Olivia Schmidt
EME 6055

W8-1 Activity: Educational Game Evaluation

Game 1 – The Oregon Trail, 1990 Macintosh version

For my first selection of an educational video game to review, I figured that there was no better place to begin than one of the forefathers of games for education – *The Oregon Trail*. An emulated version of the 1990 Macintosh version is available on Oregon's travel website, visitoregon.com. Regarding the development of educational video games, I believe it is essential to look at the past to understand how we arrived where we are today; the surge in the prevalence of game-based learning in the classroom demands a study of past successful and unsuccessful games, their features, and the characteristics of their design. Van Eck et al. elaborates, noting that one of the "common pitfalls" in examining the theories that inform game design is that we often look toward newer theories and games, thereby dismissing prior research and theory (2018, p. 279.

In *The Oregon Trail*, players are asked to successfully lead their party of settlers from Independence, Missouri, to Oregon's Willamette Valley. The player can choose between assuming the role of a banker from Boston, a carpenter from Ohio, or a farmer from Illinois. Each character option begins with a certain amount of money to spend at the supply store (the banker having the most, the farmer the least), to prepare for their journey. Once the player departs from their destination, they will encounter several notable landmarks along the way where they may size up their current situation by resting, trading, purchasing supplies, etc. Throughout the course of the journey, one or several of the player's settlers may fall ill due to common ailments of the 2,000-mile route, such as measles, typhoid, cholera, and dysentery. Accidents, such as snakebites, drowning, or accidental gunshot wounds may also lead to the death of the settlers. At the end of the game, the player's score is calculated by the number of remaining settlers, leftover cash, and initial character choice (a banker receives no bonus, a carpenter's score is doubled, and the farmer's score is tripled.)

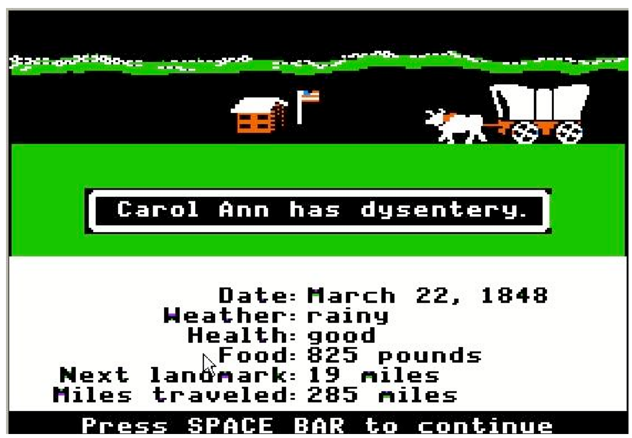

Image 1: A party member contracts dysentery.

The educational value of *The Oregon Trail* lies in its ability to teach its players about the westward movement of U.S. settlers in the mid-19th century through playful mechanics and critical decision-making. The game does not demand prior knowledge about the subject, instead, the purpose of the game is to learn and gain mastery as you play. Through a series of critical decisions that determine whether their characters will live or die through the toilsome trek, the player is driven to complete the journey in the most expeditious and unscathed fashion. The play phenomenon in *The Oregon Trail* is determined by the player's intrinsic, voluntary motivation to complete their journey with the least possible losses and incurred deaths. If the player is unsatisfied with their score result, they may always try different ways of playing through experimentation with character roles and choices. The productive outcome of this type of play, the game's developers and teachers alike might hope, would be players learning about this pivotal era in American history.

The Oregon Trail, a choice-based video game that places such a heavy emphasis on impactful decision-making and strategy (food rationing, spending, start date, mode of transportation, pace, etc.), is placed within higher-order problem-solving in contrast to basic skill practice. The design of problem-solving games such as *The Oregon Trail* is supported by the situated learning theory, in which "...learning embeds learning and assessment in … environments that mimic the real-world contexts." (Van Eck et al., 2018, p. 280). *The Oregon Trail* captures several real-world environments that would've mimicked the landmarks of that time, such as Kansas River Crossing, Fort Kearney, Chimney Rock, and Fort Laramie. In reference to how *The Oregon Trail* captures "the actions and processes that would normally occur when *demonstrating* that knowledge in the real world"; the game is not intended to be a wholly authentic simulation of the westward expansion, but rather it captures themes and details that appear to be historically accurate.

For what makes a "good" learning experience, *The Oregon Trail* provides goal-oriented outcomes through its scaffolded problem-solving; there is no obvious solution to the multiple problems that may arise during the journey – players have to use their best judgment to determine the best course of action, with the goal of retaining as many supplies, human bodies, and pounds of food as possible. A limitation of the game, however, is its lack of adaptive challenge and support: there is no way to change your difficulty setting, so players with more expertise might find the game to be understimulating without the kind of support or challenge options that would keep them playing and engaged. Another limitation is that the game offers few opportunities for active involvement; a good portion of the game is spent simply watching the miles rack up, rather than taking the time to gather resources or information during these long traveling periods. Lastly, one of the drawbacks of older games is their inability to intelligently predict and make valid inferences about students' current knowledge level, or to make any kind of real-time assessment using evidence-centered design (ECD). Therefore, a game like *The Oregon Trail* would not be able to present students with specifically selected content that would be at their skill level. Rather than employing ECD, *The Oregon Trail* is a game that is widely accessible to a broad range of players with varying skill levels.

Game 2 – Elinor Wonders Why, Pond Life

Pond Life is a web-based, point-and-click educational video game that helps children learn about the living and non-living components of the aquatic habitat of a pond. The digital game is offered by PBS Kids, which offers educational games based on PBS KIDS shows; in this game, recognizable characters Elinor, Ari, and Olive build their own pond ecosystem and see what creatures and plants grow there. Young children are prompted to click and drag different biotic and abiotic factors into the pond, such as rocks, tadpoles, ducks, turtles, and algae. Any larvae from dragonflies, diving beetles, or scavenger beetle that was initially added into the pond eventually mature, and children can witness the life cycles of these small organisms. Children don't just learn about common pond organisms – creatures that are uncommon to rare in abundance, like the pumpkinseed sunfish and the yellow bullhead catfish, can also be added to the pond and examined by using the magnifying glass tool. The magnifying glass tool is used to learn more about what has already been added to the ecosystem. Players zoom in on a particular creature, and the narrator, voiced by Olive, tells players about the physical adaptions they notice would help the organism survive and thrive in the pond ecosystem. Players can also zoom in on plants, prompting Olive to point out its physiological adaptations and visual features. At the 'end' of the activity, where the maximum number of plants and creatures can be added, players can visually inspect their pond using the zoom in and out keys. Players can create up to two more habitats, making a total of three ponds.

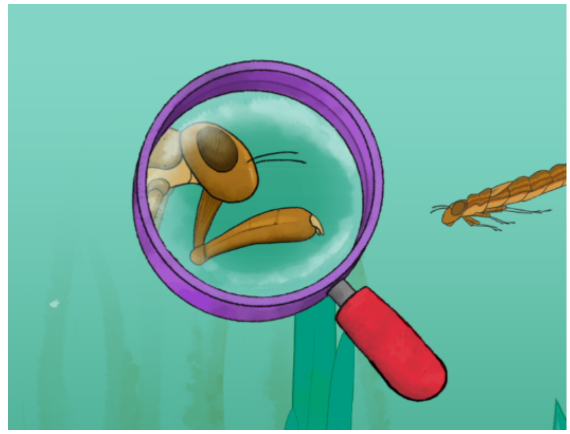

Image 2: A player uses the magnifying glass tool to learn about the dragonfly larva.

What lends *Pond Life* to being playful, triggering a "play phenomenon" in its users, is its simple drag-and-drop mechanics alongside interaction in an environment that mimics the real-world ecosystem of a pond. Dissimilar to my earlier reviewed educational game, *Pond Life* does not trigger higher-order thinking skills; there are no problems that require solving, instead, players are simply building competencies through visual interaction and engagement. As players construct their environment and take in facts about the different creatures, they are actively advancing their understanding of how real-world ecosystems function and the different roles species play in their environment. The implicit, overarching goal of the game is to retain as much knowledge about pond ecology as possible, but also to construct general, fundamental knowledge about how other types of ecosystems might work, and how organisms interact in those settings. Given that educational games are used to support and supplement current learning, a teacher might use *Pond Life* to engage students in a science lesson plan about habitats and ecosystems.

Pond Life demonstrates the use of good game principles in several ways– it is situated within a real-world context, it requires active engagement from its players, and it is goal-oriented towards developing the "best" pond (whatever players consider to be the ideal combination of biotic and abiotic factors). Due to its mechanically simple design, players can easily progress through the game at whatever rate is most comfortable for them. Despite its advantages, *Pond Life* is limited in terms of its ability to offer targeted feedback and promote higher-order thinking skills. This might come at a particular disadvantage to teachers and players who are looking for a game that can evaluate knowledge, provide varying levels of challenge, and prompt students to summarize their knowledge, analyze data, and evaluate their findings. In Clarke-Midura & Dede's article, they stress the importance of assessments related to inquiry, particularly in situations where the learner cannot immediately observe scientific phenomena taking place (2010, p. 316). While a particularly keen observer of a pond may be able to see some surface-level events taking place, there are hundreds of microorganisms that cannot be seen by the naked eye, and beneath the surface, even more ecological processes taking place. *Pond Life* could be significantly improved as an educational resource if it expanded its capacity to offer real-time, unobtrusive assessment on key ecosystem factors, functions, and processes of a pond.

References:

Clarke-Midura, J., & Dede, C. (2010). Assessment, Technology, and Change. *Journal of Research on Technology in Education*, 42(3), 309–328

Van Eck, R., Reiber, L., & Shute, V. (2018). Leveling Up: Game Design Research and Practice for Instructional Designers [Book]. In J. V. Dempsey & R. A. Reiser (Eds.), *Trends and Issues in Instructional Design and Technology* (4th ed.). Merrill/Prentice Hall.