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Using Mobile-memo to Support Knowledge Acquisition and Posting-question in an Mobile Learning Environment

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Abstract: This study developed a mobile-memo system that supports the knowledge acquisition and posting-question to assist learners' learning in a web-based learning environment. To understand the effectiveness of our proposed system, the data was collected from the use of the proposed system. The result showed that the mobile-memo was effective for learners to gather information in construction and reflection during the learning activities. In other words, the mobile-memo system could effectively support learners to acquire knowledge and post question relating to the learning course contents during learning activities.

Keywords: Mobile-memo, Knowledge acquisition, Mobile learning, Question-posting

Introduction

In past decade, there has been increased research for the use of digital learning and mobile tools to support mobile learning environment. Because of small size, light weight, portability and wireless communication features, handheld devices are seen as a potential tool to achieve a great positive impact on learning [7][8]. In general, handheld devices are significantly changing human-computer interaction, communication and learning activities. Research has shown that handheld devices provide new opportunities for communication and innovative learner interaction both in and out of the learning setting [4][9]. Although several studies [2] have demonstrated the benefits of mobile learning, the limitation of handheld technology for the delivery in learning objects was the small screen that could available for effective display [3]. That is, a potential limitation of such screen size leads to lack of effective presentation of information and knowledge acquisition. Besides, in such mobile learning environments learners can only retrieve learning materials given solely by the systems.

Besides, prior research showed that gender issues in technology use have been noticed. For example, the males had more positive attitudes, more confidences and more competencies than the females in using the computers and further in participations of technology-related works [6]. Additionally, female students tend to express their ideas verbally, and the least amount of visual representations [5].

This paper presents an implementation of handheld devices in support of a mobile learning on a real curriculum. From another learning perspective, it is taken into account that educational materials could be provided by the learners. By doing so, learners could actively discover their learning contents for themselves rather than via passive guidance to achieve the purpose of knowledge acquisition and sharing. The present study designed a mobile-memo system that

allows students to gather information and post question to the website where they can view and share in the classroom or at home. Research questions are as follows:

1. What is the relationship between multimedia elements regarding posted content in the mobile learning?
2. What is the preference for the use of multimedia element by difference genders?
3. By using the mobile-memo system, what are the effects on learner's learning activity and their satisfaction?

1. System Description

Mobile-memo is a service that provides both handheld devices and website to support mobile learning. The workflow and operation of the system are shown in Fig. 1. The system provides a flexible web environment for both discussion and communication. In addition, the mobile-memo system could assist learners to post knowledge/questions by using handheld devices and these contents were subsequently stored in the database server.

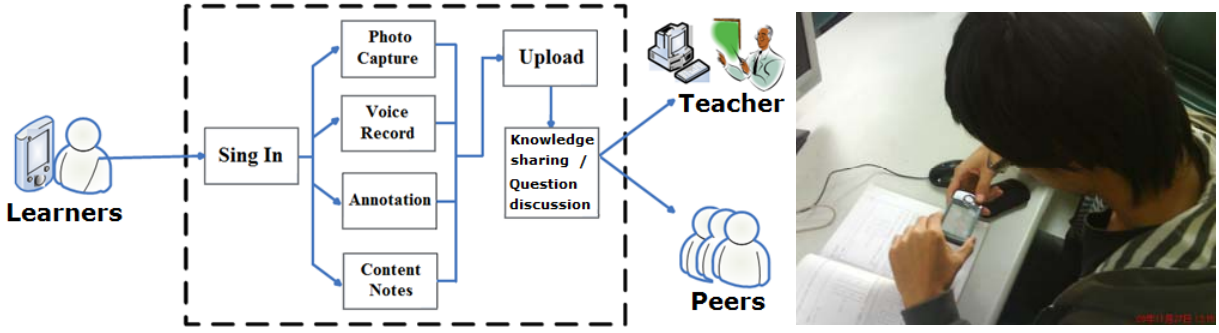

Fig. 1. System Operation Flow.

2. Methodology

2.1 Participants

The participants were included 20 graduate students (10 male, and 10 female) in Department of Information Management, and each learner has a handheld device with network communications.

2.2 Learning activities

The designed activity was to investigate the assistance of using handhelds to support a general learning activity in a mobile learning environment. Specifically, the teacher used the general methodology, which included the theoretical explanation of the concepts in class, to solve the problems for students. During and after class, the students could use handheld devices with the mobile-memo service to support their learning. They could create new contents by using

the handheld devices to take photos, record sounds, handwritten notes, and input some texts. All the contents they capture were sent by network communications from the handheld devices to the platform.

2.3 Procedures

The designed learning activities were deployed for 4 months (18 weeks) in a semester including training phase, knowledge interflow and evaluation phase. The training phase took 1 week. In this phase, the teacher assistance instructed the use of the mobile-memo system and introduced the learning activities which include the learning tasks. The knowledge interflow learning activities took place in the next 16 weeks; the students' task was to investigate the process of analyzing and selecting sources/objects, by using the handheld devices to collect relevant information. Therefore, students could present their knowledge or question in the classroom or share them with peers. In the final week, each student needed to accomplish a questionnaire, indicating their perception of use the system.

3. Results

3.1 Effects on elements of multimedia used

Some of the correlations between multimedia elements were significant (see Table 1). For example, the result indicated a significantly negative correlation between photos and sounds ($r=-0.831$, $p=0.000 < 0.01$). Moreover, there were significant negative correlations between the multimedia elements used such as sounds and handwritten notes. ($r=-0.463$, $p=0.000 < 0.01$).

Table 1. Correlations between multimedia elements used.

	Photos	Sounds	Handwritten notes	Texts
Photos	1.000			
Sounds	-0.831**	1.000		
Handwritten notes	0.634**	-0.463**	1.000	
Texts	0.357*	-0.816**	0.119	1.000

***p < 0.05 **p < 0.01**

3.2 The preference in the use of multimedia elements between different genders

Figure 2 shows the results of using multimedia elements between genders. The results illustrated that most of the females' preference was to take photos (64%). Most of the males were to use sound recording (76%). This result revealed that the males and the females seemed to have different multimedia preference in the mobile-memo system.

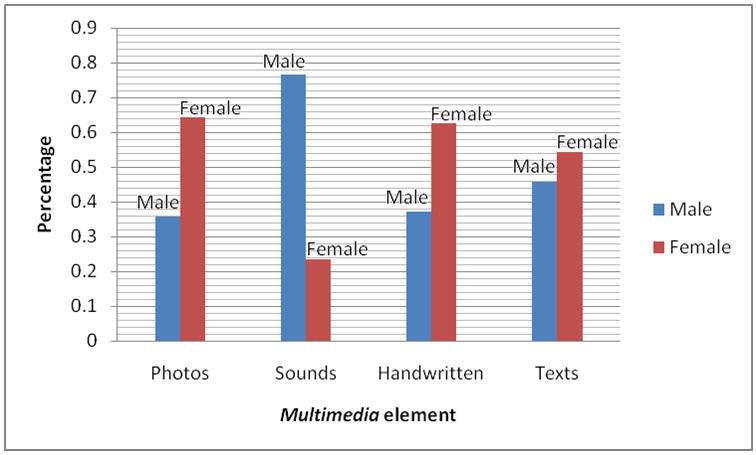

Fig. 2. Gender differences in the use of multimedia element (male = 10, female = 10).

3.3 Evaluation of students' learning attitude toward the use of the mobile-memo system and satisfaction

The effectiveness of the mobile-memo system on students' learning attitude was conducted by a questionnaire. The responses of each question in the questionnaire were designed by using a 7-point likert-scale. In which 7 stands for "strongly agree" and 1 stands for "strongly disagree". The study also examined the students' attitude from open ended question which could present more realistic response. The statistical results were presented in Table 2. We adopted the questionnaire by Arbaugh [1], the questionnaire item includes:

1. I am satisfied with my decision to take this course via the mobile-memo.
2. If I had an opportunity to take another course via the mobile-memo, I would gladly do so.
3. My choice to take this course via the mobile-memo was a wise one.
4. Conducting the course via the mobile-memo made it more difficult than other.
5. I was very satisfied with the course.
6. I feel that this course served my needs well.
7. I will take as many courses via the mobile-memo as I can.
8. Please comment the learning experience as a mobile-memo. (open ended question)

Table 2. Questionnaire results.

Item	Mean	Stand Deviation	Variance	Score >= 6
1	6.350	0.769	0.592	75%
2	6.425	0.675	0.455	90%
3	6.375	0.740	0.548	80%
4	2.570	0.670	0.450	0%
5	6.350	0.699	0.489	85%
6	6.275	0.784	0.614	80%
7	6.350	0.735	0.541	80%

Table 3. Open ended question summary.

Item	Summary
8	(a) … I want to share more helpful online resources with my classmates … (b) … Mobile-memo system is convenient for me to post article, upload photo any time and any where … (c) … when I see an event which is related to the learning concept, I can take a photo by the handheld device and upload it using mobile-memo system immediately …

According to the responses of 8th item (see Table 3), the mobile-memo system was regarded as a helpful, convenient tool in a mobile learning activity and stimulates students to look for more information on the system.

4. Discussion and Conclusions

Since handheld devices are widely used in everyday life, several studies have suggested that guiding the students to learn in the mobile-learning environment has become an important and challenging issue. In this study, the questionnaire results reflected that the mobile-memo system could be used for mobile learning, such as knowledge acquisition and posting-question. Additionally, educational practice could perform conveniently and easily any time and any place. Interestingly, taking photos was a popular activity for females; however, the study observed more males created their own audio descriptions. That was not represented students were focus in their devices, but rather that the technology mediates and extends a experience of m-learning environment. In sum, using handheld devices as a learning tool can not only assist to amplify the feature of the pedagogic theory, but also stimulate students' learning satisfaction and improve students' learning enthusiastically.

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