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Game-based Narrative System for Student English Learning

Zhi-Hong CHEN[a*], Huei-Jhen CIOU[b] & Pei-Yun CHI[b]
[a]*Graduate Institute of Information and Computer Education, National Taiwan Normal University, Taiwan*
[b]*Department of Information Communication, Yuan-Ze University, Taiwan*
*zhchen@ntnu.edu.tw

Abstract: In this paper we describe a game-enhanced language learning system that uses narrative as an interactive environment to anchor student language learning. The system consists of three layers, including game world, storylines, and dialogues. In addition to the development of the system, a preliminary system evaluation was also conducted. The results revealed that the system make students have a significant improvement in terms of their learning effectiveness.

Keywords: Game-based learning, English vocabulary, Narrative

1. Introduction

According to the principle of situated learning theory (Lave & Wenger, 1991), learning is advocated to be situated in a specific context, or embedded in a particular social and physical environment (Kindley, 2002). Based on the foundation, different approaches are investigated to explore how to apply this principle in practice: scenario-based learning (Clark, 2009), and game-based learning (Prensky, 2008). First, scenario-based learning places students in authentic works in order to integrate needed knowledge and skills situated in the context (Clarke, & Mayer, 2011). In other words, scenario-based learning advocates that students should learn in concrete situations and by examples, instead of abstract or decontextualized knowledge. In addition, game-based learning recently provides promising potentials to support situated learning through characteristics of digital games in student motivation and participation (Schultz & Fisher, 1988).

On the other hand, it has been indicated that vocabulary plays a significant role in mastering a foreign language (Nguyen & Khuat, 2005), and language learning and acquisition is better to occur from meaningful contexts, not separated from the learning situations (Krashen, 1981). Following this line of thought, different studies of game-enhanced language learning have been explored. This is due to the fact that digital games could stimulate student participatory motivation and improve learning effectiveness. For instance, Chen and Yang (2013) used digital games to help students acquire second language, and the results indicated that digital games could stimulate student motivation and further foster their reading, listening, and vocabulary skills. In addition, Chen and Tsai (2009) used mobile games to help students learn English, and the finding indicated that this game-based system could increase students' interest and willingness to learn.

However, game-enhanced language learning often focuses on the game types and rule-based mechanisms, and ignores the potentials of narrative and dialogues. Previous study has indicated that character design and narrative environment are two features that could foster student learning (Dickey, 2007). Thus, there is a need to investigate how to integrate narrative with the development of game-enhanced language learning systems.

2. Interactive 3D game: PlanetAdventure

This study develops an interactive narrative game, named PlanetAdventure system, which extends the background setting of the novel "little prince" (de Saint-Exupéry, 2013). Students play the role of little

prince to find his lovely rose in the B612 planet, but the rose is murdered. Thus, the game goal is to expose the mystery: who murder the rose and the reason why. The PlanetAdventure system consists of three major components: game world, storylines and dialogues (see Figure 1).

2.1 Game World

The game world is established based on the background story of the novel "little prince", which consists of several scenes in the planets. Each scene involves different non-player characters (NPCs) that can interact with students to trigger specific events, such as discovering cues, initiating dialogues, or starting specific events. The purpose of these different scenes in the planets is to offer students immersive contexts to learn, because they have more controls in the game world to decide where to explore, whom to talk, what object to pick up. These choices and controls in the game world allow them to create their own "story" and learning experiences.

2.2 Storylines

The storylines refer to the series of events that happen in the game world, and are also called "plots". The main storylines of the PlanetAdventure system is to expose the murders who kill the rose, and contains three storylines: king "penguin", conceited "parrot", and lamplighter "fish". Different from the original novel, these NPCs in this system are illustrated in the forms of cartoon animals to engage students in a fantasy world. Storylines are the main topics of the learning materials. When students advance in one of the storylines, they are situated in a specific scene. In this way, the entire game environment is learning materials, were students can interact with these NPCs and learn from the dialogues.

2.3 Dialogues

When students advance in one of storylines, they will encounter a number of NPCs, which will initiate pre-defined dialogues, and offer students information and cues about the murderer. Because the game goal is to figure out the mystery, they are required to interact with different NPCs for obtaining news and information, and then interpret and reason the cause-and-effect relationship. This purpose will drive students to understand comprehensively the information what the dialogues provide. In other words, such game environments could be regarded as "anchor" to combine learning materials, and students can learn from the sentences, vocabularies of the dialogues.

Figure 1. Screenshot of the PlanetAdventure system

3. Pilot Study

After the PlanetAdventure system was implemented, a pilot study was further conducted to preliminarily evaluate the influences of the system. The participants were 61 college students who used the system for 40 minutes to learn 30 specific English vocabularies. These English vocabularies were embedded into the dialogues of the system. Pre-test and post-test were employed before and after the system use, respectively. Both of the tests were the same, but they were formatted in different order to prevent the rote effect. The test contained was 30 blank-filling questions with the scores ranging from 0 to 100. The results of the pre-test and post-test were illustrated in Table 1. A paired-sample t-test was further conducted to examine its difference, and the finding indicated that the improved scores had a statistical significance, implying that the PlanetAdventure system make student improve their learning effectiveness. However, more future work is required to investigate the influences of the system, and obtain more feedback to revise the system development.

Table 1: Results of the pre-test and post-test

	Pre-test		Post-test		t
	Mean	SD	Mean	SD	
Score	10.73	5.12	25.14	4.74	-27.95**

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References

Chen, C. M., & Tsai, Y. N. (2009). Interactive location-based game for supporting effective English learning. In Environmental Science and Information Application Technology, 2009. ESIAT 2009. International Conference on (Vol. 3, pp. 523-526). IEEE.

Chen, H. J. H., & Yang, T. Y. C. (2013). The impact of adventure video games on foreign language learning and the perceptions of learners. Interactive Learning Environments, 21(2), 129-141.

Clark, R., (2009). Accelerating expertise with scenario based learning. Learning Blueprint. Merrifield, VA: American Society for Teaching and Development.

Clarke, R. C., & Mayer, R. E. (2011). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning. (3rd ed.). John Wiley & Sons.

de Saint-Exupéry, A. (2013). The little prince. Houghton Mifflin Harcourt.

Dickey, M. D. (2007). Game design and learning: A conjectural analysis of how massively multiple online role-playing games (MMORPGs) foster intrinsic motivation. Educational Technology Research and Development, 55(3), 253-273.

Kindley, R. W. (2002). Scenario-based e-learning: a step beyond traditional e-learning. ASTD Magazine. Retrieved from http://www.astd.org/

Krashen, S. D. (1981). Second language acquisition and second language learning. Oxford University Press.

Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge university press.

Nguyen, T. T. H. & Khuat, T. T. N. (2005). The effectiveness of learning vocabulary through games, Asian EFL Journal Quarterly, 5(4). Available online at: http://www.asian-efl-journal.com/dec_03_vn.pdf.

Prensky, M., & Prensky, M. (2007). Digital game-based learning (Vol. 1). St. Paul, MN: Paragon house.

Schultz, M. & Fisher, A. (1988) Games for all reasons: interacting in the language classroom (Reading, MA, Addison-Wesley).