Designing Games for Historical Education
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Description
For this project, I will be working with Dr. Erik Harpstead, a systems scientist from the HCII Department. As he teaches a course on educational game design, he has a lot of background in teaching principles and how to incorporate them into the development of games. I plan to design and develop a video game detailing the lifestyle and culture of different Americans during the Industrial Revolution, in order to educate students on the common lifestyle of the time, and to illustrate the dark side of society at the time of technological achievement (greed, abuse, bad work conditions, etc). Afterwards, I want to test the game on a few students and evaluate its effectiveness using preexisting data analytics tools. However, I anticipate a few challenges with this project. For one, I will need to still interest the player in the game while attempting to educate them, not only with information but also to convey a message about the negative impact of greed on the masses. Additionally, I will need to develop and test a game within a semester, which is a difficult task to achieve individually. The motivation behind the project lies in the education content being taught at today’s schools. While STEM is an important part of today’s society, many people overlook the importance of other subjects, like English or social studies. These subjects, in particular history, are fundamental to a good educational foundation and well-roundedness before students enter college, as it is important for students to understand mistakes made in the past, achievements gained from the past, and important relations between countries in the past in order to understand what has shaped today’s culture and how to avoid repeating the same mistakes. Additionally, having another form of education, video games, that interest students while still teaching them important lessons, is a good way to instill knowledge into players as well as to ensure that they don’t see education as a chore, but rather as something that is fun to learn and applicable to their lives.

Goals
My overall goals for the project involve developing all of the necessary features for the game, testing them, and making sure it was effective. My metric for success would involve both the amount of features I am able to implement in the game, as well as the success in educating the players as evaluated through testing at the end of the semester.

• **100% goal:** All three of the original planned levels for the game should be implemented, and the game should be tested on a large sample size of students (likely at least 50 students). The levels would involve a historical puzzle and lesson, and it would take about 2 weeks to fully implement a single level, assuming it was already planned out (which was the goal over the 15-300 milestone). The puzzles would each progressively get more difficult, and I could achieve this through adding slightly more content (i.e. the first level can just be a simple tutorial, the second fully immersive, and the third can be actually challenging). Each puzzle would involve scavenging around for clues and putting together hints, which wouldn’t take as long to program once an actual framework
is developed. Then, extensive analysis techniques like replay analysis can be done to see what students learned and what was missing.

- **75% goal**: Two of the game’s three levels should be implemented (the tutorial and the immersive level) and I can have it tested on at least 20 students. Since the design would be mostly complete, the implementation would be the only difficulty and thusly I would focus on simplifying that. The puzzles here would have to be very simple since a solid programming framework wouldn’t be a necessity if I wasn’t planning to add more levels. This just means that I can hardcode in some values instead of leaving things abstract, which would speed up the coding process for this goal specifically but not be great in the long-term. This would give at least some significant input into the effectiveness of the design of the game itself, so that I could work on tweaking it in future iterations.

- **125% goal**: All of the game’s levels, as well as some stretch goals for the design, should be implemented. Then, the game could be tested on 75 students or more to get maximal amounts of feedbacks. Even more ideally, we could test early so that later on, we can tweak ineffective parts of the game and re-test them on other students to see if the tweaks were effective or not. This would allow for the best possible design for the game to be developed faster.

**Milestones**

End of 15-300 milestone:

- For this milestone, I would like to have completed extensive research into the Industrial Revolution and have a basic design for the game, mechanics, scope, art needed, and levels. This includes what items are in what levels, what the story should be, what the environment for each of the three levels is, and a basic idea for a script that will convey the lessons behind the Industrial Revolution. This will allow me to focus mainly on implementation and testing for next semester, rather than attempting to keep ideating over the first few months, slowing down the process overall. With the design in place, we can also make modifications throughout as needed, which will be easier to do once a solid idea has been decided on.

Throughout the following milestones, I would make use of Game Creation Society’s playtest night every Tuesday to get feedback on the game and make changes as necessary.

Bi-weekly milestones for 15-400:

- **January 27th**: Have basic mechanics and models for the game implemented. This includes the main character, a simple room environment (desk, chair, table, etc.), movement, ability to pick things up, and the ability to speak with non-player characters (NPC’s). Also, a basic narrative mechanic should be in place (dialogue system) that allows the last aforementioned mechanic to be implemented with ease, and that allows a text file script to be fed in without much difficulty.

- **February 10th**: Level skeletons and model art should be completed (alpha). This means that all NPC models, main characters, and the details of the main room should be completed. Level skeletons include figuring out, for all 3 levels, what items should be in the room (i.e. books, letters, papers, etc), modeling them, and placing them in their respective locations. The tutorial level should be entirely completed. The script should be completed and input into the dialogue system as to allow a smooth transition between
levels and objects. Also, a data gathering system/method of determining effectiveness of game should be incorporated into game or surveys developed at this point.

- **February 24th**: Game should be playable except for a few finishing touches and polish that needs to be added in. The first two levels should be entirely completed, and the second level partly completed. Sound FX, background music, all art, and mechanics should all be functioning correctly (beta). This also means the levels should be completed (all items and interactions should be completed, modeled, and correctly placed, and the sequence of the game/story should be moving in order). Voice lines are likely not going to be a possibility but if ahead of schedule, add them in.

- **March 16th**: Add finishing polishes to the game, including particle effects and miscellaneous sounds. Finish the third level and the ending completely. Also add a main menu if possible. A protocol for testing students as well as pre- and post- gameplay surveys should be developed for testing, and a few dry runs should be performed to ensure testers know how to run tests correctly. Preemptive scheduling can also be done at this point.

- **March 30th**: Run tests on half of the intended students if possible. Run post-analyses on this small amount of data to see if there are any trends or anything that could be a cause of issue. Also attempt to find any bugs in the game and fix them at this point.

- **April 13th**: Run more tests of the game on students. Identify and fix bugs as we go, but also compare to past data to see if there is any particular aspect of the game that is causing issues or is particularly effective. Make sure to note which principles are affecting which aspects of the game, which in turn affect the players.

- **April 27th**: If time allows, run even more tests of the game. From this point onward, focus on running analyses on the gathered data to determine the effectiveness of each incorporated principle in the game, as well as to determine retrospectively what changes could have been useful and what changes were detrimental to the educational value of the game. This section will be most important in exploring the importance of how certain principles are used together to convey a certain message to the player.

**Literature Search**
I will need to do research into history of the Industrial Revolution for the game design itself, in order to understand what specific cultural and historical aspects I want to include in the game. Additionally, I need to research educational game design, teaching principles, and historical games in general. This will allow me to learn more about the importance of each principle and how to implement them in the design of my game, as well as understanding how historical game design has been done in the past. I have already researched a few of my advisor and his colleagues’ papers on educational design principles, and plan to do more research into how existing historical games incorporate these principles.

**Resources**
For this project, I will need access to a laptop with high computing power, which I currently own. I also need access to Unity, which is a game development software that allows for 2D or 3D development. In order to make the most of Unity, I’ll need to do a few tutorials to better understand the interface and usage. Also, I will need access to version control, likely GitHub, to
keep track of the progress of the project and be able to revert changes when necessary. I will have my advisor as a resource, but I am also planning to ask for design advice from members of the Game Creation Society who have extensive experience in game design and development. Lastly, since I do not know how to create art on my own, I plan to ask a student friend for help in adding art to the game.