

Clarke, P., Keing, C., Lam, P., & McNaught, C. (2008). Using SMSs to engage students in language learning. In E. R. Weipp & J. Luca (Eds.), *ED-MEDIA 2008* (pp. 6132–6141). Proceedings of the 20th annual World Conference on Educational Multimedia, Hypermedia & Telecommunications, Vienna, Austria, 30 June–4 July. Chesapeake VA: Association for the Advancement of Computers in Education.

Using SMSs to Engage Students in Language Learning

Peter Clarke
English Language Teaching Unit
The Chinese University of Hong Kong
Hong Kong, China
pgclarke@cuhk.edu.hk

Christina Keing,
Information Technology Services Centre
The Chinese University of Hong Kong
Hong Kong, China
keing@cuhk.edu.hk

Paul Lam
Centre for Learning Enhancement And Research,
The Chinese University of Hong Kong
Hong Kong, China
paul.lam@cuhk.edu.hk

Carmel McNaught
Centre for Learning Enhancement And Research,
The Chinese University of Hong Kong
Hong Kong, China
carmel.mcnaught@cuhk.edu.hk

Abstract: As mobile devices proliferate, so does the discussion about intriguing possibilities for using these devices to enhance student learning. However, the tension between problems and possibilities is a strong one. In this paper, the challenges facing mobile learning (mLearning) will be explored. These include incomplete support, complex procedures in using the devices or the applications, expensive devices, and project running costs. The conclusion we have reached is that ubiquitous, simple and robust technologies are more likely to be successful, and that naturalistic studies are needed in order to investigate genuine learning benefits. These principles are exemplified by a study on the use of SMS (short message service) technology to support two cohorts of students studying English as a second language at a university in Hong Kong.

The Terrain of Mobile Learning

The growing popularity and advancing functionality of mobile devices has raised their profile in teaching and learning contexts. Their ubiquity and portability make the realization of ‘learning on the move’ and ‘anytime, anyplace learning’ a real possibility (Lee, 2005).

In considering mobile learning (mLearning), one needs to consider the range of devices and the diversity of applications and functions. The devices include mobile phones, smartphones, personal digital assistants (PDAs), multimedia players such as iPods and mp3 players, handheld games consoles, and handheld computers or the ultra-mobile personal computers (UMPCs). Naismith, Lonsdale, Vavoula and Sharples (2005) have classified mobile technologies in terms of their portability and personal character. This diversity is shown in Figure 1, which includes quite large pieces of equipment. The exact position of each item in this two-dimensional diagram is, of course, indicative only.

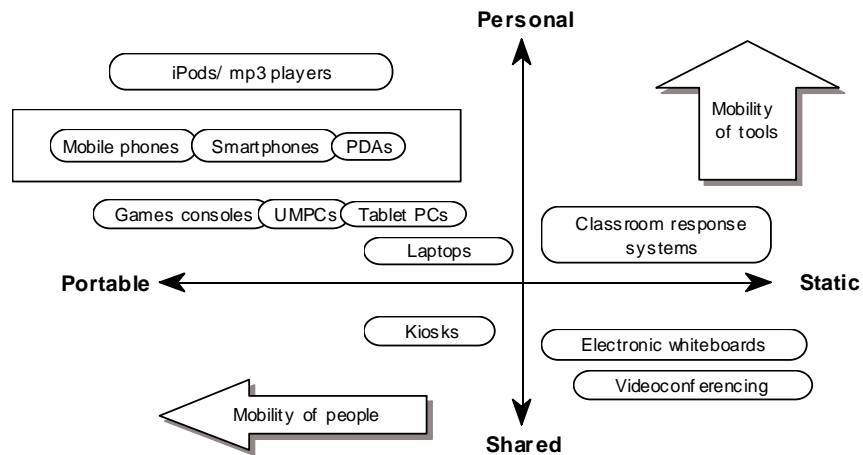


Figure 1: Classification of mobile technologies.
(after Kennedy & Vogel, in press, and Naismith, Lonsdale, Vavoula & Sharples, 2005, p. 7)

In this paper we focus on highly portable and personal forms of mobile technology – mobile phones, smartphones and PDAs – shown in the upper left-hand quadrant of Figure 1. We are excluding multimedia players such as iPods and mp3 players, not because we don't think they may emerge as key educational devices but, at present, they are not actively used in that way in Hong Kong. However, readers are referred to Chinnery (2006) for an excellent overview of the use of iPods in language learning; the most interesting possibility appears to be in the area of podcasting.

For the same reason, smartphones will not receive a key focus. A defining characteristic of smartphones is that they offer full email access. At present they represent the high end of the market and have less than 10% of the camera phone market. Certainly educational projects involving smartphones are increasing, and it is clear that smartphones, with their dual email/ phone functionality, hold great promise. For example, once the costs of smartphones falls to a level of widespread affordability, the use of products such as 'Hotxt' (<http://hotxt.com/>) and 'Nimbuzz' (<http://www.nimbuzz.com/en/>), both free internet-based text services, could really revolutionize educational communications. On the website for the Centre for Learning & Performance Technologies (2007), there is a useful directory of learning tools for mobile devices that indicates functionality, availability and price. However, in Hong Kong, projects using this level of technology are 'boutique' projects and not common in our universities.

So, for education, we are realistically only considering mobile phones and PDAs for large-scale class adoption. We will therefore consider these two forms of technology, contrasting their possibilities and challenges. The analysis informs and guides our study in the area of language learning.

Mobile Phones and PDAs: What Do They Offer?

In considering these two quite common mobile technologies, the trade-off is between the mobile phone's almost ubiquitous ownership and associated ease of use with the larger screen size and access to more complex applications that can be found with PDAs. There are highly positive claims, often associated with the removal of the limitations of space and time (e.g. Irmischer, 2003). Also, there are numerous examples of small-scale studies where there is some measure of success in terms of 1) students' engagement with the overall learning environment (possibly because it's more 'cool' than conventional teaching approaches), 2) an increased frequency in actually doing learning tasks, and 3) some indication of improved learning. Some examples are:

- the use of quizzes on mobile phones; e.g. Quang and Sasaki (2006) converted online quizzes to be readable on mobile phones;
- harnessing the communicative power of mobile phones in the classroom to enhance teacher-student interaction through on-the-spot wireless messaging (Kadirire, 2005);
- the use of PDAs for out-of-class work, especially in clinical medicine (Bertling et al., 2003), and in geography and biology fieldwork activities (e.g. Chen, Kao, & Sheu, 2003, for bird-watching);

- access to databases via PDAs; e.g. Trifonova, Knapp, Ronchetti and Gamper (2004) developed PDA access to an existing online learner's dictionary and a text corpus; and
- the development of self-contained interactive and multimedia learning packages tailor-made for mobile devices; e.g. Bomsdorf, Betermieux and Schlageter (2005) used the metaphor of 'flash cards' to build a 'digital learning cards' system for use with PDAs. In this example, having a reasonable screen size was very important.

The success in these and many other cases is due to having a learning design that is 'fit for purpose'. The use of the technology fits the learning tasks the teacher/ designer has for her/his students. So, for communication and limited amounts of text, mobile phones are good; as soon as images are needed, the larger screen size of the PDA becomes important. Of course, the PDA is converging with the smartphone and so this separation is really only a temporary one. Indeed, all comments must be made with caution as the technology is changing so rapidly.

However, there are other factors to be considered. Even a brief review of the literature shows that this positive demonstration of the possibilities is far from the reality of most classrooms. Some of the reports of successful mLearning projects involve substantial effort in development and support by the research teams. For example, Furuya, Kimura and Ohta (2004) reported improved learning outcomes in their use of mobile phones for language practices. They found the frequency of studying English increased from once a week to several times a week and the places students studied English changed from inside the home and classroom to a variety of outdoor places. However, massive volumes of content material were developed by the team during the project. Without this substantial background support from the research team, one wonders about the practicality of these strategies in more realistic settings where support is less intense.

There are also queries about the feasibility of mobile learning from a pedagogical perspective. Lee (2005), for example, was concerned that the "the curtness characteristic of 'text speak' will discourage deep thinking and critical reflection"; the technology "runs the risk of stifling the development of critical interpersonal communications and oral presentation skills" and we "may not have achieved enough technology to facilitate true mobile learning" (p. 13). Multisilta, Henno Lipiäinen, and Hämäläinen (2001) noted limitations in the present level of technology, listing constraints in user interface, limited memory and processing capacity, and the small bandwidth for wireless telecommunication networks; overall they were concerned about limits to the amount of data that can be transferred and any guaranteed response times. While these comments were made some years ago, the concerns are still pertinent.

The discussion above tends to indicate that mLearning is a teaching and learning strategy with useful potential but care needs to be paid in applying it in a naturalistic setting. What are our recommendations about how to get mLearning started in a traditional university, where the present uptake of mLearning is almost non-existent? We have six principles which are in line with good innovation practice: mLearning needs to:

1. address a genuine learning need so that it seen as relevant by both teachers and students;
2. be easily used by both teachers and students;
3. be reliable and robust;
4. offer teachers and students security for their personal information;
5. be affordable in the long term; and
6. be evaluated in realistic settings in 'ordinary' courses so that there is an evidence base for other teachers to consider.

SMS as A Viable Strategy

SMS (short message service) has been use quite widely in educational institutions. The majority of the uses, however, are for administrative issues rather than for teaching and learning. Riordan and Traxler (2005), for example, reported a process of informing students about administrative changes in courses using the technology and remarked that the new method is "generally helpful for their studies" (p. 258). Nix, Russell and Keegan (n.d.) also used SMS for administrative purposes. They, in particular, wanted to give more personal advice and care to students who had been identified as being at risk of dropping out through issuing 'just-in-time' SMS messages. They found the strategy was a very successful approach for "keeping students in the system" as "SMS can be regarded as a kind of personal touch to reduce the drop-out rate" (p. 2). Stone (2004) offered students an SMS information service: students could enrol to receive messages via SMS about examinations and assessment, and time-sensitive information. It was found that the service increased rapidly in popularity: in the first six weeks of the semester, 115 students registered for the SMS support system.

There are also some reports of using SMS as a learning strategy. Thornton and Houser (2001) reported a case of using SMS to 'push' learning resources to students, with very positive results. They remarked that they had achieved four things in their attempt: students were able to study vocabulary, the messages appealed to students, students were content to read their lessons even without being given the chance to interact (i.e. replying to the SMS), and students read the messages soon after the messages arrived. Balasundaram and Ramadoss (2007) described a strategy for using SMS to deliver short quiz questions to students; students interacted with other students and teachers through reading and replying to these SMS questions.

Sending and receiving SMS messages with mobile phones is perhaps one of the most user-ready mobile learning strategies. SMS has the following characteristics. First of all, it is 'low tech'. SMS messages are text-based and do not carry multimedia content. Secondly, the technology is now well established and the capability to send and receive SMS messages is also a very common function in virtually all models of mobile phones (high-end or low-end). Also, nearly all phone networks (at least in Hong Kong) provide a relatively cheap SMS service to their network users. SMS pricing varies. In some phone plans, sending a certain number of SMS messages (say, 100 a month) is already included in the standard plans. In some, SMS requires an additional per-message charge, which can be from HKD0.5 to HKD0.9 (about 9 US cents). Receiving SMS messages, however, is usually free of charge. Despite these variations in charges, the cost of the service on the whole can be considered quite low, especially when compared with other 'added services' such as 3G (high bandwidth) and/or WAP (wireless application protocol).

The use of SMS is also 'low tech' in terms of the skills required by the users. While certain skills may be required by the message senders to compile and type a message (particularly if the typing is to be done using the phone keypad), receiving messages is very straightforward and virtually 'fool-proof'. SMS demands nearly zero effort on the receiver's part to find the information. This is sometimes referred to as a 'pushing' strategy as the users do not need to search for the information (unlike browsing the internet). On the contrary, the information finds the users. Users then usually do no more than clicking one button to view the information delivered to them.

In Hong Kong, SMS is a robust, reliable and secure system. We are quite certain of the availability of the network at most times. Messages are nearly always sent to the targeted recipients. Safe and accurate delivery of messages can be assumed.

As SMS is technologically and functionally very simple, it can be considered to be a relatively primitive technology. However, viewing it from another angle, we see that SMS ranks very highly in terms of user convenience. The software and hardware required to make SMS work are by far more popular than other mobile strategies. Kennedy, Krause, Churchward, Judd and Gray (2006) reported in their study of first year university students at The University of Melbourne that 79.5% of their subjects (aged 17 to 21) used SMS daily. Hong Kong is particularly well situated to be a testing ground for strategies that employ the use of mobile phones as it has one of the highest mobile subscriber penetration rates in the world, 143% of population (!) as of August 2007 (Office of the Telecommunications Authority of Hong Kong, 2007).

Successful uptake of mobile learning strategy is more likely in the situation when "learning activities can integrate into our lives in an unobtrusive fashion" (Lee, 2005, p. 13). SMS can deliver information in this unobtrusive fashion more readily than other strategies. If the learning objective is for students to learn from multimedia resources, the most obvious obstacle will be that not many of the students will have appropriate high-end devices and/or will not be willing to pay extra for the service. Heavy subsidization and support would have to be provided, rendering the study unnatural and unrealistic. SMS, thus, can be regarded as a practical and realistic mLearning technology for use in natural settings at present.

There are limitations in sending and receiving SMS messages. First of all, the messages are text-based and short (limited to 266 Western/ alphanumeric characters per message at the moment in Hong Kong). Interaction is also restricted, especially in the direction from students to teachers, as students are charged for sending any reply message. In view of these factors, SMS may be not a good strategy to engage students in intensive discussions and/or complicated learning activities.

SMS for Learning Social English

The present study is an investigation of the benefits of mLearning in a naturalistic environment using SMS. The area of the study was the use of social English. For all the students in the course English is a second language.

Overall, the standard of English in Hong Kong is not high; in a comprehensive study of first-year university students' English proficiency, Littlewood and Liu (1996) found that the students lacked an adequate command of grammar, vocabulary, speaking, writing, listening, and reading.

The usability of SMS as a teaching tool has also been greatly enhanced by an additional tool that has been developed to ease the workload of teachers in sending bulk messages. The Information Technology Services Centre (ITSC) at our University (The Chinese University of Hong Kong, CUHK) has recently developed an online system to enable teachers to send batch messages to a single student or groups of students through a web-based interface. The SMS gateway service is illustrated in Figure 2. The messages reach the phone of the students for all networks used in Hong Kong.

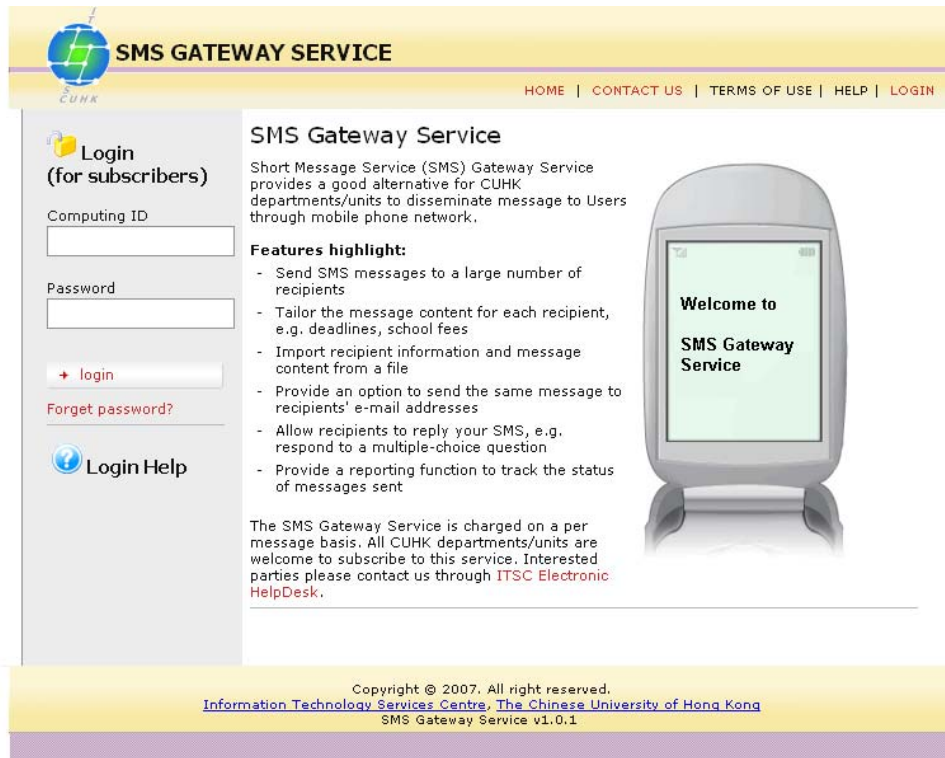


Figure 2: The SMS gateway service at CUHK.

SMS was used in two cohorts (second term 2006–07 and first term 2007–08) of a seven-week course on Social English taught by the English Language Teaching Unit (ELTU) at CUHK. There were seven weekly topics:

- | | | |
|--|---|------------------------------|
| 1. Vocabulary meaning
'good' or 'bad' | 4. Describing, invitations | 6. Nationalities, opinions |
| 2. Idioms, roommates | 5. Fillers, checking for
understanding | 7. Everyday consumer devices |
| 3. Movement, sympathy | | |

This course offered one weekly two-hour class, but the teacher (Peter) believed that English cannot be learnt effectively if students have contact with the subject only once a week. The SMS quiz tackled this problem by reminding students of the material every day, and prompting them to look at their notes to find answers. Emails are convenient but they may not be able to reach students as effectively as SMS messaging.

With consent obtained from his students, Peter sent, through the SMS gateway service, a brief question to each of his students every day for the duration of the course. Each question was related to the material taught in the preceding lesson. The answer of the question was then sent to the students through SMS the following day, together with the next question. No cost was incurred by the students as the ELTU paid all the SMS-sending charges. Students were not expected to answer the questions by replying to the SMS messages. Table 1 shows the questions and answers sent off on the first week of the course. Peter was aware of the technical limitation that the SMS messages had to be short. The questions were thus largely closed-ended and unambiguous in order not to violate the word limitations of SMS messaging.

Week1: Good/bad vocabulary for introductions		
Date	Question	Answer
Day 1	You're 'very happy' to be on ELT2101. What is a suitable adjective?	Thrilled, excited or delighted.
Day 2	The view from your hostel room is 'very nice': what other word?	Splendid, awesome or gorgeous.
Day 3	Your workload this term is xxx (very large). What's xxx?	Huge, whopping, hefty.
Day 4	I'm not strong, so my muscles are xxx (small). What's xxx?	Puny, feeble or skinny.
Day 5	What is back-channeling? Hint: uh-huh.	Noises to show you're listening.
Day 6	At a first meeting, why's it bad to talk about your illness?	Too negative. Choose +ve subjects.
Day 7	'Whereabouts' is different from 'where': explain.	Whereabouts means general area.

Table 1: SMS questions and answers sent off on the first week.

In order to evaluate the students' use and perception of the SMS strategy, a student survey was conducted at the end of each of the two cohorts. The questionnaires used in the two cohorts were largely identical except for refinements of two of the questions in the second administration. Twelve responses were received out of a total of 14 participants in the first cohort, and seven out of 12 in the second. The overall response rate altogether was 73%. While the numbers in this small naturalistic study are small, it has the advantage of having two experiences. The pattern of responses for the two classes was scrutinized carefully and was very similar. We therefore feel that the data represents students' views about the use of SMS and is not just a description of a 'one-off' event.

The survey addressed several aspects of the SMS activity, namely:

1. As SMS questions are limited in length and complexity, Peter was concerned about the actual perception of the *appropriateness* of this type of simple question: the content of the questions, and the one-question-a-day design of the mobile quizzes.
2. Peter was interested in learning about the *usefulness* of the quizzes. In particular, he wanted to know whether the short questions could lead to the learning outcomes he had originally expected – that students would revisit the subject materials.
3. The charges for the sending of the SMS questions were covered by the ELTU. Peter was interested in knowing whether students would like to share, or even take over, the *financial responsibility*.
4. Other than SMS, similar quiz activities could also be carried out utilizing other forms of technologies such as putting the quizzes on websites, on learning management platforms (such as WebCT and Moodle, which are both supported at CUHK), as Podcast materials which can be automatically downloaded to students' computers (after they have subscribed to the appropriate channel), through emails, or even through organizing Q&A sessions using online chat facilities. There are advantages and disadvantages in all of these methods. SMS, as mentioned above, is great in immediacy and ease of use. Putting the quizzes on the web is a more common strategy but students need to expend effort in looking for the questions. Emailing the questions to students eases the students' burden in searching for them, but it lacks immediacy and learning will be restricted to fixed locations (where there are computers with accessibility to the web). Q&A sessions are very interactive but at the same time are more demanding in terms of both teachers' and students' time. We were interested in learning how students would compare the *different forms of strategies*.
5. The quizzes were optional. Students were not required to supply an answer to the question before they receive the answer the next day. Students' engagement in the tasks were not (and actually could not) be monitored. Thus, Peter was interested in letting students self-report their *engagement on the tasks*: whether they liked the tasks, and whether they were motivated in working on the questions in the quizzes even though they were not part of the course assessment.

Findings

Appropriateness

Students really appreciated the content of the questions. When the students were asked 'Were the quiz questions challenging enough', taking the comments of both cohorts into account, 95% of the students replied 'about right' (responses to 'too easy' were 5% and 'too hard' were 0%). In general, the students also found the one-question-a-day design appropriate. They liked the number of questions they received over the period; 72% of the students responded 'about right' to the question 'Were there enough questions provided?' (not enough' 22% and 'too many' 6% [comment from one respondent: maybe stop sending on Sunday]). They also liked the time the messages were sent; 90% of the students said 'yes' when asked 'The questions were sent at 1.15 pm each day.

Was this appropriate?’ The time of 1.15 pm was chosen as it is a lesson-ending time [only one student said s/he was occupied in the time slot], and so arrival of the messages would not cause distraction; also, it was hoped that the students would view, consider and possibly discuss the question while eating lunch.

Usefulness

Concerning the benefits to learning these questions have led to, students’ responses were also positive. Ten comments were received in the open-ended question ‘Did the quiz help you to learn the course material more effectively’. All of the comments were confirmatory. Below are some direct quotes:

- “Yes, help to consolidate my vocabulary.”
- “Yes, it helps me remember what I have learnt.”
- “Definitely.”
- “Yes, it gave a good revision every day.”
- “Yes; SMS is more effective than WebCT and email, which require manual checking.”
- “Yes. It can help me to revise the material taught in class.”
- “Keep us remembering the course content.”
- “It’s convenient.”

Financial Concerns

Students do not want to pay for the SMS activities. The quiz contained 51 questions in total. Sending them by SMS cost the ELTU about HKD40 (about USD5) per student. The present design, where the cost was covered by the ELTU, seemed to be the only workable solution. In the first cohort, students were asked ‘If you were asked to pay \$40 for the quiz, would you still wish to take part’, and none of the students said ‘yes’, (75% said ‘no’ and 25% ‘not sure). They were further asked ‘Would the quiz be more effective if you had to answer the questions?’ Although students in general welcomed the idea of more interactions (‘yes’ 58% / ‘not sure’ 8% / ‘no’ 34%), the monetary concern is apparently one factor which interferes strongly with students’ being willing to adopt a more interactive mode. One of the students stated that “It would cost us a lot if we have to reply.”

Comparison of Strategies

Table 2 illustrates how they contrasted the SMS quizzes, daily question on WebCT, daily Podcast, daily email, and virtual class (chat on Moodle). Compared with the other strategies offered, the students in both cohorts overwhelmingly preferred the present arrangement. For example, only about 40% of the students in two cohorts liked the idea of daily questions through emails and 68% of the students would make the effort to check them. Only one-third liked the idea of daily questions on WebCT and half the students would make the effort to view them. A virtual class strategy (e.g. a Q&A chat for 15 minutes twice a week on Moodle) is also not popular. Only about one-third liked the strategy and would attend. Worst, perhaps, is quizzes through Podcasts. Only 11% of the students liked this approach and 5% would actually download the questions in this format. This option was disliked despite its ease of use perhaps because podcasts are not much used in Hong Kong.

	Like it? (Like L; Not sure NS; Dislike D)			Use it? (Would W; Not sure NS; Would not WN)		
	L %	NS %	D %	W ... %	NS %	WN ... %
a. SMS	95	0	5	N/A		
b. Daily WebCT question	32	37	31	check 47	21	check 32
c. Daily podcast	11	42	48	use 5	32	use 63
d. Daily email	42	48	11	read 68	21	read 11
e. ‘Virtual class’	32	37	32	attend 37	37	attend 26

Table 2: Students’ preferences for various mobile and online strategies.

Students’ Engagement

Despite the fact that no marks or external incentives were given to students for completing the quizzes, Peter was informed in the course-end survey that most of the students were motivated by the activity. Students commented that they did indeed revisit their notes in order to answer the questions.

Opinions of the students on the quizzes were very positive. When asked 'Overall, do you think the quiz was worthwhile', 84% of the students said 'yes' (16% 'not sure' and 0% 'no'). They also highly enjoyed the SMS cases. The students in the first cohort were asked this question 'Overall, did you enjoy the quiz'. 83% of the students said 'yes' (17% 'not sure' and 0% 'no')

Out of the 15 comments received from the question 'What did you like or dislike about the quiz' in the two cohorts, 10 of them were praise. They included (wording moderately changed for readability):

- "If I didn't know the answer, it would motivate me to read the lecture notes immediately."
- "Use of SMS as the quiz medium is creative and useful."
- "It reminds me to catch the chance to learn English every day."
- "I can bring it with me anywhere."
- "The quiz helps to strengthen my memory and remind me of things that I did not notice during class."
- "It's convenient."
- "Let us remember the course content."

As for the negative points mentioned by students, they were not rejecting SMS as a useful learning strategy but rather called for further improvements:

- "Some questions didn't learn and too difficult, making no interest."
- "Like: a kind of daily reminder. Dislike: 1 question per day is not enough."
- "If students have to answer the questions, it will be more useful."
- "The answers should go along with the questions each time."

Discussion

Success

The concept of sending daily SMS messages as a top-up or reminder of course material was clearly successful and well received (84% of students found it worthwhile and 83% enjoyed it). Students did not regard it as intrusive, as initially feared, but found it helpful and beneficial. Students certainly perceive SMS as the best medium for this, because of the convenience: the message is portable and is received automatically, without the need to check on a computer. As the quizzes were 'pushed' to them, students did not have to look for the questions as they would have if the quizzes were administered by being placed on a website or eLearning platform such as WebCT or Moodle. The format of the quiz was also well received. One question a day at lunchtime was appropriate. A few students felt that more questions should be delivered. A majority of students felt it would be better if they were expected to reply.

It is worthwhile to note that not much additional resource had been put into the SMS activity. Students did not receive support on the skills required to use SMS. The mobile phones were the students' personal mobile devices. Developing the quiz items demanded some small effort on Peter's part. However, the SMS gateway service had considerably alleviated the workload as batch messages could be sent easily, and the teacher could also pre-set multiple messages and the times they were to be released. The simple but highly appreciated mobile learning strategy is thus a practical and sustainable model.

Challenges

One drawback with the SMS strategy, however, is the cost. Sending the messages cost HKD0.8 per student per message; thus, a 50-message quiz sent to 16 students costs HKD640 (~USD82). The questionnaire responses showed that students are not willing to bear the cost of the SMS messages. Students also expressed their concerns about cost if they were expected to reply. Both of these problems would be avoided if the quiz was delivered by email instead, although other advantages, discussed above, would be lost. A possible compromise would be for students to *receive* messages by SMS, but *reply* by email.

Conclusion

The paper has described an example of simple mobile learning activity using SMS in a real context. Despite the technology involved in the tasks being relatively simple, we would like to suggest that simple strategies can also lead to considerable teaching and learning benefits. Moreover, simple strategies seem to be the only practical

and sustainable solutions that can really operate at present. The empirical data collected confirmed our expectations that mLearning in a simple form is workable and beneficial.

The study, however, does not preclude the practicability of other mobile strategies. On the contrary, when technology advances, and when smartphones become ubiquitous, a richer set of mobile learning strategies will be practical.

In the meantime, we consider that SMS strategies can be further exploited. After this small study, Peter is already thinking about further extending the strategy in his next attempts by encouraging the students to reply without inducing expenses on the students' side (perhaps done via email). There will be other trials in using the SMS method in other courses to study the applicability of the method in multiple disciplines. Also, where possible, multiple questions will be delivered in a single SMS message.

References

- Balasundaram, S. R., & Ramadoss, B. (2007). SMS for question-answering in the m-Learning scenario. *Journal of Computer Science*, 3 (2), 119-121. Retrieved December 10, 2007, from <http://www.scipub.org/fulltext/jcs/jcs32119-121.pdf>
- Bertling, C. J., Simpson, D. E., Hayes, A. M., Torre, D., Brown, D. L., & Schubot, D. B. (2003). Personal digital assistants herald new approaches to teaching and evaluation in medical education. *Wisconsin Medical Journal*, 102(2), 46-50. Retrieved December 10, 2007, from <http://www.med.uiuc.edu/FacultyDev/TeachingSkills/PDA/PDAsTeachingResource.pdf>
- Bomsdorf, B., Betermieux, S. & Schlageter, G. (2005). Digital learning cards in mobile learning scenarios. In G. Richards and P. Kommers (Eds.), *ED-MEDIA 2005, Proceedings of 17th annual World Conference on Educational Multimedia, Hypermedia and Telecommunications* (pp.154-159). Chesapeake, VA: Association for the Advancement of Computers in Education.
- Centre for Learning & Performance Technologies (2007). Directory of learning tools. Retrieved December 10, 2007, from <http://www.c4lpt.co.uk/>
- Chen, Y. S., Kao, T. C., & Sheu, J. P. (2003). A mobile learning system for scaffolding bird watching learning. *Journal of Computer Assisted Learning*, 19 (3), 347-359.
- Chinnery, G. M. (2006). Emerging technologies: Going to the MALL: Mobile assisted language learning. *Language Learning & Technology*, 10 (1), 9-16. Retrieved December 10, 2007, from <http://llt.msu.edu/vol10num1/pdf/emerging.pdf>
- Furuya, C., Kimura, M., & Ohta, T. (2004). Mobile language learning – A pilot project on language style and customization. In G. Richards (Ed.), *E-Learn 2004, Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp.1876-1880). Chesapeake, VA: Association for the Advancement of Computers in Education.
- Irmscher, K. (2003). Mobile distributed platform for e-learning scenarios. In P. Kommers and G. Richards (Eds.), *ED-MEDIA 2003, Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications* (pp.64-67). Chesapeake, VA: Association for the Advancement of Computers in Education.
- Kadirire, J. (2005). The short message service (SMS) for schools/conferences. In *FORMATEX, 2, Recent Research Development in Learning Technologies*, 856-859. Retrieved December 10, 2007, from <http://www.formatex.org/micte2005/4.pdf>
- Kennedy, D. M., & Vogel, D. (in press). Integrating pedagogy, infrastructure and tools for mobile learning. In D. Taniar (Ed.), *Encyclopedia of mobile computing and commerce*. Hershey, PA: Idea Group Reference.
- Kennedy, G., Krause, K., Churchward, A., Judd, T., & Gray, K. (2006). First year students' experiences with technology: Are they really Digital Natives? *Internal report*. The University of Melbourne. Retrieved December 10, 2007 from http://www.bmu.unimelb.edu.au/research/munatives/natives_report2006.pdf
- Lee, M. J. W. (2005). Getting a move on with mobile learning. *Training Journal*, 13. Retrieved December 10, 2007, from <http://www.trainingjournal.com/tj/158.html>
- Littlewood, W., & Liu, N. F. (1996). *Hong Kong students and their English*. Hong Kong: Hong Kong University/ Macmillan.
- Multisilta, J., Henno, J., Lipiäinen, J., & Hämäläinen, M. (2001). Is the future of eLearning in mobile devices?. In G. Montgomerie and J. Viteli (Eds.), *ED-MEDIA 2001, Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications* (pp.1372-1375). Chesapeake, VA: Association for the Advancement of Computers in Education.

- Naismith, L., Lonsdale, P., Vavoula, G., & Sharples, M. (2005). *Literature review in mobile technologies and learning (11)*. Bristol: FutureLab. Retrieved December 10, 2007, from http://www.futurelab.org.uk/download/pdfs/research/lit_reviews/futurelab_review_11.pdf
- Nix, J., Russell, J., & Keegan, D. (n.d.). Mobile learning/SMS (Short Messaging System) academic administration kit. Retrieved December 10, 2007, from http://www.ericsson.com/ericsson/corpinfo/programs/incorporating_mobile_learning_into_mainstream_education/products/book/sms_admin_kit.pdf
- Office of the Telecommunications Authority of Hong Kong (2007). Key telecommunications statistics. Retrieved December 10, 2007, from http://www.ofa.gov.hk/en/datastat/key_stat.html
- Quang, V., & Sasaki, H. (2006). Development of a mobile-phone E-Learning system. In T. Reeves, & S. Yamashita (Eds.), *E-Learn 2006, Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp.2983-2986). Chesapeake, VA: Association for the Advancement of Computers in Education.
- Riordan, R., & Traxler, J. (2005). The use of targeted bulk SMS texting to enhance student support, inclusion and retention. In B. Werner (Ed.), *WMTE'05, Proceedings of the 2005 IEEE International Workshop on Wireless and Mobile Technologies in Education* (pp.257-260). Danvers, MA: The Institute of Electrical and Electronics Engineers, Inc.
- Stone, A. (2004). Mobile scaffolding: An experiment in using SMS text messaging to support first year university students. *Proceedings of the IEEE International Conference on Advanced Learning Technologies (ICALT'04)* (pp.405-409). Joensuu, Finland, 30August – 1 September.
- Thornton, P., & Houser, C. (2001). Learning on the move: Vocabulary study via email and mobile phone SMS. In C. Montgomerie and J. Viteli (Eds.), *ED-MEDIA 2001, Proceedings of World Conference on Educational Multimedia* (pp.1896-1897). Chesapeake, VA: Association for the Advancement of Computers in Education.
- Trifonova, A., Knapp, J., Ronchetti, M., & Gamper, J. (2004). Mobile ELDIT: Transition from an e-Learning to an m-Learning System. In P. Kommers & G. Richards (Eds.), *ED-MEDIA 2004, Proceedings of the World Conference on Educational Multimedia, Hypermedia and Telecommunications* (pp.188-193). Chesapeake, VA: Association for the Advancement of Computers in Education.