

Mobile Wireless Technology and Its Use in Lecture Room Environment: An Observation in Malaysian Institutes of Higher Learning

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Abstract—The use of Mobile Wireless Technologies (MWT) such as mobile phones, tablets and laptops are widespread. Despite their advantages such as portability and speed, their use in the field of education is under-researched in Malaysia. This study was conducted with the main aim of exploring the use of (or rather the lack of) MWT during lectures in higher learning institutions. Non-participatory observations were conducted in four lecture sessions. Results clearly showed that no MWT tools were used during the lectures, and there are almost no interactions between students and lecturers despite the huge number of more than 50 students in the class. A hypothetical framework was then developed based on these findings and supported by related theories. Future work will aim to test and validate this framework by administering interviews and surveys with students and academicians in the country.

Index Terms—Higher learning institutions, interaction, mobile wireless technology, observation, students-academicians.

I. INTRODUCTION

Studies have been conducted to harness technological tools to enable interactivity in schools and tertiary institutions. Technological tools, such as a response system is believed to be able to raise students' participations and engagements in class. The recent explosion of Mobile Wireless Technology (MWT) brings much needed convenience and improves our ability to communicate whenever we want. In the higher education sector, MWT have made its impact and is fast being utilized by students and academicians. The myriad advantages of MWT such as mobility, simplicity and speed, etc. have resulted in it being a valuable tool in higher education [1].

Despite the many advantages of MWT and its high proliferation in the country, the use of MWT in higher learning institutions is under-researched. This study is therefore undertaken to explore the use of MWT during lecture sessions in higher learning institutions. The aim of this paper is twofold: 1) to explore the use of MWT in lecture rooms, and 2) to design a framework based on the observation results.

The remainder of the paper is organized as follows: The next section discusses the background studies conducted in MWT and education. This is followed by the research

methodology which delves into the observations. The results are presented next, followed by the development of the hypothetical framework. The future work concludes the paper.

II. BACKGROUND STUDY

Studies have indicated that the use of computers and technology is an integral part of the education process to improve learning [1]–[3]. It is however, interesting to note that the findings on the use of MWT during lectures are mixed. On the positive note, the use of MWTs were found to enable students' to send their feedbacks to their teachers [4], enhance interactivity and promote higher levels of learning attention [5] and enhance interaction amongst students and between students and lecturers [6].

On the other hand, the use of MWTs such as laptops during lectures resulted in students spending substantial amount of time multitasking, which may negatively affect students' learning [7]. Moreover, disruption activities, such as instant messaging and web surfing also create problems when laptops were allowed to be used during lectures [8].

In recent years, the proliferation of newer MWTs like tablets and iPad has brought significant changes for higher education. The Pearson Foundation found tablets ownership in college and college-bound students has tripled in just a year, and that 90% of the students who own tablets viewed such devices as valuable for educational purposes [9]. Colleges and universities have begun experimentations to integrate tablets and iPad in classrooms. In 2010, Seton University announced that it will start distributing iPad to all its full-time students. However, adoption of such technology by students and academicians in higher education does not translate to quality educational experience. Keyboard typing on the iPad screens using fingertip is deemed to be inconvenient and slows down typing speed [11].

III. RESEARCH METHODOLOGY

Non-participatory observations of large lectures (i.e. more than 50 students) were conducted at two local universities, covering four different subjects from science (Mathematics, Multimedia and Programming) and non-science (e-commerce) domains. These courses were for the undergraduate studies in the universities. Table I below provides the details.

The date, time and locations for each lecture observation were made in advance. The observations were also recorded,

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through which field notes were written down on significant occurrences during the observed lectures, such as the observed drawbacks of large lectures and the nature of students-lecturer interactions. Each observed lecture was approximately two hours. The recorded observations were replayed twice to confirm the observation field notes as well as to ensure crucial incidences were noted down.

TABLE I: OBSERVATION SUBJECTS

Lecture	Subject	Students present	Students absent
1	Mathematics	62	6
2	Multimedia	116	5
3	Programming	65	4
4	E-Commerce	112	15

IV. OBSERVATION RESULTS

Table II (see next page) presents the overall outcomes of the observations. We present the main results in three categories as follows:

A. Lecture Methods

The main methods in lecture deliveries were the use of PowerPoint slides, and also the conventional white board and marker pens. This is probably due to the nature of the subjects themselves, whereby technical subjects such as Mathematics and Programming require the lecturers to further elaborate examples or points on the whiteboards.

B. Lecturer Interaction with Students

None of the lecturers were found to use any form of MWT during their lectures to facilitate interactions with their students. General face-to-face communication was used to gauge students' level of understanding, however, class discussions were not observed for all the lectures. This is probably due to the time limitation whereby the lecturers have approximately two hours to complete their syllabus for the day. Additionally, the large number of students in the classes also may have prohibited the discussions to be conducted during the lecture hours. Feedback elicitations were also not very satisfactory, with the majority of the responses coming from the front-row students. We believe self-esteem plays an important role here in which students who are confident generally are more forthcoming in responding. Additionally, probably the culture may also be one of the reasons for this scenario. Asians are generally not very vocal in voicing out their opinions or uncertainties in a public environment.

C. Students Interaction with Lecturer

The observation on the students' initiatives to communicate with the lecturer revealed the majority of the students to be quite, despite the large number of students in the lectures. Similarities were observed for two lectures whereby only very few students seated in the front rows made attempts in interacting with the lecturers. As for Programming and E-commerce, none of the students were found to have interacted with the lecturers.

In summary, we noted that interactions between students and lecturers need a lot of improvement. Although culture may affect the way one acts, we believe the use of MWT during lectures may improve students and lecturers

interactions with each other. This needs to be further tested, therefore the next section describes the hypothetical framework proposed based on the observation results and also some existing models.

V. HYPOTHETICAL FRAMEWORK

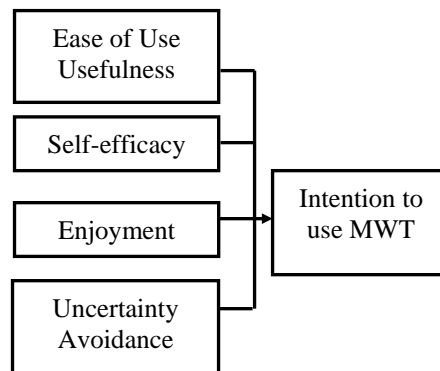


Fig. 1. Hypothetical framework.

Fig. 1 above depicts the proposed framework to measure the intention to use MWT (dependent variable). Five main independent variables were identified from various theories and models. They are as follows:

Technology Acceptance Model (TAM): This model is based on perceived usefulness (the degree in which one believes that using an information system will improve productivity) and perceived ease of use (the degree in which one believes using an information system will require minimal effort) [12]. TAM has been used in various studies, such as, in assessing users' acceptance of email and computer software [13].

Motivational Model: This model dictates that intrinsic motivations come from an individual's sense of enjoyment in performing a task, without the need for reinforcements. Therefore, it is believed that when one enjoys using MWT, then he or she will be encouraged to use the technology more.

Social Cognitive Theory (SCT): SCT attempts to explain human behavior by placing importance on self-efficacy as a direct determinant of a person's behavior. Therefore, self-efficacy can be used to measure the personal confidence a person has in his or her own skills to use and interact with an instructor using MWT during lectures [14].

Hofstede's Dimensions of Culture: One of the Hofstede's dimensions that may be of particular interest in the study of technology acceptance model is uncertainty avoidance which refers to "the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity" [15]. We believe that when a person is uncertain about the use of MWT, he or she will avoid using it.

VI. FUTURE WORK

The observations revealed that interaction between students and lecturers need much improvement. Based on these findings and related theories and models, we proposed a hypothetical framework to measure the intention to use MWT during lectures. Therefore, the next stage of the study would be to validate this model. This will be accomplished

by conducting interviews and questionnaire surveys study may encourage academicians and students to use more involving lecturers and students in higher learning technological tools during lectures. institutions in the country. It is believed that the results of the

TABLE II: LECTURE OBSERVATION

	Lecture 1	Lecture 2	Lecture 3	Lecture 4
<i>Lecture methods</i> : Observer focused on the general pacing of the lecture, techniques used by the lecturer in her presentation, types of learning activities conducted and the use of instructional aids or tools				
1. Pacing and presentation method	Satisfactory. Mathematical questions written down on the whiteboard and students need to complete the questions. Observed only students in front seem to have finished the questions given. After the allocated time, solutions were given and explained by the lecturer.	Satisfactory. Lecture was conducted using PowerPoint slides. After each slides, lecture will pause before continuing to the next slide.	Not satisfactory. Lecture in the form of examples driven, written on the white board and students were given time to copy. Observed that insufficient time was given and some students were struggling to finish copying down the examples.	Not satisfactory. Lecture was conducted using PowerPoint slides. Each slide follows one another. Only intermittent pause for questions were observed.
2. Learning activities	Not observed. Mathematical questions were written down on the whiteboard and students need to complete the questions. Observed only students in front seem to have finished the questions given. After the allocated time, solutions were given and explained by the lecturer.	Not observed. A question was written on the white board. Students were given time to solve the problem after which volunteers were elicited. Students seated in front volunteered to write the answer on the white board. Discussion ensued.	Not observed. Programming questions were fielded, students given time to attempt and explanation followed.	Not observed. None were given.
3. Technological / instructional tools	Not observed. Verbal lecture delivery using the whiteboard and marker pen only.	PC provided in the lecture hall, projector and PowerPoint software.	Not observed. Verbal lecture delivery using the whiteboard and marker pen only.	PC provided in the lecture hall, projector and PowerPoint software
<i>Lecturer interaction with students</i> : Focused was on the lecturer initiatives to encourage communication with students, prompting for feedbacks and responses to students' enquiries.				
1. Prompt student feedback to gauge student understanding.	Satisfactory. After solutions were discussed, students understanding were enquired. Some students in front requested for additional clarifications. Lecturer will then repeat the explanation.	Satisfactory. After some slides, students were prompt. Students seated in front were seen giving some sort of feedback or confirmation. Some students were seen nodding their heads.	Satisfactory. After each example, students were prompt. Students were generally not responsive.	Need improvement. Lack of initiative to interact with students.
2. Encourage class discussions.	Not observed.	Not observed.	Not observed.	Not observed.
3. Interact with all students fairly and impartially.	Need improvement. Interaction seems to center on the students seated at the first few rows. Partiality observed towards front students.	Satisfactory. The lecturer did not singled out any students during prompting. She looked at the entire class in general when enquiring. Majority of the communication took place at the front of the classroom.	Satisfactory. Lecturer looked at the whole class in general when interacting to get students' feedback. Students were not responsive.	Not observed.
4. Demonstrate awareness when students require further clarification and responds to students' questions and comments.	Satisfactory. Lecturer demonstrated awareness when students fielded request for further clarification. Took place in front of classroom. Students seated at the back were passive.	Not observed. Students did not field any questions, only confirmation when asked whether they understood the lecturer's explanation.	Not observed. Students were unresponsive and none asked questions.	Not observed. Students were unresponsive and none asked questions.
<i>Students' interaction with lecturer</i> : The observer focused on the students' initiatives to communicate with the lecturer.				
1. Demonstrate attentiveness during lecture and show awareness when lecturer prompts for feedback.	Need improvement. Only students seated in first few rows. Some students seated in the back were seen chatting and using their phones.	Need improvement. Only students in front provided some feedback, like nodding their heads or saying a confirmation yes when lecturer prompts them.	Not observed. Students were busy copying down the notes.	Not observed. Appear nonchalant and uninterested in the subject matter.
2. Are responsive to lecturers' enquiries / actively ask questions.	Need improvement. Only students seated in front responded.	Need improvement. Only students seated in front responded.	Not observed. Students were unresponsive and none asked questions.	Not observed. None of the students were responsive or asked any form of questions.

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