Mobile Messages as a Tool to Stimulate Learning Activities

Shuk Ying Ho
School of Accounting and Business Information Systems
Australian National University
Canberra 0200, ACT, Australia
susanna.ho@anu.edu.au

Kevin K.W. Ho
School of Business and Public Administration
University of Guam
Mangilao, Guam 96923
kevinho@uguam.uog.edu

Abstract
Mobile learning (m-learning) is gaining significance. It has the potential to provide interesting and relevant learning experiences to learners. Firms and education institutes explore the use of mobile devices to facilitate teaching and apprehension. This study proposes to use one of the simple functions of mobile phones, i.e. text messaging, as a tool to stimulate learners to access course materials. This study also examines whether users’ personalities influence their reactions to learning via text messaging. Specifically, we used a personality instrument, Myers-Briggs Type Indicator (MBTI), to categorise learners. We conducted an experiment with 78 students, who received text messaging to remind them to access lecture materials for two weeks. We found that extroverts more often followed text messages to participate in discussion learning activities than introverts, and students of a judging type who liked well-defined learning schedules often followed the text messages to work on their learning schedules. A learner’s personality does have an effect on the amount of learning they are prepared to participate in, when they respond to mobile text messaging.

Keywords: learning, text messaging, learner’s personality

1 Introduction
Firms increasingly need to offer flexible learning to their employees, so many have begun to deliver training programs via mobile devices such as mobile phones and personal digital assistants. Distance learning institutes send teaching materials to students’ mobile devices so that the materials are accessible anywhere, anytime (e.g., travelling on a bus, sitting in a café). Sometimes, the mobile learning process can also be collaborative. That is, students can upload questions and opinions to a mobile site, and share their learning experiences. They can receive immediate feedback and guidance from instructors who are simultaneously online. Incorporating mobile devices in the learning process results in a paradigm shift in the way individuals learn — from the classroom to the pocket. But so far, scant research has examined the effectiveness of using mobile devices to stimulate students to learn. This study aims at providing empirical evidence to evaluate the effectiveness of incorporating mobile devices in learning. In particular, we focus on a basic function of mobile phones, text messaging, and examine the effectiveness of using text messages to stimulate access to learning materials.

The first objective of this study is to examine the use of mobile text messaging to fully exploit its strength of stimulating students to access course materials. Technology designers sometimes forget the fundamentals in their eagerness to embrace technology. Although the term “m-learning” is now embedded in the university and corporate vernacular, most trainers find themselves doing little more than scattering mobile technologies within training programs at random, hoping that some of them will work. These technologies add little or even no value to the learning process (Roschelle 2003). Obviously, “build it and they will come” is not effortless. This research examines the effects of mobile text messages to stimulate learners to access learning materials.

The second objective is to explore the effects of mobile text messages on stimulating learners to access different types of learning methods (i.e., course discussions, course materials) (Jong and Ferguson-Hessler 1996). In particular, we look at how learners’ personality influences their learning preferences. Prior work has developed “personalised” learning applications, but most applications only consider the difficulty of teaching materials. Smarter students take harder lectures, and weaker students take easier lectures. Educators generally believe that the psychology of human differences is fundamental to learning (Biggs 2001, Wan, Wang, and Haggerty 2008). Chen, Liu and Chang (2006) developed learning systems which personalised learning schedules for individual students. These studies support a general idea that learning environments will be more effective if they capitalise on the characteristics of both the learning tasks (i.e., participation in a discussion forum, or revising course materials) and the individual (i.e., personality).
In sum, we anticipate that positive learning outcomes will be achieved if the capabilities of m-learning (technology) match the delivery of different types of knowledge (task) for learners with different dispositions (individual). With the above objectives, we formulate a set of research questions:

RQ1. What are the effects of mobile text messaging on stimulating learners to access various teaching content (e.g., course materials, discussion forums)?

RQ2. What is the role of personality in affecting learners’ response to text messages?

The rest of this paper is structured as follows: Section 2 provides a review on learning and learners’ personalities. This helps us gain an understanding of personalising m-learning to learners’ personalities. Section 3 presents an experiment and its findings. Section 4 discusses the practical implications of the work. Section 5 concludes our work.

2 Literature Review

Prior research has shown that web-based learning is effective for disseminating teaching materials online (Alavi and Leidner 2001, Benbunan-Fich 2002, Piccoli, Ahmad and Ives 2001, Narciss, Prosek and Koerndle 2007, Shen, Callaghan and Shen 2008, Woo and Reeves 2007, Xu and Wang 2006). For example, Woo and Reeves (2007) studied whether the increase in interactions on web-based education platforms leads to meaningful learning outcomes. Narciss, Prosek and Koerndle (2007) presented the result of a large-scale project that developed an authoring tool to support online teaching. Piccoli, Ahmad and Ives (2001) conducted an empirical study to examine the effects of web-based learning, including instructors’ and students’ performance, self-efficacy, and satisfaction. They also took different learning design, such as learning control and learning materials, into consideration when they developed the web-based learning system. These studies focus on web-based learning. Scant research examines the learning outcomes with mobile devices (Keegan 2002). There is little empirical work and no theoretical framework on mobile learning.

This research focuses on learning activities stimulated by mobile phone text messaging. That is, learners in this study use a web-based learning platform to access teaching materials. Even though the use of text messaging has been proposed for education purpose before (Lim, Hocking, Hellard, and Aiken 2008), our question is focused on whether mobile phone it can be used to stimulate learners to access the web-based learning platform more frequently? We also explore whether learners’ personality types influence their responses to their mobile text messages. Most personalisation algorithms are based on individuals’ past activities. Our work is a pioneering effort to use individual personality types to generate personalised content. We will use the Myers-Briggs Type Indicator (MBTI) to measure personality types, because it comprises four dichotomies and these dichotomies cover the key aspects of how individuals perceive and judge information (Table 1). The MBTI has been used in traditional education research (Cooper 1991).

In this preliminary study, we focus on two out of four MBTI dimensions. They are extrovert-introvert, and judging-perceiving. Extrovert-introvert, explains where individuals put their attention and get their energy. Extroverts (E) like to spend time in the outer world of people and things, feel comfortable in groups and like working in them. Introverts (I) attend to their inner world of ideas, feel comfortable being alone and like things they can do on their own. Because extroverts like discussions and enjoy social interactions, we anticipate that extroverts are more likely to respond to mobile text messages that invited them to participate in discussion forums than introverts do.

H1: After receiving a text message on course discussion participation, extroverts (compared with introverts) are more likely to follow the text message to access course discussion forums.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>How Does It Relate to M-Learning?</th>
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<tbody>
<tr>
<td>Introversion-Extroversion (E-I)</td>
<td>This dichotomy explains where individuals put their attention and get energy. Introverts (I) attend to their inner world of ideas, feel comfortable being alone and like things they can do on their own. Extroverts (E) like to spend time in the outer world of people and things, feel comfortable in groups and like working in them. Discussion and group activities: I-learners prefer to work on individual tasks, whereas E-learners prefer group activities, sharing and discussions.</td>
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<tr>
<td>Sensing-Intuition (S-N)</td>
<td>This dichotomy explains how individuals process information. Sensing (S) type individuals pay attention to facts and physical reality; they start with facts and then form a big picture. Intuition (N) type individuals are interested in new things; they like to see the big picture then uncover the facts. No covered in this study</td>
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<tr>
<td>Thinking-Feeling (T-F)</td>
<td>This dichotomy explains how individuals make human-related decisions. Thinking (T) type individuals use objective principles and impersonal facts to make decisions. Feeling (F) type individuals put more weight on personal concerns. No covered in this study</td>
</tr>
<tr>
<td>Judging-Perceiving (J-P)</td>
<td>This dichotomy explains how individuals organise their lives. Judging (J) type individuals prefer a more structured and decided lifestyle. Perceiving (P) type individuals prefer a more flexible and adaptable lifestyle. To personalise a learning schedule: J-learners prefer a well-defined learning timetable, P-learners prefer a checklist from which they can establish their own schedule.</td>
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Table 1. Four Dichotomies in MBTI for Personalised Learning
Judging-perceiving, explains how individuals organise their lives. Judging (J) type individuals prefer a more structured and decided lifestyle. Perceiving (P) type individuals prefer a more flexible and adaptable lifestyle. Presumably, judging learners prefer to follow the instructor’s defined work plan to complete the learning materials. Conversely, perceiving learners like to set up their own plans. Hence, we anticipate that judging learners are more likely to respond to mobile text messages that invite them to revise the course materials than perceiving learners would.

H2: After receiving a text message on course material revision, judging learners (compared with perceiving learners) are more likely to follow the text messages to revise the required learning materials.

3 Methodology

3.1 Participants

Our target participants were university students from an introductory course on management information systems. We believe that these university students are authenticated participants because they were learners. Generally they accessed their lecture materials on WebCT – a teaching and learning management platform adopted by the university. The experiment spanned two weeks. We recruited 78 volunteers (32 males and 46 females; average age = 20 years) to participate in this preliminary test, which was equivalent to 76% of the students who enrolled in the captioned course. All of them were active mobile phone users. During the experiment period, we sent 468 SMS recommendations to the 78 participants. Each participant received six SMS learning reminders (three reminders per week) to invite them to access the WebCT course materials.

3.2 Procedures

At the beginning of the study, each participant filled in a demographic questionnaire and took an MBTI test. After the registration, the participants received a text messaging reminder on Monday, Wednesday, and Friday. In the first week, they received text messages with content, “content, on XXX topic, is available on WebCT. It is important. Please read.” In the second week, they received text messages with content, “Your lecturer has posted messages in the discussion forum. Enjoy.” We tracked the participants’ logon and page access on WebCT.

3.3 Findings

We collected the participants’ MBTI scores at the beginning of the study. It took 45 minutes for participants to complete the MBTI questionnaire. The MBTI questionnaire measured four dimensions of an individual’s personality: extrovert-introvert, sensing-intuition, thinking-feeling, and judging-perceiving. In this study, we only focused on extrovert-introvert, and judging-perceiving.

The introvert (0) to extrovert (16) scores also ranged from 0 to 16. The mean of the introvert-extrovert scores for our participants was 9.2. We used a median split to divide our participants into two groups: extrovert learners and introvert learners. There were 39 introvert learners and 39 extrovert learners. We analysed their access of WebCT discussion forums within one day of sending out the text messages. We collected two data: (1) the number of accesses of discussion forums; and (2) the length of their reading time of discussion forums. Figure 1 presents the descriptive statistics. We conducted two ANOVA tests. The dependent variable of the first test was the number of accesses. On average, there were 1.2 accesses by extrovert learners and 0.3 accesses by introvert learners ($p < 0.01$). The dependent variable of the second test was the amount of time spent on the discussion forums (in minutes). On average, extroverts spent 7 minutes on the discussion forums, and introverts spent 2 minutes ($p < 0.05$). Both dependent variables supported H1, i.e., the results showed that extrovert learners were more likely to follow the reminder to access discussion forums than introvert learners.

![Figure 1. Learning Activities by Extroverts and Introverts](image)

The perceiving (0) to judging (16) scores also ranged from 0 to 16. The mean of the judging-perceiving scores for our participants was 11.7. We used a median split to divide our participants into two groups: perceiving learners and judging learners. There were 37 perceiving learners and 39 judging learners. Because some learners had equal scores, the two group sizes were not even. We analysed their accesses of WebCT within one day of sending out the text messages. We also collected two data: (1) the number of WebCT logons; and (2) the length of their reading time of the lecture materials. Figure 2 presents the descriptive statistics. We conducted another two ANOVA tests. The dependent variable of the third test was the number of logons. On average, there were 2.3 logons by judging learners and 1.4 logons by perceiving learners ($p < 0.05$). The dependent variable of the fourth test was the length of logon sessions (in minutes). On average, there were 16 minutes by judging learners and 6 minutes by perceiving learners ($p < 0.01$). Both dependent variables supported H2, i.e., judging learners are more likely to follow the reminder to study the required learning materials than perceiving learners.
the teaching platform to mobile devices — which may lead to affective learning. M-learning delivers teaching content to an identifiable device; hence, it can be personalised. For instance, teaching materials, training schedules and quizzes can be tailored for individuals and even matched with their personality types. Learners can receive reminders via SMS. This study provides preliminary findings on the effects of personalised m-learning.

Last, this research provides information to technology designers on the effectiveness of an m-learning function: personalisation. Personalisation has been widely adopted in electronic commerce (Tam and Ho 2005, 2006). This study is one of the pioneer efforts to examine the use of personalisation in learning. Our findings confirm that personalised learning should take users’ characteristics, i.e., personalities, into consideration. This study examines whether users’ MBTI personality types influence their learning preferences. In the future, more research efforts should be invested in exploring the effects of various user characteristics or traits on users’ learning preferences.

4.2 Limitations and Future Research

There are some limitations for this study. First, as it is a preliminary test, our experiment spanned only for two weeks. It is not sure whether the impacts that we observed in this study would have a long time effect. Hence, as the first possible extension of this research, we plan to conduct a longitudinal study to explore whether they would be a diminishing effects of mobile text messaging on stimulating learners’ to access various teaching contents.

Second, we only explored the impacts of personality on learners’ response to text messages for two out of four MBTI dimensions. To gain a better understanding of the impacts of different personalities on the learners’ response to text messages, we plan to investigate the impacts of the remaining two MBTI dimensions, i.e. Sensing-Intuition and Thinking-Feeling.

5 Conclusion

Mobile devices will play a significant role in future education. They have the potential to provide interesting and relevant learning experiences to students. Firms and education institutes explore the use of mobile devices to facilitate teaching and learning. In this study, we examined the effectiveness of text messaging on stimulating students’ learning activities. Specifically, we examined whether learners’ personalities (extrovert vs. introvert, judging vs. perceiving) influence their reactions to text messaging of learning. With an experiment including 78 students, we confirmed that extrovert students were more interested in text messages on class discussions, and judging students preferred to have text messages to remind them of their learning schedules.

6 References


7 Acknowledgement
This project was partially supported by the Australian Research Council (Project ID: DP0879736).