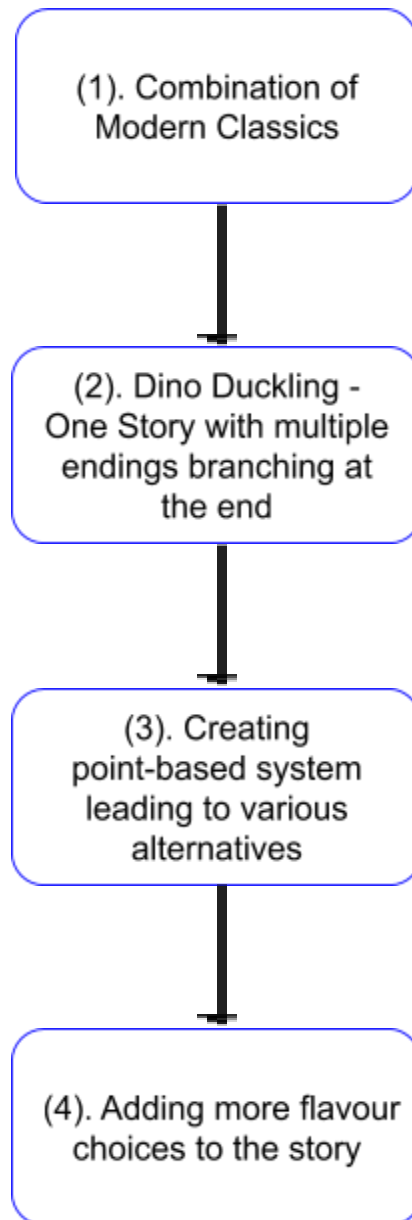


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I. Iterative Design:



1. We first planned to convert multiple modern classic children's books such as "Rainbow Fish" by Marcus Pfister, or Doctor Suess books like "Cat in the Hat". However, we had to change our plan to creating a story by ourselves to avoid plagiarism.
2. We created the *Dino Duckling*, a story about a small duckling who wants to become a dinosaur. We planned to have a story with alternative endings: one

where the duckling would realize they would never be happy with themselves and meet a crazy scientist who would transform them into an actual dinosaur; one where the the duckling decides to keep certain dinosaur-like aspects, like a dino costume, and walking around like a dinosaur; one where the duckling loses all interest in dinosaurs and decides to just accept his size. However, we felt that this method was not complex enough to cover the sentiment of what we wanted to create -- a children's book about actions and consequences. We also decided to incorporate original art.

3. Taking Dr. Marten's advice, we incorporated a points-based system where the user would be led to an alternative based on the choices they made before.
 4. After further discussions, we decided to include flavour choices to make the user (a child) feel like they have more control over the story. We started out with letting the user change the text color. We also decided to let the user choose a "big animal" and a "small animal". Similar to the duckling trying to become a dinosaur, the "small animal" wants to become the "big animal" that it's paired with programmatically.
- A. Our project is centered around creating a story for children to give them the experience of actions and consequences. Thus, our design choices for our twine game also depend on the story.
1. What unsuccessful designs did you explore? What made you decide not to pursue them?

Some design decisions were deemed unsuccessful either after we reviewed the work through the eyes of a child or as a result of feedback from playtests.

We had originally used some longer, more complicated words for choices in a passage such as "stealing". We later reflected that if a younger child was the consumer, they might not know what those words are. Even with their parents reading it to them, they would have to explain that it's an immoral activity, leading to lesser chances for the child to make that decision on their own. Instead of "stealing" and other complex or intense words, we went with a simpler, subtler version such as "Take money from mom's purse behind her back."

We also planned to do voice-overs with an automated voice for each passage, but later voted against it. We decided that most children would have this work read to them by a parent, and an automated voice would make that experience very robotic.

Since our work is based on actions and consequences, one of our consequences included a suspension that featured a 10 passage loop to represent 10 days. After

reviewing this feature, we came to the conclusion that 10 passage loops might cost the child's attention and reduced that to 3 day suspension.

We originally had only one character, a duckling who wanted to turn into a dinosaur. We later felt that children enjoy personalization and added 2 more choices. The child can be a duckling, an ant, or a clownfish.

2. What did you learn from working with playtesters?

We initially struggled to add complexity to the project on our end that wouldn't necessarily translate into complexity on the user's end. During a playtest, Dr. Martens suggested that we use a point-based system to calculate the consequences for the user's actions. Following this suggestion gave us a more polished game.

We originally used "he" to refer to the character, although we allowed the player to choose the character's name. We changed it to "they" after our second playtest.

We were also reassured in our decision to feature colorful artwork in our project. One playtester thought that the beginning of the story might not be too interesting to kids because there is a lot of background information before they are allowed to start making choices. But when we showed them the art that we planned to include, they thought that would help make kids interested.

3. What technical challenges did you face, and how did you overcome them?

We faced technical challenges while adding images to the story. Hannah, our artist, created more than 35 images of all the different animals. In order to make the project more appealing to children, we also made our choices appear as clickable images.

The implementation of looping structure in-order to take the kid back to a checkpoint in an event of too many bad choices resulted in some complications, as to the choices which need to be presented to the child.

Another interesting part was the implementation of Home passage, which could be visited from multiple nodes and revisited and hence, the text displayed as well as the choices presented depended on the past history. This was achieved by having boolean variables in critical passages and tracking them using If-else statements.

The looping structure involved in "Chores" and "Selling Lemonade", needed to be flavorful to keep the imagination of the child intact while being presented with the same kind of storyline in a loop.

4. How does your final prototype differ from your initial concept?

Our initial concept was to focus our project in creating interesting alternatives to modern classic children's books that the target audience would have already read. That way, we hoped they would be more interested in the game in general. After multiple iterations, our final prototype became a piece of IN where the ending depends on choices the user has made earlier.

5. What grade do you feel the execution of your project deserves based on the rubric you submitted in your concept document?

Based on our rubric from our concept document, we feel that we should receive 30 points. We delivered all the sections we aimed for:

Research similar games/ideas:

From a user experience perspective, we will investigate what types of interactions are easiest for children

Design an original narrative that is interesting and accessible to children:

The narrative will present choices for the player to explore, representing a branching structure

There are several (3/+) outcomes that reflect the choices that were made throughout the story

Develop the game in Twine:

The game can be played from start to finish without running into any bugs.

Each step in the narrative features images that help convey the story, making the game accessible to children

II. Research (Paper Summary)

“Children’s Learning From Interactive eBooks: Simple Irrelevant Features Are Not Necessarily Worse Than Relevant Ones” [1]

This paper explores children’s story comprehension and word learning between non-interactive eBooks and interactive eBooks. They originally began this experiment to bridge a gap in the research done on children learning from interactive eBooks.

The authors had an original story read to 103 preschoolers (ages 3 - 5) with word-object pairs using one of three methods: non-interactive control, relevant-interactive control, and interactive-irrelevant. In non-interactive control, the book pages were flipped by the experimenter. With relevant-interactive control, the children touched a relevant imager on the screen. And irrelevant-interactive control refers to the page turning when a child touches an irrelevant part of the screen.

In the original story, a farmer needs to collect his tools to fix a broken tractor. The tools are 5 objects from the Novel Object and Unusual Name Database, 2nd Edition (NOUN database) that are usually used in research with young children. It ensures that the participants wouldn't have any prior knowledge of these words while still keeping phonetic properties common to the English language nouns.

After each group finished the experiment, they were assigned a post-test that tested for word-learning and story sequencing. For the word-learning post-test they were tested with 5 novel object-label pairs in random order. For the story comprehension post-test, they were asked to place pieces of the story in order that they occurred. After these tests, the children played another game using pieces of a similar but unfamiliar story to assess general story schema. They had a final vocabulary test where they were shown 4 pictures for each word and asked to match the picture or the word. As the tasks advanced, the words became more complex.

The authors had a couple hypotheses based on prior research:

- a. Books with relevant-interactive features would increase word learning while irrelevant-interactive features would decrease word learning.
- b. Children will be less likely to correctly sequence a story following an interactive eBook than a non-interactive one. Performance on this task will be lower for children who used an interactive eBook with irrelevant features.

Each child was tested individually in a private room and the experimenter interacted with the child and recorded their responses. The children were also allowed to withdraw from the study early. The entire study lasted 15 minutes.

The authors used covariance to test the effect of interactivity on the two dependent variables, word learning and story comprehension. Initial analyses showed that the vocabulary and general story schema were correlated with story comprehension. So these were included in the story comprehension. Initial analysis also showed that child gender, social status, and book-use did not differ across the experimental conditions.

The authors concluded that relevant-interaction methods were no better than the irrelevant-interaction methods. They also found that the repetitive interaction features do not remove the reader from the story and are not harmful for learning. They claim their findings suggest that the simple interactive features don't necessarily help the preschoolers learn more from the story.

III. User Feedback Report

We tested our game with one three-year-old (Hannah's nephew). For the playtest Hannah had to read through the text for him, but asked him what choices he wanted to make and allowed him to press the buttons. Overall he was very engaged with the story, especially the pictures and the interactive aspect of being able to push the buttons and make decisions. In particular

getting to pick the type of animal was one of the flavor choices that seemed to be his favorite part of the story. He was not very interested in the pages without pictures, so we hope to be able to add more pictures before the final story demonstration. In addition, he seemed to really enjoy being able to press the next button, so we are going to try to make all of the choice buttons into pictures. However, on some pages you had to scroll to get to the next button and he was a little confused by that. Before the final demo we hope to fix this, but overall it did not impair his ability to interact with the story once Hannah demonstrated the need to scroll. We were worried that children wouldn't be able to identify with their character since the story is in third person and they are acting as the animal, but he had no problem with this. In fact, he very much identified with the clownfish character and often asked to see the drawing of "himself" again. He even went to get his mom to show her that she was a clownfish (the mom character) in the game. One of our main goals was to teach kids moral lessons, and he seemed to be learning from the choices he made. When he made a decision that made someone else sad, he saw they were sad in the picture and always chose to apologize. After making the wrong decision, he would often go back and choose the right one. Overall the game seemed enjoyable for someone his age with an adult to read the words for them.

IV. Link to code repository and README

<https://github.com/dhruvil009/Duckling>

V. Reflection Survey

We have all finished the reflection survey.

References:

1. Etta RA, Kirkorian HL. Children's Learning From Interactive eBooks: Simple Irrelevant Features Are Not Necessarily Worse Than Relevant Ones. *Front Psychol.* 2019;9:2733. Published 2019 Jan 10. doi:10.3389/fpsyg.2018.02733