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# Mobile instant messaging support for teaching and learning in higher education

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ABSTRACT

Smartphones could be the fastest spreading technology in human history. These mobile devices change the way we communicate and enable mobile and ubiquitous learning at a different level. This study evaluated the use of mobile instant messaging tools to support teaching and learning in higher education. A total of 61 undergraduate students enrolled at a teacher-training institute in Hong Kong who have smartphones with WhatsApp were assigned into experimental and control groups. Besides the traditional classroom learning for both groups, the experimental group was also supported with bite-sized multimedia materials and teacher-student interaction via WhatsApp outside school hours. The participants of the control group used WhatsApp only for academic communication. Pre-test scores were used as the covariate. The marginal means on the post-test scores showed that the participants in the experimental group performed better than those in the control group. The intervention of WhatsApp improved the learning achievement of the participants. The strength of the intervention between the two groups was medium to large. A questionnaire designed by the author was administered at the end of the study. The participants showed positive perception and acceptance of the use of WhatsApp for teaching and learning. The participants slightly rejected the view that receiving instructional materials and questions outside school hours could interfere with their private lives. The typical usability issues on mobile learning were found to be valid. The experience learnt in this research was discussed.



## 1. Introduction

The widespread use of smartphones is reflected by the observation that most higher education students in Hong Kong own such devices. Subscribing to discounted or unlimited data plans is common among them. These devices allow them access to Internet via high-speed WIFI connectivity around the campus and at home. Kukulska-Hulme et al. (2011) conducted an international survey on university students and found that "amongst the mature age students surveyed, receptive, productive, and communicative uses are shown across learning, social, entertainment, and workplace environments" (p. 30). Owing to the upsurge of smartphone penetration in recent years, over-the-top (OTT) messaging services on mobile instant messaging, microblogging, social networking chats, and voice-over-IP talks have become the prime communicative use of smartphones. The general public including students is less likely to use SMS service (Church & de Oliveira, 2013). Instead, they are more inclined to communicate with family and friends using various synchronous and asynchronous communication tools such as WhatsApp, Line, Viber, WeChat, KakaoTalk, BBM, Twitter, Skype, and more (Pew Research Center, 2015). The use of these mobile instant messaging (MIM) apps has been growing rapidly. The ubiquitous nature and the special features of these MIM apps have the potential to foster an effective environment to support teaching and learning. Since all the participants of this study had WhatsApp in their mobile devices, the mobile instant messaging support in this research is solely referred to the use of WhatsApp for teaching and learning.

In recent years, the popularity of text messaging and instant messaging has prompted educators to integrate messaging tools in higher education teaching and learning (Bakker, Sloep, & Jochems, 2007; Brett, 2008; Lauricella & Kay, 2013; Quan-Haase, 2008). Considerable work has been reported on the use of these tools for content learning (Cifuentes & Lents, 2010), language learning (Cavus & Ibrahim, 2009; Levy & Kennedy, 2005; Lu, 2008; Zhang, Song, & Burston, 2011), classroom interaction and discussion (Hou & Wu, 2011; Jeong, 2007; Markett, Arnedillo Sánchez, Weber, & Tangney, 2006; Scornavacca, Huff, & Marshall, 2007), peer collaborative support (Ng'ambi & Brown, 2009; Timmis, 2012), administrative support (Goh, Seet, & Chen, 2012; Jones, Edwards, & Reid, 2009; Naismith, 2007) and more. However, many of these studies are limited to the exchange of text-based messages (e.g. SMS) and, in some cases, the messaging tools are resided in PCs (e.g. desktop instant messaging tools). Rambe and Bere (2013) have pointed out that the academic potential of MIM remains to be one of the least explored functionalities of smartphones in higher education institutions. The appropriate inclusion of these tools in higher education institutions is a challenge to the mobile learning research

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community. Teachers, who may be comfortable in using computers for teaching, may not be as comfortable in utilizing mobile technologies such as WhatsApp into their teaching. They may not realize that MIM has the potential to create alternative dialogic spaces for student collaborative engagement (Rambe & Bere, 2013). The approaches to deliver instructional materials and activities with these tools remain as an uncharted territory for many educators. This paper aims to fill the gap.

The purpose of this study was to explore the use of a mobile instant messaging tool to support the teaching and learning of a Database course in higher education. The intention of this research was not to conduct the entire course within WhatsApp. Instead, the traditional method of teaching such as face-to-face lectures and tutorials was supplemented with the delivery of succinct instructional materials and activities through WhatsApp outside school hours. WhatsApp was used to extend and re-enforce the concepts learnt in the class, and provide a channel for the students to communicate with the instructor and their peers ubiquitously. The following two research questions were addressed in this study:

*Research Question 1*: Does the intervention of WhatsApp, which supports the traditional classroom instructions of an undergraduate Database course outside school hours, improve the learning achievement of the participants?

*Research Question 2*: To what extent do the participants perceive the usefulness and accept the use of WhatsApp for teaching and learning?

The rest of this paper is organized as follows: the pertinent literature of text messaging and instant messaging for educational purposes is reviewed in Section 2. Section 3 presents the rationales for using WhatsApp to support teaching and learning. The arguments are based on the salient characteristics of modern MIM tools. It is followed by a discussion of the methods and data analysis. Section 4 provides the details on the process of setting up the research and the highlight of the intervention. The detailed results of the quantitative analysis derived through the instruments are reported in Section 5. The main findings, the limitations of the study, the practical implications and suggestions for future research are discussed in Section 6. Section 7 provides the concluding remarks of MIM support for teaching and learning in higher education.

## 2. Relevant research

Computer- and mobile-mediated communication provide users the opportunity to facilitate social affinity and social presence. Communication using messaging tools is versatile. Users have control over when and with whom they interact. A number of research publications in the last decade have shown that messaging systems can be utilized in many educational activities. These applications can be largely categorized into (1) teaching and learning support and (2) communication and administrative support. This categorization follows the conversational framework of Laurillard (2002) and her notion on the effective use of digital technologies to facilitate learning through instruction, construction, discussion, and collaboration (Laurillard, 2010). In the proposed intervention specified in the first research question, these two domains of applications with WhatsApp could be found and discussed in the later section. The following literature review provides the relevant studies which have implemented the two modes of messaging communication, namely text messaging and instant messaging, in the two supporting domains described above.

### 2.1. Text messaging

Text messaging (texting) typically refers to the asynchronous mobile communication service between mobile handsets using SMS. Texting has been popular for communicating short messages prior to the widespread ownership of smartphones and the shift of more users to OTT messaging apps in developed societies (ITU, 2013). Many educators and scholars use text messaging as the form of communication for educational purposes (Brett, 2008, 2011; Goh et al., 2012; Jones et al., 2009).

For teaching and learning support with text messaging, many researchers have reported its use in language learning. Levy and Kennedy (2005) described a project on learning Italian via mobile SMS in an Australian university context. Lu (2008) explored the application of SMS in L2 learning in Taiwan. Cavus and Ibrahim (2009) reported an experiment on the use of SMS to support the learning of technical words. Zhang et al. (2011) reexamined the effectiveness of vocabulary learning between an SMS group and a paper-based group. Hayati, Jalilifar, and Marshhadi (2013) examined the push aspect of SMS affordance in relation to the delivery of bite-sized English idioms. A number of studies explored the use of SMS to increase classroom interaction and discussion (Markett et al., 2006). Scornavacca et al. (2007) presented an SMS-based classroom interaction system and explored its effect on the learning experience of the students. Ng'ambi and Brown (2009) implemented a dynamic frequently asked questions tool that incorporated SMS. The tool was intended to facilitate consultation among students and with the lecturer anonymously and inclusively. The MeLAS project (Brett, 2008) was an institution-wide implementation of SMS-based technology. SMS tools allowed the creation of three types of messages, namely, one-way communication, formative assessment with feedback, and collaborative learning.

In the area of communication and administrative support with text messaging, Naismith (2007) reported an e-mail to text message service that supported administrative communication for higher education staff and students. Message types included notifications of room changes and class cancellations, reminders on assignment submission and collection, notifications of relevant instructional activities, warning messages to absentees, instructional messages, and greeting messages. Furthermore, many education institutions such as Deakin University and Victorian Curriculum and Assessment Authority (VCAA) of Australia release examination grades and results via SMS.

### 2.2. Instant messaging

Instant messaging (IM) can be classified as quasi-synchronous communication. IM apps allow interlocutors to exchange short typed-texts anywhere across the globe. The actual communication channel is normally bi-directional, although turn-taking in conversation is a common practice. IM is a form of OTT services, which can be further categorized into mobile instant messaging (MIM) and desktop instant messaging (PC IM). The cost of sending and receiving messages is negligible in comparison with that of SMS texting. Modern IM apps can support multimedia data and hyperlinks. Most of these apps allow group communication and help to build a closer social networking environment for users (Vrocharidou & Efthymiou, 2012). IM tools facilitate many significant opportunities for higher education (Farmer, 2005). University students are heavy IM users (Quan-Haase, 2008). Researchers have shown considerable interest in how students use IM (Bakker et al., 2007; Flanagin, 2005) and how IM can be integrated into their social and academic lives (Ogara, Koh, & Prybutok, 2014; Quan-Haase, 2008). Lauricella and Kay (2013) have found that both text and IM are useful and viable tools to augment the communication among peers and faculty in higher education.

For teaching and learning support with instant messaging, IM tools could be used to support synchronous discussion activities (Hou & Wu, 2011). Formal and informal interactions integrated with IM tools in online learning environments could have positive effects on learning (Contreras-Castillo, Pérez-Fragoso, & Favela, 2006; Hrastinski, 2006; Jeong, 2007). In studying subjects, such as a biology course for forensic science (Cifuentes & Lents, 2010), IM could encourage students to approach their professor with confidence as well as to increase their interest and success in their study. Timmis (2012) argued that IM conversation offers a means of sustainable peer support among