Kanakatana: Teaching Japanese Through Game Mechanics

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ABSTRACT

Designing a game that is both educational and enjoyable can present some unique challenges. Kanakatana[1] is an exploration into finding areas of overlap between foreign language learning and role-playing-games (RPG). It is designed so that its most important mechanics leverage similarities between learning a new language and playing an RPG. We are able to demonstrate success of this strategy through a 21-person user study. We show that subjects without prior Japanese knowledge are able to identify individual Japanese words 60% to 80% of the time. Interestingly, the subjects' self-assessment of their own improvement is more pessimistic.

1. INTRODUCTION

Kanakatana is meant to teach Japanese through the mechanics of an RPG. Kanakatana explores the overlap in experiences between playing an RPG and studying a second language. The game uses this area of overlap to effectively teach a language while still retaining the appeal of a game that focuses purely on entertainment. The primary design philosophy for Kanakatana is to build its mechanics within these areas of overlap. Rather than having some mechanics to educate, and some mechanics to entertain the player, Kanakatana is designed to have its individual mechanics further both goals at once, such that the mechanic would fit the needs as either a purely educational game or a purely entertaining game.

2. GAMEPLAY

In Kanakatana, the player explores randomly generated levels from a top down perspective. The player also uses kana based abilities to combat enemies while searching for more kana. Players use the mouse to move their character on screen and use the keyboard to activate their abilities. To use an ability, the player presses a key associated with a kana. This causes the player to hear that kana, and for a word that begins with that kana to appear on screen. The kana that spell the word appear scrambled and the player must use the number keys to select the kana in the proper order. Doing so causes an ability associated with that word to activate. For Example, いなずま (inazuma) means "lightning." When the player selects, the い kana and the word いなずま(inazuma) appear on screen with the relative positions of the kana randomized. If the player selects the kana in the correct order to spell いなずま, lightning will strike at the location of the mouse cursor (Figure 1).

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[1] We encourage readers to try the downloadable Windows compatible version of the game:
https://users.csc.calpoly.edu/~foaad/Kanakatana

Figure 1. Kanakatana Screenshots

3. PLAYER ABILITIES

One of the key ideas of Kanakatana is that the player's ability to act is restricted by their recognition of kana. To use an ability, the player must learn to associate the sound of the kana with its appearance. Making effective use of these powers is necessary to succeed in Kanakata. Use of abilities is meant to be inherently rewarding, encouraging the player to better learn these kana. The player's learning can be continuously monitored, rather than intermittently tested.

4. THE USER STUDY

4.1 Structure

Testing is conducted in a computer lab on 2 laptops and 2 desktops, all running the game. Each station is set up to have a browser window open to the survey and a launcher for the game. Participants are instructed to begin the survey. The first half of the survey focuses on any prior ability to speak or read Japanese. The survey prompts users to open the game and begin playing.

The participants are instructed to play until they either explore the games content, become stuck on how to proceed, or find the game unpleasant to play. They ended up playing between 10 and 30 minutes. They are also instructed to return to the second half of the survey once they are finished with the game. The second half

of the survey focuses on testing the participants' ability to recognize the words and kanas presented to them in the game. These questions are primarily designed to test how well the game actually meets its goal of educating players. It also contains qualitative questions on the participants' experience while playing. These questions are designed to get the players' perspective on their learning.

4.1.1   Pre-exposure questions
Before the participants were exposed to the treatment, some baseline measures were taken to establish their existing ability to speak or read Japanese. The pre-exposure questions were:

- Can you speak Japanese?
- Can you read Japanese?
- What Japanese systems of writing are you capable of reading aloud?

4.1.2   Post-exposure questions
After the participants had been exposed to the treatment, they were asked the following questions:

- Did you understand what was happening in the game? Did you understand what it was trying to teach?
- What are kana? What do they represent?
- What is Hiragana? How is it used?
- For the next four questions, you will be shown a word in Japanese and will be asked to give its English translation.
- Did you feel like the game successfully taught you some basic Japanese?
- If you felt that the game taught you some basic Japanese, please explain what you have learned. If you feel the game did not teach you any Japanese, please explain why you think the game failed.
- When did you feel that you had the most trouble recognizing kana?
- When was learning easy for you? At what points did you struggle to learn?

5.   ANALYSIS
The user study is conducted in a junior level game design course, which is an elective course in the computer science curriculum at the California Polytechnic State University. 26% of users describe themselves as able to read some Japanese. The remaining 74% of the participants indicate that they had no prior ability to read Japanese. None of the participants described themselves as fluent.

61% of the participants did not feel like the game successfully taught them any Japanese. Of the 21 participants who felt that they did not learn, 16 had no prior ability to read Japanese, whereas 5 out of 8 prior Japanese readers felt that they learned from playing Kanakatana. So prior ability to read kana may have some impact on the participant's perception of how much they learn.

Contrasting these pessimistic views about learning is the data from the questions asking participants to identify words from the game written in hiragana (Figure 1). For each of the four words the participants are asked to identify the names of abilities in the game which had to be spelled to cast. On average, participants were able to correctly identify words 70% of the time. あり (ari)

was the first ability introduced to participants and was frequently useful throughout the game. It is also only 2 kanas long. It is likely that some of these factors have contributed to its recognition, as they would increase the number of times the participant was exposed to the word. In contrast to this, きりかぶ (kirikabu) was used very infrequently which may account for its lower identification rate, though a larger pool of participants would be valuable before making these conclusions.
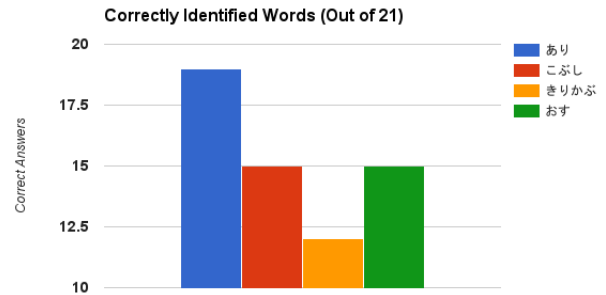

Figure 1. Subjects who correctly identified each word

When any of the participants who self-identify as "able to read some Japanese" are removed from the calculations, the average rate of identification drops from 70% to 68%. If the majority of self-assessments is correct, one would expect much lower numbers. Figure 2 has the breakdown for the non-Japanese-reading subjects.
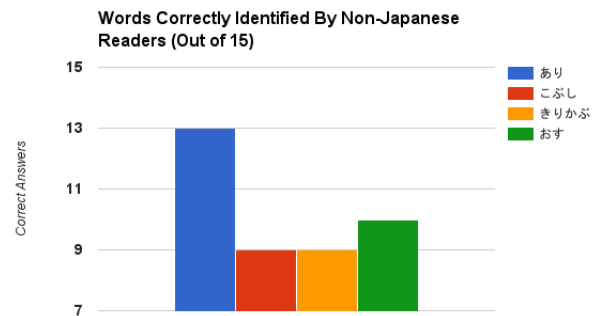

Figure 2. Numbers of non-readers of Japanese who correctly identified each word

6.   CONCLUSIONS
The results of this project indicate that Kanakatana succeeds in familiarizing players with hiragana and a few words in Japanese. Most participants express interest in the game, but say the game is not making its goals very clear. The user study reveals that Kanakatana can more strongly succeed as being both an educational game and an entertainment game. For more information about this study, please see Olson et. al in proceedings of the Sixth Workshop Procedural Content Generation, co-located with FDG 2015.