge two." Missing pieces are filled in with designer "notes" to explain gaps in narrative and function.

The core loop represented in *Fossil Quest* is depicted in the "experiment one," "experiment two," "challenge one," and "challenge two" portions of the game prototype. Users repeatedly a) select an option or drag an object to a location b) watch game responses or read feedback and c) take note of finding and/or make changes. Assessment is depicted in the "challenge one" and "challenge two" portions of the prototype.

References

Kapp, K. (2012). The gamification of learning and instruction: Game based strategies for training and education. 177-178.

Gee, J.P. (2008). *What video games have to teach us about learning and literacy.* Palgrave Macmillan.