AN APPLICATION THAT COMBINES LEARNING AND GAMES TO MAKE LEARNERS KEEP INTERESTED IN LEARNING

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ABSTRACT

Learning a new language and a new culture is always fun and interesting at the beginning. However, when learners get deeper into the learning process, they find that whether it is memorizing vocabulary, learning different types of grammar, or learning a new culture that is completely different from the learner's country, it becomes very difficult and learners gradually lose their enthusiasm for learning. Also, some of the textbooks right now are published a long time ago. Teaching some 20 or 30 years ago's culture won't help the learner and may make them misunderstand the modern culture of that country. So, why can't we give the learner more accurate information and keep the learning process as fun as ever? This paper designs a software that combines the games and learning together. By setting up different scenarios, building a variety of representative buildings, adding various characters to communicate with, designing different culturally significant objects, and conceiving an interesting story plot to let people who are learning a new language or culture can learn in a unique and more fun way. After applying the app to language schools, Japanese language learner communities, and the Internet, the results showed that the app makes learners learn in a more relaxed atmosphere and makes them want to learn more.

KEYWORDS

2D RPG, Culture, Language, Unity, Explore

1. INTRODUCTION

Today, there are approximately 3.3 billion bilingual people worldwide, accounting for 43% of the population. About 1 billion people are trilingual or even know more languages. Till now, there are an estimated 30 million people attempted to learn a new language. Learning a new language is not pointless, it can provide you with more educational and job opportunities and meet a variety of people from all over the world. A great example of why learning a new language and new culture can benefit you is Japan. Due to people's interest in Japanese food, anime, and manga, more than 3.66 million people in 137 countries and regions are studying Japanese [4]. Japanese is now the fifth most popular language to learn in the world and is the fastest growing language in the United States and the United Kingdom [5]. Japan is now one of the largest consumer markets in the world and learning Japanese will definitely be beneficial for you. For workers, there are many good technology companies, animation studios, highly developed trem systems etc... There are many working opportunities in Japan and the minimum average is usually higher than most South East Asia countries. For teens, many people do not want to read the subtitles when they are watching anime. Also, there are a variety of excellent books and

manga. You need to read these books in Japanese to get a better understanding of these works. Translations in English or other languages are definitely not as good as the originals. Based on the sources above, the importance of learning a new language and culture can be seen. People are trying to learn a new language but the boring classes might make people lose the passion for studying. If they want to do self learning, the textbooks that are not in line with modern culture and language can really make people confused easily. That's the reason why an app that is both fun and knowledgeable is very important.

On different platforms, there are only a few educational games about teaching language and culture [7]. Most of them are usually culture and language learning tools that do not contain much about game elements [8]. People have to memorize flashcards from those tools and quizzes every chapter, which makes people get bored really quickly. From the few existing games about language and culture, none of them have an interesting storyline and exquisite maps. The user interface isn't very clear for the user and the information about culture and language is either missing or not fully correct. There are also some textbooks that can teach you about language and culture, but the disadvantage of that is a lot of textbooks today that is hasn't been updated for a long time, which means the information about culture is old and not correct anymore. It's hard to let the learner learn the newest cultural information from the textbook.

By using Unity, there are some benefits for both me and the player. The Unity asset store allows me to find various assets with Japanese characteristics, such as Japanese city tile maps, Japanese characters, Japanese cultural images... etc. For players, most people are familiar with unity and they can enjoy the amazing game experience on it. For my game, my method is inspired by a lot of classic Japanese 2D RPG games [6]. The way those games tell a story and interact with the player gives me an idea of how my games should be like and what features my game should have. In my game, there are some good features to let the player experience the game better. First, in the game, the players can explore and interact with a lot of the objects. The player can search the objects and the game will tell the player the background or some knowledge about this object. Second, there are 13 different scenes related to Japan in the game. The scenes contain Two Japanese cities, Japanese public bath, Japanese school, Japanese company, Japanese sushi restaurant, Japanese bar, Japanese arcade, Japanese convenience store, Japanese cultural room, a shop, and a main room. Each scene is decorated and built with Japanese characteristics, which is intended to give players a better understanding of what Japan looks like. Third, some buildings are not just for seeing, the player can actually enter the building and explore inside. For example, you can enter a company building to see the features in a Japanese building. Fourth, there are a lot of NPCs in the game that allow the player to talk with. Through the dialogue with the NPC, the player will learn more and have a better understanding of Japanese culture. Fifth, the money system, music system, bag system, and shop system in the game can make the players have more fun while studying. Last, every different scene has its own background music that matches the scene, it gives the player a much better experience when playing the game. According to all the features I have in this game, I believe that the game will give the learners a lot more fun, meanwhile, learners can also gain a lot of new knowledge.

For a game with educational implications, information about Japanese culture and language must be true and accurate. For this reason, I did research on the internet about Japanese culture and language to find the most accurate information [9]. Through the research, I found out that there is a lot of new cultural information that is never mentioned in the textbook. It is very important to add that new information into the game. Online research is not the only way. I also asked a lot of native Japanese people, including adults and students, from every aspect, to give more advice about Japanese culture and language for the game. To test the game, I talked to several language schools and had the teachers and students there test my game. I also had some people who had never studied Japanese play the game. As I expected, the results showed that the game can

accurately teach a lot about Japanese culture and language. Students think the game makes it easier for them to learn about Japan compared to books. The teachers thought the game was very innovative and they felt that the game would make it more fun for students to learn new information.

The rest of the paper is organized as follows: Section 2 gives the details on the challenges that we met during the experiment and designing the sample; Section 3 focuses on the details of our solutions corresponding to the challenges that we mentioned in Section 2; Section 4 presents the relevant details about the experiment we did, following by presenting the related work in Section 5. Finally, Section 6 gives the conclusion remarks, as well as pointing out the future work of this project.

2. CHALLENGES

In order to build the project, a few challenges have been identified as follows.

2.1. How to integrate the Japanese language and culture into the game

The first challenge, which is also the most important part of my game, was how to integrate the Japanese language and culture into the game. A country's culture and language can not be explained in a few words [10]. Culture can be divided into many levels, from the larger culture of society to smaller cultures with different details. It can't be too short or too long, it can't be hard to understand, and I have to keep adding cultural information to let players learn about Japan through searchable objects, NPCs, buildings, etc. For searchable objects, I have to add correct cultural information about what this item represents as a part of Japanese culture. Different searchable objects contain different elements of Japanese culture so that players can learn better. For NPC, I have to think of a good dialogue to represent Japanese culture and groups of people in Japan. A good dialogue between player and NPC so that the player can actually bring themself into the game and can learn more about Japanese culture. For buildings, I need to focus on how people can learn with the characteristics of this building and how to use good and simplest sentences to teach the players.

2.2. How to give players a better gaming experience

The second challenge is how to give players a better gaming experience. Including building different scenes with Japanese characteristics, finding good drawers to draw the npc pictures, and images of items with Japanese characteristics. A good game must have a good scene. Building different scenes take me a lot of time and effort. Depending on the size of the scene, in 13 different scenes, a small scene cost me about 4-5 hours to build and a big scene usually cost me about half a day to build. I had to pay attention to some of the details of the different types of Japanese streets, buildings, and decorations and put them in different scenes. When building these scenes, I had to be really aware of the layers, the building layouts, and the correct colliders. Not only that, good backgrounds and pictures of NPCs are needed to show the players about Japanese culture as well. So I had to find good drawers and talk to them about the characters and how to draw them better. I also looked up some images online that could fit the game.

2.3. The platform

The third challenge would be the platform. As the first time using unity, I have to figure out different features of unity. Making a 2d rpg type of game on Unity isn't that easy [14]. Unlike other platforms like RPG Maker MV, using Unity can give you more creativity for the game, but meanwhile, it increases the difficulty. In unity, there are a lot of components for game makers to use, but I have to figure out what these components do and how to use them correctly. For example, for a player, I have to add a player movement component and set all the data correctly in order to let the player move. Sometimes, you have to code your own components when there are no public components that fit in my game. In unity, I have to keep organizing the hierarchy, adding canvas, text box, objects, and colliders. Those are all challenges I faced when making this project.
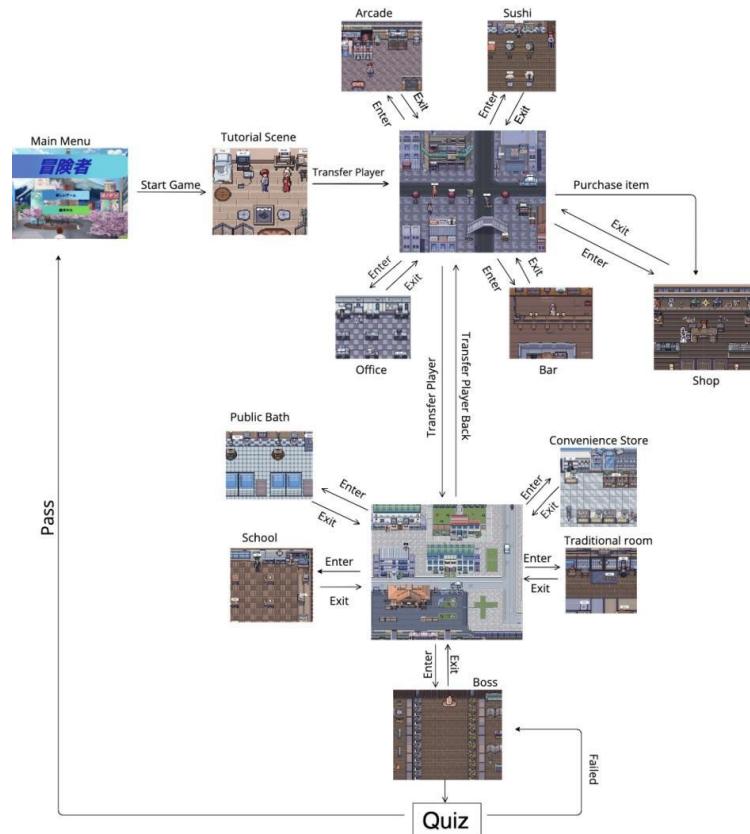
3. SOLUTION

Figure 1. Overview of the Gaming Process

The program is focused on teaching about Japanese culture and language, so there should be a lot of Japan related content throughout the game. In the main menu, the background image contains a lot of characteristics about Japan. Anime culture, Mount Fuji, Japanese modern buildings, sakura trees etc are all shown in the image. It gives the player a very good visualization about Japan and keeps the player interested in the game. After starting the game, the player will be brought into a tutorial scene. In this scene, the player will talk to their first NPC and can start to search for the items. What I mean by searching the item is that if the player gets closer to any

objects, a search button will appear. If the player clicks on that button, a text box will show and tell the player the feature of this object. For example, if the player clicks the search button on a sakura tree, the game will tell you that sakura is the national flower of Japan and a lot of Japanese get hay fever because there are too many of them in Japan. The purpose of the tutorial scene is to make the player become familiar with the game and tell the player the general background of the game story by talking to the NPC. When the player feels confident enough to start their exploration, they will be transferred to the first big level. Every big level's building style and decorations are based on Japanese cities. In this level, players can search for 20 different items. There is also a tracker to count how many objects the player has searched so that the player will not get lost. There are also 3 different npc in the first level. During the conversation with the npc, he or she will tell you some interesting cultural information. For example, there is a npc dressed up like a witch in the first level. If the player goes up and talks to her, she will tell you about the cosplay culture in Japan, which is why she dressed up like a witch. When player talks to npc or search the items, there will always be some Japanese phrases or Japanese vocabulary in the text. Player can learn culture and Japanese at the same time. In the first big level, there are also 5 buildings you can enter. When the player enters the building, they will be transitioned into a smaller scene that represents the inside of the building. I called that a building scene. In each building scene, there will be new searchable objects waiting for the player to search. Inside the building scene, there will be a chance that the player can find a npc and have a conversation with them as well. If the player is done exploring the building scene, they can always exit that scene and go back to the big level. In the game, there is a money system and a bag system. The player can find some en, which is Japanese money, while they explore the scene. Using the money player finds in the game, the player can enter the shop and purchase the items. After that, the player can check the items they bought from the bag. The items in the shop are all famous and traditional Japanese dishes, and the name of each item are typed in Japanese. The purpose of that is to give the player a better understanding of the Japanese food area as well. If the player finished exploring the first big level, they can now enter the second big level. The player can always return to the first level. The second level has an exactly different style of decoration and buildings compared to the first big level so the player can experience more. There are 1 NPC,5 buildings scenes, and 25 searchable objects. Player can start another round of exploring and learn more about Japan and its culture. When the player feels confident enough about their knowledge of the Japanese language and culture, they can enter the boss room. To make the game more fun, I make the boss a cute dog instead of the traditional scary boss in other games. The boss will offer you a small quiz, which contains 10 multiple choice and 5 listening questions. All the questions are about Japanese culture and language and they are all based on the information that the player has learned from the game. The Player's goal is to get them all correct in order to defeat the boss and finish the game. If the player fails the quiz, they will have infinite chances to retake the quiz. Players can always go back to any previous scene and to review the information that I have been taught in this game.

```
private IEnumerator GoInsideCoroutine()
{
    player.StopMovement();
    player.enabled = false;

    panel.SetActive(true);
    enterbutton.gameObject.SetActive(false);
    if (queue.Count > 0) yield return ShowText(queue.Dequeue());


    while (queue.Count > 0)
    {
        if (Input.GetMouseButtonDown(0)) yield return ShowText(queue.Dequeue());
        yield return null;
    }
    yield return new WaitUntil(() => Input.GetMouseButton(0));
    AudioManager.Instance.PlaySound("enter_room");
    GameManager.SaveAllData();
    GameManager.SavePlayerPosition(player.transform.position);

    yield return SceneTransition.Instance.FadeInBackground();

    GameManager.LoadScene(sceneName);
}
```

Figure 2. Building Manager

Throughout the whole game, player will enter a lot of different scenes. For this reason, I need to code two different components called building manager and scene transition. All the components of the game, I use C# since it is a good language for programming a game [15]. For the building manager, it allows the player to enter the building scene and save the player's data. To make this component work for the game, stopping player movement is important, because if the player in front of the building door clicks the enter button and then the player goes somewhere else, then the game may have unnecessary bugs appear. Then, set the panel active and show the text is needed because the game will tell the player some information about this building before the player enters it. Sometimes, the information the game wants to tell the player is not just one prompt, for multiple prompts, using a while loop is necessary. Using the get mouse button down allows the player to click their mouse and then the next prompt will show up until there is no more prompt left. After all those, the player can start the transition, the audio manager, which is also the music system for this game, will set the specific music for that scene. Under Audio Manager, the game manager, which is basically my game data manager, will save all the player's position and the data. Including the money and the items in the bag so that the player can still access them even when they enter another scene. It is very important because in Unity, data can not automatically be saved in a new scene from an old scene.

```
public IEnumerator FadeInBackground()
{
    MusicManager.Instance.FadeOutCurrentMusic();
    loadingbarBackground.SetActive(false);
    loadingBar.fillAmount = 0;
    backgroundImage.gameObject.SetActive(true);
    float timer = 0;
    MusicManager.Instance.FadeInCurrentMusic();

    while (timer <= transitionTimer)
    {
        backgroundImage.color = new Color(1, 1, 1, (timer += Time.deltaTime) / transitionTimer);
        yield return null;
    }
    loadingbarBackground.SetActive(true);
    float t = 0;

    while (t < loadingTimer)
    {
        loadingBar.fillAmount = (t += Time.deltaTime) / loadingTimer;
        yield return null;
    }
}
```

Figure 3. Music manager

This game requires very little performance, so when the player transitions from an old scene to a new scene, they may feel some abruptness, so I decided to add a timer, a loading bar, and a background image that represents Japanese characteristics to make the player not feel abrupt when switching scenes. In the code, I set the music to fade out during the transition and fade back

in after the transition is finished. Then, I initialize a couple of things like the loading bar fill amount = 0, timer =0, and set background to true. There are two while loops in this code, those two while loops allow the background image to fade in and the loading bar to be filled. The time to finish filling the loading bar and the time finish fade in the background image depends on the timer. Image below is an overview picture of what the player will see during the transition. The image will also change depending on what building the player enters.

Figure 4. Screenshot of the buildings

4. EXPERIMENT

4.1. Experiment 1

To get a better chance to know If my project helps people, the experiment is important. I gather people from the internet, Japanese community, and my friends to be the Experimental group. For the experiment, I divide those people into 5 groups based on their skill and knowledge about Japanese culture and language. They are No previous knowledge, Lived or been to Japan,Anime fans with no previous knowledge, and Japanese. I gave each participant a copy of my game, and then asked them to play only the first level and allowed me to enter the building scenes in first level. Then they need to calculate how much new information they learned from searchable objects in the game that they didn't know before.
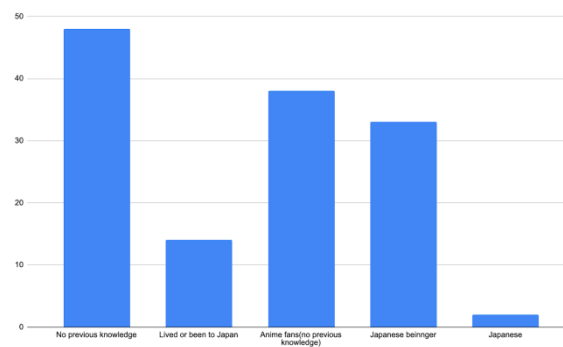

Figure 5. Result of experiment 1

In the first level and its building scenes, there are about 52 searchable objects in total. From the chart, we can tell that the game is very helpful for groups with no previous knowledge about

Japan, Japanese anime fans, and Japanese beginners. The data proves that they learned the most new information about Japanese language and culture that they didn't know before. This data also gives me more confidence because it can actually teach people about Japanese culture and language and the content of the game will not be too simple for players to play.

4.2. Experiment 2

To test if the player actually has a good understanding of Japan and learned the information well enough, a few days after experiment 1, I send a small quiz to the same participants from experiment 1. The reason for this is to check if the participants actually learned and remembered the information from the game that they played a few days ago. Here are a couple examples of the game.
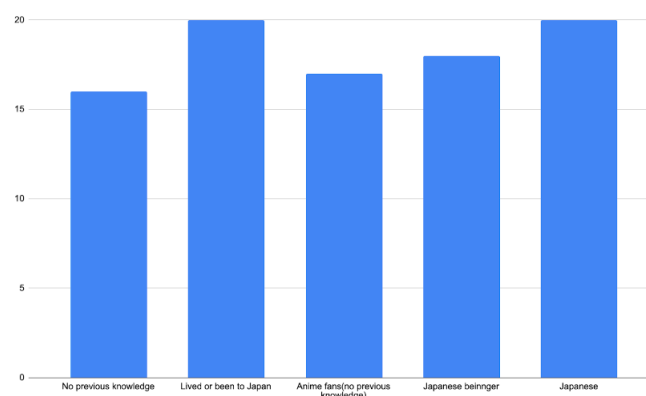

Figure 6. Survey questions

Figure 7. Result of experiment 2

From the chart, I am very satisfied with the result. None of the participants failed the quiz. There are 20 questions for the quiz and all the groups have a high score. This proves that after playing the game, it does give them a better understanding of Japanese culture and language. It also

proves that learning in a game way does enforce the player's memorization. They can remember the information that they searched for by themself and memorize that information.

From 2 different experiments, I found out that teaching people about Japanese culture and language in a game does help the learner a lot. Experiment 1 proved that the game has a lot of various information about Japan that players did not know before, so they can not worry about the game's content being too simple. Experiment 2 then proved that learning in the game can enforce the player's memories and keep them doing well in a pop quiz. Overall, two experiments do give me a lot of positive results and be more confident about my project.

5. RELATED WORK

Roger, D and Osamu, I published a book that teaches people about some Interesting Japanese vocabulary. In their book, they explain the meaning of words very carefully. They can also explain well when the meaning of some Japanese kanji does not match the meaning of the word itself [11]. However, all of the vocabulary is a bit jumpy, with no particular connection between each word and no commonality in the Japanese kanji, and the overall difficulty of the book is high, making it difficult for readers to remember the vocabulary. In my project, all vocabulary is connected to the items the player searched ,so that the player can have a more specific memory to help them remember these words.

Paul, V published a book about Japanese culture. There are a lot of pictures about some traditional Japanese items and very specific explanations in the book [12]. In his book, a lot of ancient Japanese culture has been told. However, the book was published in 2000, so even though there is a modern chapter in his book, the cultural information in his book compared to today's cultural information has a lot different. This also happens in most textbooks on Japanese language and culture, as they were published a long time ago. In my project, every piece of information about culture is the most modern, and every piece of information is very detailed.

From the book published by Fran, L, readers can learn about Japanese pop culture [13]. In his book, he talked about a lot of Japanese pop culture like anime, manga, shows etc. The author uses a lot of paragraphs to explain Japanese pop culture to the reader. One of the flaws of this book is the lack of some more modern pop culture, modern pop culture is not only anime and manga, but also karaoke, arcade and such places. In my game, there is more information about Japanese pop culture and the player can learn more from it.

6. CONCLUSIONS

In summary, my application is designed mainly to help people learn about Japan and Japanese culture. By adding various objects, scenes, and NPCs, the game can bring more knowledge for players to learn. Learners will no longer be bored while learning. Learners also don't have to worry about not having the right textbook to learn about Japan. The experiment proves that the game contains the newest and most useful cultural and language information for the player to learn. There is no need for learners to worry that the game will be too easy, as Experiment 1 also gave results on the difficulty of the game. Learning from a game can also enforce the player's memory about what they learned since they experienced and explored that knowledge by themself. Experiment 2 proves that as well.

The limitations of this application is that it can not cover all the cultural information in Japan and it can not teach the player all the Japanese vocabulary. There are 47 prefectures and 500,000 vocabularies in Japan and it is very difficult to include all of these in the game. It is also very

important to know how to promote this game better. If more people play the game, then more people will give me feedback so I can update and modify my game. But If I have few players, then my game will not be improved.

For future work, I will continue to create different versions that include different Japanese cultures and languages to make sure that players can really learn something new from this game. I also plan to make versions for other countries such as China, USA, Mexico, etc. to allow more people to learn the culture and language of the countries they don't hear.

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