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### Implementing mobile language learning with an augmented reality activity

*Mobile learning offers great potential for language teachers to support practice beyond the classroom, to encourage anytime-anywhere learning and to facilitate situated learning (Pegrum, forthcoming). Augmented reality (AR) apps are a type of mobile application that allows users to overlay the physical world with digital information, for example by attaching pictures, text and audio or video. These can be added to particular real-world objects and locations and become available for others to use when using an AR app on their phones. Teachers can use activities with AR to encourage learners to practise their language skills outside the classroom and to share information with other learners and the wider community. Some exciting projects and studies have been carried out (Holden & Sykes 2011) but so far the potential of AR for mainstream language education is only just starting to be explored. In this article we describe an activity in which students had to create a mobile tour for visitors to their campus. We detail the way we designed the activity, its instructions and procedures, as well as the technologies used. We then describe how the students went about completing the activity and their reaction to it. From this we draw some practical implications for language teaching and offer some suggestions for other teachers who may wish to use AR or other mobile learning activities with their students.*

### Mobile-assisted language learning and augmented reality

Many educators are considering the benefits of mobile technologies for learning. It is useful to briefly look at the characteristics that set mobile technologies apart from other, earlier technologies. How are they different, and how can these differences be harnessed? Some ten years ago already Klopfer et al (2002) identified several key characteristics of mobile technologies. These include: their

- 1) Portability; mobile devices can be carried around
- 2) Social interactivity; most are primarily communication devices
- 3) Context sensitivity; increasingly they are aware of their location and sensitive to their context (e.g. a phone that gives you restaurant recommendations based on your current location, and based on your preferences for certain types of food)
- 4) Connectivity; mobile devices are always connected to different data sources
- 5) Individuality; they are highly person and personalisable devices, tailored to individual needs and tastes.

These, however, are merely technical features, the question is to what extent they can impact pedagogical practice. We propose the above features have the potential for learning and teaching that is:

- 1) Distributed; not limited to one place or time.
- 2) Collaborative

- 3) Situated; relevant to specific contexts (see below)
- 4) Networked; connected to different people, different information
- 5) Autonomous; giving learners control over their own learning.

It is the third aspect, the possibility of supporting *situated* learning, that we were particularly interested in as situated cognition has been found to have a significant impact on immediate learning (Hendricks 2001).

Information about specific locations can be harnessed in different ways. It can be used to provide authentic *contexts* for learning. Perhaps more interestingly, place-based information can also help support situated learning, or learning in the situation in which it will be applied (Lave & Wenger 1991). In the area of language learning, this has been shown to be motivating in the case of the use of mobile phones for out-of-class learning, such as with mobile blogging during a study abroad period (Comas-Quinn & Mardomingo 2009). Students' motivation was found to increase as students developed further familiarity with the technology (Kim, Rueckert, Kim, & Seo 2013).

Augmented Reality (AR) adds a further layer by offering an interface between reality and relevant digital information. Such information can be harnessed by learners to get information about a particular place, its meaning, its users, and even the language that is relevant and/or appropriate in that place. Taking this idea one step further, learners can also create this information themselves to share with future visitors or learners to that site. This can lead to a high level of engagement with the location and the language needed to convey the learner's ideas (Klopfer 2008).

Research into the use of AR for language teaching is recent and limited. As one example of an interesting project, Holden & Sykes (2011) developed a location-based game in which visitors to a particular part of Albuquerque in the US have to solve a historical murder by using local cues, interacting with the environment, and by working with other players. They found that the game was popular and that participants engaged with the locations and preferred those activities that required them to physically explore the locations than the subsequent off-site tasks. More recently, in a small-scale study involving five participants, Liu & Tsai (2013) had students complete a short campus tour where objects had been tagged with (digital) information, such as information about the object as well as vocabulary and expressions. The preliminary results showed the participants used the vocabulary in their subsequent essays. The authors call for further research into this area.

### **Our activity: creating a campus tour**

We were interested in exploring the potential benefits of location-based and AR technologies with our students to encourage greater engagement and more practice. In particular in our EFL context in Thailand, students have limited opportunity to use English outside the classroom and we therefore wanted to create an activity that would be authentic in that it would require the students to use the language for real communicative purposes.

For this reason, we decided to have our students create a campus tour for future visitors to the university's faculty of Engineering, such as conference attendees and visiting lecturers. The idea was to create an interactive map that visitors could use to find out information about key places in and around the faculty, to learn about its academic and social facilities. In other words, the students would be working on a product that would have real value and would be used by others.

We had students complete two activities. The first one required them to create a campus tour, using prompts about five sites we had chosen around their faculty (see **appendix 1**). The sites chosen represented both places that were familiar to the students and those that were not quite as familiar, but were notable locations. This blend of both highly familiar and relatively unknown was so

that students could draw partly on their personal background knowledge to complete the activity, but would also be required to formulate and use appropriate information-gathering strategies. The second activity had them take a tour created by their classmates and answer questions about the sites. (A third group created a tour in class and we hope to compare and analyse this data at a later stage.)

One class period before the students completed the tour creation activity, the concept of augmented reality (AR) was introduced. The mobile application Wikitude had been chosen as the app the students would use to create their tours. The app was relatively user-friendly and there were already step-by-step guides on how to use it in conjunction with Google Maps available, both a text-only version (<http://www.wikitude.com/build-wikitude-world-google-collaborative-maps>) and a video version (<http://youtu.be/Ot5HKJvIST4>). The app allows users to tag physical locations, known as points of interest, and provide pertinent textual information about them. Then, when another user who has the app on their phone is at the same location and accesses the app, the information is made available to them. Below are screenshots of the application and a location as viewed with it.



(Source: <https://upload.wikimedia.org/wikipedia/commons/7/73/Wikitude.jpg>)

Following the introduction of the AR technology was a brief overview of the tour creation activity. The students were told they would be going out to various sites around campus (this was met with general excitement) in order to create an AR tour for a new faculty member to utilize when he/she came to teach at the university. They were told to download the Wikitude app and to either read the online guide on how to use it or watch the video that covered the same material for the next class period. However, the app turned out to be problematic, and a number of students reported difficulty in either downloading it, installing it, and/or getting it to work. To prepare for the activity, and in order to test its use, I had already downloaded the app to my mobile phone, but I also had difficulties in using it, particularly around the university. The university's wireless Internet capability was not uniform throughout the campus. There were certain areas where it was easier to connect, and there were certain areas where a connection was almost impossible. Thus, it was decided to make creating the AR component of the tour a follow-up activity. In the class period following the introduction of AR, the students split into small groups of three to four students. These groups were then randomly assigned to create tours for either "academic" sites (places connected to university functions, such as the registrar's office) or "social" sites (places associated with less academic pursuits, such as a sports field). They were then given a worksheet with prompts and space

to fill in information on their five sites. Another instructor and myself acted as chaperones for the students as they went to the various sites.

The second activity had the students taking a tour; if they had created a tour of academic sites, they were to take a social sites tour, and vice versa. To keep them on task, they were given worksheets with open-ended questions about each site. Again, another instructor and myself acted as chaperones as they toured the different sites.

### **How did it go?**

The activity was done with 34 students, all in their first year at the Faculty of Engineering. Every student had a mobile phone, and the majority had wireless Internet access. Students were allowed to use their mobile phones to search the Internet for information for regular classwork, and were often observed consulting online bilingual dictionaries and performing web searches. Some students also had tablets that were used for similar purposes.

During the activity, we observed that the students were actively engaged in the task. Probably because I, the instructor, had informed them beforehand that I would not be providing any assistance beyond clarifying the parameters of the assignment, they used a number of methods to find information on the various sites. The group members helped each other to respond to the prompts, but I also noted that they did not work only with their own group members, but also with members of other groups as well, offering each other suggestions and advice. They used their cell phones and tablets to search for vocabulary items in Thai-English bilingual dictionaries. They also conducted informal interviews with personnel they encountered at some of the sites, such as a technician who was at the IT and Audiovisual department and the librarian on duty. Their level of engagement was very high at every site, with requests for time extensions at every stop, particularly the sites they were less familiar with, such as the IT and Audiovisual department. I had to usher them away from each site. Though it was planned that the students would take a total of two hours to complete the activity, in practice they took nearly two and a half hours. The enthusiasm I noted was not confined to the group I supervised. The instructor who oversaw the other group observed a similar level of interest in the activity, as well as similar requests for more time. When asked about their opinions regarding the activity, the students' positive opinions of it were summed up by one student, who said, "It's nice to be able to get out of the classroom once in awhile. It's boring to be in the classroom all the time. I think every class should do this activity."

In contrast, the second activity, the tour taking activity, saw a marked reduction in enthusiasm among the students. Unfortunately, due to continuing technical difficulties and time limitations, the students did not have a chance to upload their tours to the Wikitude app. As noted previously, technical difficulties stemmed from the university's wireless Internet capability. Although some students were able to use their devices' personal Internet capabilities, some relied on the university's service, which proved problematic. Thus, in order to ensure fairness, the requirement to upload the tours was abandoned. Several students informally enquired about this, but as the app did not work equally well for all students, it did not seem to be fair to require that the tours be uploaded. Thus, for this activity, they were also provided a worksheet that they had to complete by going to the various sites. The worksheets had open-ended questions that could be answered using a combination of both background knowledge and information that could be gathered from the sites, and thus, was comparable to the prompts that were provided in the first activity. However, in the group I chaperoned, I observed a clear lack of interest in actually going to the various sites in order to gather information to respond to the prompts. In fact, at the second site, I noted that a number of the students had already completed the entire worksheet. They used either their own background knowledge or elicited information from their friends to answer the questions. I also observed very little academic use of their mobile phones (although I saw one or two checking social network sites!). Many students expressed boredom and questioned the rationale for visiting the subsequent sites. When asked about their feelings on this second activity, one student said, "I

already finished the worksheet after a few minutes at the Registrar's office [the first site]. I don't know why we had to go on. I wanted to go home."

Unlike the first activity, none of the students asked for a time extension. Instead, they asked for time to go buy snacks or to go to the bathroom, as they had already completed the assigned worksheet. The only way to convince them to go on to the third, fourth, and fifth sites was to offer them a greater incentive, in the form of extra credit points. The other chaperone also noted a reduced amount of enthusiasm in actually visiting the various sites, with the students asking for permission to complete the worksheet stationed at the either the canteen or coffee shop (which were two of the sites on the tour they were supposed to take).

### **Lessons learned**

Several implications for teaching may be gleaned from the implementation of the two activities. First, the level of enthusiasm we witnessed during the tour creation activity was highly encouraging. Even though the sites the students visited were places they were already familiar with, the fact that they were able to leave the regular classroom seemed to be very motivating for them. Thus, it may be said that a change of venue can have a very positive impact on motivation levels. Second, the duration of a task should be considered very carefully. The tour creation activity took slightly longer than originally intended, while the tour taking activity took less time than planned. While the tour creation activity was not adversely affected by the need for more time, the ease with which the students completed the tour taking activity was problematic. The students were bored and did not wish to complete the activity as planned. Though the parameters of the two activities were very similar, the key difference appeared to be the level of engagement required. For the tour creation activity, they were required to actively seek information and synthesize it in order to respond to the prompts. In contrast, they quickly realized that the tour taking activity could be completed with a minimum of effort.

If these activities were undertaken again, there are several aspects that would undoubtedly need modification. The issue of time is an important concern. The tour creation activity required a time extension of half an hour. However, this was only accomplished by me physically leaving the location and issuing a verbal warning that we had to move on. If given the opportunity, it was clear the students would have liked even more time for each location. It would seem, though, that if time is limited, more time should be given to sites that students are less familiar with, as they require more time to gather information. Another issue to take into consideration is the greater exploitation of mobile technologies. As noted, initially, we had planned for students to use the Wikitude app to create and take AR tours of faculty sites, but this had to be abandoned due to technical difficulties. Clearly, this is an aspect that we must solve next time. However, observation of the students showed that even without using the app, and without prior encouragement, the students' mobile phones served as valuable learning tools throughout the activity. They used them to take photographs of the locations, to search for vocabulary items, and to help check their spelling. It was evident that their enthusiasm and innate comfort with mobile technologies is something that can be further explored.

Finally, the lack of interest in the tour taking activity must be addressed. Even though the places the students toured were "new" in the sense that they had not visited them in the prior activity, the enthusiasm over completing an activity in a novel location, as seen during the tour creation activity, was markedly absent. Thus, if this activity was done again, ways to encourage a comparable level of enthusiasm are clearly needed. Perhaps having them answer questions on a worksheet was too simplistic and readily accomplished. What might be more engaging is to have them answer similar questions through a format such as picture slideshow or a video log; the majority of students had mobile phones that could take photos and/or videos. Even if some students' mobile phones do not have these capabilities, they can complete the task as a group.

We are currently analysing the tours created by the students to find out whether the amount and type of language they produced is different from when they write up their tours in class.

Regardless of the differences we may (or may not) find, the students' excitement was clear to us and we intend to use this type of activity again in the future.

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## Appendix 1 – some sample prompts

Dear Visitor,

Welcome to the Faculty of Engineering at Chulalongkorn University! This short tour is to help you find your way to some important sites around the faculty. To take the tour, simply follow the instructions on screen. Read the information about each site and then move on to the next point of interest.

This is our first site. This is the 'Registrar Office'. Here you can

... (50-70 words)...

The Registrar Office is a good meeting place, because most students and staff know where it is.

Our next stop, the 'IT and Audiovisual department' is a good place for visitors to know. The staff here can help you with

... (50-70 words)...

## **Appendix 2 – sample student responses**

Dear Visitor,

Welcome to the Faculty of Engineering at Chulalongkorn University! This short tour is to help you find your way to some important sites around the faculty. To take the tour, simply follow the instructions on screen. Read the information about each site and then move on to the next point of interest.

This is our first site. This is the 'Registrar Office'. Here you can

contact staff and inquire about your educational information for instance courses register, withdrawing courses, registered problems, filing complaints. For filing complaints, it contains postponing test, dropping your semester and resigning. Furthermore, you can find your lost things here and pronounce student's activities.

The Registrar Office is a good meeting place, because most students and staff know where it is.

Our next stop, the 'IT and Audiovisual department' is a good place for visitors to know. The staff here can help you with

inform about broken devices to administrators then they will repair them. Usually they look after about IT and Audio-visual devices in faculty of engineering and keep them in good conditions. You can borrow IT and Audiovisual devices.