Visual Novel Anthology

A Major Qualifying Project
submitted to the faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the
Degree of Bachelor of Science in
Interactive Media and Game Development
and
Computer Science

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Approved:
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28 April 2022

Abstract

We developed and tested an anthology of three short visual novels, *The Secret in Grandpa's Diary, Another Fantasy Quest,* and *Another Try*. Created using the Ren'Py engine, they offer a variety of gameplay styles and art approaches. All design and writing, and most art assets, were produced by the team, supplemented by publicly available audiovisual assets. Our experience goal was to evoke curiosity, intrigue, and satisfaction for players.

Acknowledgements

We would like to thank many people who assisted with the completion of this project. Without their input and guidance, this project would not have been possible:

- Professor Brian Moriarty, for his feedback, advice, and input that helped guide this team.
- Our volunteer playtesters, for taking the time to try our games and give us valuable feedback that shaped our final submissions.

Contents

1. Overview

The Visual Novel Anthology is a collection of three different visual novels made by our MQP group in the Ren'Py engine. In the concept stages of this MQP, these visual novels would have been accompanied by a new visual novel engine, developed alongside these games. This engine would have been potentially coded within the open-source engine Godot, with the Ren'Py versions being placeholders to develop and playtest our games before we could port them to this new engine. We eventually stuck with the Ren'Py engine to focus on our visual novels themselves. The new engine was growing out of scope, and our choice of using Godot was proving more daunting of a task due to the current stages of development Godot was in.

Ren'Py is an open-source visual novel engine that we chose for the Visual Novel Anthology. We chose to use Ren'Py because it is very easy to use, regardless of a developer's prior experience with scripting languages. This allowed development to progress smoothly, ensuring all three games had full alpha builds ready early in development.

When pitching this project to us, IMGD Professor Brian Moriarty emphasized the idea that creating a visual novel individually would make for a better learning experience for our Major Qualifying Project (MQP). The members of our group agreed, so development began on three individual visual novels.

The Secret in Grandpa's Diary, created by Matthew Selva, is a puzzle game where the player must read through their grandfather's diary to uncover a mystery relating to their family history. *Another Fantasy Quest*, created by Daniel Enriquez, is a fantasy story filled with twists and turns, culminating in a confrontation with a dark lord of evil. *Another Try*, created by John Frazia, is a mysterious game where the player is trapped in a dangerous time loop. Julian Herman supported development with character designs and title screens, while Fernando Barzuna supported development with background art.

2. *The Secret in Grandpa's Diary*

The Secret in Grandpa's Diary is a visual novel where the player, embodying a young man named Robby, reads the diary of his late grandfather to uncover a mysterious truth in the family's past. The diary captures the grandfather's experiences in World War II while also elaborating on his life after returning home.

Within the first moments of the game, the player is pointed toward their grandfather's diary by their recently deceased grandmother, with a claim that the diary holds a piece of information that must be shared with Robby's mother. While reading the grandfather's diary, the player must keep track of hints to uncover the name of a mysterious woman from his past. To keep track of these hints, players have access to an interactive checklist built into the game.

The goal of this project was to create a game that tells a story primarily through text, while giving players a satisfying small-scale mystery to solve.

2.1. Concept

As a programmer, I wanted to create a game with minimal art assets to maximize the amount of the project I could truly do individually. I came up with a concept of a visual novel where the story is told entirely through writing within the pages of a book.

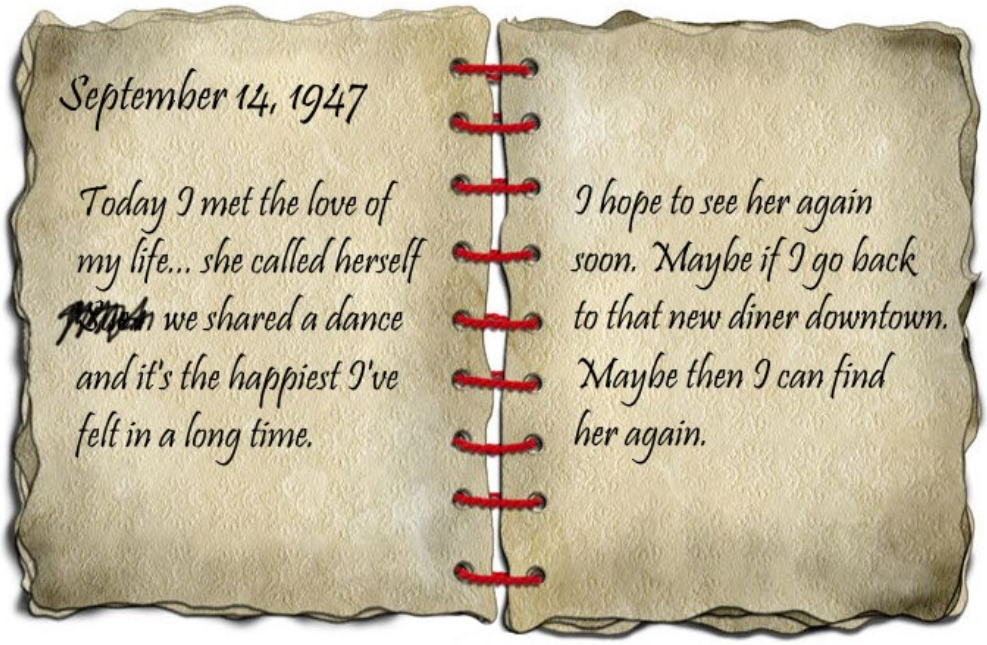

Figure 1. Initial diary concept. Source: URL

After coming up with the idea of a story told within the pages of a book, the overall narrative began to form around the visuals of the book itself. I thought the aesthetic of an old, raggedy diary, as shown in Figure 1, would make for an interesting set piece for a visual novel. With this idea in mind, the game naturally grew into an interactive diary with a mystery to solve.

2.2. Experience goal

As with any typical puzzle game, ensuring players are confident with the solution to the puzzle is key to creating a fun experience. *The Secret in Grandpa's Diary* is a simple puzzle, and I strived to ensure players ended the game with a sense of satisfaction.

2.3. Research

Before starting development, I had to determine the time period the bulk of the narrative would be set in. My grandfather fought in World War II, and while he never left behind any mysterious diaries, I decided to base the narrative on that. My research began by looking into the lives of soldiers returning from the war. An interview conducted in 2005 with Navy veteran John Turchinetz gave me useful insight on the actions of a soldier returning from the war ("Coming Home from World War II."). I shaped the grandfather in the story around the content of this interview, such as how he enrolls in engineering school soon after returning from the war.

After returning from the war, Harold struggles to fit into society and is encouraged by his mother to find a nice girl. This idea expanded into the core mystery of the game - who is this girl from Harold's past?

Figure 2. Waitress lineup. Source: URL

Clues are scattered throughout the diary, but the most noteworthy one comes in the form of a newspaper article featuring a line-up of waitresses at a diner, shown in Figure 2 above. Discovering this image was key to the development of this game, as it ensured my idea to set the majority of the entries at a diner would yield beneficial results.

2.4. Gameplay

The Secret in Grandpa's Diary is an interactive visual novel created in Ren'Py. After starting the game, players are greeted with a brief introduction set within the pages of a journal kept by the protagonist, Robby. He briefly reflects on the passing of his grandmother before referencing a letter she left behind, pictured in Figure 3 below.

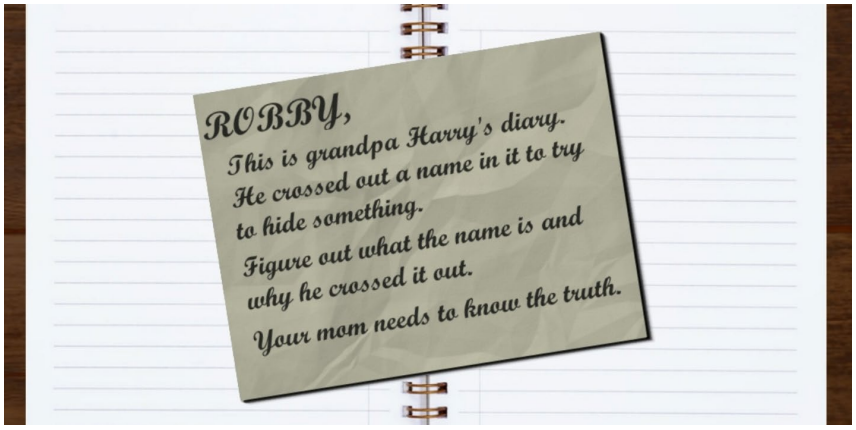

Figure 3. Note from grandma. Source: Screen capture.

This note prompts Robby to locate the diary his grandfather left behind while ensuring the player is aware of the overarching mystery that they must solve. After this brief introduction, the player spends the rest of the game within the grandfather's diary, pictured in Figure 4 below.

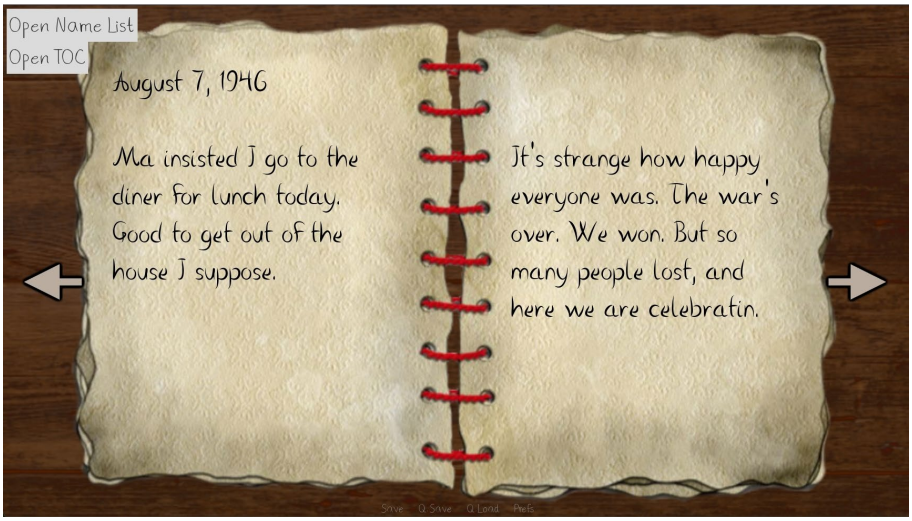

Figure 4. Grandfather's diary. Source: Screen capture.

Figure 4 also showcases the primary methods of navigating through the diary. Players can flip pages left or right using the arrow buttons, simulating the freedom they have when reading a typical book. Players also have access to a full table of contents, allowing them to return to any previous diary entry. This gives players enough freedom to explore the entire diary at their own pace without needing to worry about missing vital information.

2.4.1. Solving the mystery

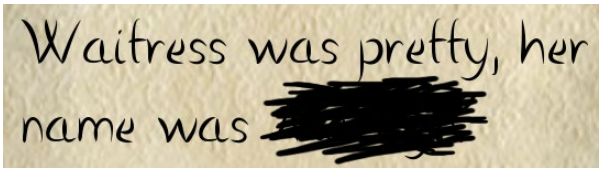

Figure 5. A mysterious name scribbled out. Source: Screen capture.

Throughout the diary, the player will find many dark scribbles, as shown in Figure 5 above. The primary objective of the game is to use a process of elimination to determine who this mysterious woman is. The player is provided with the necessary tools needed to solve this mystery after thoroughly reading through the diary. When the player reaches roughly the halfway point in the diary, they're greeted with the newspaper image featuring the line-up of waitresses, as shown in Figure 6 below.

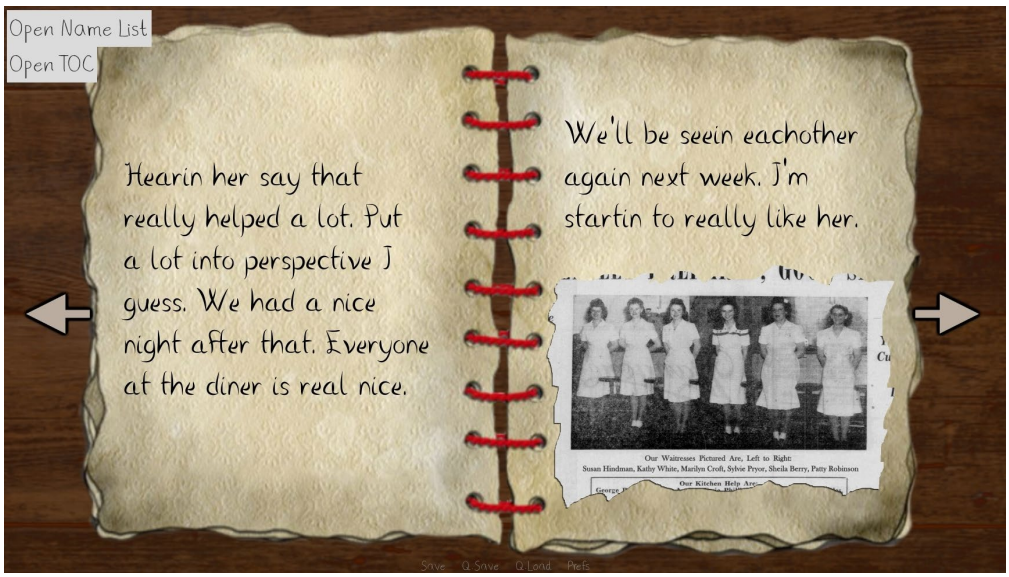

Figure 6. The page featuring the newspaper clipping. Source: Screen capture.

When the player reaches this page, Robby will comment on the waitresses in the image, suggesting to the player that one of them is the mysterious individual they're seeking. This prompts Robby to keep a quick list of names that the player can access at any time. Using this list to keep track of which names are mentioned in the diary without being crossed off is critical to the player's success. An example of this list with names crossed off is shown in Figure 7.

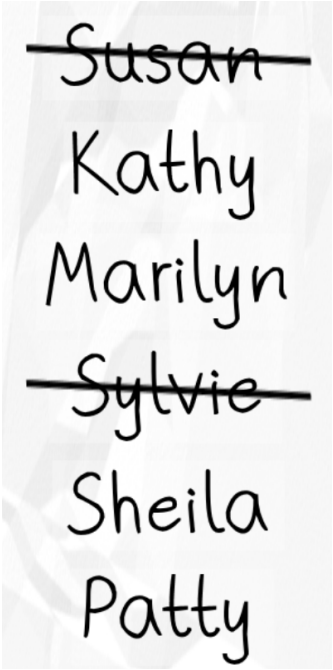

Figure 6. The interactive name list, critical to solving the mystery.
Source: Screen capture.

Using all the information present in the game is critical to solving the mystery within Harold's diary. If players can successfully deduce the identity of the mysterious woman, they can reveal the truth to Robby's mother, giving her closure for some old family drama.

2.5. Technical implementation

When initially creating a diary using Ren'Py, I knew I wanted to make it completely interactive so the player could read through it like a book. Typical visual novels are linear with branching paths based on the player's choices, but this diary system gives the player the freedom to navigate through the game at their own pace. To accomplish this, I first had to create the diary itself using the tools available in Ren'Py. To do so, I used screen language, a system built into Ren'Py that allows developers to fully customize the appearance of the screen. As shown in Figure 7 below, I used two screens to simulate the pages of a diary, properly positioned to fit within the background image.

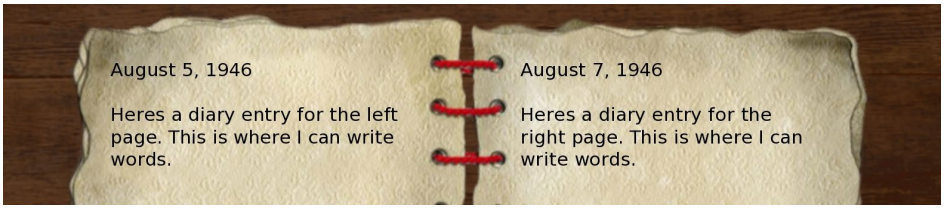

Figure 7. Two screens creating diary pages. Source: Screen capture.

The code for displaying these screens is quite simple, as each page is defined separately. Figure 8 below shows sample code for displaying any given set of pages in the diary.

```
scene bg diary

show screen diary_left (x=
show screen diary_right(x=
$ renpy.pause()
hide screen diary_left
hide screen diary_right
```

Figure 8. Two screens creating diary pages. Source: Code sample.

First, the diary background is set. Then, the writing within the left and right pages is set. Finally, I include a call to *renpy.pause()*, which pauses the screen until the user manually progresses to a new page. When they do, both pages are hidden, and a new set is loaded.

With the diary screens in place, my next goal was navigation. I wanted the diary to feel like the user was reading through a book, so players had to be able to turn pages in either direction. I also wanted to give the user the ability to jump to any previous page at any time, giving them easy access to information hidden within the opening of the diary. To accomplish these goals, each set of pages in the diary is stored within an array. The user can progress forward or backwards in the diary by simply jumping to a neighboring page in the *navDates* array. The code sample in Figure 9 below shows the functionality of the back button.

```
def back_button():
    hide_thoughts()

    if (navDates.index(currentDate) == 0):
        return

    else:
        renpy.transition(flipfadeBack)
        renpy.music.play("audio/sfx_page_back.ogg", loop=False)
        renpy.jump(label=navDates[navDates.index(currentDate) - 1])
```

Figure 9. Code that runs when the user presses the back button.
Source: Code sample.

Any time the user wishes to return to the previous page, the *renpy.jump* function loads the screens stored in the previous index of the array. Progression also includes a custom page flip animation which fades the screen in the appropriate direction. A sound effect for the page flip is also triggered, which pans in the direction the page is moving.

Storing pages in an array also gave me the ability to create a table of contents mechanic that stores all of the pages seen by the player. At any time, the player can open the table of contents and instantly return to any previous page. A sample image from the table of contents is shown in Figure 10 below.

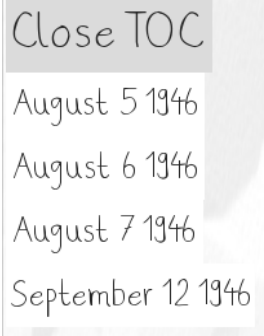

Figure 10. A small section of the table of contents mechanic. Source: Screen capture.

All other mechanics present in this game are done using similar techniques to those referenced above. Storing the pages within an array gave me an immense amount of freedom to construct the diary to fit the needs of the player while enhancing the game's narrative. There are two instances in the diary where the player needs to focus on a specific detail on the page. In order to draw their attention to these details, I included a series of thought bubbles where the protagonist thinks about a certain aspect of the diary, directing the player's attention to that detail. Figure 11 below showcases the first of these thought bubbles, putting emphasis on the mystery lying within the pages of the diary.

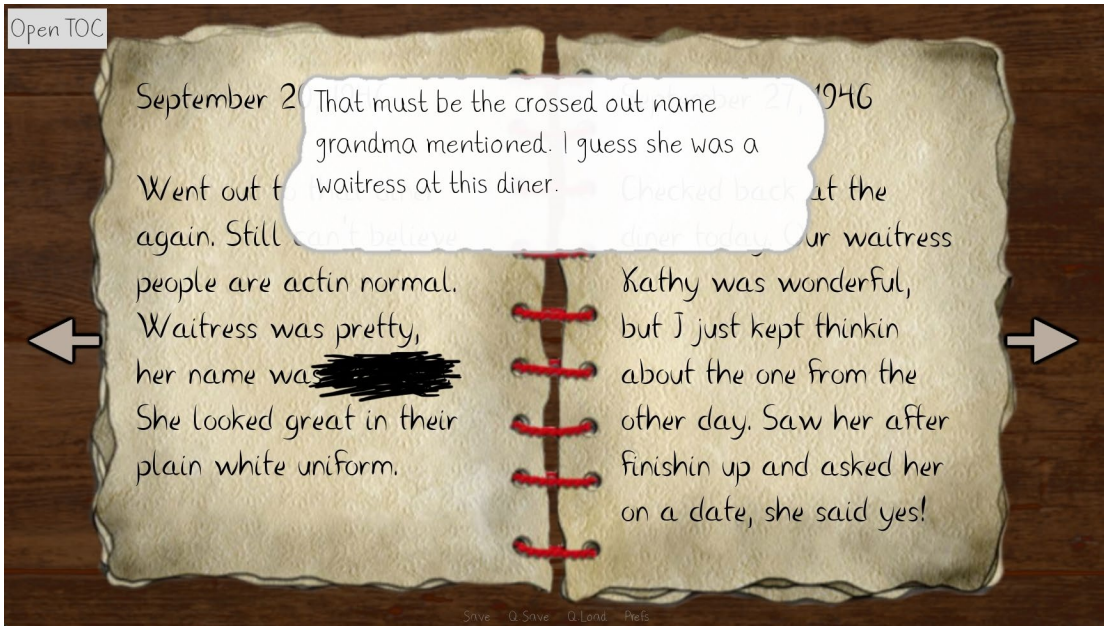

Figure 11. The protagonist pointing the player's attention toward the mystery.
Source: Screen capture.

Implementing this feature required the creation of an additional screen for the thought bubbles, which is simply a background image with text displayed. Incorporating them into the overall diary navigation was a bit trickier, as I had to account for the open-ended nature the array approach allowed for. To solve this potential problem, I ensured all thought bubbles are only shown once, which streamlined the process of re-reading the associated pages. When the player initially turns to one of these pages, the screen is shown, and a variable is set which prevents the thought bubbles from being shown again.

2.6. Telemetry

In addition to the creation of my visual novel, I also created a telemetry system that was used during playtesting to obtain quantitative data about user play sessions. This system was also used by my peers to give them useful information about their games during our playtesting sessions. I created the system using Python, which is directly built into the Ren'Py game engine. Figure 12 below shows the code used to create telemetry files during a playtest session.

```python
init python:
    from datetime import datetime

    ##############################################################
    ##  Initializing telemetry (creates directory and file)  ##
    ##############################################################
    def telemetry_init():

        # Create Telemetry directory if it doesn't already exist.
        if not os.path.isdir(renpy.config.gamedir + "_telemetry"):
            os.mkdir(renpy.config.gamedir + "_telemetry")

        # Get the current date and time.
        now = datetime.now()
        date_string = now.strftime("%m/%d/%Y")
        time_string = now.strftime("%H:%M:%S")

        # Get the full time string to append to the file name.
        global start_time
        start_time = now.strftime("-%m_%d_%Y-%H_%M_%S")

        # Write to file.
        with open(os.path.join(renpy.config.gamedir + "_telemetry/run%s.csv" % start_time), 'w') as f:
            f.write("Time,Event Name,Details\n")
            f.write(time_string + "," + "Telemetry Event" "," + "New run initialized!\n")


    ###############################
    ##  Recording custom events  ##
    ###############################
    def event(name, text = ""):

        # Get the current time to write to the file.
        now = datetime.now()
        time_string = now.strftime("%H:%M:%S")

        # Write custom events to the file.
        with open(os.path.join(renpy.config.gamedir + "_telemetry/run%s.csv" % start_time), 'a') as f:
            f.write(time_string + "," + name + "," + text + "\n")
```

Figure 12. Code that controls the telemetry system. Source: Code sample.

The telemetry system is initialized at the start of the game with a single call to *telemetry_init()*, as shown in Figure 13 below.

```python
label start:
    $ telemetry_init()
```

Figure 13. Initializing telemetry at the start of the game. Source: Code sample.

This call will create a *game_telemetry* folder in the project's file system, as well as the telemetry file itself. The file is named based on the date and time of its creation, allowing the files to be easily tracked and organized. Figure 14 below shows an example of a populated *game_telemetry* folder after running the game four times.

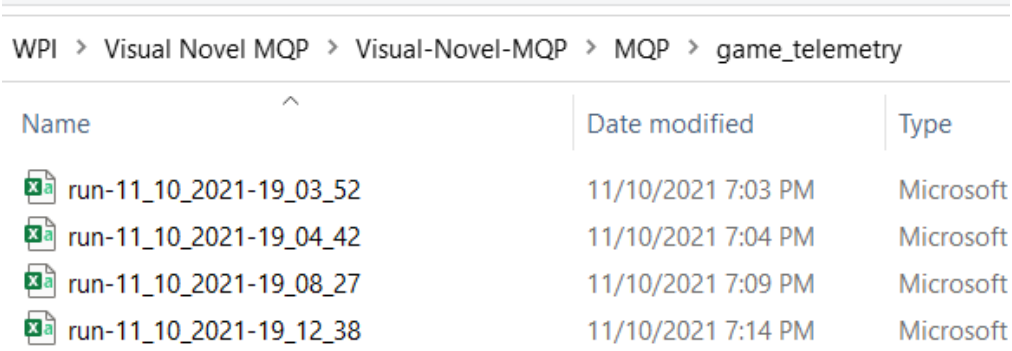

Figure 14. A populated game_telemetry folder after four runs. Source: Screen capture.

Each telemetry file is a CSV viewable using Microsoft Excel containing a variety of developer-specified events. When the file is initialized, a default initialization event will be printed to the CSV, as shown in Figure 15 below.

Time	Event Name	Details
19:12:38	Telemetry Event	New run initialized!

Figure 15. The telemetry initialization event printed to the CSV file. Source: Screen capture.

After initializing the telemetry system, custom events can be created to include valuable information in the CSV file. For example, Ren'Py visual novels typically emphasize branching paths with multiple choices. It's inefficient to ask a play tester to recall every choice they made during a survey, so this telemetry system can be used instead. A custom event can be created at every branch, efficiently printing the user's path through the game to the CSV file.

The screenshots in Figures 16 - Figure 19 below showcase examples of specific events I defined during playtest sessions throughout the creation of this visual novel.

```
label after_the_war:
    $ event("Progress", "Section 1: After The War")
```

Figure 16. A telemetry event recording the user's progress through the diary.
Source: Code sample.

```
$ mysteryName = renpy.input("What is the name of the person\ncrossed off in the diary?")
$ mysteryName = mysteryName.strip()
$ event("Ending", "Name Inputted: " + mysteryName)
```

Figure 17. A telemetry event recording the name submitted by the player at the end of the game.
Source: Code sample.

```
label talk_to_grandma_correct:
    $ event("End Route", "Grandma & Correct")
```

Figure 18. A telemetry event recording information about a split route, which was present in very early builds of the game. Source: Code sample.

```
init python:
    state = "off"

    def toggle_notes():
        global state

        if (state == "off"):
            state = "on"
            event("Notebook Toggle", "On")

        elif (state == "on"):
            state = "off"
            event("Left Page", leftNote)
            event("Right Page", rightNote)
            event("Notebook Toggle", "Off")
```

Figure 19. The game used to include an interactive notebook the player could write in. This telemetry event recorded how often it was used and what was written in it.
Source: Code sample.

3. *Another Fantasy Quest*

Another Fantasy Quest is a visual novel game where the player takes on the role of Ziv, a young shopkeeper living in a medieval fantasy village, in a land beset by the onslaught of an evil dark lord. One day, as the village gathers to hear a prophecy that will name the hero destined to defeat evil, everyone is surprised when Ziv is named, rather than the charismatic and popular warrior Perseus. Aided by Remnil, the wise mythical elder of the village, Ziv sets off on a journey to defeat the dark lord and save the land.

My concentration within the IMGD Bachelor of Arts program at Worcester Polytechnic Institute is writing, so I was eager to participate in a project where I would be able to utilize my writing skills to their fullest extent. Additionally, I was excited to work on a long-term project that would be a great addition to my portfolio. Because of the effects of the COVID-19 pandemic, I had less of a chance to work on large-scale portfolio pieces during my time at the university than I would've liked, so I was looking forward to working on this project.

3.1. Influences

Figure 20. The village of Riverwood in *The Elder Scrolls V: Skyrim*. Source: URL

After discussing the project with Professor Moriarty at the end of the 2020-2021 academic year, the project officially started in August of 2021. Over the summer break, I began brainstorming some broad concepts for my game, and by the time I returned to school, I had settled on the idea of a fantasy-themed story. I've been a fan of fantasy genre works for years, with works such as *The Lord of the Rings*, *Dungeons and Dragons*, and *The Elder Scrolls*, as seen in Figure 20, serving as some of the works that influenced my turn towards the genre.

Figure 21. Dialogue in *Save the Date!* Source: URL

As work began on the project, I also worked on gathering inspiration from other visual novels. At the onset of the project, Professor Moriarty recommended that we play *Save the Date!*, a visual novel created in the Ren'Py engine by Paper Dino Software. In *Save the Date!*, the player is going on a date with a woman named Felicia, only for the dates to all end in a horrible catastrophe, as shown in Figure 21. The player is encouraged to replay the game multiple times in order to view different choices and try different endings. Not only was this a good opportunity to get familiar with the engine I myself would be using, as I had not used it for previous projects, but it provided a lot of early inspiration for the choice-based structure I initially planned on implementing into the game.

Figure 22. Partner character Maya Fey in *Phoenix Wright: Ace Attorney Trilogy*. Source: URL

Another major inspiration for me was the popular visual novel series *Ace Attorney*, which I was introduced to in October 2021. The series is a courtroom drama starring defense lawyer Phoenix Wright, who works to defend his clients in trials by engaging in trials and debating evidence with rival prosecutors. I quickly took note of how the series masterfully incorporates humor into its writing, with Wright often crossing paths with all manner of strange characters, typically leading to him remarking to himself about his current situation. I certainly took cues from this approach to character writing when developing my own cast of strange characters. Additionally, the inclusion of a partner character that follows Wright around and offers him someone to banter with (typically the spirit medium Maya Fey, as seen in Figure 22) helped me when making alterations to the story later in development, leading me to give the character of the village elder a more prominent story role.

3.2. Concept

I knew that I wanted to make a fantasy game, but I also knew that making a serious adventure set in a medieval location was not an original idea. Not only has that concept already been done often, and far better than I could likely do it, but I myself had already made a similar visual novel in 2019, and I wanted to take a different approach to this project. I decided instead to approach the design of the game from a different angle, resulting in my attempt to create a pastiche of the genre. To this end, I crafted a narrative that, while it did contain trappings of the genre such as a malevolent dark lord and an ancient prophecy, attempted to subvert the player's expectations in its use of them.

Figure 23. Character art of Perseus.

For a protagonist, I conceptualized the idea of starring an ordinary villager who is unexpectedly chosen by a prophecy to save the kingdom, as opposed to an experienced adventurer. In fact, to further emphasize this, I did include such an experienced adventurer, but in the role of the rival and eventual final antagonist, Perseus, shown in Figure 23. I characterized Perseus as a brash and arrogant hero only interested in praise and adulation, hence why he bears the name of one of the most well-known Ancient Greek heroes. However, throughout the course of the story, Perseus becomes corrupted by envy and jealousy as the main character, Ziv, becomes more confident and able in their quest. His negativity eventually corrupts him, and he fights the player at the conclusion of their adventure.

I originally planned for the main character's inexperience to have a greater effect on the gameplay, where it would influence what the player was able to access during dialogue choices. The player would have access to two less than ideal options, with a third, "correct" option appearing that the player would be unable to access due to Ziv's inexperience and lack of confidence. I eventually scrapped this idea to redevelop Ziv from a nervous avatar into a more confident and sarcastic character of their own. They retain some aspects of this original player avatar mindset, such as bearing a gender-neutral name.

Figure 24. Character art of the village elder, Remnil.

Aside from Ziv and Perseus, character development for the final main character, Remnil, the village elder, seen in Figure 24, came later in the game's development. While developing the story, I noticed that there were long stretches where Ziv would be talking to themselves, which could feel disconnected at times from the larger narrative. Taking cues from the *Ace Attorney* franchise, I expanded the role of the village elder. Previously, the elder only appeared during the game's first chapter, where they served a minor role before sending Ziv off on their adventure. However, upon revision, the elder now appears throughout the game, not only guiding Ziv through dialogue and serving as a companion to banter with but aiding them in battle with healing magic. In accordance with his expanded role, I gave the character a fitting name, Remnil, as an anagram of the legendary wizard, Merlin.

3.3. Experience goal

The goal with *Another Fantasy Quest* was to create a simple game the player could laugh along with, while also feeling like they were able to go on a meaningful journey. While the question of whether or not I achieved this is up to player interpretation, my hope is that players are able to enjoy the humor as they battle their way through the adventure.

3.4. Gameplay

Another Fantasy Quest follows a standard linear structure where the player takes the role of Ziv and travels across numerous villages in a fantasy realm to reach the dark lord's fortress at the end of the adventure. Along the way, they'll encounter other characters, most of whom will have to be battled in order to progress the story. Additionally, some characters will offer branching dialogue choices for the player, which exist solely for flavor. The game is separated into six chapters: the beginning chapter, where the player meets Ziv, Perseus, and Remnil, the middle four chapters, where the player goes to a village and solves a problem plaguing the local townsfolk, and the final chapter, where the dark lord is confronted.

Figure 25. Chapter 1 of Another Fantasy Quest. Source: Screen capture.

The first chapter is short and features a simple introduction to the plot and characters. Ziv is selected by an ancient prophecy read by Remnil, as depicted in Figure 25, to defeat the dark lord, who has been raiding and pillaging villages. After being selected, they're given a sword by Remnil, after which he asks them if they're ready to set out, offering them a few simple dialogue options as a way to familiarize the player with Ren'Py's choice system. After this, Perseus confronts the player, and a simple battle begins. Although this battle is unwinnable by design, it introduces the player to the basic mechanics of the system.

Figure 26. The beginning of the game's fourth chapter. Source: Screen capture.

The middle four chapters are structured similarly, with the player arriving in a village, discovering a problem, like a request from a villager as shown in Figure 26, and solving it. The problem is typically tied to one of the dark lord's acolytes, who must be battled. The player also runs into Perseus twice during their journey, where more unwinnable battles against him take place. Originally, these chapters were structured in a more open way, but telemetry data showed that players simply approached them linearly, so I opted to remove the open nature of the chapters in favor of a more fleshed out narrative. After clearing all four middle chapters, the final chapter is a gauntlet of fights, where the player takes on the final acolyte, the dark lord, and finally confronts Perseus, completing the game at the conclusion of all three.

3.4.1. Battle system

Figure 27. The first battle of the game, featuring only the Attack option.
Source: Screen capture.

Another Fantasy Quest features a turn-based battle system not unlike those found in many classic RPGs, such as *Dragon Quest* or *Final Fantasy*. Ziv can use their sword to attack, as seen in Figure 27, which does 10 damage to an enemy in every encounter. Enemies do 10 damage back to Ziv, and then the turn resets, with the encounter ending when the enemy is defeated. The exception to this is the first three encounters the player has with Perseus, which are scripted encounters that are designed to be impossible for the player to win. After every battle, the player's health is fully restored, and their maximum health points (HP) goes up by 10. Maximum enemy HP varies but generally increases as the adventure continues. Once again, the exception is Perseus, who retains a consistent 100 HP throughout the entire adventure.

F

Figure 28. The game's fourth battle shows both the Attack and Heal options.
Source: Screen capture.

Originally, the only option for the player in combat was attacking, however after playtesting the game, I received feedback that this led to combat feeling boring and repetitive. As a result, I added a healing option to all combat encounters after the second, as shown in Figure 28. When healing, Remnil can restore 10 of Ziv's HP. Consequently, when the enemy attacks, Ziv is able to guard with their shield, causing them to only lose 5 HP. The battle system is specifically structured to prevent over healing, as if the player attempts to heal beyond their max HP, they will simply be capped at full health instead. Additionally, because the ability to heal caused the possibility that the player would be able to beat the first three Perseus fights, which were originally designed to be unwinnable, I added some scripted events to the fight to preserve the original intention of the battles.

3.5. Technical implementation

Like the other visual novels, *Another Fantasy Quest* was developed in the Ren'Py engine. Using the engine, as well as references from Ren'Py's included tutorial, the sample game *The Question*, and Professor Moriarty's own sample game, *The Bridge of Death*, I was able to construct a framework for my game that I continued to add to with additional content.

```
scene bg northern village

show elder encouraging at pos2:
    xalign 0.5
    zoom 0.75

e "{cps=20} Well Ziv, let's keep an eye out for those acolytes, eh?{/cps}"

p "Umm, sure. Uh, what do they look like again?"
```

Figure 29. A section of dialogue from the game's second chapter. Source: Code sample

Figure 29 demonstrates how a typical scene of dialogue is laid out in *Another Fantasy Quest*. When a new background is used, it's called with the *scene* tag, after which the character art is called using the *show* tag, where it's positioned into place. Note that Ziv does not feature a similar show tag due to the game taking place from Ziv's perspective in a first-person point-of-view. Each of the characters is referred to with a shorthand letter; in this case 'e' represents Remnil, the elder, and 'p' represents Ziv, the protagonist. Dialogue is encapsulated in quotation marks, with the *cps* tag in brackets indicating the text speed for the dialogue as it appears on screen. I set all characters to a speed of 45 characters per second by default, however Remnil is altered to speak at a slower 20 characters per second to emphasize his elderly nature.

```
p "(Wait. I wonder if this hooded person he's talking about is one of the Dark Lord's Four Acolytes? Maybe I should a

menu western_menu:

    "Weather's mighty fine today, isn't it?" if PickedA ==False:
        $ PickedA = True
        jump westernchoice_yes

    "What's the best bar in town?" if PickedB ==False:
        $ PickedB = True
        jump westernchoice_no

    "P…please sir, was this person in a black robe? Did they seem dangerous?":
        jump westernchoice_done

label westernchoice_yes:

    $ menu_flag = True

    v "Sure, sure. Why don't you go enjoy it somewhere else?"

    $ event("Choice", "Western Village Choice Option 1")

    jump western_menu

label westernchoice_no:

    $ menu_flag = False

    v "Well, we only got one, but I ain't lettin' you by for a taste-test."

    $ event("Choice", "Western Village Choice Option 2")

    jump western_menu

label westernchoice_done:

    v "I reckon I'd say so. I told them to scram just as I told you and your old pal here, but this guy was stubborn.

    $ event("Choice", "Western Village Choice Option Done")
```

Figure 30. An example of a menu within the game. Source: Code sample

Figure 30 demonstrates the utilization of Ren'Py's *menu* system within the game. When the player is presented with options, a menu appears displaying several buttons with text on them. When the player selects an option, the game records they've picked that option and uses the *jump* tag to jump to a new *label*, with each *label* containing a different option. In this instance, the first two choices are simply there for flavor and don't advance the plot. Choosing either of them will give the player a short line of dialogue from the villager character before returning them to the original menu screen. However, since the game recorded the player's choice previously, the menu choice they had previously chosen no longer appears on the menu, preventing tedium. Once the player picks the third option, the corresponding *label* does not contain a *jump* back to the original menu, allowing the player to continue the story. It should be noted that the player's choices were also recorded with the *event* tag to log the player's choices using the telemetry package described in **Section 2.6**.

```
# This screen displays a single stat.
screen single_stat(name, hp, hp_max, xalign):

    frame:
        xalign xalign

        vbox:
            spacing 5

            hbox:
                text _("HP"):
                    min_width 40
                    yalign 0.5

                bar:
                    value AnimatedValue(hp, hp_max, 1.0)
                    xmaximum 180
                    ysize 26


                text " [hp]/[hp_max]":
                    yalign 0.5


# This screen uses single_stat to display two stats at once.
screen perseus_stats():
    use single_stat(_("Ziv"), protag_hp, protag_hp_max, 0.0)
    use single_stat(_("Perseus"), hero_hp, hero_hp_max, 1.0)
```

Figure 31. The stats screen for the battle system. Source: Code sample.

One of the signature features of *Another Fantasy Quest* is the battle system. To begin setting up the battle system, I adopted elements from the stat screens demonstrated in the included Ren'Py tutorial, as seen in Figure 31. This allowed me to set up a basic battle UI, consisting of Ziv's health bar in the top left corner and the opponent's health in the top right corner. Additionally, I set variables to represent the current HP and the maximum HP for both Ziv and all the enemies in the game at the beginning of the script.

```
a1 "This isn't on my schedule, and you're interrupting production. I won't have any delays!"

play music "Battle.mp3" fadeout 1


show screen acolyte_stats
with dissolve

menu westernbattle2_menu:

    "Attack":
        jump westernbattle2_yes
    "Heal":
        jump westernbattle2_no
```

Figure 32. Code for the battle menu. Source: Code sample.

Figure 32 demonstrates the battle system from the start of the fourth battle in the game. At the start of every battle, the game's battle music begins playing and the stats screen is shown. Subsequently, a menu like those used for dialogue appears on screen, giving the player two options, "Attack" and "Heal." Selecting either option will jump the player to a new label.

```
label westernbattle2_yes:

    $ menu_flag = True

    play sound "Attack Sound 1.mp3"


    $ enemy_hp = enemy_hp-10

    a1 "Wretch! Just who do you think you are?"

    if enemy_hp == 0:
        a1 "Ha!"
        jump westernbattle2_done
    else:
        play sound "Attack Sound 2.mp3"
        $ protag_hp = protag_hp-10
        jump westernbattle2_menu
```

Figure 33. The label used after the player selects the "Attack" option. Source: Code sample.

Upon choosing the “Attack” option, code will run that resembles the code seen in Figure 33. A sound effect will play to represent Ziv’s sword strike, and the value of the enemy’s HP is reduced by 10. The enemy will typically respond in an angry fashion after taking damage, and then the next move is decided. If Ziv’s strike lowers the enemy’s current HP to 0, the enemy will say a line of dialogue to indicate their defeat, and a jump will be called to go to the label designated for the end of the battle. If the strike does not finish off the enemy, however, a sound effect will play to indicate Ziv taking damage, followed by a reduction in their HP by 10 points. Finally, a jump will be called to proceed back to the menu for the start of the next turn.

```
label westernbattle2_no:

    $ menu_flag = True

    if protag_hp == protag_hp_max:
        e "{cps=20}Ziv! Healing won't do anything when you're at full health!{/cps}"

    if (protag_hp + 10)>40:
        $ protag_hp = 40
    else:
        $ protag_hp = protag_hp+10

    a1 "Nice try punk! It won't do you any good!"

    play sound "Attack Sound 2.mp3"

    if protag_hp < 5:
        $ protag_hp = 0
        if protag_hp==0:
                e "Ziv! Not yet!"
                e "Time magic, heed my command!"
                p "(Woah, I feel good as new!)"
                $ protag_hp = 40
                $ enemy_hp == enemy_hp_max
                e "Now, Ziv! Give it another go!"
    else:
        $ protag_hp = protag_hp-5
        if protag_hp==0:
                e "Ziv! Not yet!"
                e "Time magic, heed my command!"
                p "(Woah, I feel good as new!)"
                $ protag_hp = 40
                $ enemy_hp == enemy_hp_max
                e "Now, Ziv! Give it another go!"

    if enemy_hp == 0:
        a1 "Ha!"
        jump westernbattle2_done
    else:
        jump westernbattle2_menu
```

Figure 34. The label used after the player selects the “Heal” option. Source: Code Sample

If the player chooses instead to select the “Heal” option, a different label, resembling the one in Figure 34, will run. Firstly, the code will check and see if the player is already at full health. If the player is, Remnil will give the player a warning reminding them not to health when at full health, because it will have no effect and they will still take the subsequent 5 points of damage. If the player is able to heal, the code checks and makes sure healing the player by 10 points will not exceed their max HP for this battle. If they are able to heal, 10 health points are added to the player’s current HP. The enemy will proceed to attack the player for a reduced 5 points of damage. The reduced damage is explained in the story through Remnil winning Ziv a shield in a contest, allowing them to defend themselves.

The game will check and see if Ziv’s HP is less than 5, and if it is, will automatically set it to 0 to prevent the value from becoming a negative number. If not, they will simply lose 5 HP. Fortunately for the player, if their health reaches 0 in any battle besides the scripted fights with Perseus, Remnil will use his time magic (an intentionally obvious deux ex machina) to rewind the clock, fully restoring the health of both Ziv and the enemy. This can be done as many times as necessary with no penalty imposed upon the player. Finally, the code checks to make sure the enemy’s health is not at 0, and then returns to the menu for the next turn.

```
label westernbattle2_done:
    hide screen acolyte_stats
    play music "Village.mp3" fadeout 1

    hide druid
    show druid surprised at pos2:
        xalign 0.5
        zoom 0.75

    a1 "Impossible! Utterly inconceivable!"
```

Figure 35. The label used after the battle is concluded. Source: Code sample.

Figure 35 demonstrates the conclusion of a battle in *Another Fantasy Quest*. The code hides the stats screen and returns the music to the usual ambiance that plays in villages. Each enemy character also has a surprised or defeated sprite, and that is called upon their defeat in battle. The character will say a line of dialogue lamenting their defeat, and the story will continue as normal.

4. *Another Try*

Another Try is a visual novel where the player, embodying a reporter, travels through a time loop during mysterious and dangerous events. You travel through multiple time loops to find a way to stop a crime you witness, unknowing that it is the precursor to a larger story.

The game starts with the player traveling to a city for a job at a radio station, but through misfortune, the player ends up witnessing an illegal arms deal within the sewers of the city. You are killed, but come back due to the power of an heirloom given to you by your mother. The player is now prompted to investigate this crime using the power bestowed upon you.

4.1. Influences

This visual novel was influenced by a variety of games. These influences consist of the *Kiseki* series, *Save The Date!*, and the *Ace Attorney* series.

4.1.1. The *Kiseki* Series

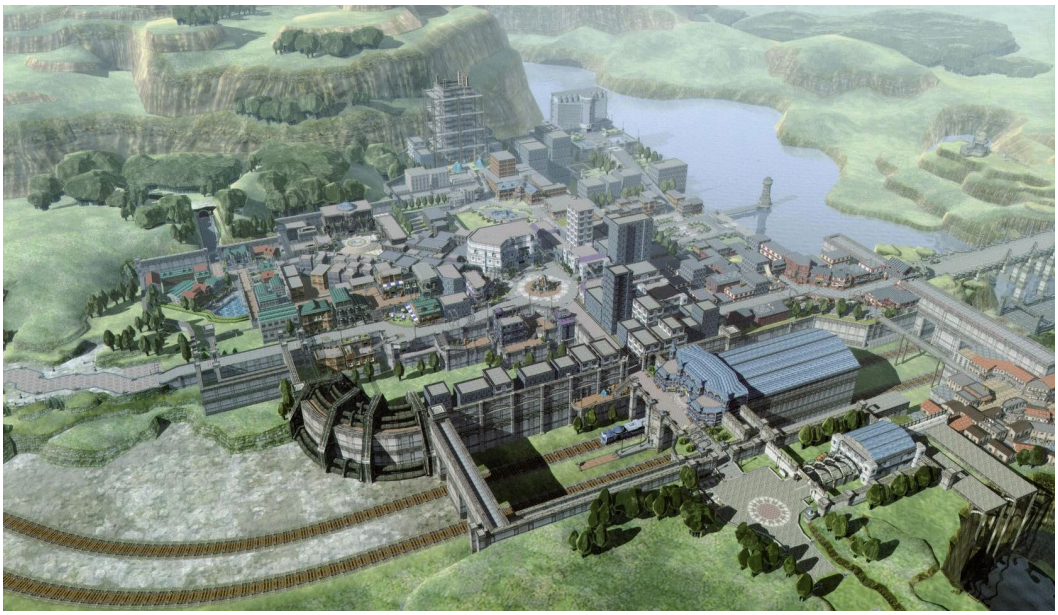

Figure 36. Crossbell City from Nihon Falcom's *Kiseki* series. Source: URL

During the Summer of 2021, I became enthralled with Nihon Falcom's *Kiseki* series, known as *Trails* in English. When playing through the fourth and fifth entries, *Zero no Kiseki (Trails from Zero)* and *Ao no Kiseki (Trails to Azure),* I was gripped by the political story lurking within the fictional city-state of Crossbell, shown in Figure 36 above. This fictional setting of Crossbell is a small city-state that holds important resources that two surrounding military powers seek. Throughout the two games, the player experiences the proxy warfare between these two powers, a plotline that became the basis of my original concept for *Another Try*.

Figure 37. City of Ruan from Nihon Falcom's *Kiseki* series. Source: URL

I took heavy inspiration from the *Kiseki* series and its settings. Originally, my setting was a mixture of Crossbell and Ruan, shown in Figure 37 above. I didn't want to directly rip Crossbell from *Kiseki*, so the choice was to have the city be a border city instead of a city-state. At first, the conflict began over resources. The original setting was a seaport city on the border of a country that desperately wanted a sea route. The appearance of this city changed in my mind over the first few weeks. My plans for one singular city quickly evolved into two connected cities with vastly different appearances.

4.1.2. *Save the Date!*

Figure 38. Screenshot from *Save the Date!* Source: URL

In the beginning of the project's lifespan, I was recommended to play the visual novel *Save the Date!* which was also created using Ren'Py. This decision was a massive influence upon my game's central idea. *Save the Date!* is a comedic fourth wall breaking visual novel that has a time loop mechanic. At the end of a route, the player returns to the title screen. Every future playthrough has new options reflecting the actions made in the previous run. After playing *Save the Date!* I was influenced to add a time loop to my game, allowing for replayability.

4.1.3. *Ace Attorney*

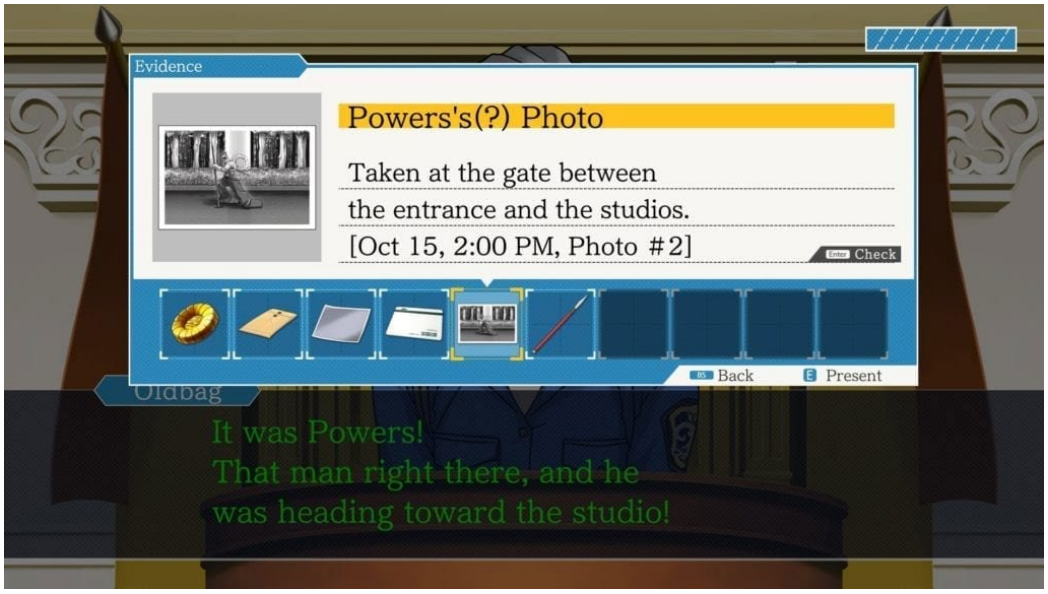

Figure 39. *Phoenix Wright: Ace Attorney Trilogy* Evidence Screen. Source: URL

The *Ace Attorney* series is another entry in the visual novel genre, with a very noteworthy evidence system, shown in Figure 39 above. Throughout the game, you investigate and gather evidence to make your case in court. This mechanic influenced my idea for the leads system, where the player would gather information over the course of the time loops and use their knowledge to advance the plot.

4.2. Concept

The original concept of *Another Try* was a prologue, a game that would follow a reporter finding evidence of proxy warfare in their city, and dying in the end, their death being spun to create reasoning for war. My original plan was to make the end of the game feel like the end of a chapter instead of an end of a story. From there, I would be able to expand the setting in personal work beyond the scope of this project.

At the onset of the project, the game's scope was much larger than possible. As time went on, the leads system also grew too large, greatly impacting the overall scope of the game. The unruly scope proved detrimental to the development of the game, so a lot of aspects of the game were cut, resulting in a more concise final product.

4.3. Experience goal

The original experience goal of *Another Try* was to give the player the experience of piecing together a conspiracy before being hit with despair once they realize that there was no way to stop the war from growing out of control. However, like the game itself, the experience goal changed over time. The current experience goal of *Another Try* is to intrigue the player and make them want to learn more about the world I created.

4.4. Gameplay

The first build of *Another Try* was an investigative mystery visual novel. The game would start with a kinetic novel section with minimal player interaction. Once that ended, the player would be able to freely investigate the world. At a certain point, the game would end with a cliffhanger, prompting the player to begin a new loop. The game would start again, but the introduction would be altered based on the player's previous playthrough. This new playthrough opens choices that weren't available before. The general gameplay loop would have been exploring, and learning about the setting, gradually unraveling the true story of what occurred in the cliffhanger.

The current build of *Another Try* is very similar and yet notably different than the first iteration of it. It is still an investigative mystery visual novel, with the kinetic novel introduction. However, the leads system was removed to ensure the scope remained reasonable.

4.4.1. Leads system

For the first iteration of the game, the major gameplay feature was the leads system. This system used Ren'Py's persistent data in order to hold over variables and data to when you would go back to the title screen or completely close the game. The leads system was a persistent list of variables that would reveal more about the story and the setting. These variables would interact with each other, theoretically unlocking new content once all certain leads were created. This system was implemented at a basic level for the first iteration of the game, but it had no real impact on the narrative at that point.

4.5. Technical implementation

Aside from the overall simplicity of implementing games using Ren'Py, a major benefit of the engine is the fact that everything is text based. If there is text present in the code within a pair of quotation marks, Ren'Py will display the text as spoken dialogue assigned to specified characters. This basic format makes writing the script in the engine very easy, and also allows it to be adjusted afterwards with ease.

```
    if WatchSold is True:
        jump game_over
    else:
        jump another_try2


label ending:
    $ event("Good End")

#Telemetry Here
    $ persistent.discuss = False
    $ persistent.death = False


    main_char "Oh thank god you are here. Wait...why are you here?"

    bartend "This was my business. I'm an ex-cop and the majority of these guys still respect me enough (and afraid enough for their bar tabs) to listen to me."

    main_char "...That explains that then. So, do I need to go in to testify then?"

    bartend "Let's just say that we got a tip from an anonymous source and we keep this less messy than it has to be...I'm assuming your way of figuring this out

    "THE END"

    return
```

Figure 40. A sample of Ren'Py code using persistent data. Source: Code sample.

Ren'Py also contains a unique feature that allows us to handle data in a unique way. As shown in Figure 40, there is a "persistent" component that can be added to variables. When this tag is added to a variable, such as *persistent.discuss*, it turns the variable into a persistent variable. A typical variable in Ren'Py will be saved to the current playthrough and forgotten about when the game concludes. A persistent variable will only save when Ren'Py has closed, or when a specific command is called. This allows data to be saved between separate playthroughs of any Ren'Py game. Persistent data was originally the backbone of the leads system, allowing the game to save the knowledge the player gained across time loops.

4.6. Twine prototype

Early in *Another Try*'s development, major scoping issues forced me to restructure the story of the game. At this point, the kinetic novel section of the game and the code required for the leads system were functional, but there was no game supporting these features. Professor Moriarty pointed me to another storytelling engine, Twine, to help establish the framework of the game's overarching narrative.

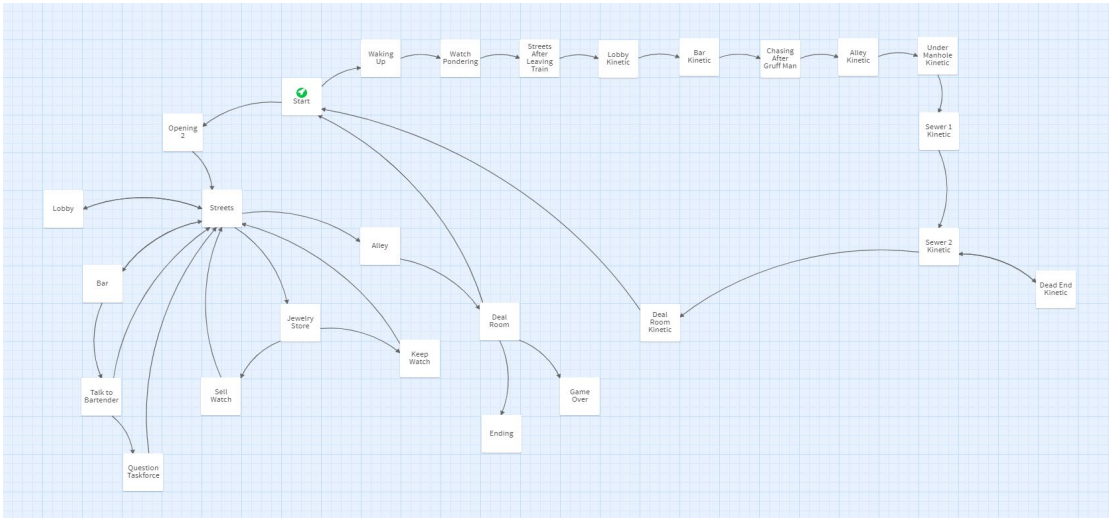

Figure 41. The finalized narrative structure of *Another Try*. Source: Screen capture.

To remake the structure of my game, I used this new visual novel engine, Twine. As shown in Figure 41, Twine works by connecting passages to each other. Since my game had interconnection between areas, it gave me a better visualization of how specific sections of the game connected to each other. Rather than relying on a large text document in Ren'Py, I could now use an interconnected chart to structure the game's narrative. As shown in Figure X, Twine gives a unique view of the game, showing which passages connect to each other. This new structure allowed me to create a prototype of *Another Try* using Twine, which was easily converted to a fully functional Ren'Py game.

5. Character design

Through character is how we perceive events and actions of all works of media, making the presence and rendering of those characters incredibly important in bridging the connection between consumer and producer. Characters and character designs are one of the most effective tools of visual communication in any medium reliant on its visuals to tell a story, set a tone, or appeal to a specific audience. Character design is just as important as the writing and dialogue behind a character to make a character both come alive and stand out as an individual.

5.1. Aspects of characters

When first designing a character, one has to consider a variety of aspects that make up the core building blocks of attempting to render that character in an honest and compelling way. Key aspects to consider include the time period, genre, age, fashion, personality, color choice, and the character's role in the story.

5.1.1. Personality

Personality is a major factor to consider when designing a character. The character's design should represent how they act within the context of the narrative. A way to judge an effective character design is if you can look at the character in question, and instantly understand who that character is and what they are about in the story being told. A viewer should be able to describe a character's personality by simply looking at their design. All the following aspects of character design are effective ways to influence the character's personality.

5.1.2. Time period

Dependent on how the character looks or how they are dressed, one can assume the time of the story. Aspects such as how contemporary the fashion is, or how well dressed the characters are can tell a lot about the chronological date of the events unfolding.

5.1.3. Age

A key aspect of characters when conceptualizing a design is their age - both their literal age, and how old they appear to the person viewing the design. Sometimes when designing a character, especially in a collaborative project, the character's age will already be given to you, making it easier to design the character. However, when the design and choice of the age is left in the hands of the artist, age can be a very important building block in designing and presenting a character. Consider what a person's age represents in who they are as a person. Are they young and youthful? Are they old and world weary? Are they a newcomer to the story at hand or do they have experienced the other characters or viewers would not be privy to themselves? These questions are important to ask when designing a character for the first time. Figure 42 below showcases how a character's design can evolve as the character ages.

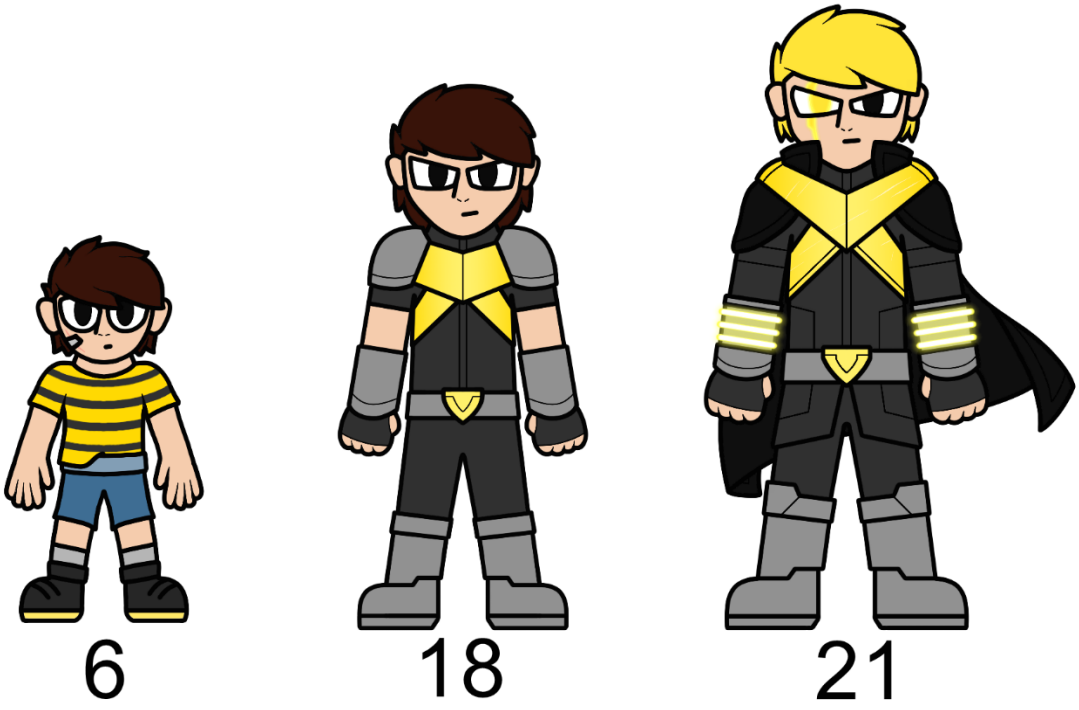

Figure 42. The age of the character can not only dictate the design, but the vibe and the tone of the character and the story being told.

5.1.4. Fashion

How a character is dressed, or dresses themselves can tell you a lot about them. Different outfits, such as casual attire, a business suit, or a specific uniform, paint a clear picture of that character's role in the story. Whether a character's clothing is sloppy and unkempt or fashionable and clean cut can tell the viewer what the player's role in society is. These decisions are key to ensuring the character properly fits into the story being told. Figure 43 below showcases how fashion choices can dictate a viewer's perception of a character.

Figure 43. Different fashion on different characters can send different messages to the audience about what a character represents.

5.1.5. Role in the story

Often dictated by the designers and writers of the story, the character's role and presence within the story being told is a key factor that can help dictate the character design. A good rule to follow is that characters with more plot relevance should have more detailed and memorable designs. Background characters, or side characters that have minimal appearances in the narrative, can have less detail in their designs since the viewer doesn't need to remember them as vividly as the main characters. While thought should certainly still be put into minor character designs, ensuring the main characters stand out among the rest is critical to designing characters the player will remember. Figure 44 below showcases two characters with differing amounts of detail based on their relevance to the narrative.

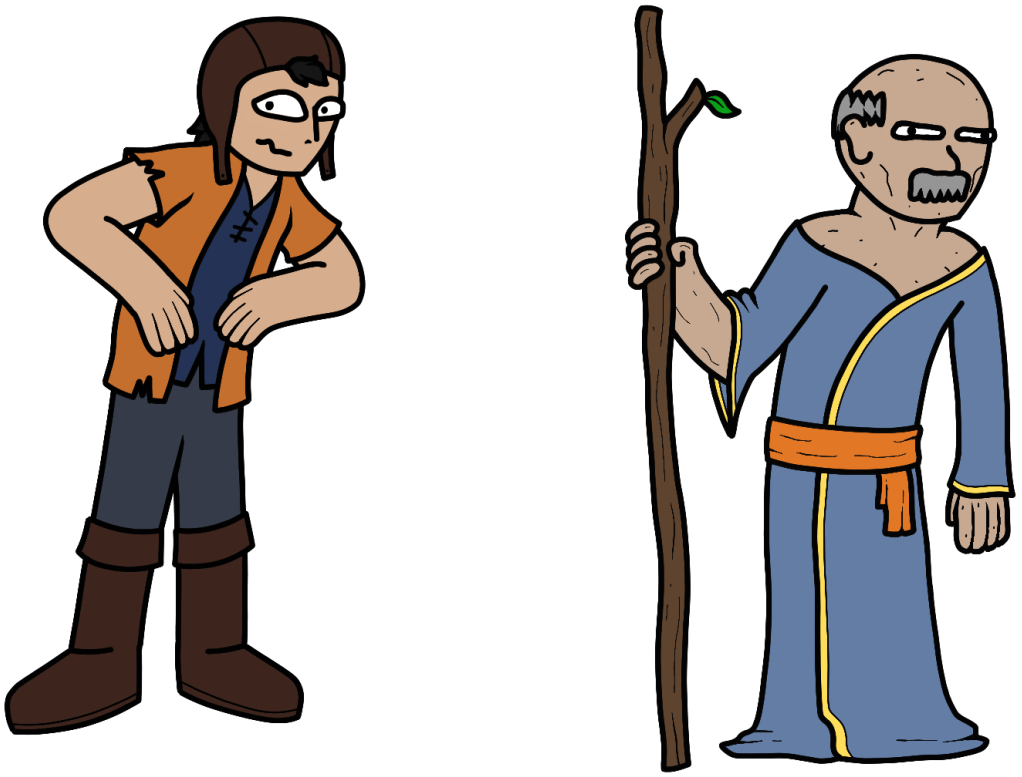

Figure 44. A side character (left) should be comparably less detailed with less prominent features when compared to a prospective main character (right).

5.1.6. Color choice

Color usage and color theory can tell a viewer a lot about a given character upon first glance. In artistic interpretation, colors often have great significance when it comes to expressing ideas, and this idea stands true when it comes to character design. Color theory is largely subjective to every piece of art, meaning the artist can apply meaning and significance to their given work of choice. Aspects such as hue, tone, saturation, and specific usage of certain colors could all be given visual significance based on an artistic work. Color usage should always be purposeful and deliberate in their usage. Figure 45 below showcases two identical character designs with vastly different color choices, showing the impact color has on a character.

Figure 45. The same character with two different color schemes can give off different ideas or tones in terms of what the given character represents.

5.1.7. Genre

Through usage of visual motif and iconographic imagery, character design can often tell us in what style of story the characters reside. Visual signifiers such as the shape of the characters, the color palette, and the fashion they wear can oftentimes inform the viewer on what type of story is being told. Some signifiers have become iconic to certain genres, such as metallic robots in science fiction and pointy eared elves in fantasy. Traits like these can immediately communicate the genre to the player with minimal explanation, relying on the viewer's preconceived familiarity with the design tropes to fill in the blanks for themselves.

5.1.8. Guidelines

When designing a character on a collaborative project, another member of the team, often the writer or director will give the artist creative guidelines about how to render the character in accordance with the artistic vision of the overall project. Guidelines could take the form of either artistic choices in dictating the art direction, or details about the character that should be kept in mind when designing the character. Whatever guidelines are given to the artist, it is imperative that they be kept in mind when rendering the character as to adhere to the artistic vision of the writers and designers working on the project.

5.2. Artistic process

For my work in this project, I used Autodesk Sketchbook to design characters. When designing characters, it's important to follow a series of steps starting with a sketch, and then proceeding to a blockout, creating line art, and adding color. These processes are detailed below.

5.2.1. Sketch

This step is important for coming up with two of the most important aspects of character design, posing and proportions, as shown in Figure 46 below. The pose of the character is what will be viewed most frequently, so it is important for it to reflect the character's personality. A quick sketch can ensure you accomplish this without making the pose too obtuse or exaggerated. Designing proportions ensures that the character's size and weight distribution accurately represent the character. It's important to consider the features of the designs that should be more pronounced while sketching the character to fit the guidelines given by the rest of the team.

Figure 46. The sketch of the drawing shows the basic pose and shape of the finished character.

5.2.2. Blockout

Taking the sketched-out bones of the character, take a thick lined marker or digital pen and draw over the sketch. This gives the character the necessary girth and screen presence to feel real, while also creating their silhouette, as shown in Figure 47 below. This step of the process should simply give the character more of a presence, it should not be used for adding specific details. After the character's blockout is drawn, be sure to either delete or hide the sketch that was previously drawn.

Figure 47. The character's blockout helps to give the character design girth as well as establish what the general silhouette will look like.

5.2.3. Line art

Now that the overall shape of the character is determined, detail is added on top of the blockout of the character. This is done by drawing the outline around the blackout and then adding individual details around or within the outline, as shown in Figure 48 below. Details include many aspects of the character's design such as the character's clothes, face structure, and any additional accessories. This step of designing a character usually takes the longest amount of time to design, but it's essential to creating a finished character. After the character's line art is drawn, be sure to either delete or hide the blockout layer that was previously drawn.

Figure 48. The outline establishes what the character looks like in a non-colored form, showing off the fashion and design of the character.

5.2.4. Coloring

The final step of designing a character is coloring all the individual components of the lineart, as shown in Figure 49 below. Be sure to color on a layer below the lineart layer as to not overlap or ruin the lineart itself, assuring the color will always be behind the lineart. This can be done with either a pen tool or a direct fill tool. When using a fill tool to color, it's best to select the negative space with a selection tool and fill the selected area in a new layer to avoid losing color detail in the line art.

Figure 49. Coloring the character makes the character pop out of the background and helps to give them visual depth.

5.2.5. Exporting

The final step of creating a character is extracting the character from the program in a usable non-layered form. With the cut tool, select the character you want to export. Then, save a copy of the canvas as a .png of the chosen character. Be sure to hide the background layer to give the character a transparent background when exported. Once exported, revert the previous steps to ensure the rest of the canvas and any other drawn details are preserved.

5.3. Motivation

The art style for both games are roughly the same, an exaggerated art style defined by thick outlines, bold colors, and thick pronounced limbs. These artistic choices were done to make the characters pop, both out of the environment and in the viewer's mind. The thick outlines give a distinct difference between the central characters in question, and the background they are presented in, making them distinct assets of the same scene while giving prominence to the character's presence and design. The bold colors are primarily done to make the characters pop out from their outlines, but by keeping the colors generally flat, the colors become a cohesive part of the character's design. The thick limbs of the characters make adding detail to the limbs easier due to the wide pallet while increasing the character's presence on the screen. This choice ensures that the designs will stick with the viewer.

5.4. Reflection

This project gave me a great experience of what it would be like to make art and act as an art director for an official game studio. Through communication between the developer, rendering art, and importing and exporting different art, I was able to better understand the developmental pipeline of game design and how to best slot myself into it. My key piece of advice I would give to anyone aspiring to be a character designer, not just for video games but for any piece of art, is to continually change your ideas. Kill your darlings and come up with new and exciting design ideas to try out. If any of those ideas don't work, kill it and try again. Don't be afraid to cut back or let loose if a project's pace demands it.

6. Background design

Initially, development for the backgrounds began by using the image editor GIMP. This was a good program that, based on research, seemed to be on par with Photoshop with the added benefit of not requiring the hassle of obtaining a license. However, that issue was remedied by signing up through Worcester Polytechnic Institute, so Photoshop became the primary background editing software for this project. The only piece of experimental concept art made with GIMP is shown in Figure 50 below.

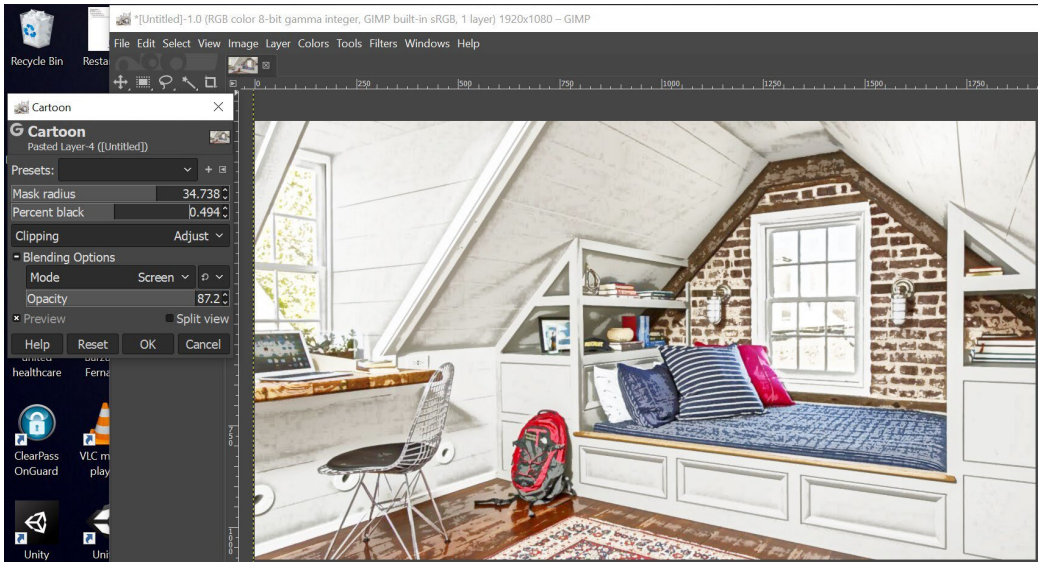

Figure 50. Software filter test using GIMP.

The goal during the phase of development was to adjust photographs using Photoshop filters to make them appear hand drawn. At this point there was no specific style in mind, though some guidelines were given to produce effective background art. These guidelines were to have a blurry effect on the background to emulate typical background art, and to emphasize the colors of the image to make it stand out.

6.1. *Another Try*

The first task for the background art was to be able to create a hand drawn style and apply it to a train station, shown in Figure 51.

Figure 51. Train background. Source: URL

Multiple attempts to create a specific style resulted in a variety of options that the developers were able to choose from. Two of these options, Figures 52 and 53, are shown on the following page. Figure 52 shows an attempt where a blur effect was added in addition to a layer with the color yellow, but this looked comparatively unappealing. Figure 53 was the final outcome which used a filter that removed some of the detail from the picture, giving it more of a cartoon aesthetic.

Figure 52. Filter with green background layer attached.

Figure 53. Outcome for this attempt. This was the motif chosen by the team.

The resulting image acted as the basis of the style that was applied to the other background assets. In the process of finalizing the designs, a lot of time was spent experimenting with Photoshop's built-in style transfer tools. Figures 54 and 55 below show two examples where using a single style transfer led to undesirable final images.

Figure 54. This style transfer made the entire picture blurry rather than hand drawn.

Figure 55. This style transfer looked far more stylish, but to an exaggerated degree.

Eventually, a style was discovered that consistently created a visual look that we all wanted for the backgrounds. Unfortunately, this design solely relied on Photoshop's style transfers, which weren't particularly effective. The background designs were then combined with Photoshop's "Angled Strokes" filter, creating a visual look that resembled a hand drawn background as shown in Figures 56 and 57 below.

Figure 56. The original picture of the office. Source: URL

Figure 57. Outcome using a neutral filter called "Angled Strokes" and a style transfer.

For the remainder of this project this method was used to provide satisfactory background designs for the rest of the assets. The following images (Figure X - Figure X) were all edited using the processes described in the pages above.

Figure 58. City street. Source: Photograph by John Frazia.

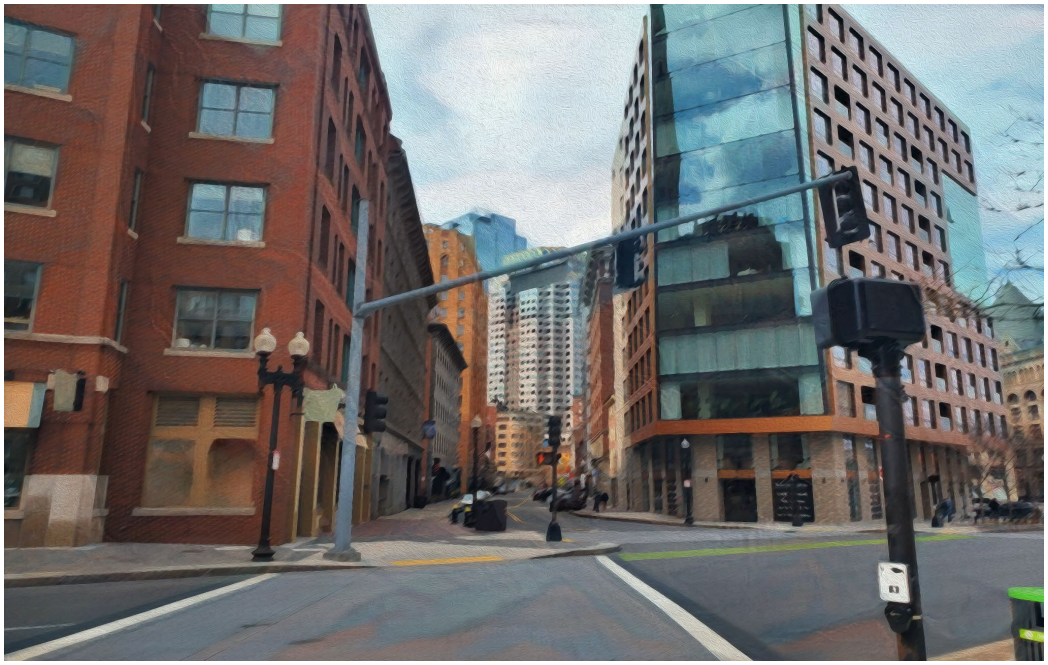

Figure 59. Edited photo using style transfer and neutral filter “Angled Strokes.” Logos and advertisements were edited out.

Figure 60. Original image of a bar. Source: URL

Figure 61. Edited photo using style transfer and neutral filter “Angled Strokes.”

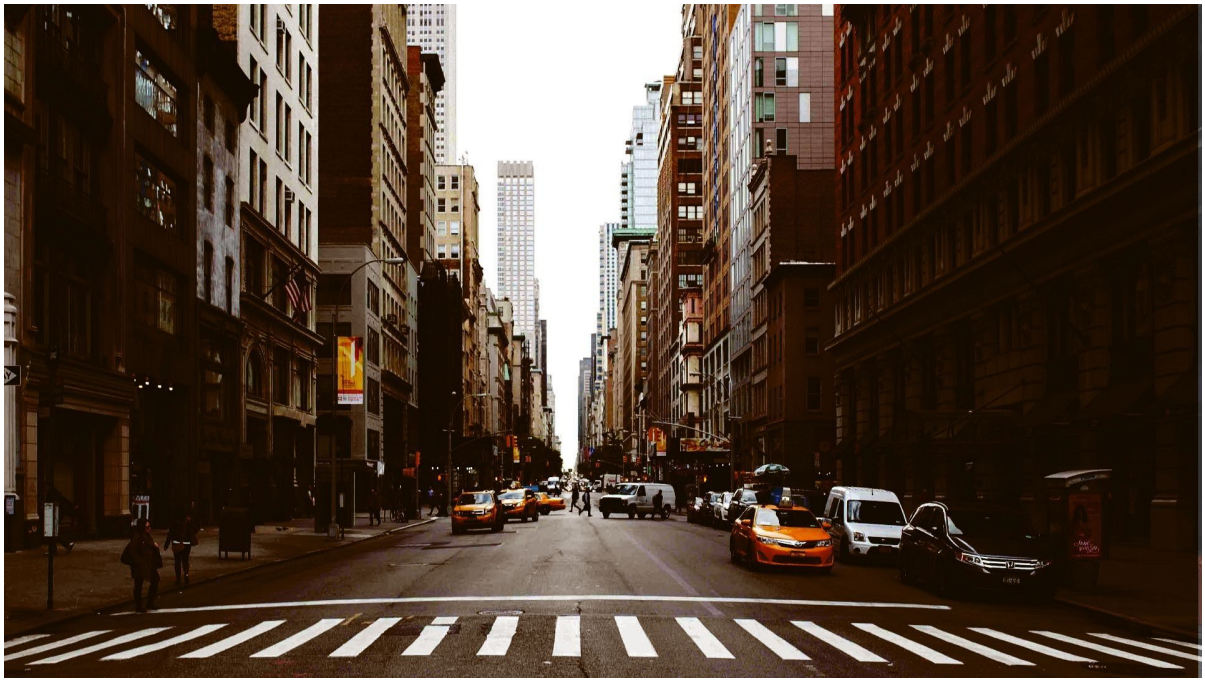

Figure 62. City street. Source: Photograph by John Frazia.

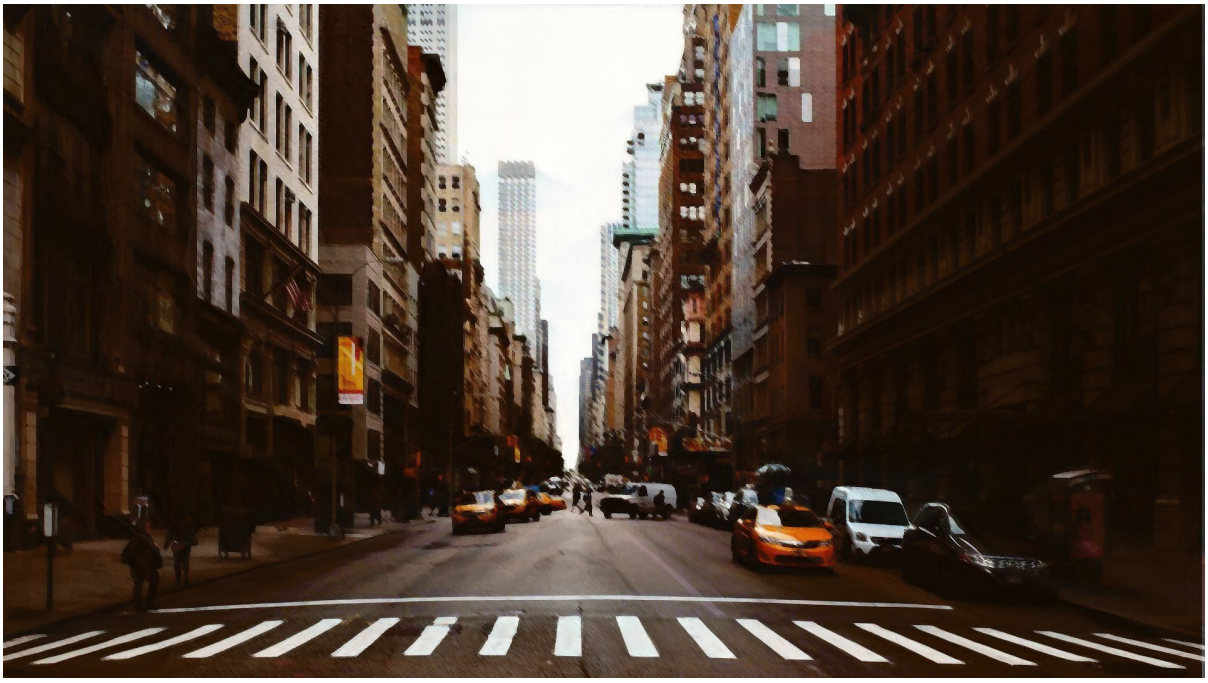

Figure 63. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 64. Original Image of Jewelry store. Source: URL

Figure 65. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 66. City at night. Source: URL

Figure 67. Edited photo using style transfer and neutral filter “Angled Strokes.”

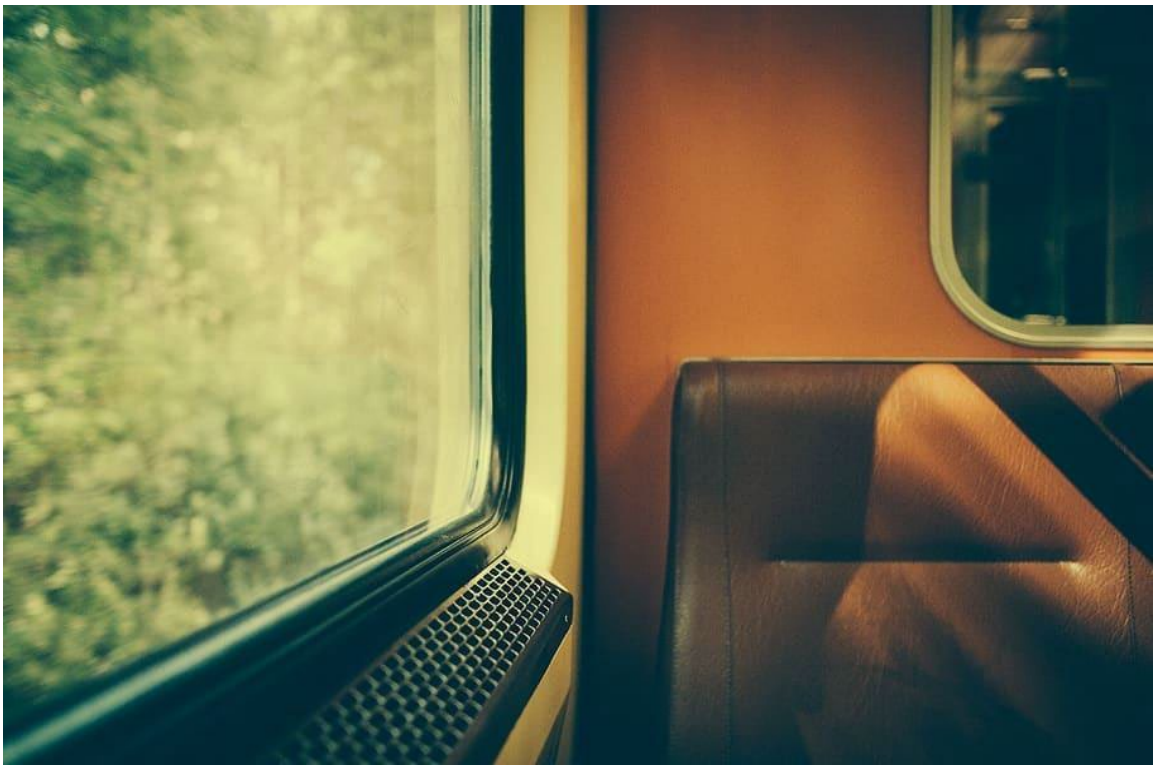

Figure 68. Original picture of train seat. Source: URL

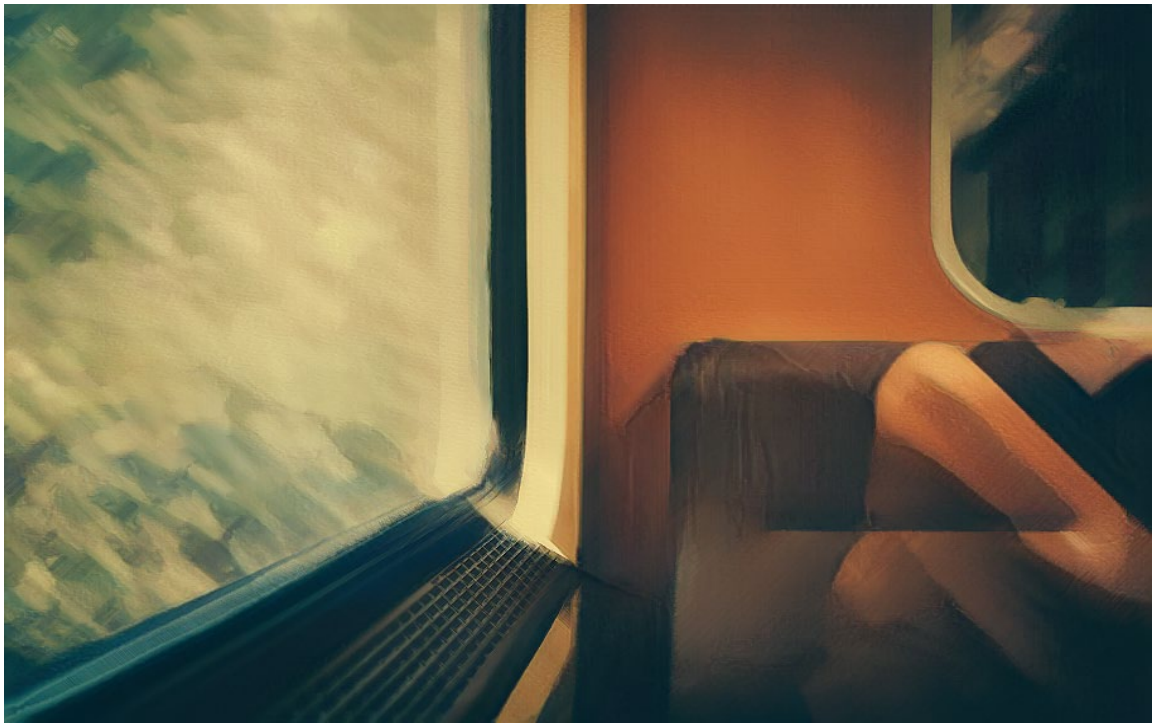

Figure 69. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 70. Alleyway. Source: Photograph by John Frazia.

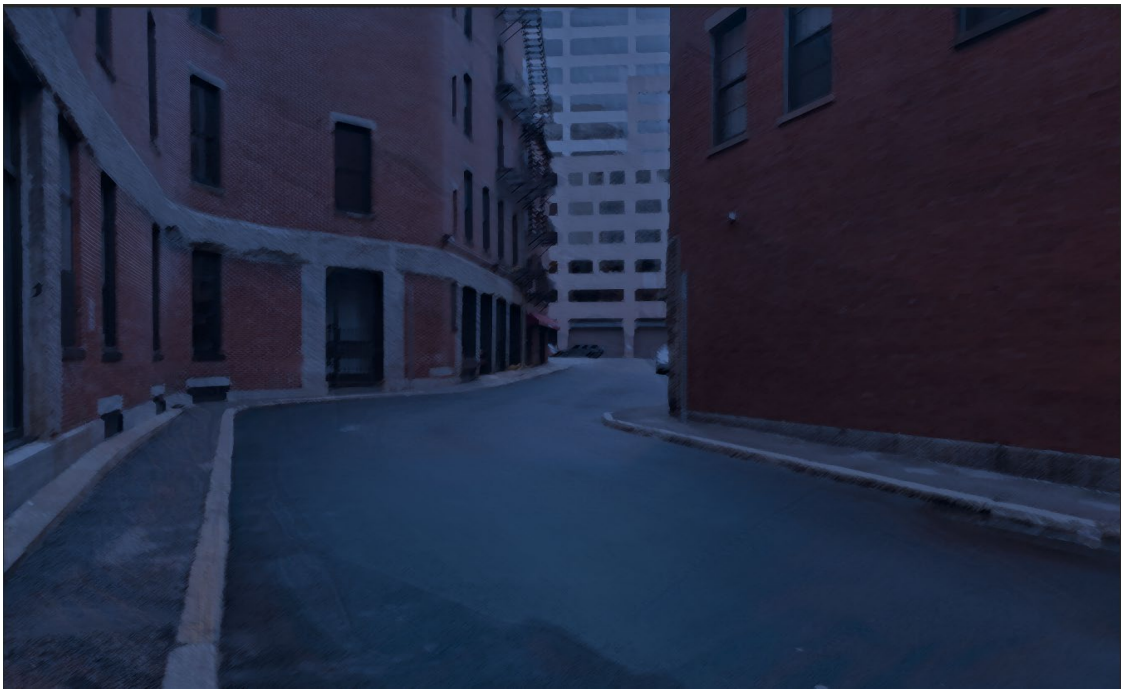

Figure 71. Edited photo using style transfer and neutral filter “Angled Strokes.” Further edited to make it look like nighttime.

6.2. *Another Fantasy Quest*

When it came to working on *Another Fantasy Quest,* all the strategies and lessons learned from the work done on *Another Try* were applied. The same art style was used in both games which meant that the work on this project was done much more efficiently. The following images (Figures 72 - 85) showcase the design process for the backgrounds used in this game.

Figure 72. Tavern background. Source: URL

Figure 73. Tavern background with style transfer and neutral filter “Angled Strokes.”

Figure 74. Final dungeon background. Source: URL

Figure 75. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 76. First village background. Source: URL

Figure 77. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 78. Second village background. Source: URL

Figure 79. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 80. Third village background Source: URL

Figure 81. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 82. Fourth village background. Source: URL

Figure 83. Edited photo using style transfer and neutral filter “Angled Strokes.”

Figure 84. Fifth village background. Source: URL

Figure 85. Edited photo using style transfer and neutral filter “Angled Strokes.”

6.3. Reflection

This project was certainly an interesting venture. This was specifically challenging since art is not my major, and trial and error was a big factor in this project which made certain things take longer than they may have otherwise. If someone ever takes on a similar role like this, there are a few things to keep in mind that will prove beneficial in the long run. The first thing is to come up with an art style as soon as possible - you need to know what specific style the developers are looking for so there isn't any guesswork on your part while designing the backgrounds at the desirable pace. Secondly, it's imperative to emphasize the extent of your capabilities and what programs you are familiar with. A personal mistake I made was waiting until our weekly meetings to voice concerns or questions, as solving issues as early as possible will save a lot of time in the long run.

My final bit of advice is to keep a journal documenting the development of whatever aspect of the game you're working on, whether or not it's artistic in nature. This ensures that you have a thorough documentation of the entire development process, saving precious time when having to reflect on the work you did in the form of a final report.

7. Evaluation

Over the course of development, we had three opportunities to officially gather playtest data for our games. During these playtests, we also implemented the telemetry system created by Matt to gather additional information about the experience of players. The surveys referenced here can be viewed in full in **Appendix C**, **Appendix D**, and **Appendix E**.

7.1. Methodology

When playtesting our games, we planned our test sessions in accordance with WPI's Institutional Review Board (IRB) policies for human subject research. Each member of the team was required to complete a short training course familiarizing them with the protocols established by the university to ensure safe and fair testing would be put in place. Additionally, any in-person testing was required to adhere to WPI's COVID-19 safety protocols. Refer to **Appendix A** and **Appendix B** for more information on these protocols.

Our first scheduled testing session took place during the IMGD department's AlphaFest event on November 19th, 2021. For this event, each of us developed an alpha build of our game to give testers an idea of where the game was headed. Testers were required to fill out an Informed Consent Agreement form as well as a form agreeing to comply with WPI's COVID-19 protocols. Additionally, sanitation materials like anti-bacterial wipes and hand sanitizer were provided for testers, while all equipment used for testing, such as keyboards and mouses, were thoroughly sanitized after every use. Testers were also asked to fill out a post-test survey giving their opinions on the game after playing.

Our next session took place online in February of 2022, where we tested the games with the students in Professor Moriarty's History and Future of Interactive Media & Games course. By this point, the games were more fleshed out and the builds reflected the final product more than the previous iteration. As this session was conducted entirely online, the COVID-19 protocols did not apply, however participants were still required to fill out an Informed Consent Agreement as well as being asked to complete updated post-test surveys. Additionally, participants were asked to email telemetry files, as detailed in **Section 2.6**, to the respective game

creators. Participants were required to fill out the Informed Consent Agreement and email their telemetry files in order to obtain full credit for playtesting within Professor Moriarty's course.

Our final organized playtesting session took place in April of 2022, and followed the same outlines as the previous session, this time taking place within Professor Moriarty's Digital Game Design I course.

7.2. *The Secret in Grandpa's Diary*

While gathering playtest data, I decided to focus on two key aspects of my game, the legibility of the text and the quality of the puzzle.

7.2.1. Legibility of text

Due to *The Secret in Grandpa's Diary* focusing on telling its story entirely through text, I had to ensure the fonts I used throughout development were legible so players could understand the narrative. Figure 86 showcases responses to a question asking if players could read the text with ease, scaled from 1 (too difficult to read) to 5 (very easy to read). I never changed the fonts throughout development as a result of the positive responses I received.

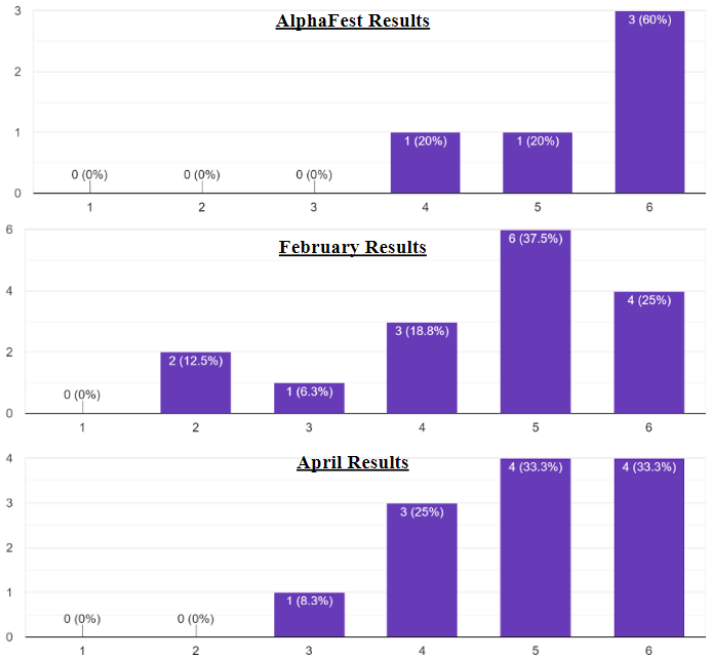

Figure 86. Survey responses showing that the text was sufficiently legible.

7.2.2. Interactive notebook

The puzzle featured in *The Secret in Grandpa's Diary* is straightforward. Players must read through the diary and perform a process of elimination on a list of names to determine the answer. As a result, players must keep track of information to determine the solution. To avoid forcing players to physically write notes or remember information, I originally implemented a note taking system using the technology available within Ren'Py. Figure 87 below showcases what this mechanic looked like in early builds of the game.

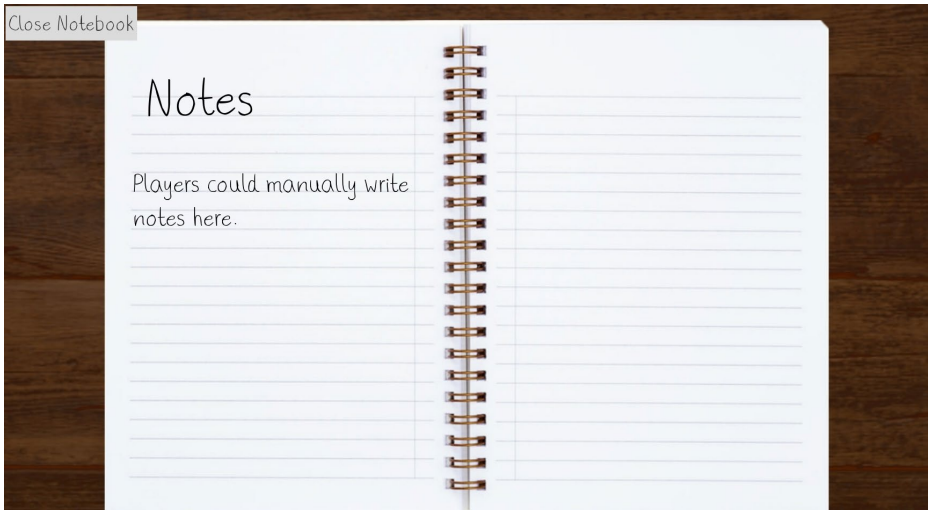

Figure 87. The original note taking mechanic. Source: Screenshot

Implementing this mechanic was difficult using the technology built into Ren'Py. I was able to successfully create a system that let players freely write in the notebook, but their freedom was limited. Players were unable to use the enter key to create new lines, and they were unable to track their cursor on the page. This led to a large amount of confusion during February's playtesting session. Figure 88 on the following page showcases responses to two questions about the notebook. First, players were asked how often they used the feature, scaled from 1 (never) to 6 (extremely often). Then, players were asked how intuitive writing in the notebook was, scaled from 1 (not intuitive) to 6 (very intuitive).

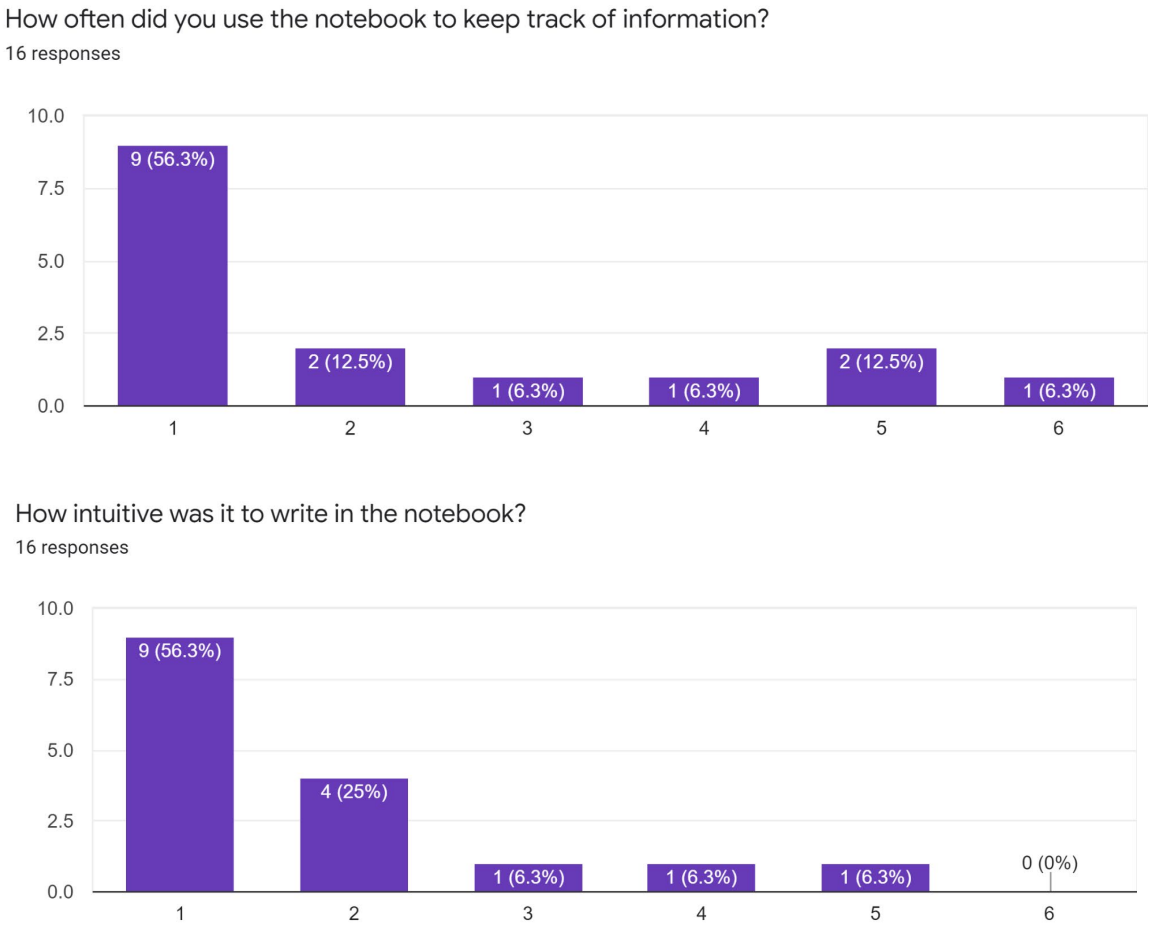

Figure 88. Survey responses relating to the interactive notebook feature.

As shown above, responses to the interactive notebook were overwhelmingly negative. Fixing the feature would have been a large task, forcing me to completely restructure how the text on the notebook is displayed to ensure that it could be used in an intuitive way. I had to ask myself if putting in the work required to fix the notebook was worth it, and ultimately, I decided that it wasn't. Using my telemetry system, I was able to print out exactly what the player wrote in the notebook to gain an understanding of how a typical player may approach the feature. Figure 89 below showcases a line from the telemetry that I saw extremely often.

19:09:36 | Left Page | sylvie agatha susan marilyn cassie

Figure 89. A line of telemetry data from a playtester.

I noticed that an overwhelming number of players would simply use the notebook to keep track of the list of names. The notebook I developed was quite large, and users were only using a small amount of it to progress through the game. Fixing the notebook would make writing in it more intuitive, but the telemetry data suggests that players wouldn't use it very often regardless. This led to the creation of the Name List feature, which replaced the interactive notebook.

7.2.3. Name list

In response to the negative reception to the notebook, I replaced the mechanic with a simple list of names that can be interacted with, allowing the player to cross off names as they're mentioned in the diary. This feature was fully implemented in time for our April playtesting session. Figure 90 below showcases responses to a question asking how intuitive using this feature was, scaled from 1 (not intuitive) to 6 (very intuitive).

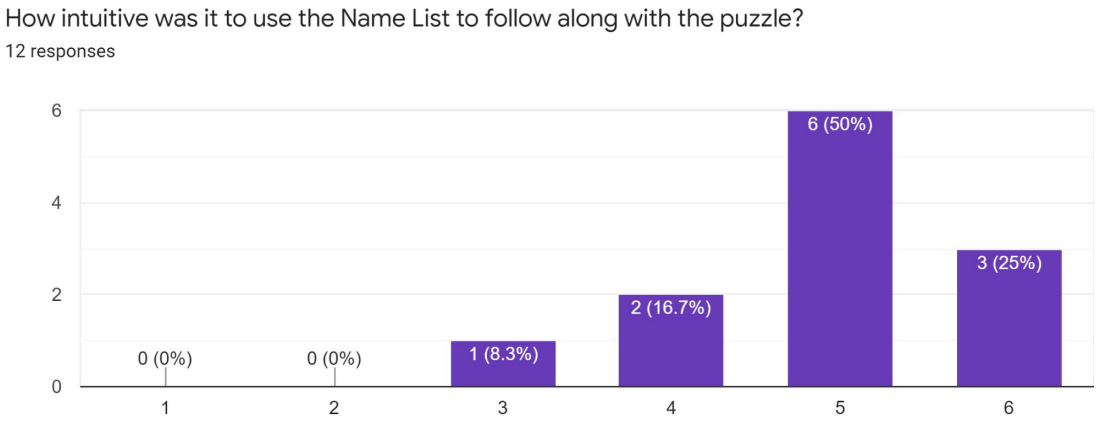

Figure 90. Survey responses relating to the name list feature.

As showcased by the responses, players had a very positive opinion of this feature, especially when compared to the interactive notebook. These responses suggested that my decision to change the feature was beneficial to the game.

7.2.4. Solving the mystery

During our playtesting sessions in February and April, I asked a very simple question at the end of the survey asking if players were confident in the solution to the puzzle. If players weren't confident in their solution, I failed to create a cohesive puzzle and accomplish my experience goal. Figure 91 below showcases the responses to this question during February's playtest with the interactive notebook.

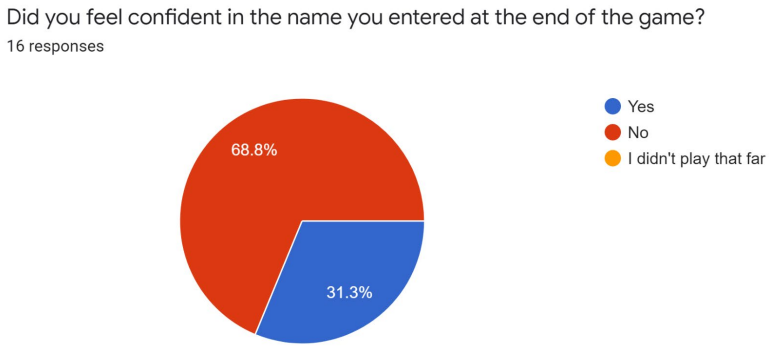

Figure 91. Survey responses to a question asking if players were confident in their solution.

As shown above, players were not confident in their solution during our February playtesting session. As a result, I adjusted the format of the puzzle and replaced the notebook with the name list feature. Figure 92 below showcases the responses to the same question during April's playtest with the name list feature.

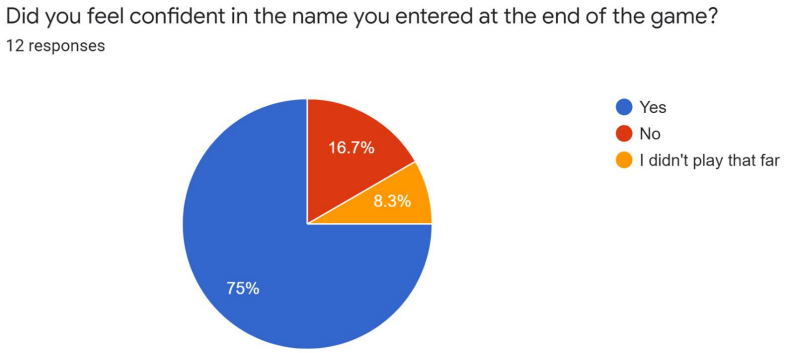

Figure 92. Survey responses to the same question after adjusting the game.

After making the specified changes, players were much more confident with their solution to the puzzle. The changes I made were very effective, and my goal of delivering a conclusive puzzle was achieved.

7.3. *Another Fantasy Quest*

When conducting my evaluations, I primarily focused on trying to gauge if the players were engaged with the story and comments on the game's battle system.

7.3.1. AlphaFest

The build at the AlphaFest event was quite rudimentary, so my initial evaluations were focused on gathering feedback on the choices and storyline of the game. In total, I had a sample size of 8 respondents who provided feedback during this session.

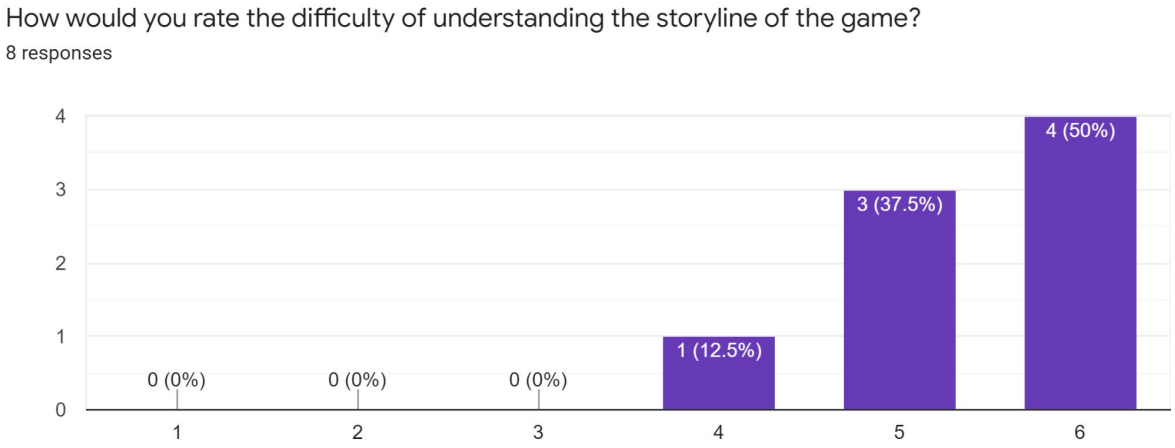

Figure 93. Survey responses on understanding the game's storyline.

While the build of the game consisted solely of what would eventually become the game's second chapter, and contained no finished art assets, nor a final battle system or character names, it was an encouraging sign to see that the plot line I had in mind was not isolating to players immediately, as demonstrated by Figure 93.

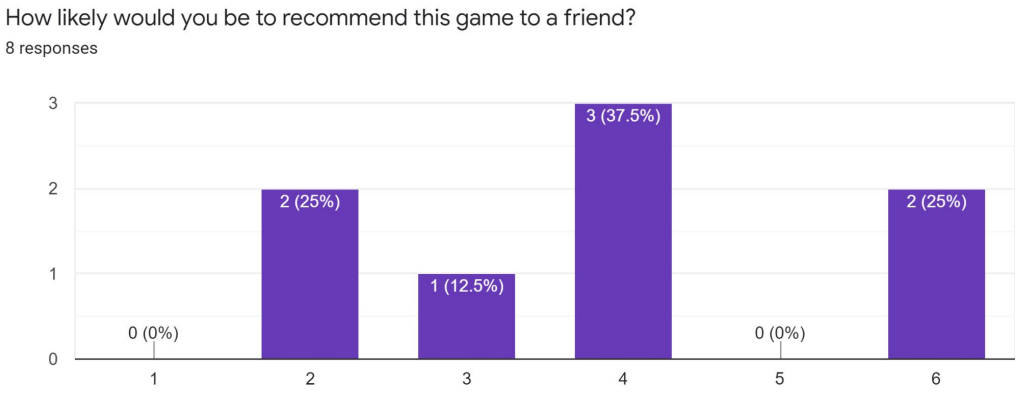

Figure 94. Survey response to if the then-current build would be recommended to a friend.

Although responses to the survey's final question were mixed, as evidenced by Figure 94, I was still encouraged by an overall positive response to the game at such an early stage.

7.3.2. February playtesting

A second playtesting session was conducted online in the last week of February 2022, with the participants consisting of the students in Professor Moriarty's IMGD 4200 and 5200 classes. I had a total sample size of 27 respondents who provided feedback during this session. This test session proved to be the most demoralizing of the three, as while my game had evolved significantly since the previous session, the feedback from this session was more critical.

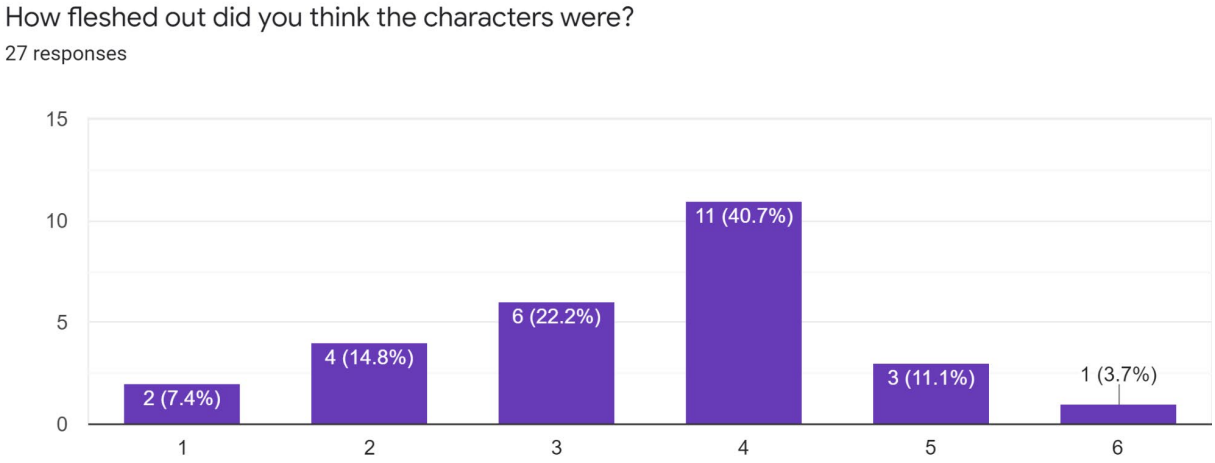

Figure 95. Survey responses on character depth.

As I had done more work on the narrative, and by this point the characters all had final names and more established personalities, I was eager to get feedback on my writing in particular. The responses to the characters were mixed, as seen in Figure 95. Additional comments expanded on this point, with responses such as “There is a really solid start here, but the characters feel kind of lacking.”

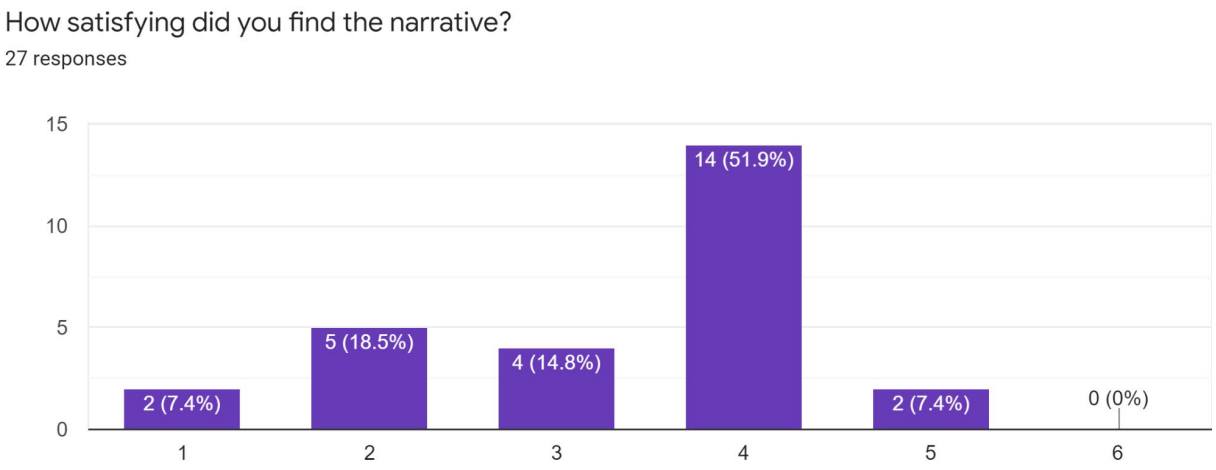

Figure 96. Survey responses on player satisfaction regarding the narrative.

The critiques of the character writing could also be found in the narrative, with similar levels of satisfaction to this element of the writing as seen in Figure 96. Additional comments followed, with some such as “The story is quite rudimentary” and “A lot felt kind of cliché.” Furthermore, a lot of critique in the optional comments focused on the battle system, which testers generally found to be too simple and quite boring.

Figure 97. Survey response to if the then-current build would be recommended to a friend.

Figure 97 more succinctly summed up the results of my playtesting, as of the options presented to testers, a plurality said they were “Not Likely” to recommend the then-current build of the game to a friend. While these results were less than ideal, it was impossible to argue they wouldn’t be helpful in the long run in aiding me with making crucial adjustments to my game.

7.3.3. April playtesting

A third and final playtesting session was conducted online from April 12th, 2022, to April 15th, 2022, with the participants consisting of the students in Professor Moriarty’s IMGD 2900 class. In total, I had a sample size of 13 respondents who provided feedback.

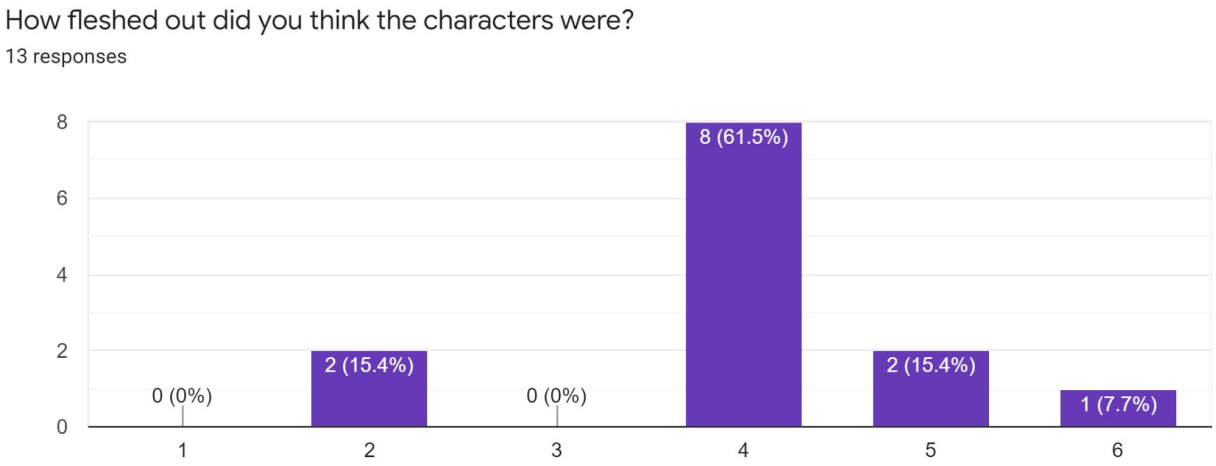

Figure 98. Survey responses on character depth.

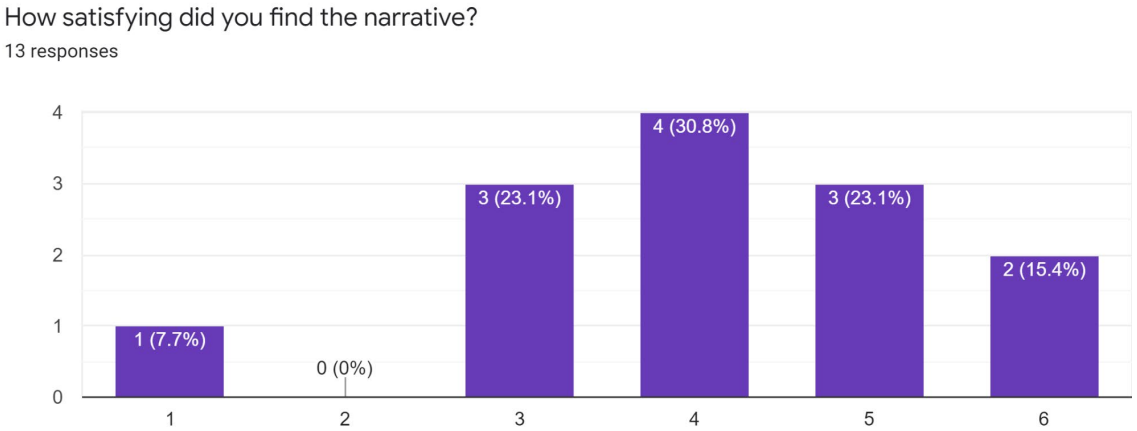

Figure 99. Survey responses on player satisfaction regarding the narrative.

The changes I had made to *Another Fantasy Quest* proved to have paid off with this playtesting session. One of the chief concerns after the previous session was with player satisfaction regarding the characters and narrative. As previously indicated in Figures 95 and 96, players did not feel as though the characters were well fleshed out and were generally not satisfied with the narrative. Figures 98 and 99 seem to indicate that the changes made to these aspects of the game in the interim were largely for the positive. Though it's worth noting that the sample size for this survey is less than half the size of the previous sample size, additional comments added by the respondents also seemed to indicate a positive shift. One respondent said they "really liked the mildly-fourth-wall-breaking humor" while another said "overall, the one liners were so funny, I loved the dialogue! Especially the self-awareness bits." There were a few critiques as well - one respondent was of the opinion that "the 'meta-ness' doesn't really land" - but overall, I was far more pleased with this reception when compared to the reactions from a month and a half earlier.

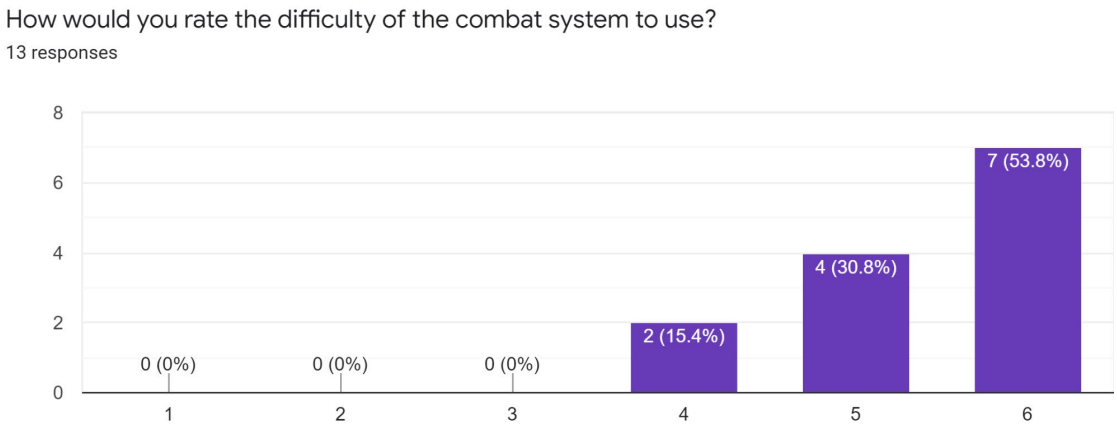

Figure 100. Survey responses on player opinion regarding the difficulty of the battle system.

Another area where this survey proved beneficial was in getting feedback regarding the revamped battle system. In response to the critiques, I received in the previous session, I implemented the healing system before this session. While there was still some critique that the system was too easy to take advantage of, I was pleased with the results as shown in Figure 100. Adjusting the system to rely less on frequent reuse of heals or attacks would likely help balance the system and further refine it, however.

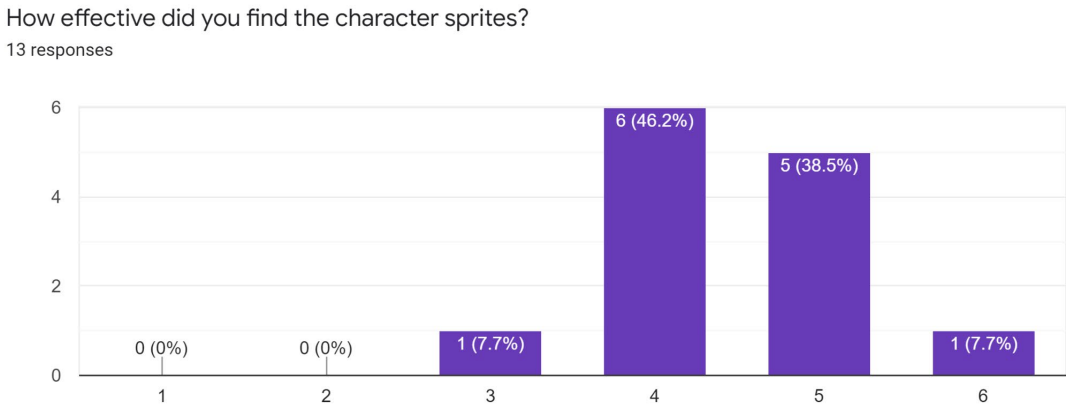

Figure 101. Survey responses on player opinion of the character sprites.

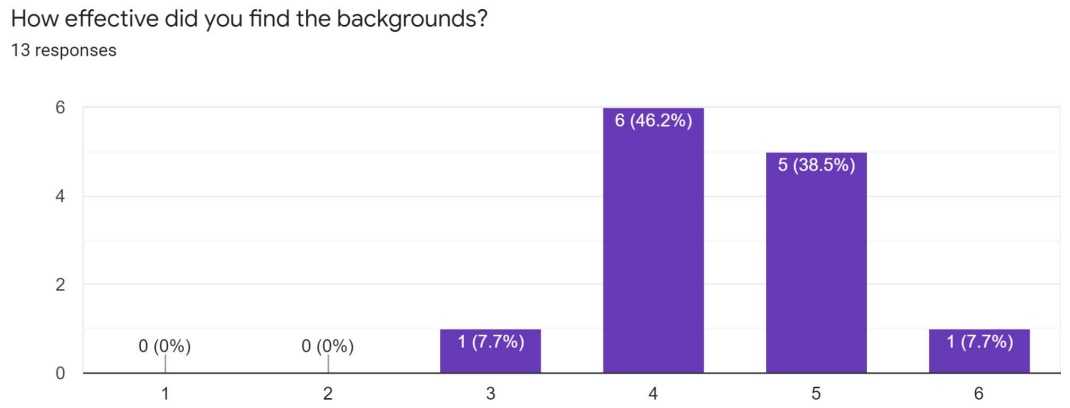

Figure 102. Survey responses on player opinion regarding the effectiveness of the backgrounds.

One area I was eager to get feedback on for this playtesting session was in the visual department. We were not able to test the finalized visuals in the previous playtesting sessions, so I was nervous about getting feedback for the first time so late into development. Thankfully, as Figures 101 and 102 demonstrate, I needn't have worried, as the response to the visual elements was overall positive.

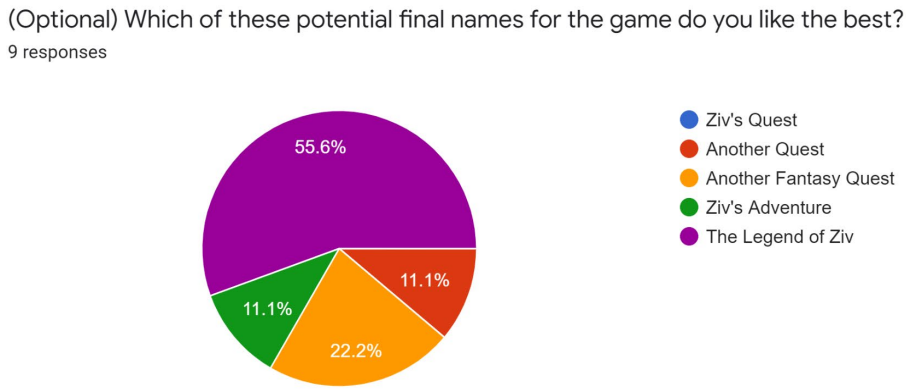

Figure 103. Survey responses on player opinions regarding potential final names for the game.

Additionally, by the time the playtesting survey began, a finalized name for the game had not yet been decided. Thus, I decided to include an optional question regarding the title, which was answered by 9 of the 13 respondents, the results of which can be seen in Figure 103. Within the poll, I included a number of options that I had been debating for the final title, including *Ziv's Quest*, *Another Quest*, *Another Fantasy Quest*, *Ziv's Adventure*, and *The Legend of Ziv*. *Ziv's Quest* got 0 votes, while *Another Fantasy Quest* received 2, *Ziv's Adventure* and *Another Quest* received one each, and *The Legend of Ziv* won a majority of the votes with 5, likely due to its (intentional) similarities with the popular fantasy adventure game series, *The Legend of Zelda*. While I originally intended to take the advice of the respondents and choose *The Legend of Ziv* as the final game, I quickly began to feel as if the name felt too grand for the scope of the game, while also carrying the potential to mislead players into believing there were more similarities between it and *The Legend of Zelda* than actually exist. Therefore, I decided to go with the runner-up, *Another Fantasy Quest*, as I felt that better conveyed the tongue-and-cheek nature of the final product.

7.4. *Another Try*

When conducting my evaluations, I primarily focused on the player's thoughts on the narrative, characters, and time loop mechanic.

7.4.1. AlphaFest

At the end of B-Term of 2021, the first playtesting session of *Another Try* was held. This playtest was held with the first iteration of the game, testing both the story and basic implementations of the gameplay systems.

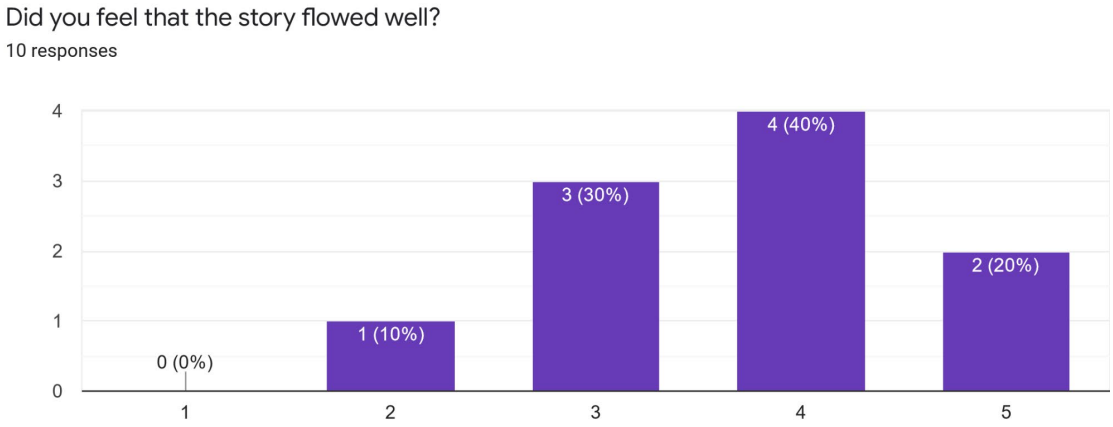

Figure 104. AlphaFest survey on game flow.

The game received positive to mixed reviews in its early state, trending towards mixed. The general flow of gameplay seemed to be received well, as shown in Figure 104. The overall flow of the narrative was something I was concerned with, as a lack of flow could be heavily detrimental to the overall experience of the game.

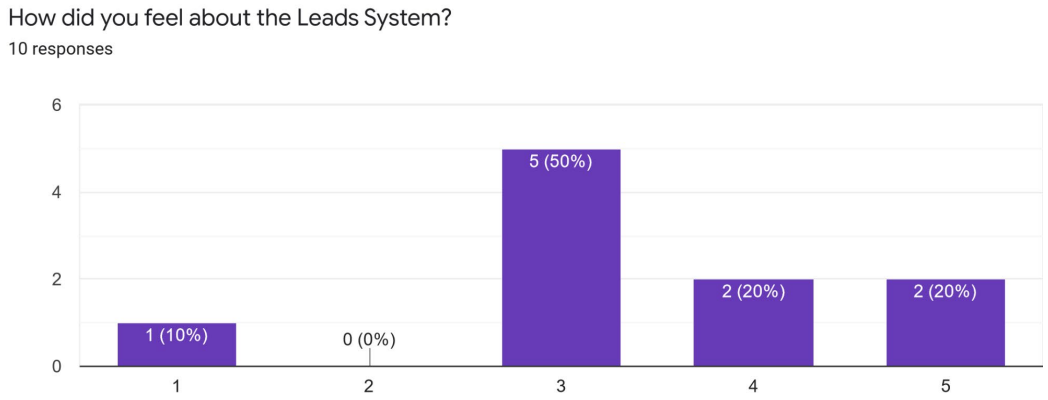

Figure 105. AlphaFest survey on the leads system.

As shown in Figure 105, the central mechanic of *Another Try*, the leads system, had received generally mixed reviews. The players seemed to be ambivalent to the cornerstone of the game. This was worrying to me, as I felt confident in the execution and theory of the system, even with the scoping issues that it had created. After careful consideration, the playtest feedback was what ultimately convinced me to drop the leads system from the game.

7.4.2. February playtesting

A second playtesting session was conducted in the last week of February 2022, with the participants consisting of the students in Professor Moriarty's IMGD 4200 and 5200 classes. At this point, the game was more fleshed out, so the feedback I obtained was used to shape the final product of the game.

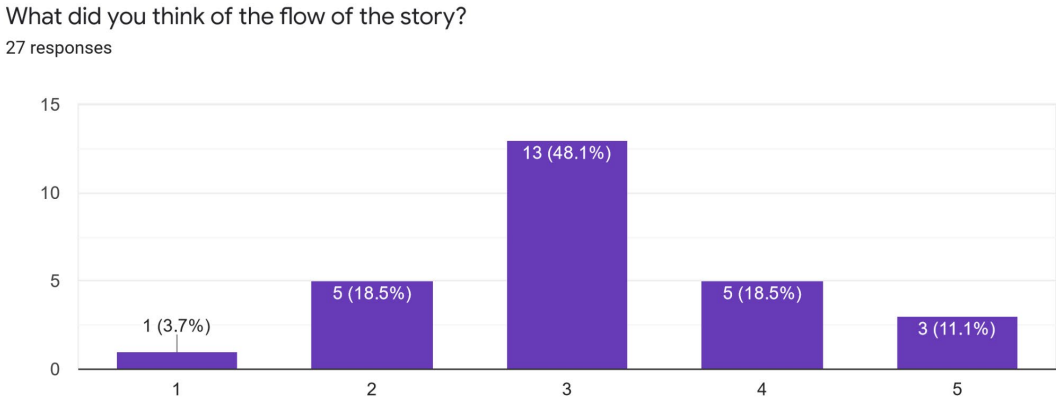

Figure 106. C-Term survey on game flow for *Another Try*.

As evident by the responses in Figure 106, my concerns regarding the flow of the game were warranted. Now that the game had been drastically simplified, the flow of the overall narrative had suffered as a result.

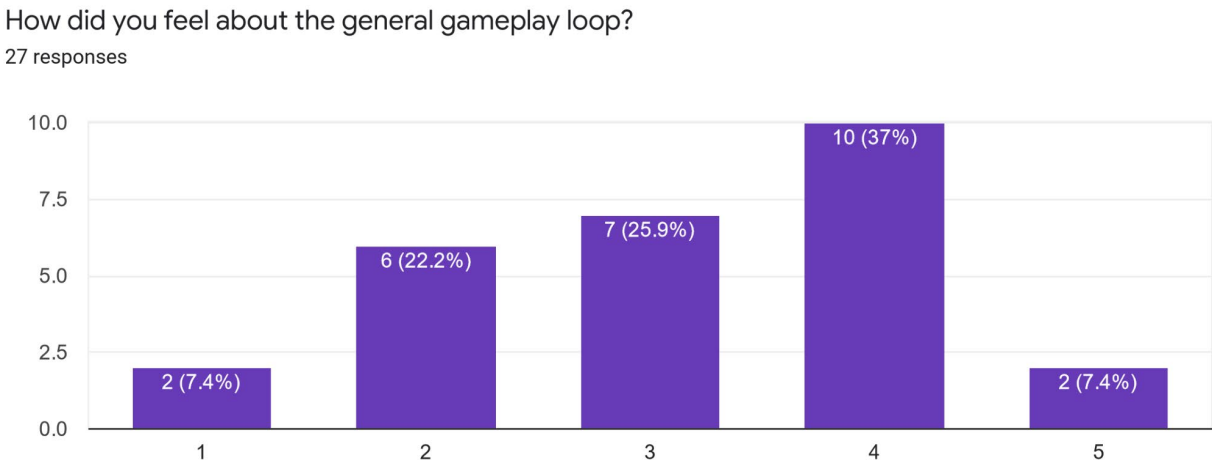

Figure 107. C-Term survey on the gameplay loop of *Another Try*.

Another worry of mine was the general gameplay loop. Without the leads system, I was concerned that the gameplay would prove to be boring due to the lack of engaging elements within the narrative. However, my fears seemed to be unfounded in this case, as results generally skewed positively in response to this question, as shown in Figure 107.

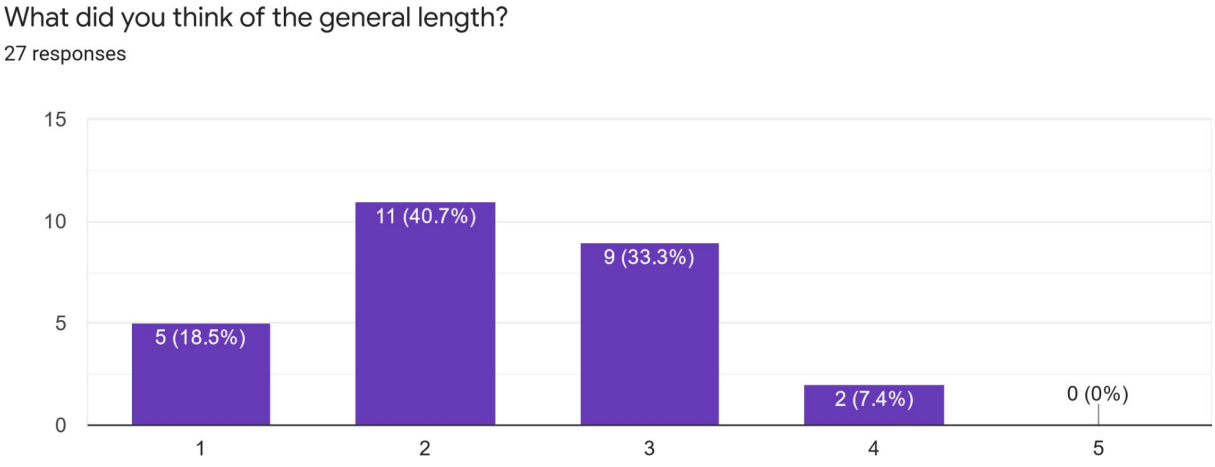

Figure 108. Data from C-Term survey about game length.

With this playtesting session being the first of the new iteration of *Another Try*, I wanted to know the general feelings about the game's length. Figure 108 shows the feedback I received when asking players for their thoughts on the length, ranging from 1 (too short) to 5 (too long). Overall, it seems as though play testers were satisfied with the length of the game, but they thought it would benefit from being slightly longer.

7.4.3. March and April playtesting

I conducted two additional playtesting sessions after April, with a smaller session in March and a more formal session in April. At this point, I wanted to focus on a key aspect that February's playtest session brought to my attention - game length. The focus of these sessions was to ensure players were satisfied with the length of the game.

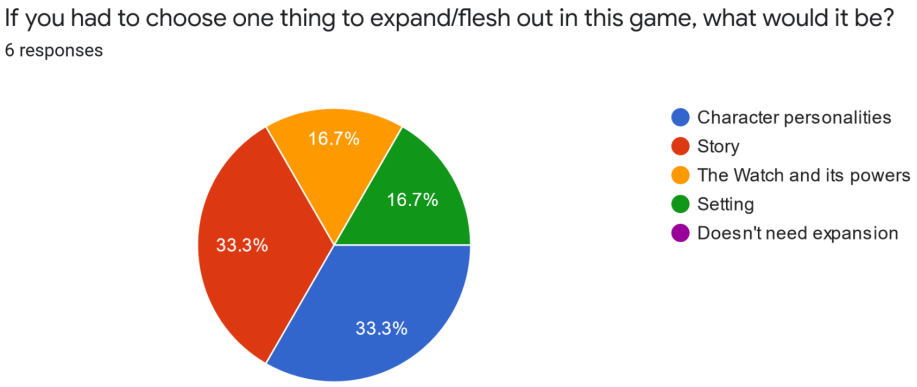

Figure 109. Data from the March playtesting session.

From what I learned from the February playtesting session, the game had minor flow and length issues. While *Another Try* was made to be a short game, it did need to be expanded a bit. Before and during this session, I added more to the game to try to improve upon the flow issue. However, I wanted to first determine which aspect of the game the play testers wanted to see expanded, so I could focus my edits there. Figure 109 shows that while each part of the game needed expansion, most players felt expanding the story would have the most positive impact on the final product. Expanding the story would involve increasing the length, which was a goal of mine, but I had to remain cautious of scoping issues.

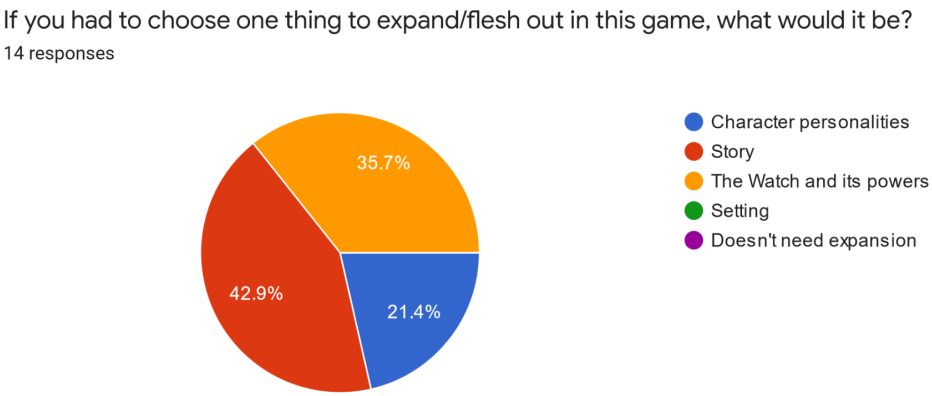

Figure 109. Data from the April playtesting session.

For the April playtesting session, the survey I sent to testers was nearly identical to the previous one. This was done to conclusively determine the effect of the changes done between sessions. As shown in Figure 110, the playtesting results from the second session are notably different than the first. Most players felt as though the story and watch should be further fleshed out, rather than the characters and setting. The intent of their responses, as evident by their additional comments, was to increase the length of the game. However, the original goal of *Another Try* was to create a prologue for a larger story. Ultimately, I'm satisfied that these results seem to show that players want to see more from the game's narrative.

8. Conclusion

Overall, we are very proud of the work that we've done. While some of our games aren't what we envisioned from the start, we all learned valuable lessons over the course of this project. In developing *The Secret in Grandpa's Diary*, we learned the importance of balancing features based on user feedback. User feedback was extremely negative to the interactive notebook aspect of the project, and sacrificing the work spent to create it ultimately led to a better final product. In developing *Another Fantasy Quest*, we learned the importance of proper planning and time management, as well as the importance of taking feedback. While the game started off strong, the development often ended up being rushed, causing poor feedback upon testing. However, properly managing time allowed for improvements to be made to deliver a more satisfying final product in the end. In developing *Another Try*, we learned the importance of scope. The current version of the game is not what was envisioned from the start, with many features being massively reduced or cut all together. The game shifted from a political drama inspired by *Kiseki* to a simple game for entertainment. The final product is far from disappointing, however, as it acts as an example of how to recover from the dangers of over-scoping to make a comprehensive final product in a limited timeframe.

For any future projects tackling visual novels, our main advice is to be cautious of scope. Visual novels seem like simple games to create, but scoping the narrative is a major challenge that can quickly lead to catastrophe. Starting development without an in-depth plan for the entire narrative is dangerous and can quickly lead to scope issues. We advise planning out not just the narrative, but any additional features the game will need, before beginning to develop the game.

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Appendices

A. IRB Informed Consent Agreement

Informed Consent Agreement for Participation in a Research Study

Investigator: Brian Moriarty

Contact Information: bmoriarty@wpi.edu, (508) 831-5638

Title of Research Study: Visual Novel Anthology

Sponsor: WPI

Introduction: You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Purpose of the study: The purpose of this study is to obtain feedback on the project in order to facilitate design improvements and find/address operational bugs.

Procedures to be followed: You will be asked to play a brief game lasting less than ten minutes. Instrumentation in the game software will anonymously record your activity during play. After completing the game, you will be asked to complete a brief, anonymous survey describing aspects of your subjective experience.

Risks to study participants: There are no foreseeable risks associated with this research study.

Benefits to research participants and others: You will have an opportunity to enjoy and comment on a new game under active development. Your feedback will help improve the game experience for future players.

Record keeping and confidentiality: Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

Compensation or treatment in the event of injury: There is no foreseeable risk of injury associated with this research study. Nevertheless, you do not give up any of your legal rights by signing this statement.

For more information about this research or about the rights of research participants, or in case of research-related injury, contact the Investigator listed at the top of this form. You may also contact the IRB Manager (Ruth McKeogh, phone 508 831-6699, email irb@wpi.edu) and/or the Human Protection Administrator (Gabriel Johnson, phone 508-831-4989, email gjohnson@wpi.edu).

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

_____ Date: _____

Study Participant Signature

_____

Study Participant Name (Please print)

_____ Date: _____

Signature of Person who explained this study

B. IRB COVID-19 Risk Mitigation Protocol

Investigator: Brian Moriarty

Contact Information: bmoriarty@wpi.edu, (508) 831-5638

Title of Research Study: Visual Novel Anthology

Sponsor: WPI

At WPI, our primary responsibility related to research is to protect the safety of our research participants.

COVID-19 refers to the Coronavirus that is being spread across people in our communities. We need to provide you with important information about COVID-19, and to tell you about ways your study participation might change because of COVID-19 related risk.

If you are considering joining a study at this time or are currently enrolled in a study, **it is important that you consider the following information to determine if study participation is right for you at this time.**

How is COVID-19 spread?

COVID-19 is a respiratory virus spread by respiratory droplets, mainly from person-to-person. This can happen between people who are in close contact with one another (less than 6 feet). It is also possible that a person can get COVID-19 by touching a surface or object (such as a doorknob or counter surface) that has the virus on it, then touching their mouth, nose or eyes.

Can COVID-19 be prevented?

Current ways to minimize the risk of exposure to COVID-19 include "social distancing" which is a practice to decrease the potential for direct exposure to others who may have been exposed to COVID-19, for example by avoiding large gatherings or refraining from shaking hands with others. It is important to understand that since study participation may include increased travel outside of your home and increased exposure to others within a research site it may increase your exposure to COVID-19. At this time, there is no vaccination to prevent COVID-19 infection.

What are the risks of COVID-19?

For most people, the new coronavirus causes only mild or moderate symptoms, such as fever and cough. For some, especially older adults and people with existing health problems, it can cause more severe illness, including pneumonia. While we are still learning about this virus, the information we have right now suggests that about 3 of 100 people who are infected might die from the virus.

Who is most at risk?

Individuals over 60 and with chronic conditions such as cancer, diabetes and lung disease have the highest rates of severe disease from the infection.

What do we do to minimize risk for research participants?

a. All in-person research will take place on the WPI campus.

b. Participation in the study will be strictly limited to WPI students and faculty authorized to attend campus in-person.

c. **Research visits will strictly abide by all official WPI COVID-19 protocols in effect at the time of the test session.** These protocols specify campus-wide standards for COVID-19 mitigation, including (but not limited to):

- Visitors allowed on campus
- Required vaccination status of visitors
- Masking requirements
- Social distancing requirements
- Maximum room occupancy requirements

A summary of the latest WPI protocols is maintained at this URL:

https://www.wpi.edu/we-are-wpi

d. Regardless of current WPI protocols, all test administrators and subjects will be required to wear a face mask at all times during the test session.

e. Test subjects will visit the research site only once, and only long enough to review the Informed Consent Agreement, participate in the test and respond to the research survey.

f. The location where study subject visits take place will have hospital-approved hand sanitizer readily available for use before and/or after the test session.

g. All physical equipment handled by subjects during the test (keyboards, mice, game controllers, headsets, etc.) will be thoroughly sanitized with alcohol wipes before each test session.

If you have further questions about COVID-19 and your participation in research, please talk to your study team.

_____ Date: _____

Study Participant Signature

_____

Study Participant Name (Please print)

_____ Date: _____

Signature of person who explained this study

C. *The Secret in Grandpa's Diary* survey instruments

AlphaFest instrument

1. How much prior experience do you have playing Visual Novels?
   [Likert Scale 1 - 6] 1 = No Experience | 6 = Highly Experienced

2. Which of the following Visual Novels have you played, if any? *(Checkboxes)*
   a. Danganronpa
   b. Doki Doki Literature Club
   c. Fate/Stay Night
   d. Phoenix Wright: Ace Attorney
   e. Save the Date
   f. Other (please specify)
   g. None

3. How would you rate the difficulty of understanding the storyline of the game?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

4. How easy was it to read the text? (consider size, font, color, etc.)
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

5. What was your preferred method of opening and closing the notebook?
   a. Clicking the on-screen button
   b. Using the TAB key

6. How easy was it to write in the notebook?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

7. How satisfied were you with the ending you received?
   [Likert Scale 1 - 6] 1 = Not Satisfied | 6 = Very Satisfied

8. How interested are you in replaying the game to obtain different endings?
   [Likert Scale 1 - 6] 1 = Not Interested | 6 = Very Interested

9. (OPTIONAL) Please add any additional comments or suggestions below.

February instrument

1. How much prior experience do you have playing Visual Novels?
   [Likert Scale 1 - 6] 1 = No Experience | 6 = Highly Experienced

2. How would you rate the difficulty of understanding the storyline of this game?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

3. How easy was it to read the text? (consider size, font, color, etc.)
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

4. (OPTIONAL) If you have any additional comments on the text, please leave them below.

5. How easy was it to navigate throughout the diary? (flipping back and forth between pages, using the Table of Contents, etc.)
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

6. How often did you use the notebook to keep track of information?
   [Likert Scale 1 - 6] 1 = Never | 6 = Very Often

7. How intuitive was it to write in the notebook?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

8. (OPTIONAL) If you have any additional comments on diary navigation and/or the notebook, please leave them below.

9. Did you feel confident in the name you entered at the end of the game?
   a. Yes
   b. No

10. How satisfied were you with the ending of the game?
    [Likert Scale 1 - 6] 1 = Not Satisfied | 6 = Very Satisfied

11. (OPTIONAL) Please add any additional comments or suggestions below.

April instrument

1. How much prior experience do you have playing Visual Novels?
   [Likert Scale 1 - 6] 1 = No Experience | 6 = Highly Experienced

2. How would you rate the difficulty of understanding the storyline of this game?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

3. How easy was it to read the text? (consider size, font, color, etc.)
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

4. (OPTIONAL) If you have any additional comments on the text, please leave them below.

5. How easy was it to navigate throughout the diary? (flipping back and forth between pages, using the Table of Contents, etc.)
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

6. How helpful was the introduction to the "Name List" feature?
   [Likert Scale 1 - 6] 1 = Not Helpful | 6 = Very Helpful

7. How intuitive was it to use the Name List to follow along with the puzzle?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

8. (OPTIONAL) If you have any additional comments on navigation and using the Name List feature, please leave them below.

9. Did you feel confident in the name you entered at the end of the game?
   a. Yes
   b. No

10. How satisfied were you with the ending of the game?
    [Likert Scale 1 - 6] 1 = Not Satisfied | 6 = Very Satisfied

11. (OPTIONAL) Please add any additional comments or suggestions below.

D. *Another Fantasy Quest* survey instruments

AlphaFest instrument

1. How much prior experience do you have playing visual novels?
   [Likert Scale 1 - 6] 1 = None | 6 = Highly experienced

2. Which of the following visual novels have you played? *(Checkboxes)*
   a. Ace Attorney
   b. Danganronpa
   c. Doki Doki Literature Club
   d. Fate/Stay Night
   e. Clannad
   f. Steins;Gate
   g. Save the Date
   h. Other

3. Did this game remind you of any other visual novels? *(Checkboxes)*
   a. Ace Attorney
   b. Danganronpa
   c. Doki Doki Literature Club
   d. Fate/Stay Night
   e. Clannad
   f. Steins;Gate
   g. Save the Date
   h. Other

4. How would you rate the difficulty of understanding the storyline of the game?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

5. How would you rate the effectiveness of the choices offered in the game?
   [Likert Scale 1 - 6] 1 = Ineffective | 6 = Highly effective

6. How easy was it to read the text (size, font, color, etc.)?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

7. How would you rate the effectiveness of the sound effects and music?
   [Likert Scale 1 - 6] 1 = Ineffective | 6 = Extremely effective

8. How likely would you be to replay the game to explore different outcomes?
   [Likert Scale 1 - 6] 1 = Not Likely | 6 = Very Likely

9. How likely would you be to recommend this game to a friend?
   [Likert Scale 1 - 6] 1 = Not Likely | 6 = Very Likely

10. (OPTIONAL) Please add any additional comments or suggestions here.

February instrument

1. How much prior experience do you have playing visual novels?
   [Likert Scale 1 - 6] 1 = None | 6 = Highly experienced

2. Which of the following visual novels have you played? *(Checkboxes)*
   a. Ace Attorney
   b. Danganronpa
   c. Doki Doki Literature Club
   d. Fate/Stay Night
   e. Clannad
   f. Steins;Gate
   g. Save the Date
   h. Other

3. Did this game remind you of any other visual novels? *(Checkboxes)*
   a. Ace Attorney
   b. Danganronpa
   c. Doki Doki Literature Club
   d. Fate/Stay Night
   e. Clannad
   f. Steins;Gate
   g. Save the Date
   h. Other

4. How would you rate the difficulty of understanding the storyline of the game?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

5. How fleshed out did you think the characters were?
   [Likert Scale 1 - 6] 1 = Barely fleshed out | 6 = Very fleshed out

6. How satisfying did you find the narrative?
   [Likert Scale 1 - 6] 1 = Unsatisfying | 6 = Very satisfying

7. How would you rate the effectiveness of the choices offered in the game?
   [Likert Scale 1 - 6] 1 = Ineffective | 6 = Highly effective

8. How easy was it to read the text (size, font, color, etc.)?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

9. How would you rate the effectiveness of the sound effects and music?
   [Likert Scale 1 - 6] 1 = Ineffective | 6 = Extremely effective

10. How likely would you be to recommend this game to a friend?
    [Likert Scale 1 - 6] 1 = Not Likely | 6 = Very Likely

11. (OPTIONAL) Please add any additional comments or suggestions here.

April instrument

1. How much prior experience do you have playing visual novels?
   [Likert Scale 1 - 6] 1 = None | 6 = Highly experienced

2. Which of the following visual novels have you played? *(Checkboxes)*
   a. Ace Attorney
   b. Danganronpa
   c. Doki Doki Literature Club
   d. Fate/Stay Night
   e. Clannad
   f. Steins;Gate
   g. Save the Date
   h. Other

3. Did this game remind you of any other visual novels? *(Checkboxes)*
   a. Ace Attorney
   b. Danganronpa
   c. Doki Doki Literature Club
   d. Fate/Stay Night
   e. Clannad
   f. Steins;Gate
   g. Save the Date
   h. Other

4. How would you rate the difficulty of understanding the storyline of the game?
   [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

5. How would you rate the difficulty of the combat system to use?
   [Likert Scale 1 - 6] 1 = Difficult to use | 6 = Easy to use

6. How fleshed out did you think the characters were?
   [Likert Scale 1 - 6] 1 = Barely fleshed out | 6 = Very fleshed out

7. How satisfying did you find the narrative?
   [Likert Scale 1 - 6] 1 = Unsatisfying | 6 = Very satisfying

8. How would you rate the effectiveness of the choices offered in the game?
   [Likert Scale 1 - 6] 1 = Ineffective | 6 = Highly effective

9. How effective did you find the character sprites?
   [Likert Scale 1 - 6] 1 = Ineffective | 6 = Highly effective

10. How effective did you find the backgrounds?
    [Likert Scale 1 - 6] 1 = Ineffective | 6 = Highly effective

11. How easy was it to read the text (size, font, color, etc.)?
    [Likert Scale 1 - 6] 1 = Difficult | 6 = Easy

12. How would you rate the effectiveness of the sound effects and music?
    [Likert Scale 1 - 6] 1 = Ineffective | 6 = Extremely effective

13. (Optional) Which of these potential final names for the game do you like the best?
    a. Ziv's Quest
    b. Another Quest
    c. Another Fantasy Quest
    d. Ziv's Adventure
    e. The Legend of Ziv

14. (OPTIONAL) Please add any additional comments or suggestions here.

E. *Another Try* survey instruments

AlphaFest instrument

1. How much prior experience do you have playing visual novels?
   [Likert Scale 1 - 5] 1 = None | 5 = Highly Experienced

2. Which of the following visual novels have you played? *(Checkboxes)*
   a. Phoenix Wright: Ace Attorney
   b. Danganronpa
   c. Fate/Stay Night
   d. Clannad
   e. Steins;Gate
   f. Save the Date
   g. Higurashi: When They Cry
   h. Other
   i. None

3. Did these games remind you of any other visual novels? *(Checkboxes)*
   a. Phoenix Wright: Ace Attorney
   b. Danganronpa
   c. Fate/Stay Night
   d. Clannad
   e. Steins;Gate
   f. Save the Date
   g. Higurashi: When They Cry
   h. Other
   i. None

4. Did you understand the storyline?
   [Likert Scale 1 - 5] 1 = Not at all | 5 = Completely

5. Did you feel that the story flowed well?
   [Likert Scale 1 - 5] 1 = Not at all | 5 = Very Smoothly

6. Do you think the title alone did a sufficient job of alluding to the time loop?
   [Likert Scale 1 - 5] 1 = No | 5 = Yes

7. (OPTIONAL) Any ideas that might help allude to it?

8. How did you feel about the Leads System?
   [Likert Scale 1 - 5] 1 = Dislike it | 5 = Liked the Idea

9. Did you use the Leads System?
   a. Yes
   b. No

10. Do you think the pocket watch should have been mentioned earlier?
    [Likert Scale 1 - 5] 1 = No | 5 = Yes

11. Do you think that the game should have no explicit choices or keep its current structure?
    Linear Scale [1 to 5] 1 = No Explicit Choices | 5 = Current Structure

February instrument

1. How much prior experience do you have playing visual novels?
   [Likert Scale 1 - 5] 1 = None | 5 = Highly Experienced

2. Which of the following visual novels have you played? *(Checkboxes)*
   a. Phoenix Wright: Ace Attorney
   b. Steins;Gate
   c. Umineko: When They Cry
   d. Danganronpa
   e. Save the Date
   f. Doki Doki Literature Club
   g. Fate/Stay Night
   h. Other
   i. None

3. Did these games remind you of any other visual novels? *(Checkboxes)*
   a. Phoenix Wright: Ace Attorney
   b. Steins;Gate
   c. Umineko: When They Cry
   d. Danganronpa
   e. Save the Date
   f. Doki Doki Literature Club
   g. Fate/Stay Night
   h. Other
   i. None

4. Did you understand the storyline?
   [Likert Scale 1 - 5] 1 = Not at all | 5 = Completely

5. Did you know that this game involved a time loop from the title?
   [Likert Scale 1 - 5] 1 = No | 5 = Yes

6. (OPTIONAL) When did you figure out the time loop if you didn't find it out in the title?

7. How did you feel about the ending?
   [Likert Scale 1 - 5] 1 = Terrible| 5 = Great

8. (OPTIONAL) Any other notes or thoughts on the ending?

9. How did you feel about the general gameplay loop?
   [Likert Scale 1 - 5] 1 = Boring | 5 = Fun

10. What did you think of the flow of the story?
    [Likert Scale 1 - 5] 1 = Jerky | 5 = Smooth

11. What did you think of the general length?
    [Likert Scale 1 - 5] 1 = Too Short | 5 = Too Long

12. How obvious was it that the watch was responsible for the loop?
    [Likert Scale 1 - 5] 1 = Not at all | 5 = Very Obvious

13. How easy was it to get to the end of the game?
    [Likert Scale 1 - 5] 1 = Incredibly Hard | 5 = Very Easy

14. (OPTIONAL) Please give any thoughts or advice you have.

March and April instruments

1. What is your experience with Visual Novels?
   [Likert Scale 1 - 5] 1 = None | 5 = Highly Experienced

2. Which Visual Novels have you played if you have played? *(Checkboxes)*
   a. Umineko: When They Cry
   b. Fate/Stay Night
   c. Steins;Gate
   d. Doki Doki Literature Club
   e. Phoenix Wright
   f. Other
   g. None

3. Which Visual Novel does this game remind you of? *(Checkboxes)*
    a. Umineko: When They Cry
    b. Fate/Stay Night
    c. Steins;Gate
    d. Doki Doki Literature Club
    e. Phoenix Wright
    f. Other
    g. None

4. What did you think about the story?
    [Likert Scale 1 - 5] 1 = Didn't like it | 5 = Loved it

5. (OPTIONAL) Any thoughts on the story?

6. Did you feel the story and pacing flowed?
    [Likert Scale 1 - 5] 1 = Not a good flow | 5 = Flowed smoothly

7. Did you feel that there was a lacking part of the story?
    [Likert Scale 1 - 5] 1 = No | 5 = Yes

8. (OPTIONAL) If so, where did you think it was lacking?

9. If you had to choose one thing to expand/flesh out in this game, what would it be?
    a. Character personalities
    b. Story
    c. The Watch and its powers
    d. Setting
    e. Doesn't need expansion

10. (OPTIONAL) Why so?

11. (OPTIONAL) Any last comments, questions, or recommendations?