S. L. Wong et al. (Eds.) (2010). Proceedings of the 18th International Conference on Computers in Education. Putrajaya, Malaysia: Asia-Pacific Society for Computers in Education.

Design and Implementation of a mobile game-based system to Support Chinese language speaking for International Students in a Chinese Environment

Sara REINA, Shelley S. C. YOUNG
National Tsing Hua University, Taiwan, R.O.C.
s9865685@m98.nthu.edu.tw
scy@mx.nthu.edu.tw

Abstract: In Taiwan universities many foreign students suffer difficulties due to adaptation problems and language barrier in a Chinese-Speaking environment. An initial survey showed most international students have a basic level of Chinese and they also consider Chinese as a barrier to be involved in different local activities. This paper presents a mobile game-based system to support Chinese language speaking for international students in a Chinese environment. The system contains a scenario-based fulfilling activities associated of students and it encourages users to speak in Chinese through the mission tasks. The users are rewarded based on their tasks performance and extra points for each level reached. The game system may increase students' motivation to continue their Chinese learning. Besides, mobile devices provide the opportunity to learn Chinese outside the classroom and to interact directly with an authentic living environment.

Keywords: mobile game-based learning, Chinese language learning

Introduction

In Taiwan universities there is a considerable amount of foreign students thanks to multiple opportunities offered by the government and different institutions. For reference the National Tsing Hua University (NTHU) international student's population is 2% of the total student's population. Foreign students face many issues mainly related to the adaptation into a Chinese-speaking environment and the language barrier. Universities efforts to help international students are offering Chinese classes but most of the cases the level of Chinese learned is not enough. In an initial survey we asked foreign students about their level of Chinese, from a total of 56 international students, 19 considered having a basic level, 17 a poor level, 13 with an intermediate level and only 7 consider as advanced Chinese speakers. As well 43 students expressed that Chinese is a barrier to involve more with academic and extracurricular activities. We also asked why they do not continue their Chinese learning beyond a basic level. Their major complains include time conflicts, courses not required by curriculum, methodology used, or no interest, etc.
The Chinese itself is already complex but added the academic burden and more may discourage learners to follow their studies. Hence learning strategies that engage learners is needed. Game based learning was chosen because it is enormously versatile, adaptable to almost any subject, information and skill to be learned [9]. Besides, games are naturally engagers of people because games are fun and are able to support learning in complex environments [2]. The game system desired outcome is to **motivate learners** to keep learning Chinese language. It also aims to promote **interaction** among international

students and their environment, through language and information independency, reason why we include a Cross Platform Map System (CPMS) used in Paniagua [8] study as a tool to locate points and obtain information. The CPMS showed student improvement in recognition of Chinese characters and in general **Chinese language learning**. In a real world foreign students may limit the participation with the environment because of the language barrier, the challenge is provide the right Chinese vocabulary related to their activities and experiences all reproduced in a game. The game provides the scenario and tasks designed for players to **learn and speak Chinese**. We review relevant literature regarding game based learning, mobile, learning theories and then present the design of the game system.

1. Literature Review

1.1 Game based Learning

Game-based learning for years has been prejudice but in the actuality academics, writers, foundations, game designers, companies and educators are aware of the enormous potential for learning contained in the gaming medium [9]. Although game-based learning has proved it effectiveness, the key point lies on the design of a game simple and attractive for learners, with good quality of content all combined with most representative characteristic of games: fun.

Technology has changed the learning ways of nowadays learners: learning is oriented into the visual, learners scan instead of read. The new generation of learners requires multiple streams of information, prefer inductive reasoning, want frequent and quick interactions with content, and have exceptional visual literacy skills; characteristics that stick to the approach of game based learning [3]. Besides there is an increase of popularity of games, gamers spends hours playing. Learning systems must take advantages of the popularity of games and develop new ways of teaching that engage learners just like game engage players.

1.2 Motivation and Learning

Learning and motivation are two terms that cannot be separated. A *sine qua non* of successful learning is motivation: a motivated learner cannot be stopped [9]. Motivation matters when learning; we would all like our learners to be: interested, competitive, active learners, etc unfortunately today students are lack of this. Alternative games offer several factors that motivate gamers and learners to keep playing.

A game that engages learners needs to have some characteristics such as: challenge, fantasy and curiosity [7]. Of those game characteristics is the first one which calls the attention. In Schwabe and Goth study [10] the competitive tasks were the most interesting feature to the learners. Learners got engaged because of the emotions immerse on competition. Game based leaning can motivate learners to be persistent with Chinese language learning, based on the idea that appears to be something in gaming that deeply touches people of all ages [10].

1.3 Mobility

Mobile technologies offer the opportunity to embed learning in a natural environment [10]. It is in a natural environment where international students face several issues. A ubiquitous learning environment allows students to learn with a PDA, Web Pad, Tablet PC

or laptop, indoor, outdoor, individual, and group situations [1]. Mobile technologies and games technologies are increasingly seen as a fertile ground for the development of resources to support learning [5]. In this study we focus on handheld and mobile phones because of their ubiquitous characteristics and their popular use among students. In addition, the system will be available in regular browsers with personal computers.

1.4 Theoretical and Instructional Background

The main purpose of this study is not just an entertainment game but an educational game. It has a ground basis in learning theories. The system is aligned with discovery learning theory that underscores the importance that learners interact with their environment. Students are more likely to remember concepts if they discovered on their own [6]. Furthermore the study lays on the situated cognition theory: the situated cognition is rooted in the social development theory of Vygotsky [11] in which social interaction plays a fundamental role in the development of cognition. For this game the learning take place in through the discovering of the context and players participate, interact and collaborate with other players in teams, as the members of a community [6].

1.5 Chinese Language Learning

Learning Chinese as a foreign language is considered difficult because of the complicate shape of its characters, different pronunciation and multiple meanings [8]. The Chinese is the official language in Taiwan. It has an inventory of 21 syllable-initial consonants, about half of a dozen vowels, more of 50,000 characters, and four lexical tones: Tone 1 (high level), Tone 2 (mid-rising), Tone 3 (low-falling-rising or low-falling) and Tone 4 (high-falling). The Pinyin is a system of Romanization for the Chinese language, where *pin* means "spell" and *yin* means "sound" the Pinyin Romanization system is used to teach pronunciation of Mandarin; learning Chinese as a foreign language by pinyin may allow learners to "read" and "speak" Chinese. Our system bases on the pinyin system to provide learners the opportunity to speak and communicate effectively, because it is widely agreed that the best way to learn to speak a language is to engage in natural conversation with native speakers [4].

2. Research questions

The research uses a game based system focusing in motivation and interaction to support the continuing of Chinese Language learning. Therefore on the basis of the issues raised in the foregoing discussion, the following research questions were formulated.

- What strategies should the game system have to engage college students to be motivated in learning Chinese language?
- What key factors should be included in the system to make students interact with the physical environment to support and gain language learning?
- How do the learners will respond to the game? Will the learners enjoy playing and value it as a useful supporting tool for their Chinese language learning?
- Does the game lead to increase learner’s motivation so they would like to play again and keep learning Chinese?

3. Participants

The international students of NTHU represent 2% of the total student population. They have different backgrounds, cultures, academic levels and Chinese language levels. The target users will be limited to the students without Chinese background or the basic level.

4. The scenario

The NTHU campus students play daily life and academic activities that are ideal for the game scenario. The learners—international students of NTHU—will learn useful Chinese vocabulary as well discover diverse points of the campus.

5. The content of the game

The Game is played in the physical campus of NTHU. Game level is defined by circuits according the type of buildings. Players receive clues to find a place within the campus map (Figure 1a). Using the map players can find the right location (Figure 1b). Once in the place they must perform a task (Figure 1c). The task and clues are given in English but the vocabulary and phrases needed to complete the tasks are given in Chinese (Figure 1d). After a task is completed the system will question players to verify the task they completed (Figure 1e). Players must visit all spots in a circuit to move to a next level.

(a) *(b)* *(c)* *(d)* *(e)*

Figure 1: Cell phone applications

6. Game Framework

The proposed game framework is based on the MobileGame of Schwabe and Goth study [10]. In addition, we include the CPMS tool, used as an exploration tool of the NTHU campus and as a language learning that uses a built in English-Chinese dictionary (Figure 2).

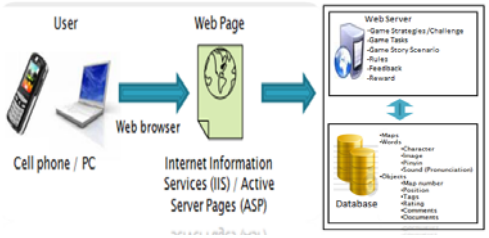

Figure2. System Architecture Design

The players will have the campus as a game scenario. They will complete tasks and interact with the environment. Moreover they will gain language knowledge through the performance of the tasks. Based on the literature review our game has six structural elements [9] as a ground base of our system: 1. Rules (Control the interaction of player); 2.

Goals and Objectives (establish the knowledge to be learnt: Chinese vocabulary and directions); 3.Outcomes & Feedback (to measure the knowledge learnt); 4.Conflict /Competition /Challenge/ Opposition (factors needed to engage and increase the motivation of learners); 5. Interaction (One aim of the system is promote the interaction of player with locals) and 6. Representation or Story. We base in those factors to create the game that teaches Chinese language with the implicit characteristic of games: Fun.

7. Discussion and Future work

This paper has discussed the proposal of a mobile game-based system to support the Chinese language learning of international students in a Chinese environment. Motivation matters: when students are highly motivated the probability of achieve an advanced language level is higher than those who are not motivated therefore a game was chosen for learning tool because games engage people.

Several concerns arise from this work-in-progress study such as the fact that international students come from diverse backgrounds. The system might go through modifications to make sure the whole design of the game can adjust to the needs of the target learners. Next steps in the construction of this project will focus on software development, implementation and collection of results and more research work will be reported later.

Acknowledgments

We thank the International Cooperation and Development Fund (ICDF) for the financial support to one of the authors studying at National Tsing Hua University, Institute of Information Systems and Applications, Taiwan.

References

[1] Chen, G. D., Chang, C. K., & Wang, C. Y. (2008). Ubiquitous learning website: Scaffold learners by mobile devices with information-aware techniques. *Computers & Education*, 50(1), 77-90.

[2] Downes, S. (2010). New Technology Supporting Informal Learning. *Journal of Emerging Technologies in Web Intelligence*, 2(1), 27-33.

[3] Eck, R. V. (2006) Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless. *EDUCAUSE Review*, 41(2), 16–30.

[4] Ehsani, F., & Knodt, E. (1998). Speech Technology in Computer-Aided Learning: Strengths and Limitations of a New CALL Paradigm. *Language Learning and Technology*, 2(1), 45-60.

[5] Facerw, K., Joiner, R., Stanton, D., Reidz J., Hullz, R., & Kirk, D. (2004) Savannah: mobile gaming and learning? *Journal of Computer Assisted Learning*, 20(6), 399–409

[6] Kebritchi, M., & Hirumi, A. (2008). "Examining the pedagogical foundations of modern educational computer games." *Computers & Education*, 51(4), 1729-1743.

[7] Malone, T. W. (1980). What makes things fun to learn? Heuristics for designing instructional computer games. *Proceedings of: 3rd ACM SIGSMALL symposium and the Wrst SIGPC symposium on small systems* (pp. 162–169).

[8] Paniagua, Y. J. (2009). Constructing a Cross-platform Map System (CPMS) to Facilitate Adaptation and learning for International Students in a Chinese-speaking Environment. (Master's thesis). National Tsing Hua University, Hsinchu.

[9] Prensky, M. (2001) *Digital Game-Based Learning*. New York. McGraw-Hill.

[10] Schwabe, G., & Goth, C. (2005). Mobile learning with a mobile game: design and motivational effects. *Journal of Computer Assisted Learning*, 21(3), 204-216.

[11] Vygotsky, L. S. (1978). Mind in society. Cambridge, MA. Harvard University Press.