The Primary Design of a Game-based Mobile Learning for Practicing Chinese Language

Jing-Jia CHEN[a*], Chang-Hwa WANG[a]
[a]*Dept. of Graphic Arts and Communications, National Taiwan Normal University, Taiwan*
*60072013h@ntnu.edu.tw

Abstract: A mobile game-based activity was presented in this study with the guidance of learning and practicing Chinese as second language. By using existing open-source software which is free and easy-to-use as a virtual interface, this learning activity was designed to deliver real world content that are suitable for Chinese-as-a-second-language students over the mobile devices. In addition, it was expected to explore effects of mobile game-based learning on their academic achievement, motivation, and satisfaction while providing some infomation for future researches.

Keywords: learning Chinese as a second language, mobile learning, game-based learning

Introduction

In recent years, wireless local area networks have been growing rapidly. Mobile devices are widely used along with the increasing availability of other portable and wireless devices. In terms of that, technology-supported learning covers much more. With the use of mobile devices, learners are not only able to learn in the classrooms but also allowed to break down barriers between physical classrooms and the real world. More specifically, mobile learning is learner-centered and ubiquitous with the flexibility, capacity of knowledge sharing, and accessibility anytime and anywhere. The Horizon Report showed that mobile learning has been an important direction for e-learning development [9] [10].

Moreover, Magal-Roy, Lopez, Alvarez, Alarcon, Nussbaum reviewed recent researches on mobile learning design and discussed its benefits [13] [1]. They concluded that too few researches embraced the importance of learning content in the mobile learning context. Thus, this study aimed to adopt existing open-source software as a free and easy-to-use tool to design and utilize a mobile game-based activity with specific instructional content related to learning Chinese as second a language. This would be a good practice of associating language learning with mobile games. Furthermore, we intended to explore the impact of mobile game-based learning on Chinese-as-a-second-language students with regard to their academic achievements, motivations, and learner satisfactions. The initial results of this study might be helpful for future researches in this line.

1. Literature Review

Learning Chinese as a second language

According to Graddol, learning Chinese as a second language has become more important because of the following reasons: Chinese economy has been developed with the growth of international trades in recent years; also, population of Chinese is still the largest in the

world [7]. Therefore, non-native speakers from other countries are likely to be attracted and willing to learn Chinese in Taiwan. Chen & Liu pointed out that those students would encounter difficulties in learning and communicating particularly during the first year of their study in Taiwan [5]. Moreover, Collins indicated that students learning English in a traditional way were tended to involve knowledge acquisition rather than life skills, and without enhancement of learning motivation [6]. Speaking of Chinese learning, we wondered the situation would be the same. Moreover, in traditional classrooms, Chinese-as-a-second-language students would not have sufficient opportunities of practicing Chinese in a real-life context. Thus, it is necessary to have a breakthrough of learning the Chinese language, that is, the context should be more applicable to the real life.

Mobile learning

According to Klopfer, Squire & Jenkins's research, mobile devices have several features which include portability, social interactivity, context sensitivity, connectivity and individuality; also, designers should harness these features into learning activities [11]. Moreover, Holzinger pointed out that using a mobile device in a learning context allows a learner to learn anywhere and anytime while the internet accessibility allows instant communication with other users. With the GPS functionality, it is possible to access content which is relevant to learning goals attached to specific locations of learners. Besides, different media, such as video, images, text and sound, are combined on mobile devices [8].

In the study of Sandberg, Maris and Geus, three groups of primary school students participated in the experiment to explore added values of mobile technology used for learning English as a second language. The first group had classroom lessons in English on zoo animals and their characteristics. The second group took classroom lessons along with the actual use of mobile applications on-site in a public zoo. Speaking of the third group, aside from previous activities, they were allowed to bring the mobile applications home for two weeks. The results indicated that students were motivated to use the application in their spare time and it benefited their learning [16].

Moreover, Billings and Mathison conducted an experimental research. Four classes were chosen as the control group with no intervention and different treatments were implemented as the following description: two classes were using DVD of TBAOs (iPod) in English in the whole class while the other two classes were using HMD with TBAOs (iPod) in English and Spanish for each student. The results indicated that students from the treatment groups increased their motivation and engagement [2]. In summary, so far, many mobile-assisted language learning activities have been successfully implemented in the second language learning context.

Game-based learning

Charles, Bustard & Black believed that e-learning would be equally successful with the adoption of certain engagement techniques used in games. They concluded that digital games should include the following elements: a) structure, including choices, control, goals, and rules; b) identity, including escapism, fantasy, presence, role play, recognition; c) challenge, including competency, competition, curiosity, and context; d) feedback, including sensory information; e) social, including collaboration, cooperation, relationships, social-interaction, and team work; f) ultimately fun. Based on these six elements, the design of games engaged learners more and raised their motivation [4]. Besides, Yan pointed out that game-based learning also included instructional components, such as learning objectives, learning efficiency, and learning satisfaction. Moreover,

substantive empirical evidences were provided in a quasi-experimental design. More specifically, students were randomly assigned to either the experimental group (incorporating DGBL to traditional instruction) or the comparison group (only using traditional instruction). As a result, the DGBL made their learning motivation stronger and learn more effectively while the classroom atmosphere was enhanced [20]. Therefore, for learners, digital game-based learning has various benefits, including enhancing learning motivation, raising learning efficiency, and meeting the learning objectives.

2. The game design

Introduction

In this part, firstly, we explained the reasons for not using existing construction tools, for instance, the Chinese learning Apps. Secondly, reasons for using free, easy, and open-source software to design this game were proposed; also, functions on free and open-source software were introduced.

Recently, education Apps on mobile devices have increasingly emerged, however, their functions are not easily expandable. For example, while using existing Chinese learning Apps to do related learning activities, it is very likely that those Apps would restrict students. More specifically, they would not be suitable for students or meeting learning needs. On the other hand, for teachers, it is too difficult if they never learned how to design Apps. Although Android SDK and iPhone SDK are specialized software to design Apps, there are many steps and techniques in practice. In addition, the rigidness of existing portfolio-construction package tools and software is another issue. As a matter of fact, portfolios constructed by those tools and software are mostly regularized and insufficiently personalized for both teachers and learners.

For these reasons, the free, easy-to-use, and open-source software was chosen as a tool to design the game-based activity. It is able to collect data from various sources or surveys on mobile devices; then, the data is aggregated on a server with useful file formats. In terms of that, for teachers, it is possibly effortless to design tasks and questions related to a game-based activity on mobile devices

Liu, Tan & Chu argued that mobile learning and ubiquitous learning had some characteristics, including being permanency, accessibility, immediacy, interactivity, situation, calmness, adaptability, seamlessness, and immersion [12]. Both Sha, Looi, Chen and Zhang, as well as Park, Nam and Cha proposed that mobile learning could stimulate student interests, learning motivation and effect, and their immersive and collaborative learning experience[17][14]. On the other hand, task-based language learning focuses on asking students to complete meaningful tasks with the use of their target language. The characteristics of task-based language learning includes interaction, student-centered focus, meaningful materials, fluent language production, learning in the real world, and clear learning goals[3][18][15]. With this regard, we presented a mobile game-based learning activity aiming at task-based language learning as an extension aside from traditional face-to-face learning.

A game called ‘Discovery’ was presented. It was designed for learners who completed learning the material *Practical audio-visual Chinese 1*. Details were shown as follows. First, it included topics related to the classroom, library, cooperative stores and campuses. Second, based on the concepts of context-aware, immersive and collaborative learning, it aimed to enable students to learn in a real environment and improve their language skills by using mobile devices. Third, it contained listening, speaking, reading and discussion sections. Speaking of the implementation, there were two parts and each is

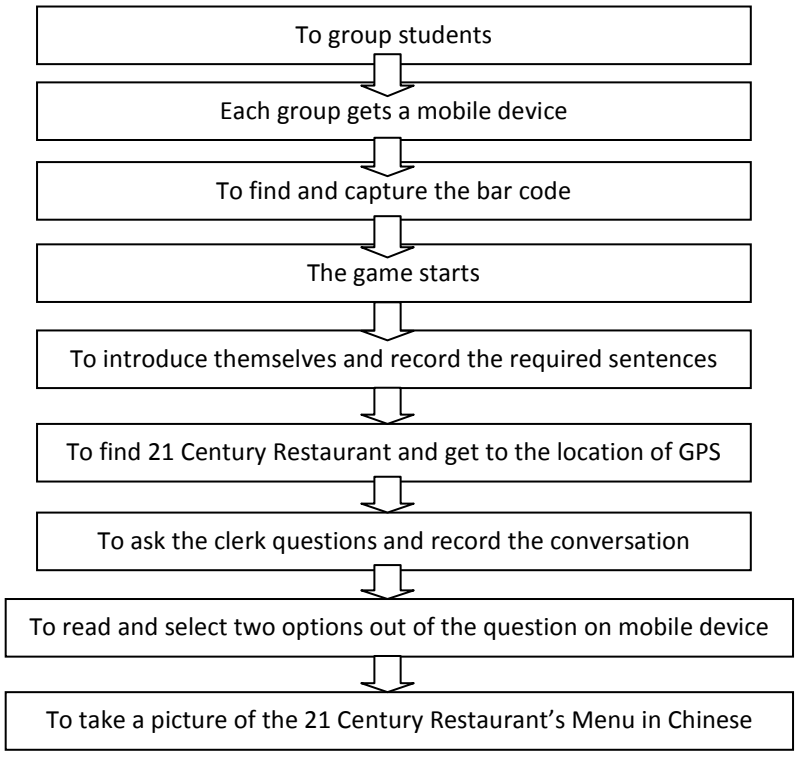
composed of six questions and tasks. The learners were asked to answer questions and complete different tasks. They were also asked to record their pronunciation, make conversation videos, and take photos with the use of mobile devices. In addition, traditional Chinese characters and Hanyu Pinyin system were used. Finally, students were assessed what they learned in the process. The evaluation included Chinese listening, speaking and reading skills.

Setting

'Discovery' was a group game whilst each group consisted of two to three learners with the total of four to five groups. Each of them got a mobile device with the installation of the app Discovery Part One. While playing the game, students had to use this app. Furthermore, they started completing the tasks at the same time and the fastest one would be the champion.

The process of playing the game

First, the learners were grouped and they had to use the built-in cameras on the mobile device to capture the bar code and interpret the content of the images correctly. Then they started off the first task which is to record the following sentence in Chinese: *My name is XXX and I am from XXX* of every student. The second task was to go to the 21 Century Restaurant and get to the location of GPS. The third task was to ask the clerk *"I would like a cup of corn soup and a large cup of iced black tea. How much are these? "* Moreover, students needed to record his conversation by the mobile device. The fourth task was to select two options out of this question "*What are not sold in the restaurant?"* The fifth task was to take a picture of what they ordered on the menu by using the built-in camera on the mobile device. The sixth task was to record a video in which each learner had to introduce what he/she ordered and report the prices. The winner was the group completing all tasks in the shortest time; also, a prize and gifts were awarded to members in that group. Figure1 shows the process of playing the game.



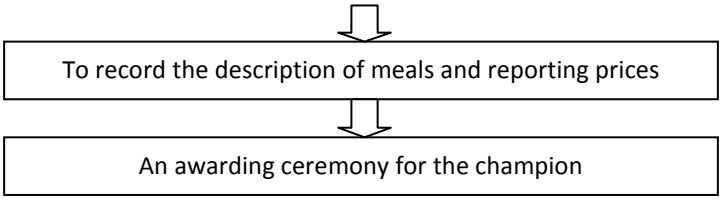


Figure1 the game process diagram

3. Methods

Research questions

This study focused on learning motivation, academic achievement, and learning satisfaction after finishing this mobile game-based activity. A quasi-experimental design was performed. Students were assigned to the experimental group with a mobile game-based learning) or the control group with a traditional game-based activity. More specifically, research questions are as following description:
Q1 Does the mobile game-based learning have an effect on learning motivation?
Q2 Does the mobile game-based learning have an effect on learning achievement?
Q3 What did learners feel about this mobile game-based learning activity?

Research design

Prior to the quasi-experiment, all of the learners had a pretest to evaluate their levels of the Chinese language. In both of the experimental and control group, students needed to learn the material *Practical audio-visual Chinese 1*. However, mobile devices were only available to the experimental group while implementing the game-based activity. After the experiment, a posttest and a questionnaire survey were conducted. The scores between the pretest and the posttest were compared to identify the effects of the mobile game-based activities. Moreover, the questionnaire was analyzed to evaluate their motivation and satisfaction. With the guidelines of Klopfer, Squire, Jenkins[11], and Charles, Bustard & Black [4], this game was designed as following description:

Table 1 The game design worksheet

Features	Mobile learning criteria				
Game design	portability	social interactivity	context sensitivity	connectivity	individuality
Task 1-6	use mobile	collaborate with other learners	gather real & simulated data	Wireless internet	use and work on it by learners

Features	Digital game-base learning criteria					
Game design	structure	Identity	challenge	feedback	social	ultimately fun
Task 1-6	purpose: communicate with people in Chinese language	customers role play	compete with other teams	base on lives of learners & they can identify	cooperate with other learners	learn Chinese with pleasure

Data collection

The design of questionnaire followed the suggestions of Tuana, Chin and Shieh [19]. Two of the six dimensions of motivation were employed in the questionnaire. They are:
a) Self-efficacy: learners believe in their own ability of well-performing in the mobile

game-based learning experience of the Chinese language.

b) Learning environment stimulation: the stimulation surrounded learners, such as using mobile devices, playing the game, and interacting with other students which influenced learner motivation in the mobile game-based learning experience of the Chinese language.

4. Potential applications

This study intended to construct a mobile game-based scheme for learning Chinese. An experiment was designed to explore learning motivation, achievement and satisfaction. Learners were expected to increase their interest in and confidence of learning Chinese after implementing this mobile game-based learning activity. Since properly applying mobile technologies to the second language learning has been increasingly important, this study may provide some useful information for future researches.

Acknowledgements

Funding of this research work is supported in part by the National Science Council of the Republic of China, under research numbers NSC 100-2515-S-003 -008 – and NSC 101-2515-S-003 -008 -.

References

[1] Alvarez, C., Alarcon, R., Nussbaum, M. (2011). Implementing collaborative learning activities in the classroom supported by one-to-one mobilecomputing: A design-based process. *Joirnal of systems and software*, *84*(11), 1961-1976.

[2] Billings, E. S., Mathison, C. (2012). I Get to Use an iPod in School? Using Technology-Based Advance Organizers to Support the Academic Success of English Learners. *Journal of Science Education and Technology*, *21*(4), 494-503.

[3] Carless, D. (2004). Issues in teachers' reinterpretation of a taskbased innovation in primary schools. *TESOL Quarterly*, *38*, 639–662.

[4] Charles, M. T., Bustard, D., Black, M. (2009). Game Inspired Tool Support for e-Learning Processes. *Electronic Journal of e-Learning*, *7*(2), 101-110.

[5] Chen, H. Y., Liu K. Y. (2008). Web-based synchronized multimedia lecture system design for teaching/learning Chinese as second language. *Computer & Education*, *50*, 693-702.

[6] Collins, T. G. (2005). English class on the air: mobile language learning with cell phones. *Paper presented at the Fifth IEEE International Conference on Advanced Learning Technologies*, 5–8.

[7] Graddol, D. (2004). The future of language. *Science*, *303*, 1329-1331.

[8] Holzinger, A. (2005). Usability Engineering for Software Developers. *Communications of the ACM*, *48*(1), 71-74.

[9] Johnson, L., Adams, S., Cummins, M. (2012). *The NMC Horizon Report: 2012 Higher Education Edition*. Austin, Texas: The New Media Consortium.

[10] Johnson, L., Adams, S., Levine, A., Haywood, K. (2011). *The NMC Horizon Report: 2011 Edition*. Austin, Texas: The New Media Consortium.

[11] Klopfer, E., Squire, K., Jenkins, H. (2002). Environmental Detectives: PDAs as a Window into a Virtual Simulated World. *In Proceedings of IEEE International Workshop on Wireless and Mobile Technologies in Education*, 95-98.

[12] Liu, T. Y., Tan, T. H., & Chu, Y. L. (2009). Outdoor natural science learning with an RFID-supported immersive ubiquitous learning environment. *Educational Technology and Society*, *12*(4), 124-140.

[13] Magal-Royo, T., Lopez, J. L. G. (2012). Multimodal Interactivity in the Foreign Language Section of the Spanish University Admission Examination. *Revista DE Education*, *357*,163-176.

[14] Park, S. Y., Nam, M. W., Cha, S. B. (2012). University students' behavioral intention to use mobile learning:Evaluating the technology acceptance model. *British Journal of Educational Technology*, *43*(4), 592-605.
[15] Roig, G. B. (2012). Task-based language learning and focus on form as a teaching concept for German for Tourism. *IBERICA*, *23*, 157-171.
[16] Sandberg, J., Maris, M., Geus, K. (2011). Mobile English learning: An evidence-based study with fifth graders. *Computer & Education*, *57*, 1334-1347.
[17] Sha, L., Looi, C. K., Chen, W., Zhang, B. H. (2012). Understanding mobile learning from the perspective of self-regulated learning. *Journal of Computer Assisted Learning*, *28*(4), 366-378.
[18] Tai, Y. M. (2012). Contextualizing a MALL: Practice Design and Evaluation. *Educational Technology and Society*, *15*(2), 220-230.
[19] Tuana, L. H., Chin, C.C., & Shieh, S. H. (2005). The development of a questionnaire to measure students' motivation towards science learning. *International Journal of Science Education*, *26*, 639-654.
[20] Yang , Y. T. C. (2012). Building virtual cities, inspiring intelligent citizens: Digital games for developing students' problem solving and learning motivation. *Computer & Education*, *59*, 365-377.