



# **A Discussion on Implementing Digital Game-based Learning in the Context of Multicultural Environment**

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**Abstract:** Digital game-based learning suits the learning style of today's students and calls for further research on what could possibly be the most educational ways of using it. In addressing this question, we conducted a case study looking at the learning process among culturally distinct students based on the assumption that cultural differences can influence digital game-based learning processes. This paper reports a pilot study of a forthcoming larger scale study. We first developed two digital games for Chinese language learning in order to tease out culture-dependent preferences and traits among Eastern and Western learners. These were compared with data arising from direct observations and interviews with four students. The findings indicate that in general, Eastern learners were fond of the type of digital game that involves social cues and situational factors while Western learners preferred simple design and goal-oriented learning game in which they can have the power of control.

**Keywords:** Culture, Digital game-based learning, Education, Social cues, Power Control

## **1.1 Introduction**

Digital games are known to have numerous educational benefits if used appropriately (Tsai, Yu, & Hsiao, 2011; Prensky, 2001a, 2001b). The so-called Digital Game-based Learning (DGBL) can provide today's learners with an accessible, flexible, independent and individualized learning (Thomson, 2010).

Digital games can also enhance learning engagement (Van Eck, 2006) by stimulating learners' interest and active participation with multi-sensory environment (Batson & Feinberg, 2006; Robertson & Howells, 2008). DGBL is also known to better sustain the motivation of learning compared to traditional teaching and learning process (Tuzun, Yilmazsoylu, Karakus, Inal, & Kizikaya, 2009). Some other studies highlighted that DGBL enhances students' social development (Yien, Hung, Hwang, & Lin, 2011) and facilitates players' communication skills and social interaction abilities with other players (Tsai, Lin, & Chien, 2011).

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The foregoing and other mainstream studies analyze the benefits of the DGBL in general. However, since there are different types of games and learners themselves are from equally different backgrounds, many extant studies could be criticized on the ground that there is no such a thing as “one size fits all” DGBL for learners across all social and cultural contexts. The literature on what kind of DGBL suits best for culturally diverse students is almost non-existent in the field.

We report hereafter a pilot study of a forthcoming larger scale research that examines a specific moment in a DGBL implementation for language learning. More concretely, we look at how culturally diverse students have different user preferences and learning patterns in DGBL.

In this paper, the concepts such as ‘East Asians’ and ‘Westerners’ are used in their broader meaning as they appear in the framework of social psychology researches conducted by Richard Nisbett and collaborators (Nisbett, Peng, Choi, & Norenzayan, 2001; Nisbett, 2003; Nisbett & Miyamoto, 2005):

1. Perception of the world—Easterners see the world as a net full of relationships while Westerners see the world as a combination of unconnected individual objects. The holistic view and analytic view possessed by Eastern and Western students lead them to focus on different aspects: Eastern turn to pay more attention to social relationships and environmental factors and see the world as a whole while Western are likely to attend more to objects and regard the world as a place of discrete things under different categories.
2. Cognitive process—When facing a new problem or event, Eastern students ask “How” as twice as that of Western students while Western students ask “Why” more frequently than Eastern students. Process-oriented behavior leads Eastern pay more attention to how the event is developed while goal-oriented behavior leads Western to set a goal and try to achieve it.
3. Controllability—Western students have a much more feeling for control compared with Eastern students.
4. Complexity and Simplicity—Western students prefer simplicity while Eastern students would like to believe that things are complex than it looks like.

The starting assumption of the present research is that Eastern and Western learners are different in terms of their cultures and these in turn can influence their learning through DGBL. All of the mentioned above could be factors that affect learners’ effectiveness when engaged in DGBL.

## **1.2 Design of Two Digital Games**

In order to investigate how and in what ways that culture differences affect learning in the implementation of DGBL, two digital games were designed. The two online digital games were designed taking into account three aspects: technical aspects, educational aspects and interphase aspects. Both digital games follow similar rules and share similar features in the first two aspects, but they differ in the interphase aspect. In terms of the interphase, one game is based on Eastern culture while the other, on Western culture.

### *1.2.1 Technical Principles*

A good online digital educational game should in animation form with interactive sounds coming out when playing. Meanwhile, the functions of pause, repeat and hints offering are all important (Wood, 2001). The CARE model (Yuen & So, 1999) also indicates that a good online learning game should be user-friendly. Based on the principles mentioned above, two online digital games were designed to be user-friendly, to our best ability, with the functions of pause, repetition and hints so that the users can stop or switch the game based on their own interests.

### *1.2.3 Educational Principles*

In terms of evaluation criteria for the educational perspective, especially on vocabulary learning aspect, Wood (2001) suggested several principles. In the two designed digital games, we adopted two

principles from Wood: firstly, the games provide in-depth processing; secondly, they offer the opportunity of providing multiple exposures to the new words.

#### 1.2.4 Interphase Design Principles

A good online digital educational game should in animation form with interactive sounds coming out when playing. Meanwhile, the functions of pause, repeat and hints offering are all important (Wood, 2001). The CARE model (Yuen & So, 1999) also indicates that a good online learning game should be user-friendly. Based on the principles mentioned above, two online digital games were designed to be user-friendly, to our best ability, with the functions of pause, repetition and hints so that the users can stop or switch the game based on their own interests.

#### Digital Game No.1 (see Appendix 1)

This digital game was designed based on the psychology thoughts of Eastern learners. The objects to be learned were placed in a harmonious way and they are interrelated to one another. The interphase of this game gives learners a holistic view of the relationships among the objects that are going to be learned (see Figure 1).

#### Digital Game No.2

This digital game was designed according to the psychology thoughts of Western learners. The items that are going to be learned were placed into different categories without any contextual connections. Also the simple, clean interphase provides learners with the scene of controllability (see Figure 2).

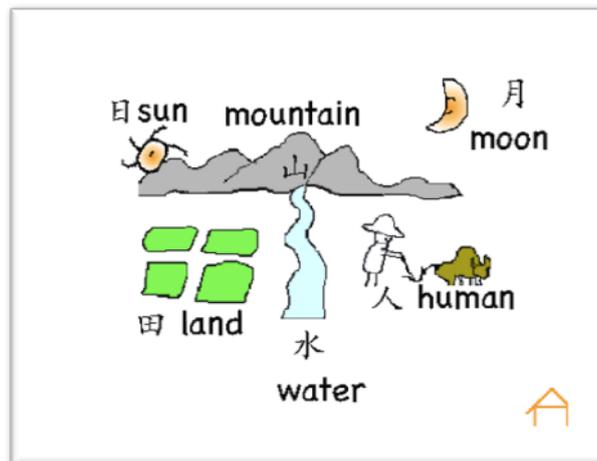


Figure 1. Interface of digital game No.1

English	Object	Chinese	Pronunciation
Wood		木	
Rain		雨	
Eye		目	

Figure 2. Interface of digital game No. 2

### **1.3 Purpose of the Study**

This case study aims at better understanding the link between digital game-based learning and culture differences. We investigate whether there is a relationship between culture and digital game-based learning. We explore how and in what ways culture differences are influencing the digital game-based learning outcome. In addition, we collect students' feedback on two online digital games in order to understand students' attitudes toward them.

#### *1.3.1 Research Questions*

1. Is there a significant cultural difference in students' vocabulary acquisition after using two different online digital games in their learning?
2. What are the elements in the online digital games that contribute to the vocabulary learning?

### **1.4 Methodology**

#### *1.4.1 Choice of Approach*

In this study, pre-/post-test together with interview were used to examine how and in what ways culture differences influence learning outcome in the process of implementing online digital game. Pre-/post-tests were aimed at examining whether culture differences have an impact on the learning outcome. Interviews were used to find out students' attitudes toward digital games after the application and see what are the factors in the two digital games that affect learner's vocabulary acquisition.

#### *1.4.2 Participants*

Participants in this study included four Chinese learners who learn Chinese as a second language. Among the participants, Sam and Peter (pseudonyms are used in this study to protect participants' identity) come from France. The other two participants are Emma from Japan and Theresa from India. The four participants are all adults. Besides the gender and age difference, participants are of the same level in terms of their Chinese vocabulary knowledge.

#### *1.4.3 Procedures*

Four procedures were involved in this study: Pre-test, digital game No.1 & No.2 playing, comparison test (post-test) and focus group interview.

##### *1.4.3.1 Pre-test*

All learners were required to take the pre-test. Participants had to answer 5 fill-in-the-blank questions and 5 multiple choice questions in 10 minutes. The questions were designed based on the words in the digital games. The total mark of the test is 100. The test score was assessed after student hand in the test paper. The aim of the pre-test is to find out how well students understand the vocabulary that is going to be learned and it will provide as a reference to see whether there is an improvement after learning. To ensure that this pre-test will not affect the post-test in the future, learners would not be given any feedback or marks after they handed in the test paper. Either were they informed that there would be a post-test so that no more attention would be given to the words appeared in the test.

##### *1.4.3.2 Digital Game Playing*

There was a five-minute introduction to the two games given at the very beginning. Then participants were given fifteen to twenty minutes to get familiar and explore the designed games one by one. The learning process was monitored throughout to ensure that students were playing the assigned games without getting distracted.

#### *1.4.3.3 Post-test*

There were two vocabulary sheets for learners to finish. After learners done with one digital game, they were asked to complete the corresponding sheet and then moved to the other digital game and finally finish the other vocabulary sheet at the end of exploring the digital game. Vocabularies covered in the two tests were the words that appeared in the two games and they were of the same level in terms of difficulty. Also, the vocabularies that appeared in the post-test were almost the same as that in the pre-test. However, the forms of the post-test and the sequences of the questions will be designed different from that in the pre-test in order to ensure the reliability of the test.

#### *1.4.3.4 Focus Group Interview*

All participants were invited to group interview (see Appendix 2) in order to better investigate their attitudes toward two digital games and to find out whether culture is influencing learners' preference when choosing the digital game to learn. The interview took around sixty minutes and the whole process has been recorded in written and audio format. More in depth questions were asked in order to find out what are the elements in the digital game that attract learners attention and whether there is a different preference between Eastern and Western learners when choosing the type of games. Questions like "which game do you think is more attractive to you", "why do you think so", "what are the elements in this game that you like" and "in what ways do you think the game is helpful in your vocabulary building" will be covered in the interview.

## **1.5 Methodology**

#### *1.5.1 Pre- and Post-test*

In order to find out whether there is any difference in Chinese vocabulary acquisition before and after the online game playing, results of the pre- and post-test were compared. There was a significant increase in the mean score, from 40 to 80, which indicates that the online digital game has helped students' Chinese vocabulary acquisition. In contrast, there was no big difference between the results of Asian learners and Western learners in the two vocabulary tests of the post-test, which suggests that the two different games are almost equally effective to both Eastern and Western learners.

#### *1.5.2 Focus Group Interview*

After word-for-word quotes transcription, content analysis was used to explore students' attitudes toward two digital games. According to Janis (1965), there are three types of content analysis: pragmatological content analysis, semantical content analysis and sign-vehicle analysis. Semantical content analysis aims to categorize the signs based on their meaning (Krippendorff, 2004), thus it was used in clarifying students' attitudes toward two online digital games. When talking about the digital game No.1, the most frequent appeared words were "harmony", "interesting", and "united". When it comes to digital game No.2, the description were "simple" and "clear". There is no difference between Eastern and Western learners when giving comments on the two digital games. Taken together, Eastern and Western learners share the similar feelings toward two different types of digital games.

Pagmatological content analysis was also used in data analysis to find out the factors that are influencing the preference of Easter and Western learners when choosing the games since pagmatological content analysis seeks to group signs according to cause and effect (Krippendorff, 2004). Simple and categorized interphase is one factor brought up by Western students that makes them have a favor for digital game No.2. "The interphase is so clear for learners. Every item was placed in different categories and it makes it easier for me to choose the one I want to learn." (quoted from Peter in interview, 27th, July, 2014). Contextual learning provided by the digital game No.1 was favored by Eastern learners. "This game

provide me with a holistic view of all the items, which makes it easier for me to understand and to remember the individual word in a big picture” (quoted from Emma, 20th, July, 2014).

## **1.6 Conclusion**

Based on a few research from neurobiology and social psychology, Prensky (2011b) suggested that contemporary digital natives think differently due to their distinct culture. However, his research and many others in the field consider that entire generation of learners belongs to one distinct but homogeneous culture. This is rather counterintuitive and problematic.

The present paper tries to understand better the culture-dependent preferences and traits among Eastern and Western learners when involved in Digital Game-Based Learning (DGBL). The data arising from direct observations and interviews with four students participating in this pilot study.

The findings indicate that, in general, there was no big difference between the learning outcome of the Eastern and Western learners in the early implementation of digital game-based learning. However, there were differences between Eastern and Western learners’ preferences within the DGBL. Eastern learners are fond of the type of digital game that involves social cues and situational factors while Western learners preferred simple designed, goal-oriented learning game in which they can have the power of control. Apart from the cultural factors, learners’ personality and ability should probably be taken into consideration when choosing the right type of digital game.

There are a number of obvious limitations in this study. The first and most important one is its small sample size, hence, the results from this study are not generalizable. However, it should be said the present paper is based on a pilot study that was intended to find a viable research framework and have it tested for a later research. A universal generalization is therefore neither claimed nor intended. Second, some inside factors such as participants’ personality, ability, and experience of playing digital games could also influenced by the result. Therefore, we cannot claim that the findings of this study totally derive from the culture differences. It is hoped that our future main research can shed light on these blind spots.

## **References**

- Baston, L., & Feinberg, S. (2006). Game designs that enhance motivation and learning for teenagers. *Electronic Journal for the Integration of Technology in Education, 6*, 34-43.
- Janis, I. (1965). The problem of validating content analysis. In H. D. Lasswell, N. Leites, et al. (Eds.), *Language of politics* (pp. 55-82). Cambridge: MIT.
- Krippendorff, K. (2004). Reliability in content analysis. *Human Communication Research, 30*(3), 411-433.
- Li, C. S., & Beverly, I. (2008). An overview of online education: Attractiveness, benefits, challenges, concerns and recommendations. *College Student Journal, 42*, 449-458.
- Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review, 108*(2), 291-310.
- Nisbett, R. E. (2003). *The geography of thought: How Asians and Westerners think differently-- and why*. New York: Free Press.
- Nisbett, R. E., & Miyamoto, Y. (2005). The influence of culture: Holistic versus analytic perception. *Trends in Cognitive Sciences, 9*(10), 467-473.
- Prensky, M. (2001a). *Digital game-based learning*. New York: McGraw-Hill.
- Prensky, M. (2001b). Do they really think differently? *On the Horizon, 9*(6), 1-9.
- Provost, J. A. (1990). *Work, play and type: Achieving balance in your life*. Palo Alto, CA: Consulting Psychologist Press.
- Robertson, J., & Howells, C. (2008). Computer game design: Opportunities for successful learning. *Computers & Education, 50*(2), 559-278.
- Thomson, D. L. (2010). Beyond the classroom walls: Teachers’ and students’ perspectives on how online learning can meet the needs of gifted students. *Journal of Advanced Academics, 21*, 662-712.

- Tsai, C.-C., Lin, S. S., & Tsai, M.-J. (2001). Developing an Internet attitude scale for high school students. *Computers & Education, 37*(1), 41-51.
- Tsai, F. H., Yu, K. C., & Hsiao, H. S. (2011). Exploring the Factors Influencing Learning Effectiveness in Digital Game-based Learning. *Educational Technology & Society, 15*(3), 240-250.
- Tuzun, H., Yilmazsoylu, M., Karakus, T, Inal, Y., & Kizikaya, G. (2009). The effects of computer games on primary school student's achievement and motivation in geography learning. *Computers & Education, 52* (1), 68-77.
- Van Eck, R. (2006). Digital game-based learning: It's not just the digital natives who are restless. *EDUCAUSE Review, 41*(2), 16-30.
- Wood, J. (2001). Can software support children's vocabulary development? *Language Learning & Technology, 5*(1), 166-201.
- Yawkey, T. D., & Pellegrini, A. D. (1984). *Child's play: Developmental and applied*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Yien, J. M., Hung, C. M., Hwang, G. J., & Lin, Y. C. (2011). A game-based learning approach to improving students' learning achievements in nutrition course. *Turkish Online Journal of Educational Technology, 10* (2), 1-10.
- Yuen, H. K. and So, H. (1999). CARE for the education web resources. e-Education: challenges and opportunities, *Proceedings of the Fifth Hong Kong Web Symposium*. Castro, F., Lai, R. and Wong, Sr. M. (Eds.) (pp.309-324). Hong Kong: Social Sciences Research Centre, The University of Hong Kong.

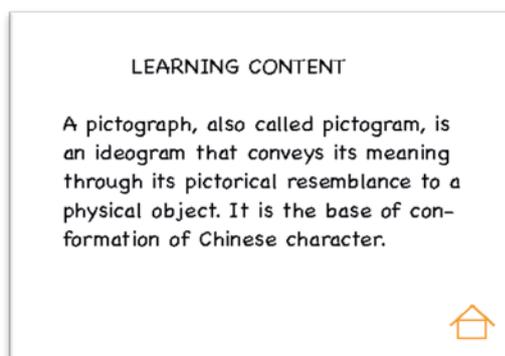
## Appendix

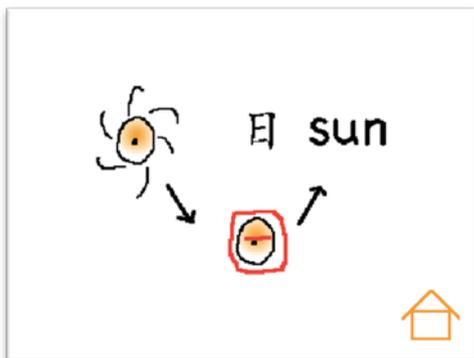
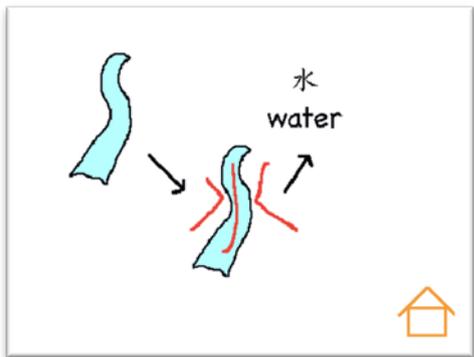
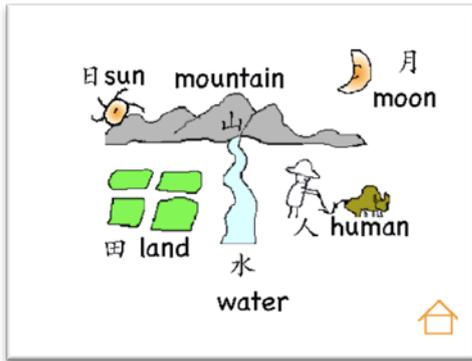
### Appendix 1. My Designed Online Digital Game No.1

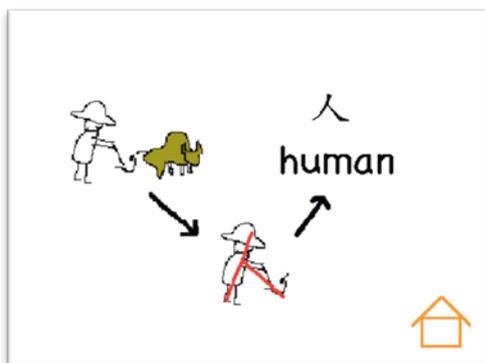
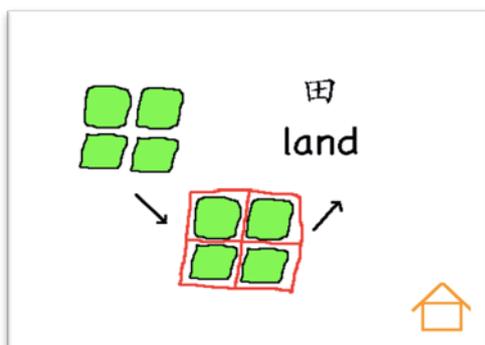
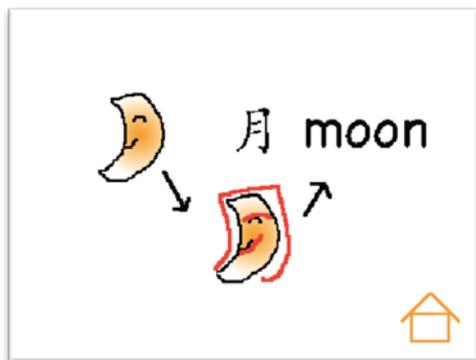
#### *Prototype of the digital game No.1*

Below is the link to my online digital game (title: Chinese vocabulary learning).

<http://scratch.mit.edu/projects/21041022/#player>







#### Appendix 2. Interview Questions

- Tell us a little about yourself and your Chinese learning.
- Have you ever played an online digital game before? Are they of educational benefits?
- What were some of your initial thoughts toward online digital games?
- Do you like the online digital game we gave to you?
- Which one do you like better and can you explain the reasons in details?
- What do you like most about the online digital game No.1?
- What do you like most about the online digital game No.2?
- Do you think the online digital game helps you in Chinese vocabulary learning? Please explain further.
- What are the factors do you think are most attractive to you in the online digital games?
- If you have to choose one digital game from the two designed ones, which one do you prefer better and why?

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