MOBILE LEARNING IN A HISTORY OF ART AND ARCHITECTURE CLASSROOM

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Abstract. This paper presents a pilot project, using mobile devices in a History of Art and Architecture classroom to enhance instructor-student classroom interactions and student learning. At our Faculty of Architecture this particular class has a usual high failure rate (26% F in 2012). It is a compulsory course for architecture students, some of them are required to take this course twice or more before they can graduate. Traditional learning is lecture-based, and students studying toward their tests are often overloaded with information. In June 2013, Rangsit University initiated a new policy to provide tablets to every freshmen; around 7,200 tablets were distributed campus-wide (Samsung Galaxy Note 10.1 with S-pen). Toward the end of the class, the students were asked to complete a questionnaire in order to find out what they think about mobile learning. Typically, students are quite satisfied, and give positive feedback in their comments. The experience gained from this pilot project will be extended to other classes.

Keywords. Design education; Mobile learning; History of Art and Architecture.

1. Project background

This paper presents a pilot project using mobile devices in a History of Art and Architecture classroom to enhance instructor-student classroom interactions and student learning. At our Faculty of Architecture, Rangsit University, this particular class has an unusual high failure rate (26% F in 2012). It is a compulsory course for architecture students, some of them are required to take this course twice or more before they can graduate.

Traditional learning is lecture-based. Students study towards their tests and are often overloaded with information; digesting contents of history of art and architecture from 5,000 B.C. to Modern Days in a 14-week class is

not an easy task. We found that the students are moving away from traditional lectures. They found lectures boring, often resulting in skipping classes. The good news is that nowadays students are more open to new technology. They seek for content anytime, anywhere, 24/7. They prefer online interactive content to hard copies. Our school's initiative to become paperless, both in administration and classroom, started 5 years ago and it's still going strong; it has become a part of our working and learning culture.

Following the one tablet per child policy of the government (Secretariat of the cabinet, 2012), in June 2103, our university initiated a policy to provide tablets to every freshmen. As a result, around 7,200 tablets were distributed campus-wide (Samsung Galaxy Note 10.1 with S-pen). It is a good opportunity to experiment with this mobile device and change the way of learning in this History of Art and Architecture classroom, hoping that the students will enjoy the new way of learning and the learning outcome will be improved.

The questions were: What pedagogic models best support effective use of a mobile learning device? Is there any suitable mobile learning theory to be applied to our case? Although sophisticated theoretical models have been developed (Laurillard, 2007; Pachler, Bachmair, and Cook, 2010; Sharples, Taylor, and Vavoula, 2007), we believe in a pragmatic approach. In spite of a need for an underpinning theory of mobile learning, especially for a research purpose, Traxler (2009) argues that such theory can be problematic since mobile learning is an inherently 'noisy' phenomenon where context is everything; the phenomenon has yet to reach the critical mass of experience and practice that justify an abstraction of such theory and has been too fragmented to justify transferable generalisations. Macfalane et al., (2009) supports that "no one model of best practice was imposed on teachers by either of the projects. Teachers were encouraged to use the devices in whatever way they thought would support their students' learning". Our approach is, therefore, a heuristic approach aiming to (1) solve the class failing problem mentioned above, and (2) explore the possibilities of using mobile learning in the history of art and architecture classroom.

2. Literature review on mobile learning

2.1. DEFINITIONS

The term "m-learning" or "mobile learning" has different meanings for different disciplines. It usually refers to a subset of e-learning, educational technology and distance education that focuses on learning across contexts and learning with mobile devices. Early in the development, the definition of

the term was technocentric and imprecise, and has always implicitly meant 'mobile e-learning', an extension of conventional e-learning (Traxler, 2009). In 2000, Clark N. Quinn wrote an article envisioning mobile learning as "the intersection of mobile computing and e-learning: accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment, e-learning independent of location in time or space" (Quinn, 2000). Importance was equally given to the mobility of learners and the opportunities offered by the mobile device, saying that it involves: "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies" (O'Malley et al., 2003).

Later on, when the technology is sufficiently mature and became affordable to most users, the emphasis in mobile learning was placed on the interaction between learners, instructors, content and technology used (Spectrum, 2009). This suggests to some investigators that mobile learning is a social process (Sharples, Taylor, & Vavoula, 2007). Recently, Helen Crompton, a specialist in instructional technology, has defined the term as "learning across multiple contexts, through social and content interactions, using personal electronic devices" (Crompton, 2013).

2.2. A (VERY) BRIEF HISTORY OF MOBILE LEARNING

In a book by Pachler et al. (2010), three phases of mobile learning history were outlined by Mike Sharples at the Becta seminar 'Future Gazing for Policy Makers' held in the UK in 2006:

- **a focus on devices**: happened in the mid-1990s, is characterised by a focus on what devices, in particular PDAs, laptops and mobile/cell phones, can be used for in an educational context for instruction and training. An example project was the 'UK project' in which some 150 teachers in 30 schools in England were given a selection of devices, mainly PDAs, to evaluate.
- **a focus on learning outside the classroom**: is highlighted by the meaning-making that is possible for a person in situations outside institutionally framed educational contexts. The affordances in the second phase can include field trips, museum visits, professional updating, bite-sized learning and personal learning organisers. An example project was the 'HandLeR' (Handheld Learning Resource) developed for children's field trip.
- **a focus on the mobility of the learner**: is characterised by the mobility of learner, the design or the appropriation of learning spaces, and the informal learning and lifelong learning. Three important affordances can be distinguished: (1) mixed reality learning or mixed modes of representation offers a

media-rich environment, (2) context sensitive learning enables learner to engage in meaning making through interactive practice, and (3) ambient learning makes use of the digital artefacts to augment the environment, enable learning, and gaining learner's attention.

2.3. TABLETS AND ITS TRACTION IN EDUCATION

The use of mobile learning, however, was limited to a number of pilot projects, until the release of Apple iPad in April 2010, which gave birth to a new category of mobile device, different from existing ones at the time (smartphone, e-reader, ipod, …). Users were able to interact with rich media content such as reading text on a large multi-touch screen, downloading songs, watching movies, shooting videos, taking photos and performing other internet functions such as share contents, read mails, browse the web, etc.

The NMC Horizon Report 2013 Higher Education Edition (Johnson et al., 2013) reports that in the past two years, advances in tablets have captured the imagination of educators around the world. This category is led by the incredible success of the iPad, which at the time of publication had sold more than 85 million units and is predicted by GigaOM to sell over 377 million units by 2016. Tablets have gained traction in education because users can seamlessly load sets of apps and content of their choosing, making the tablet itself a portable personalized learning environment. Recent case studies on mobile learning in education can be found across the globe using different tablets, i.e. Samsung Galaxy Tablets at Lavington Primary School in South Africa as part of Samsung Smart School initiative, Windows 8 PC tablets at Seton Hall University in the US - the first university in the US to explore such device, iPads for all students and staff at The University of Western Sydney as they are moving towards blended learning, and a $35 tablet initiative for rural area in India by Amrita University.

2.4. CASE STUDIES RELATED TO DESIGN EDUCATION

We would like to highlight some mobile learning projects that are related to design education, especially to the field of history of art and architecture. Many projects in the second and the third phase of the history of mobile learning mentioned above used case studies of field trips, and museum visits. An example of the second phase was 'MOBIlearn' (http://www.mobilearn.org), whose aspect of non-formal learning was tested extensively with users at the Uffizi Gallery in Florence. Another significant project for mixed reality learning was 'MyArtSpace' project (Sharples et al., 2007) whose aim was to make a school museum visit more engaging and educational by augmenting learner's meaning making. A research by Antonieta

Angulo (2007) seeks the development of mobile learning applications that provide ubiquitous training in visual-spatial skills using wireless handheld mobile devices (i.e. PDA, cell phones). Recently, Marinensi & Matera (2013) explore the most used methodologies to teach History of Art in Higher Education and propose a model to design History of Art e-learning courses for the University; deliverable through the web version of Moodle platform with a mobile device.

The NMC Horizon Report: 2012 Museum Edition (Johnson et al., 2012) reports that "the flexibility and scalability of mobile applications has museums re-thinking the way they tailor the museum experience". Smithsonian's "Access American Stories" app, "The Art of Social: Users Share Artwork on ArtStack" - a London-based social platform that enables users to share and discover artwork, "The World Is Not Enough: Google and the Future of Augmented Reality", were just a few example projects among many.

After an extensive review of case studies, we found that the mobile learning in the field of history of art and architecture mainly focuses on the field trips and museum visits; learning in classroom hasn't been sufficiently explored. Our project, therefore, contributes as a case study of such dimension.

3. Pilot classroom

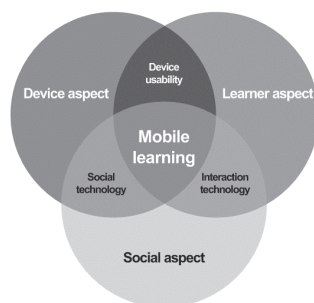### 3.1. FRAMEWORK FOR MOBILE LEARNING

Figure 1: Koole's FRAME: Framework for the Rational Analysis of Mobile Education

Koole's Model for Framing Mobile Learning (2009) is used to characterise the pilot classroom (cf. Figure 1). This consists of a three-circle Venn diagram comprising the Learner aspect, the Social aspect, and the Device aspect. The intersection of the two circles forms Device usability, Social technology, and Interaction technology.

- **Learner aspect:** (1) Zero lecture, zero exam: in order to test the idea extremely opposite to traditional lecture, no lecture is given at all, allowing us

to explore the other method of teaching History of Art and Architecture. Students earn marks for each activity and project; (2) <u>Activity-based</u>: the class is characterised by a group of activities clearly structured around learning objectives; (3) <u>Student-centred</u>: in order to strengthen students' motivation, students have to become active learners. For each activity, students can freely choose sub-topic according to their interest. The knowledge is then constructed by the student and the teacher is only a facilitator,

- **Social aspect**: most of the activities are group work. Students work in group in order to maximize the interaction among each other, sharing their own generated content, expecting them to learn from one another.
- **Device aspect**: even though Galaxy note 10.1 devices are given to students, our classroom is a multi-device one, among 177 students who answered the questionnaire (non-inclusive): 57% bring Samsung Galaxy Note 10.1 (distributed by the university) to the classroom, 4% bring iPad, 23% bring iPhone, 14% bring an Android smart phone, 1% Window phone, and 1% other phones. Figure 2 shows different devices were used by the students in this mobile learning classroom.

Figure 2: Different devices in the classroom

- **Device usability**: students can use the device in a numerous way: searching for online interactive contents, online submission, organization of knowledge, content sharing, presentation, etc. In our case, we also intensively use Google Apps for Education, especially Google sites for class website, and also some other apps such as Pinterest for organisation of knowledge,
- **Social technology**: Facebook is chosen as a social media, allowing communication between students and lecturers in a form of group posting,
- and **Interaction Technology**: some interactive activities such as polling and quiz are implemented via Google Form.

3.2. MOBILE LEARNING ACTIVITIES

The 14-week class is composed of 12 assignments, 1 field trip and a final project. The mobile learning class starts at week 3, when the students begin

to receive tablets. Following activities were designed to cover various topics of History of Art and Architecture:

- **Quick sketch:** Students watch a historical movie and sketch on the tablet buildings and interiors they see in the movie. This exercise allows students to capture the style of the architecture. They can either use the tablet to sketch or draw on papers. Those who use tablets can quickly save the picture and submit online.
- **History of Art time-line:** students are given important styles in art in random and are asked to arrange them in historical order,
- **Great Designers:** each group of students give presentations about a famous designer of their choice. Lecturer then ask a question on the class's Facebook group where students compete for the top 10 correct answers,
- **Architectural elements**: students are given graphics explaining different architecture elements of a Greek, a Roman and a Gothic building. They are then asked to search for pictures of these architectural elements and pin them on boards using the app called Pinterest,
- **Architectural style quiz**: students are asked to take a quiz about architectural style based on given pictures of buildings. The quiz is made using Google Form where the result can be summarized immediately,
- **20th Century architects battle**: in each battle, two teams of students are asked to present information about a famous architect. The rest of the class then vote for their favourite team on a Google form,
- **Architecture of Asia**: ARCASIA's history of architectural timeline chart (http://www.arcasia.org/publication/architectural-timeline-chart) was given to students as a starting point. They, then, compete on a finding of brief information on architectures in Asian countries, and then post them on class's Facebook group. The team that has found the most buildings win,
- **Walk Rally**: in a field trip to the temple, students were given tasks to take photos of their team at the given points, then upload them on to the social media with some more information about the buildings or artefacts,
- **Final Project**: the students produce Campus Magazine Special Edition on History of Art and Architecture, incorporating Layar's augmented reality technology (www.layar.com), which can be viewed using a mobile device.

Since the subject is mostly western oriented, different from our students' cultural background, the comprehensive overview of the subject is preferred to an in-depth study of a topic. The class ended mid-October, 2013.

We would like to highlight two exercises: the battle and the walk rally. In the battle, teacher gave a list of architects -for the students to choose from- a week in advance. The choosing happens in the classroom on the Google site, using the mobile device. The teacher prepares the polls in advance using

Google Form. For each battle, two groups of students are chosen randomly, i.e. Le Corbusier v.s. Mies van de Rohe, Jean Nouvel v.s. Richard Rogers, etc. The battle comprises of three rounds: early life and career, design concept and style, and selected works. Each group takes turn to present the content in each round. Once the battle completes, the rest of the class is given a link to vote for their favourite team via class's Facebook group, using their mobile devices. The result is immediately summarised in form of pie chart.

Figure 3: The walk rally to the temple of the Emerald Buddha and the posts on class's Facebook Group

The walk rally (cf. Figure 3) is a field trip to the temple of the Emerald Buddha in Bangkok and its surroundings, in which the students bring their mobile devices along. Shortly before their arrival, the students are given 10 photos of buildings and artefacts for them to find. Once the students are arrived, each team will have to take photos of their team members with the given buildings/artefacts, search for related information, and then post them to their team's thread on class's Facebook group. The teacher can communicate with the students, give immediate feedback if the answer is correct or not, and check if the team has completed the task during that day.

4. Survey and Results

The students are asked to take a questionnaire in order to find out what they think about this mobile learning. Among 177 students, they are satisfied with using student centred learning at 3.94 according to Likert scale, they are satisfied with searching for on-line information at 4.17, they are satisfied with using technology in learning at 4.27 and they are satisfied with group work at 4.20. The students also give positive feedback in the comment such as: "Very good. I would like more learning games in which students compete with each other so they have more attention", "It's so much fun using technology in the class", and even "I'm a happy learner".
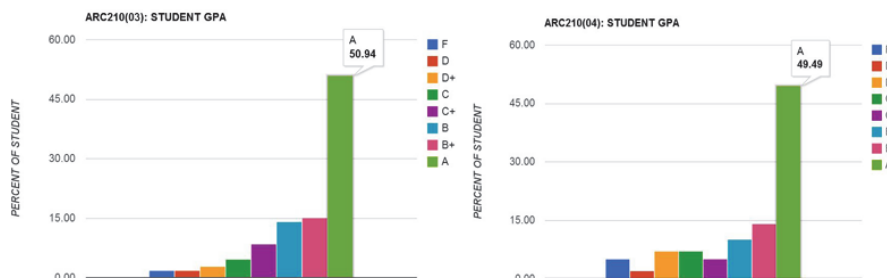
Figure 4: Students GPA charts for Section A and Section B

Figure 4 shows the students' GPA chart for both sections, in which we notice similar pattern. Section A scores a class average of 78.42%, and Section B scores a class average of 75.96%. Both sections show a very high rate of A (around 50%), and a very low rate of F (an average of 3.47% F for both sections).

5. Conclusion and Discussion

Contrary to what the chart shows, we cannot firmly conclude that the pilot classroom clearly helped with students failing the subject; even though the percentage of students failing is significantly lower comparing to the class in 2012 that had 26% F. The reason is that there is a quite high rate of dropout before the final evaluation (an average of 17.98% for both sections). The students who drop out hardly show up in class at all, so we do not know the reason of their dropout. It is possible that in this zero-exam class, the students know that they cannot test their luck in the Final exam - so they drop out before they get the actual F; this phenomenon needs further investigation. But it was observed that students who skipped this history class didn't show up in other classes either. And the average first year drop out is around 10%.

Nevertheless, to our surprise, the approach definitely helps with students' learning outcome for both sections (around 50% A). Comparing to traditional learning, this approach is totally opposite to traditional lecture, since there is no lecture given at all. The students learn by themselves through a set of activities incorporating information finding according to a learning topic. This can also be done in traditional activity-based learning but mobile learning is a true enhancer, allowing students to interact with the teacher and with each other, making a vibrant classroom.

From the teacher's point of view, mobile learning has clearly helped increasing students' engagement. When the students are asked to give a feedback about something, they seem more enthusiastic. The teacher can also ask the students to do a quiz and know immediately which student needs special

attention. In term of affordances, mobile device seems to be easy to use for the students; they could keep up with a variety of tools and apps that have been introduced week by week, with little assistance from the teacher. In terms of mobility, it is found that the line between learning in the classroom and in movement is blurring, since the device can accommodate both.

The new generation seems to adapt well to this mobile learning. Experience gained from this pilot classroom will be extended to other architectural class, as well as other classrooms on the campus.

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