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Mobile Assisted Language Learning: Review of the Recent Applications of Emerging Mobile Technologies

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Abstract

As mobile computing technologies have been more powerful and inclusive in people's daily life, the issue of mobile assisted language learning (MALL) has also been widely explored in CALL research. Many researches on MALL consider the emerging mobile technologies have considerable potentials for the effective language learning. This review study focuses on the investigation of newly emerging mobile technologies and their pedagogical applications for language teachers and learners. Recent research or review on mobile assisted language learning tends to focus on more detailed applications of newly emerging mobile technology, rather than has given a broader point focusing on types of mobile device itself. In this paper, I thus reviewed recent research and conference papers for the last decade, which utilized newly emerging and integrated mobile technology. Its pedagogical benefits and challenges are discussed.

Keywords: mobile assisted language learning, emerging mobile technology, MALL, CALL, smartphones, tablet PC

1. Introduction

In line with the computer technology development, the debate of whether new literacy is really new seems to assume that the computer technology usage would be normalized in the future (Bax, 2003; Bax & Field, 2000; Chambers & Bax, 2006). Nevertheless, one thing for sure is that it is still on the continuum towards the final stage of normalization of CALL. Warschauer (1999) also claims that the use of computers will not be considered to be a special case but rather as a primary component of language learning and language use. Kern (2006) implies the changing status of CALL, comparing two definitions of CALL from Levy (1997) and Egbert (2005):

> CALL means the search for and study of applications of the computer in language teaching and learning (Levy, 1997, p. 1)
>
> CALL means learners learning language in any context with, through, and around computer technologies. (Egbert, 2005, p. 4)

As can be seen in two definitions above, the noticeable changes are 'any context' and 'computer technologies' instead of 'computer'. Presumably, Egbert's definition would try to embrace a broad range of contexts of using computer technologies in language learning. Furthermore, even the meaning of the term 'computer' is not absolutely free of ambiguity but comprehensive one. She uses 'computer technologies' because the definition of computer has also been changing. Nowadays 'computer', in fact, seems to be too general to refer only to desktop or laptop computers. Recent mobile electronic devices that hold the capacity for language learning (e.g., 3G/4G smartphones, tablet PC) have been blurring the learning boundaries between classroom and home, as well as boundaries between the concept of computer and mobile devices. Also those new mobile computing technologies can presumably change the way we have used computers (Egbert, Akasha, Huff, & Lee, 2011). In this sense, such mobile devices can also be regarded as handheld 'computers' with versatile functionalities.

2. Mobile Assisted Language Learning

In line with the latest Horizon Report 2012 and 2013 which highlighted the educational potentials of mobile and tablet computing (Johnson et al., 2013; Johnson, Adams, & Cummins, 2012), Mobile assisted language learning (MALL) is a burgeoning subdivision of computer assisted language learning in general. As mobile technologies has evolved, so have their advanced applications developed for language education. According to the survey

results conducted by the Pew Research Center's Project for Excellence in Journalism (PEJ) in 2012 (Fox & Duggan, 2012), half of all American adults own either a tablet or a smartphone, which indicates that the usage of smart phone and tablet has been skyrocketing for the last a few years. Besides the increase of usage, mobile device technology has been drastically developed and transformed in an integrated way. In addition to the traditional purpose for oral communication via mobile phones, the current multifunctional mobile technology enable users to access to the Internet ubiquitously for locating and searching information, emailing, reading e-books, and even shopping. The mobility has also enabled learning independent of location and any time even out of classroom.

Several scholars introduced and reviewed the use of mobile technology and its applications for language education (Chinnery, 2006; Godwin-Jones, 2011; Kukulska-Hulme & Shield, 2007, 2008). Chinnery (2006) comprehensively reviewed empirical research which utilized some of mobile devices including cell phones, PDAs, and iPods. For example, instructors teach short English lessons by sending them to students' emails via mobile phone (Thornton & Houser, 2005), giving vocabulary instruction via SMS for Italian learners in Australia (Levy & Kennedy, 2005, cited in Chinnery, 2006). Even though Chinnery (2006) reported those above projects were effective for language learning, the underlying concept of those applications of mobile phone seems to be similar to the concept of Web 1.0, in that the interaction was not virtually user-centered or –created. Since the term Web 2.0 was introduced by Tim O'Reilly in 2004, the term, Mobile 2.0, has been used to refer to the mobile technology featuring Web 2.0 (Wang & Heffernan, 2009). The essential features of Web 2.0 are user-created and collaborative content. Likewise, the new approach to MALL would be co-opted from the feature of Web 2.0. Likewise, Kukulska-Hulme and Shield (2007) comprehensively reviewed MALL-related research, emphasizing speaking and listening domains. They overviewed the research in terms of the types of mobile devices including mobile phones, tablet PCs, MP3 players, and so on. More recently, Godwin-Jones (2011) explored the current state of mobile apps for language learning, adding context aware learning apps using GPS, data storage and syncing between "cloud" and mobile device. As Godwin-Jones mentioned, the noticeable development of mobile software are vocabulary learning programs and flashcard software. Besides the apps Godwin-Jones exemplified in his article, such as eStroke, Pleco, ChinesePod, many other software once operated by Windows or MAC have also increased their exposure by developing iPhone or Android apps. Supermemo, for example, is one of the powerful spaced repetition software (SRS) for vocabulary learning (Godwin-Jones, 2010), which is more effective than massed learning (Nation, 2001, 2008) Recently, Supermemo has been equipped with sound recognition system, and expanded its usability in multiple platforms including PC, smartphones, and e-learning via website (Yang & Park, 2012). In addition to the vocabulary learning, because of the increasing distribution and use of smartphones enabling wireless Internet connection, the educational applications of smartphones have been getting diverse and integrated more and more.

Likewise, recent research or review on mobile assisted language learning tends to focus on more detailed applications of newly emerging mobile technology, rather than has given a broader point focusing on types of mobile device itself. In this paper, I thus reviewed recent peer-reviewed research and conference papers between 2005 and 2013, which utilized newly emerging and integrated mobile technology. I used the databases (i.e., EBSCO, Google Scholar, ProQuest, and JSTOR) to select the articles, the selection criteria based on the following topics in previous literature (Chinnery, 2006; Godwin-Jones, 2010, 2011; Johnson et al., 2013; Johnson et al., 2012; Kukulska-Hulme & Shield, 2008): short message service (SMS), instant messages (IM), microblogging (mobileblogging), ambient technology (augmented reality), GPS, and tablet computing.

Its pedagogical benefits and challenges are discussed.

2.1 Short Message Service (SMS)

The frequent MALL activities using mobile phones seem to employ SMS (Short Message Service) for language learning. Specifically, SMS is one of the cell phone features which enable communicative language practice (Chinnery, 2006). In both studies conducted by Kennedy and Levy (2008) and Levy and Kennedy (2005), the students were sent Italian words, idioms, and example sentences via students' mobile phones as SMS messages. Both projects proved the use of SMS in language learning as a successful technique. In addition, almost all of participants showed positive attitude toward receiving text messages. Li and Erben (2007) also reported that the use of instant messages enabled the language learners to increase their intercultural awareness and critical thinking skills. Like Thornton and Houser (2005), Lu's (2008) and Zhang et al.'s (2011) studies both conducted similar experimental study to investigate the effectiveness of vocabulary learning by using SMS. In Lu (2008), 30 high school students were divided into two groups. One group learned English vocabulary via mobile phone, while the other used print materials. The result indicated that mobile users show greater gain in vocabulary than paper-based learners. Zhang et al. (2011) also found that the group studying vocabulary via mobile phone SMS

text messages retrieved more vocabulary in the posttests than the other group learning through paper material. In the same vein, Motallebzadeh and Ganjali (2011) examined the effects of SMS on 40 Iranian EFL learners' performance on vocabulary retention and reading comprehension. The result showed that mobile phone users outperformed the control group with regard to both vocabulary and reading comprehension scores.

2.2 Microblogging (Mobileblogging)

Microblogging or mobileblogging is a new form of blogging and primarily represent Mobile 2.0 technologies (Ebner, Lienhardt, Rohs, & Meyer, 2010). A microblog can be defined as "a weblog that is restricted to 140 characters per post but is enhanced with social networking facilities" (McFedries, 2007, cited in Ebner et al., 2010). Borau, Ullrich, Feng, and Shen (2009) reported the usefulness of microblogging (i.e. Twitter) in EFL learning context. Borau et al. (2009) argued that the students were encouraged to participate in cross-cultural communication and interactions effectively. Moreover, the microblogging enables the EFL learners to produce the language actively and interact in the target language via both the computer and mobile phone platforms.

Hsu, Wang, and Comac (2008) investigated the use of audioblogs in ESL setting. The instructors used the audioblogs for the management of oral assignments, interaction with learners, and evaluation of learners' performance. The students used the audio recording function of mobile phones to complete the oral assignments and they used the audioblog to submit and archive their oral assignments. Hsu et al. (2008) concluded that the integration of audioblogs plays an important role as a tool for assessing learners' performance outcomes and building mutual interaction between instructors and students.

Comas-Quinn, Mardomingo, and Valentine (2009) conducted a pilot study to investigate how students who study abroad in Spain construct meaning through informal interaction with target culture via mobile blogging. The participants shared and reflected on their experiences in target culture with other peers by uploading multimedia (i.e., pictures, short videos, audio files) they gathered in Spain with mobile devices. Comas-Quinn et al. (2009) concluded that the students' use of mobile blogs promotes interaction and a sense of community in informal setting.

More recently, Shao (2010) explored the applicability of mobile blogging for Chinese students who were newly comers in British. The findings indicated that the mobile group blog could help the participants understand authentic target culture and language use. Moreover, the mobile blogs could serve as a practical tool even for the prospective students in China to build readiness of target language use and confidence in being aware of the target culture.

Wishart (2009) conducted a small-scale study to investigate the feasibility of using mobile technology for teacher training. The study illustrated the promising result that the use of blogging could be a successful way of encouraging and sharing the teacher trainees' reflections on teaching.

Petersen, Divitini, and Chabert (2009) evaluated the use of a mobile blog to facilitate to build a sense of community in a French class. Petersen et al. found that two split communities of a French class could foster social interaction and share their information and feedback with the community, even if the communities were physically separated. Also the use of mobile blog could make the students feel more included in the community of French learners.

2.3 Ambient Intelligence and Augmented Reality

Cook, Augusto, and Jakkula (2009) defined Ambient Intelligence is a developing technology which means "*the presence of a digital environment that is sensitive, adaptive, and responsive to the presence of people*" (p. 3). This emerging technology can be applied to MALL. Beaudin, Intille, Tapia, Rockinson, and Morris (2007) reported the use of ubiquitous sensing at home for "context-sensitive microlearning" of vocabulary on a mobile device. This is one of examples of language learning integrated with everyday surroundings. Built-in and stick-on sensors detected and responded to the students' interactions with objects such as furniture, appliance at home. Then, the detected interaction presented the audio sound of English and Spanish phrases linked with the use of those objects.

Augmented reality (AR) is highly integrated mobile learning environment to improve learning outcome and experience by immersion. Azuma (1997) defined the augmented reality is the application which "allows the user to see the real world, with virtual objects superimposed upon or composited with the real world" (p. 356). Specht, Ternier, and Greller (2011) noted that AR can make a contribution to helping learners "gain a deeper understanding, experience embedded learning content in real world overlays, or explore content driven by their current situation or environmental context" (p. 121). Liu, Tan, and Chu (2010) demonstrated the effectiveness of MALL with use of handheld AR for language learning. Augmented reality allows participants "to experience

feelings and emotions as they do in the real world by interacting in a virtual environment" (p. 39). They employed a variant of 2D barcodes (i.e. Quick response code) which can be read by mobile camera. Those QR codes included the linked information for students so that they explored the map on the mobile phone while visiting designated learning zones by decrypting QR codes. Then the students sent the information to the main server for retrieving context-aware learning material wirelessly.

Antona et al. (2010) reported the small-scale but actual application of augmented technology with the use of mobile computing in foreign language learning environment, which, in particular, aimed to build L2 learners' personalized learning strategies and to support error correction. Most recently, Leonidis et al. (2012) highlights the potential for effective use of the ambient intelligence systems for classroom contexts, called 'smart classroom'. They argue the system, SESIL, provides an augmented reality environment to support L2 reading and writing practices. They also suggested the mobile devices such as mobile phones be considered to be an effective interface for classroom applications.

2.4 GPS

Since the MALL reflects mobile and ubiquitous characteristics, the context and location-aware technology play a special role in diverse MALL applications. Recent feature in the smartphones is the function of Global Positioning System (GPS). In addition to the original purpose of GPS application to help in finding one's way and locations, it also can be applied to the language learning outside the classroom. Ogata et al. (2008) tested a computer-supported mobile learning environment for Japanese language learning. In the process, the foreign students taking Intensive Japanese Program were assigned field activities by teacher. Then, they went around the town to complete tasks. The research shows the applicability of mobile devices with GPS function in language education, in that the students could integrate the knowledge in classroom and their authentic needs in their actual daily life.

2.5 Tablet Computing

Even though the mobile and portable benefit of small handheld devices (e.g., cell phones, PDAs, iPod, etc.), the potential challenges of these mobile devices are likely to be their small screen (Carlson, 2002; Chae & Kim, 2004; Chinnery, 2006; Venkatesh, Ramesh, & Massey, 2003) and limited memory and data processing speed. To cover these inconveniences, the use of Tablet PCs has recently been on the rise as the alternative (Godwin-Jones, 2011).

Lan, Sung, and Chang (2007) conducted a comparative study to investigate the benefit of using Tablet PCs in EFL context to improve peer collaboration in reading class, compared to the traditional class setting. The results indicated the application of Tablet PC to facilitate the collaboration between peers outweighed the potential weakness hindering students' collaboration process in a traditional setting. Moreover, the utilization of the mobile-device-supported peer-assisted learning could reduce EFL learners' anxiety and promote their motivation and confidence.

More recently, Chen (2013) also examined the applicability of using Tablet PC for informal learning of English out of classroom setting. As Godwin-Jones (2011) highlighted the vast potentials of using apps by Tablet PCs, Chen's study well illustrated the multifunctional features of Tablet PCs including micro-message, micro-blog, electronic book reader, and so on. For example, the participants were actively engaged in a collaborative learning environment by sharing their feedback with each other via micro-blogs. The study also showed the positive perceptions the learners had of the effectiveness of using Table PC for language learning.

3. Conclusion

The main goal in this paper has been to provide the review of recent research on MALL applications in terms of newly emerging or integrated mobile technologies. Rapidly developing mobile device technology and widespread ownership of mobile device seem to have an impact on language education, as well as other contexts learning. In conventional application of CALL, most learning environments have been occurred on stationary PCs. However, now it is transferred to mobile devices, which enable the language learning to be independent from any location and time. Both PCs and mobile device application will eventually happen simultaneously. As can be seen above examples of MALL applications, multi-functional mobile devices can contribute toward a more comprehensive educational environment for language learners.

According to the research findings reviewed above, it seems hard to confirm that MALL has already been fully utilized in educational contexts. Nevertheless, one thing for sure is that it is on the continuum towards the new stage of CALL through adopting a variety of emerging mobile technologies. The increasing ownership of mobile devices among teachers and students might not be directly related to computer technology usage for the purpose

of language education, however; it could imply the expanding nature of computer technology use in educational purposes. Furthermore, the promising results from the research about the use of mobile technologies for language learning might be challenging to indicate the prevailing trends of MALL in a definite way due to not only the fact that the application of MALL highly relies on the general consensus from language teachers and learners, but also lack of pedagogical framework of MALL. Therefore, the future research on MALL needs to explore the teachers' and learners' perspective on the use of MALL, in that it would be meaningful to find out 'emic' views on the issue from the users in educational context. All of those factors identified from the language teachers and learners can be viewed as their current obstacles to overcome toward the successful integration of new MALL technologies. At the same time, those factors play a role of a series of indicators to see 'where we are' on the continuum to the new stage of MALL.

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