

A Vocabulary Learning Game Using a Serious-Game Approach

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Abstract It is always hard to keep motivated while doing something we must do but we do not want to. However, gamers put so much time into their favorite games, just because its fun. Games have many tricks to keep attracting people, and nowadays these gimmicks are included into education-games. However, not many of the education-games in the markets are fun enough to keep users motivated for playing. In this paper we address this conflict, propose a better education-game created based on a popular smartphone game, and evaluate the improvement of the motivation through playing the game we offer. As a conclusion, we discovered that the examinees are motivated through the experiment using the education-game we created; however, these motivations are passive as they are not actively willing to do, but rather not mind doing it. Supplementations to shift these passive motivations to active motivations are considered in our future work.

Keywords Serious game · Education

Introduction

It is always hard to keep motivated while doing something we must do but we do not want to, such as studying and working. On the other hand, there is something we enjoy doing it although we do not have to: games. Games are loved by many; in the research held in 2009 in Japan, 34 % of all Japanese citizens, and 64 % of Japanese elementally students play games regularly [1], and those gamers are willing to play games for there lives [2]. Good games have power to attract people, thus applying game mechanics to education has already been investigated for

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several times. However, it is doubtful that the education games produced in the market today work well enough. According to *the Annual Video Game Industry Report*, the peak of the education game market was in 2006–2007 in Japan, with the release of *Brain Age: Train Your Brain in Minutes a Day!* and *English Training: Have Fun Improving Your Skills!*. *Brain Age: Train Your Brain in Minutes a Day!*, the one sold very well, is full of game mechanics, and even though game was not the main part of *English Training: Have Fun Improving Your Skills!*, it included some of game parts and sold well. Many education games are released after the hit of *Brain Age*, but most of them were not successful. The reason of the failure of the education game industry is based on misusing the concept of “game”. According to the *Annual Video Game Industry Report In 2008*, “many of the education game titles in the market today are just reprints of the existing books, thus they can reduce the cost of software development” [1]. These software are sold as they are games, but most of the times there is almost no game mechanics are included. Thus, it could not continue the boom of education games.

In this paper, we produced a English vocabulary learning game, Vocab Draw, by adding some educational elements to the game instead of adding game mechanics to education; with this approach, we believe that the gaming attributes remain while learning materials are provided.

Preliminary Survey

Preliminary Survey has been done for learning examinees’ attitude towards games, especially the educational ones. The samples for this survey are 10 males and 7 females, all around 20-year-old.

Eighty eight percent, 15 of 17 samples are active game players. For those game players, such a question is asked: *when they quit playing the game they are playing if it is not fun*. None of the examinees answered they play until the end whether it is good or bad, and 1/3 of them answered they quit playing immediately when they find out the game is boring. 2/3 of them play for a while even though they cannot find fun in it, waiting for the game to gets better by any change. With this result, it can be said that amusingness is important for games to make players continue playing it.

However, as its discussed in the previous section, recent education games are not attracting people well. 9 of 17 examinees have had experience of playing education games. The education games they played were able to be divided into three groups, brain training, English learning, and other. Taking close look at the brain training and English learning games, the willing to play the game again towards those two types were different; those who played brain training games are willing to play the game again, because it is fun. On the other hand, those who played English learning game are also willing to play the game again, but only to

learn English, even though the game was boring. However, it is doubtful that a boring game can attract people for long time even if it is efficient for learning.

This assumption can be verified by the popularity of education games today. By the *Annual Video Game Industry Report*, the sales of the education games in 2011 were 300 thousands, 0.56 % of all genres of games, the lowest genre out of 13 others. Also, according to our survey, the popularity of education game was the lowest as well. Even though the players say they will play the education games for their goods, while other interesting games are out there, it is hard for them to pick a boring educational game. And if they cannot continue playing the game, the efficiency of learning would become waste. Thus, we put focus on making the game interesting, rather than improve the efficiency.

Proposal of a Vocabulary Learning Game

Draw Something

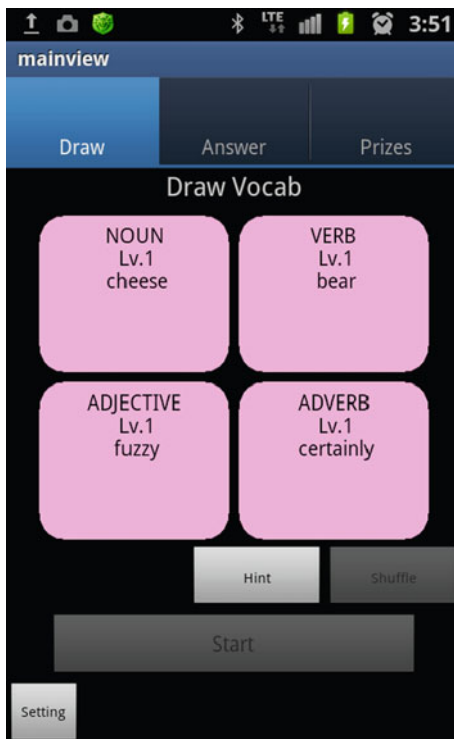
As we developed an interesting English vocabulary learning game, we used an existing popular game as a reference. The game is called *Draw Something*, published by OMGPOP. This game is distributed for iPhone and Android, and 20 million people have played free and non-free version in total on Android. The game is originally provided in English, but since it is for native English speakers there is no learning elements of English.

The basic rule is simple; two players draw and exchange their drawings, and make guess what other players have drawn. First of all, a player chooses an opponent and begins the game. Then a word selection scene is shown, and he chooses a word he might be able to draw. A level is set to each word, and the reward to each level is different. The player must choose an appropriate word from the words he can draw, while considering the rewards he can get. After the player has chosen the word, it is time for him to draw. The drawing is sent to the opponent he chose in the beginning, and then the opponent can guess what he has drawn. If the opponent corrects the answer, then their continuity is counted up as combo and some coins, which depends on the word level, are rewarded to the players. And then the drawing is now sent from the opponent to the player, and they keep exchanging the drawings to add up the combos. This series of action can be done in parallel, with many opponents at a time.

Vocab Draw

The rules we applied to Vocab Draw, our novel English vocabulary learning game, is exactly same as Draw Something. However, we added some learning elements to Draw Something in order to make it as an attractive education game. Also, we

Fig. 1 Draw-part1

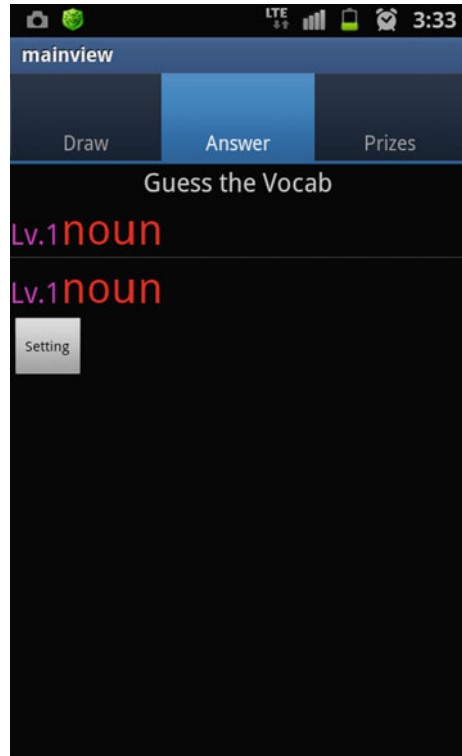


added a beneficial change to Draw Something; so players can keep their motivation. In this section, the difference between Draw Something and Vocab Draw is presented.

Interface Change As several changes are made from Draw Something to Vocab Draw, the interface was upgraded. The game part is decided into two main parts, one is Draw-part and another is Answer-Part as shown in Figs. 1 and 2. Each part starts with a word selection part, followed by actual Drawing- and Answering-parts, shown in Figs. 3 and 4.

Improvement from Draw Something At first, we changed a way of drawing exchanging from one-to-one to one-to-many. In Draw Something, a player was able to send to only one opponent per drawing, and when his opponent answered the game continued. In Vocab Draw this rule is discontinued because with this method the player must wait until the opponent answers, in order to keep playing. This mechanism is shown in the Fig. 5, when exchanging the drawing one by one, if an opponent's answer is slow or given up because he decreased the motivation to play the game, the player cannot get the feedback to his drawing. In such case, it is worried that the player's motivation is also declined. Instead in Vocab Draw, the relationship between players are reconsidered as one-to-many from one-to-one in Draw Something. As shown in Fig. 6, if the drawing is distributed to many rather than one, the chance of getting feedback is increased.

Fig. 2 Answer-part1



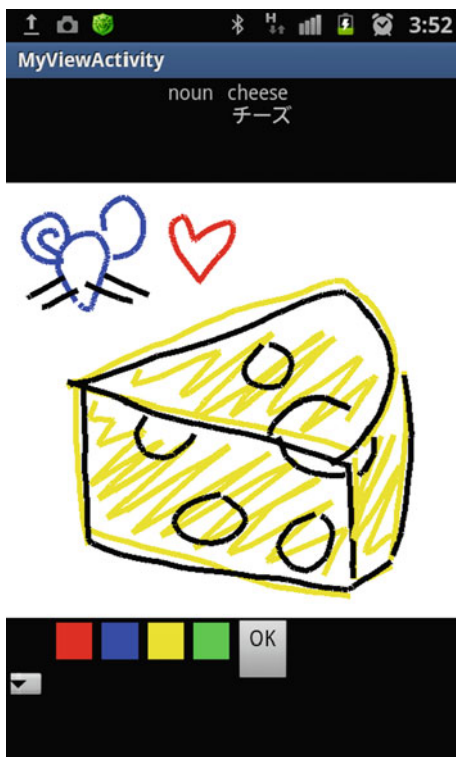
Learning Elements In order to include educational functions into Vocab Draw, materials listed below are considered:

1. Player Level
2. Coverage of fundamental part of speech
3. Japanese translation.

Firstly, the concept of level is given to each player. A player sets a level and the system shows the vocabularies according to that level. With this level, a player can learn vocabularies effectively as he tries the problems he can actually understand. In Figs. 1 and 2, the level is set as one.

Secondly, vocabularies are chosen by four fundamental parts of speech: noun, verb, adjective, and adverb. These parts of speech are considered fundamental, based on the English Note, which is published by the Ministry of Education in Japan as the base of English teaching material for Japanese elementary students [3]. In English Note, vocabularies provided for elementary students are nouns, verbs, adjectives, adverbs, and prepositions. Although preposition is as important as other five parts of speech, since it is used to show the relationship between other parts of speech, and we considered that teaching its meaning alone is pointless and confusing for the learners/players; thus, we included the first five parts of speech only.

Fig. 3 Draw-part2



Thirdly, Japanese translations are shown to improve the understanding of the vocabularies. These Japanese translations are, not shown in the first time, and they are shown by pressing Hint Button as shown in Fig. 1. If the player cannot draw any of the words provided, they can shuffle the words to get another set; an important thing is that they cannot shuffle the words until they check the Japanese translation, so there would be more chance to see English and Japanese together to learn the vocabularies. Once the player starts to draw with a hint Japanese meaning is provided as shown in Fig. 3, if he/she starts without with a hint, then there would be no translation shown.

Evaluation

After the preliminary survey, examinees were asked to play both Draw-part and Answer-part of Vocab Draw once for each. First of all, 82 % of the examinees responded with positive feedback for the question whether he/she wants to play Vocab Draw again. The specific numbers are as follows: 6 % are strongly willing to play again, 35 % are willing to play again, 41 % can play again, 18 % are not

Fig. 4 Answer-part2

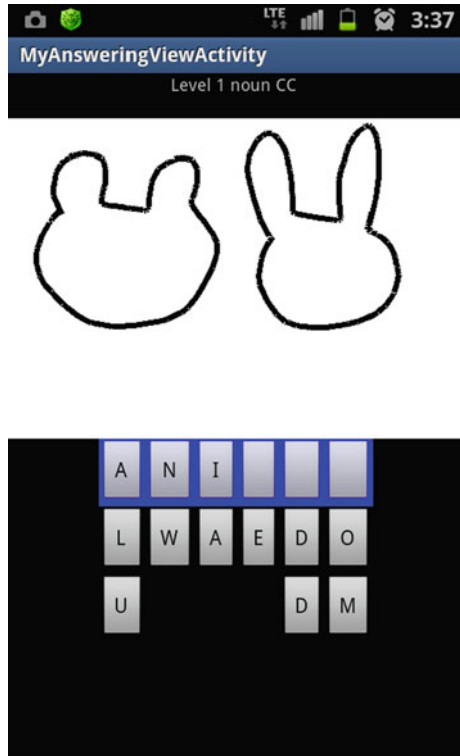
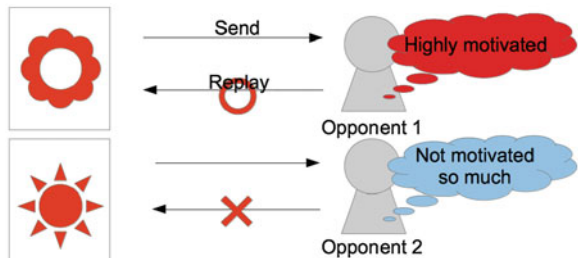
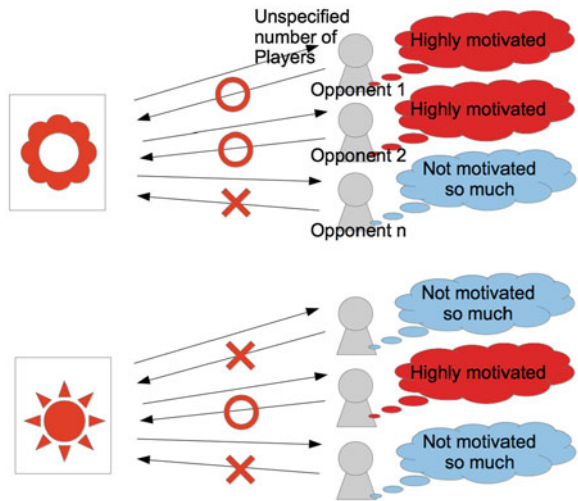


Fig. 5 One-to-one (draw something)



willing to play again. In addition, paying a close attention to the ones who gave negative posture for learning English in the preliminary survey, it is clear that their attitude changed via the usage of Vocab Draw. 72.7 % of those who are not willing to put effort into learning english, 78.6 % of those who hate learning vocabularies, and also 72.7 % of those who are not doing any extra work for learning vocabularies have improved their motivation towards English learning if it is with Vocab Draw. Asking why they want to play it again, most of the answers were because of the amusingness of the game, shown in the Fig. 7. By this result, it is proven that the amusingness would improve the attitude of learners, even if they hate learning

Fig. 6 One-to-many (vocab draw)



it. However, half of the positive feedback are as weak as that they CAN play the Vocab Draw again, and only one player answered that he strongly wants to play it again. From this it can be said that motivations can be improved with the amus- ingness as much as they do not leave the game, but it is not enough to lead them to strong attitude or willingness to play. Our future direction is to change the examinees' attitude from that they CAN play it again to they WANT to play it again.

We also asked the examinees to feedback freely with pros and cons of the application. For educational elements, some opinions in Table 1 is provided by the examinees. Most of the positive opinions were about the usage of drawing. Four examinees answered that it is easy to see the vocabulary as an image, thus it is helpful to learn it better. As another opinion, one examinee considered that Vocab Draw is more like an usual game rather than a boring education game. This opinion is important because it was our final goal.

On the other hand, some issues became distinct. Our biggest issue is that some of the words are difficult to draw in a picture. Especially the words which are not noun, it is difficult for the players to associate the word with an image. If many

Fig. 7 Features of vocab draw motivate the examinees to play again (multiple answers)

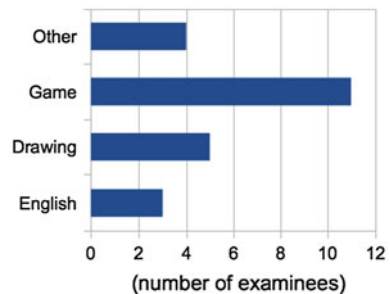


Table 1 Feedback of vocab draw

Number of people	Feedback
<i>Positive feedbacks</i>	
4	Easy to see the vocabulary as an image
3	Helpful to learning vocabularies
1	Does not give the feeling of learning
1	More chance to play with English
1	Might be memorable since playing while guessing
<i>Negative feedbacks</i>	
4	Many words are difficult to draw
1	Words should be used in text, rather than just translated alone
1	Learning efficiency is low, since long time is taken to draw
1	It is more like a testing rather than learning

people cannot draw the word except noun, the number of those words would be reduced in the answering part as well, resulting less opportunity to experience the word. Thus, in our experiment, almost everyone chose a noun to draw. If we keep using these four parts of speech, we must re-consider the easier way to draw, or the sets of the vocabularies.

Conclusion and Future Work

As the conclusion, we have succeeded to encourage the examinees to learn English vocabularies with our novel game, Vocab Draw. Their motivation to play it again was as high as 82 %, however, not all of them were strongly passionate to do so.

In order to change the players attitude from passive to active motivations, introduction of the Bartle’s personality classification [4] should be considered. Bartle’s personality classification is probably the most famous classification of game player personality, originally applied to MMORPG players. The game players are divided into four personalities of achievers, explorers, socializers, and killers. Each personality has different aim to feel joy in a game, and he plays the game to accomplish his aim. A list of their basic aims are provided in the Table 2. One goal might be a perfect fit for one type, but occasionally it wouldn’t be an amenity to another type at all. Great games tend to support all of these goals shown in Table 2, so it could attract any game players. It is proven by many top selling

Table 2 Bartle’s personality classification

Player type	Aim to motivate the player
Achiever	Achieving
Explorer	Curiosity
Socializer	Co-operating
Killer	Competition

Table 3 Possible new functions for vocab draw

Player types	Functions to implement	Aiming goals
Achiever	Gallery	Collect all the words
Explorer	Stages	Open up every stages
Socializer	Team play	Co-operate with others
Killer	Ranking	Becoming a top player in the ranking

games that this classification is useful, but it is not proven that it would work to educational games as well yet. Therefore, in our future work, we would like to validate its usefulness in an educational game by adding some new features listed in Table 3.

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