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Kin Ho, Benson Hung

Hong Kong Institute of Vocational Education (Tsing Yi), Vocational Training Council,
bensonhung@vtc.edu.hk

Kin Ming Wong

Hong Kong Institute of Vocational Education (Tuen Mun), Vocational Training Council,
km_wong@vtc.edu.hk

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INSTANT MESSAGING FOR ENQUIRY-BASED LEARNING AND PEER LEARNING COMMUNITIES

Hung K.H. ^{*, a} and Wong K.M. ^{**, b}

^a Department of Construction,
Hong Kong Institute of Vocational Education (Tsing Yi),
Vocational Training Council, HKSAR, China

^b Department of Construction,
Hong Kong Institute of Vocational Education (Tuen Mun),
Vocational Training Council, HKSAR, China

* bensonhung@vtc.edu.hk

** km_wong@vtc.edu.hk

Abstract

Instant Messaging (IM) tools such as Telegram may effectively be used to engage students in their learning. This paper explored how IM can enhance traditional teaching and learning in higher education by creating additional informal learning spaces, rather to disturb the existing classroom practices. There are three objectives that this paper was expected to achieve:-

- To measure the student response rate in using IM for the assessment of effectiveness in enquiry-based learning;
- To evaluate the impact of IM on peer-to-peer participation through the analysis of dialogues among the learning communities; and
- To discuss the essentials of successful application of IM in informal learning spaces.

A module named Highway Engineering (CON4381) of Higher Diploma in Civil Engineering at the Hong Kong Institute of Vocational Education was selected with a large class size of over 300 students. The results were encouraging with over 100 students participated in the learning communities and more than 200 number of questions posed and interaction counts. The activities trends and students' feedbacks showed positive perception and acceptance of the use of Telegram for teaching and learning. A questionnaire designed by the authors was used at the end of the semester and the participants showed positive perception and acceptance of the use of Telegram for teaching and learning. It was revealed that IM tools could elicit new learning opportunities, foster enquiry-based learning, offer informal and formal learning opportunities, and support peer learning community.

A valuable discussion was conducted to address challenges in adopting IM as transmission pedagogy including merging of academic and non-academic contents, perceived distractive nature and potential to trigger off-task behaviours and sometimes limited participation of all students etc. Although such challenges exist in adopting IM as pedagogy, the potential to foster an effective learning environment

should not be underestimated. Together with the widespread participation of all students and enhanced willingness on public expression of silenced voices, the utilization of instant messaging was found to be reasonably valid. Furthermore, an investigation into a mobile app which supplemented Vocational Training Council's Moodle learning management platform was made so as to explore further usability whenever appropriate.

Keywords: *Instant messaging, enquiry-based learning, peer learning communities, formal and informal learning spaces, active participation.*

Introduction

Instant Messaging (IM), which sends messages in real time, has become one of the most popular applications of the Internet to stay people connected. Incorporating the potential of mobile devices, mobile instant messaging (MIM) may contribute to the delivery of quality learning and teaching in formal (i.e. classrooms) and informal (i.e. out-of-the-classroom) learning spaces. The tremendous potential of mobile technologies to activate deep student engagement with content should be further exploited in higher education.

In view of the huge potential offered by these technologies, particularly in education where not only the short message service (SMS), but also IM can be used; this paper discussed the establishment of alternative dialogic spaces for student collaborative engagements in informal contexts, which can gainfully transform teaching and learning. Particularly, the objectives of the project were listed as the followings:-

- To measure the student response rate in using IM for the assessment of effectiveness in enquiry-based learning (EBL);
- To evaluate the impact of IM on peer-to-peer participation through the analysis of dialogues among the learning communities; and
- To discuss the essentials of successful application of IM in informal learning spaces.

Literature Reviews

The increasing interest in utilizing mobile devices as technologies that support collaborative learning has been widely debated in recent years (Echeverría *et al.*, 2011; Hwang, Huang & Wu, 2011; Koole, 2009; Rambe & Bere, 2013). From the view point of Educational Sciences, mobile devices have remarkable features which can create more effective learning environments for traditional classes (Kert, 2013). Kim *et al.* (2013) also praise the development of mobile technologies has enabled educators to send instructional messages in flexible ways. Moreover, Echeverría *et al.* (2011) articulate the multiple academic purposes of mobile devices as follows: access to content, supplementation of institutionally provided content and acquisition of specific information, fostering interaction and information sharing among students. It is noteworthy that the benefits of using mobile technologies are adaptability, cost effectiveness, and support for educational equity.

To define, enquiry-based learning empowers students to take charge of their own learning and gives them more freedom to research into topics of personal interest in a way which suits their own learning style (Dahlgreen and Dahlgreen, 2002). ELB starts by posing questions and students seek for active construction of meaningful knowledge through questioning on 'learning how' versus traditional learning of 'learning what'.

Being connected to the Internet for an inordinate period of time, Alvestrand (2002) suggests a phenomenon that fosters a sense of "online community" that perhaps no other application has done previously. In education, Palloff and Pratt (1999) note that the "learning community" takes on new proportions in the online environment and consequently must be nurtured and developed so as to be an effective vehicle for education. Building learning community is probably a key to the relationships and interactions among students through which knowledge is primarily generated. Moreover, learning communities are commonly viewed as groups of people engaged in collaborative learning. By enabling students to share knowledge and work collaboratively, participation in learning communities is considered to enhance student engagement, persistence and learning, in addition to encouraging students to take greater responsibility for their own learning (Tinto, 2003). Peer learning communities provide a model for connecting people in the spirit of learning, sharing knowledge, and collaborating.

Research Methods

An instance of an IM, Telegram, was adopted for the module Highway Engineering (CON4381) of higher diploma in civil engineering at the Hong Kong Institute of Vocational Education (Tsing Yi), Vocational Training Council in academic year 2016/17. Telegram is a free cloud-based instant messaging service. Users can send messages and exchange photos, videos, stickers, audio, and files of any type. With a view to heighten

lecturer-student and peer-based participation, the project was expected to enhance quality pedagogical delivery and inclusive learning for the students in both formal and informal spaces.

A total of 312 students was enrolled this module CON4381 and all of the students were full-time students. Since there were frequent interaction and adequate opportunities for students to ask questions during the semester period, the launch date of chat group was arranged before the long holidays so as to fill the teaching and learning gap and to better support the students in the absence of formal learning spaces. The qualification framework level (QF level[#]) of this module is 4 and the curriculum-hours are 26 hours including 18 hours of lecture and 8 hours of tutorial. There is no laboratory for this module.

The module lecturer was also the author (i.e. Hung K.H.) of this paper and has been taught for this module for four consecutive years. The intended use of Telegram was to enhance teaching and learning outside classroom hours and the support was not meant to replace the lectures or to introduce new topics in Telegram. Students were encouraged to pose questions and could also use this medium to discuss any subject topics with the lecturer and their fellow students.

Student response rate (i.e. count of posed questions in Telegram) was a key indicator to measure how effective the enquiry-based learning was. Peer learning communities were successfully formed with over a hundred of students at the peak time and the group was advised to limit the use of Telegram for academic discussion only. In addition, through the analysis of dialogues, peer-to-peer participation and collaborative learning were highlighted to reflect the impact on the peer learning communities. At the end of the semester, an online questionnaire was sent to all students to elicit their views on the use of IM for teaching and learning. The details of the module and participants are summarized in the following Table 1:-

Module Title	Highway Engineering	
Module Code	CON4381	
QF Level	4	
Curriculum Hours	26	Lecture: 18 Tutorial: 8
Academic Year	AY 2016/17	
Study Mode	Full Time	
Total No. of Students Enrolled in this Module	312	
No. of Classes	12	
Date of Semester Commencement	1 September 2016	
Date of Chat Group Creation	13 December 2016	
Maximum No. of Students Who Joined Telegram Since Its Launching	107	
Language Used in Telegram	English or Chinese	

Table 1. Summary of module and classes details of CON4381 together with information of IM used.

Results and Discussion

The IM learning support was optional and students are free to withdraw at any time. The traditional approach of instruction was provided to the students enrolled and the students received regular lectures on the theories and designs of Highway Engineering. No mobile contact information to the lecturer was required and students can join the chat group freely by using an invitation link. The support was to engage students to ask questions (e.g. Figure 2a) and to help each other collaboratively (e.g. Figure 2b) as learning communities. Students could freely post questions to the lecturer and fellow students and the lecturer would usually respond to the questions after a certain period of prolonged silence (e.g. Figure 2c).

The activities log as stipulated in Table 2 summarized that the maximum number of participants was 107, while the student response rate (i.e. the number of questions posed by students) was 127 questions in total or 1.19 questions per student. The interaction counts for peer-to-peer discussion were measured by counting the number of responses from peers regardless the nature, the accuracy and in any forms, as long as they were related to the questions posed. Moreover, the trends of corresponding parameters (i.e. No. of New Members, No. of Questions Posed by Students and Interaction Counts for Peer-to-Peer Discussion) perhaps suggested a common students' behaviour that they are intended to prepare their examination at the last stage. The last two series (i.e. No. of Questions Posed by Students and Interaction Counts for Peer-to-Peer Discussion) were not distinct at the initial stage of IM support.

The findings suggested heightened student participation, the fostering of learning communities for knowledge creation and progressive shifts in the lecturer's mode of pedagogical delivery. IM could possibly be used as a viable means of communicating and learning in higher education. In order to make out-of-the-classroom or informal learning spaces successful, unlike in the formal lectures and tutorials, attention must be paid to address the participants' sense of learning community within their peers.

At the end of the semester, all students were invited to express their views by using an online questionnaire. There were five key questions to collect students' feedback (on a scale of 1 = Strongly Disagree to 5 = Strongly Agree) on the implementation of Education Informatization (EI) along with two open-ended questions. All the questions were reproduced in Table 3.

The overall evaluation and students' feedback were presented in Graph 2a to 2e to elicit their views on Education Informatization, especially the use of IM for teaching and learning. For the first open-ended question, short comments from students were received including "Easy to ask question via telegram", "Telegram, review before exam" and "The best thing is that you would answered our question in telegram. Also, the answer is useful. You are the first to do this. Very impressed.". For the second open-ended question, there were no negative comments against EI or IM, while there was a

comment to suggest inclusion of videos for teaching in the future. Moreover, there was some evidence to show that learning using IM reduced the formality of the learning experience, and helped to engage reluctant learners and raised their self-confidence.

On the other hand, the challenge of using IM includes merging of academic and family life occasioned and students are also expressed academic uncertainty about IM which is often perceived distractive nature and potential to trigger off-task behaviours. Additionally, one of the most complicated academic endeavours in adopting IM as pedagogy is to generate widespread participation of all students and to increase willingness on public expression of silenced voices that have often been con-fronted with considerable academic resistance.

Table 3. Summary of five key questions and two open-ended questions

Key Question 1	The teacher was able to help me understand the key concepts, ideas and issues with Education Informatization.
Key Question 2	I was intellectually stimulated and inspired by the teacher.
Key Question 3	The teacher provided me with timely and helpful feedback.
Key Question 4	The teacher was supportive when I needed help in this course.
Key Question 5	Overall, the teacher was effective in helping me achieve the course learning outcomes.
Open-ended Question 1	What were the best thing(s) about Education Informatization?
Open-ended Question 2	What thing(s) about this teacher's teaching could be improved?

Conclusions

The rapid growth and development in mobile technology has had a significant impact in education and has brought amazing changes to transmission pedagogies. This paper discussed how mobile devices with Telegram can be used to support teaching and learning in higher education in Hong Kong.

This paper offers researchers, teachers and practitioners ideas about the use of IM tools for educational purposes. In consideration of statistics and students' feedback, the results were satisfactory and students expressed positive perception and acceptance toward the use of Telegram for teaching and learning. It was revealed that IM tools could elicit new learning opportunities, foster enquiry-based learning, offer informal and formal learning opportunities, and support peer learning community.

Despite challenges exist in adopting IM as pedagogy including merging of academic and non-academic contents, perceived distractive nature and potential to trigger off-task behaviours and sometimes limited participation of all students, the potential to foster an effective learning environment should not be underestimated.

Remark

The QF in Hong Kong is a 7-level hierarchy. Each qualification is assigned a level to indicate its position in the hierarchy relative to others. The level of a qualification is determined in accordance with a set of Generic Level Descriptors which specifies, in four domains, the outcome standards expected of the qualifications at each level. The four domains are:

- Knowledge and Intellectual Skills;
- Processes;
- Application, Autonomy and Accountability; and
- Communications, IT and Numeracy.

Figures, Graphs and Tables



Figure 2a. Students were engaged to ask questions in which enquiry-based learning was highly facilitated.

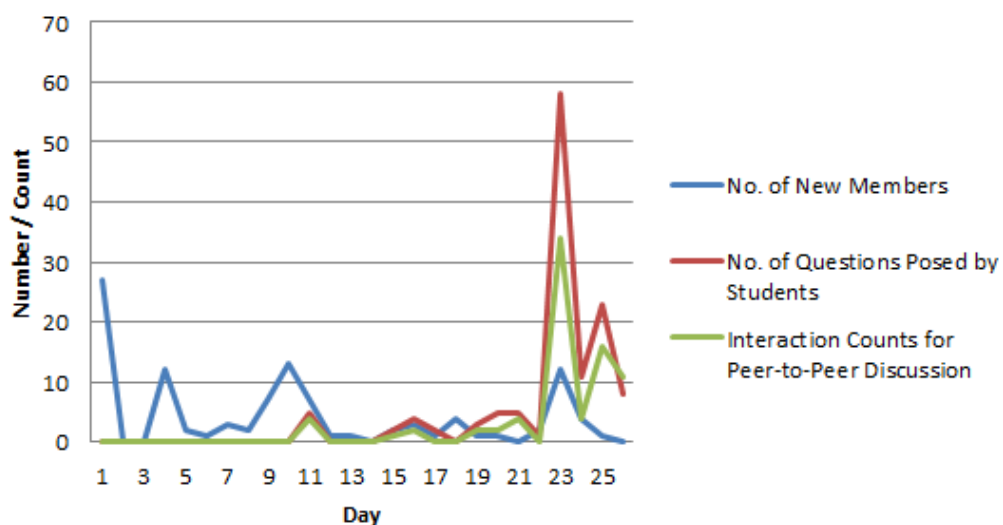


Figure 2b. Collaborative learning was significantly promoted in peer learning communities.



Figure 2c. The lecturer would usually respond to the questions after a certain period of prolonged silence.

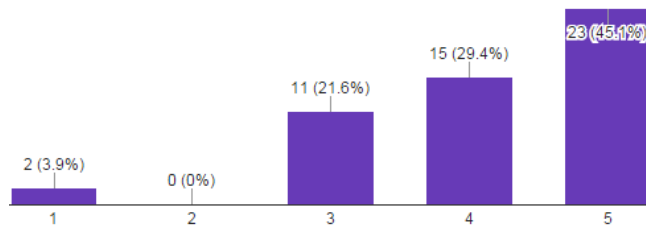
Graph 1. Activities Log of Learning Communities in the Chat Group of Telegram



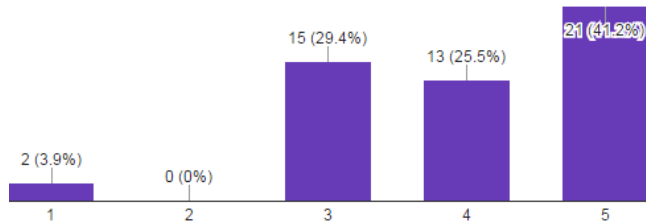
Date	Day	No. of New Members	No. of Questions Posed by Students	Interaction Counts for Peer-to-Peer Discussion	Note
13-Dec-16	1	27	0	0	Date of Creation
14-Dec-16	2	0	0	0	
15-Dec-16	3	0	0	0	
16-Dec-16	4	12	0	0	
17-Dec-16	5	2	0	0	
18-Dec-16	6	1	0	0	
19-Dec-16	7	3	0	0	
20-Dec-16	8	2	0	0	
21-Dec-16	9	7	0	0	
22-Dec-16	10	13	0	0	
23-Dec-16	11	7	5	4	Institute Holiday
24-Dec-16	12	1	0	0	Institute Holiday
25-Dec-16	13	1	0	0	Institute Holiday
26-Dec-16	14	0	0	0	General Holiday
27-Dec-16	15	2	2	1	General Holiday
28-Dec-16	16	3	4	2	Institute Holiday
29-Dec-16	17	1	2	0	Institute Holiday
30-Dec-16	18	4	0	0	Institute Holiday
31-Dec-16	19	1	3	2	Institute Holiday
1-Jan-17	20	1	5	2	Institute Holiday
2-Jan-17	21	0	5	4	Institute Holiday
3-Jan-17	22	2	1	0	
4-Jan-17	23	12	58	34	
5-Jan-17	24	4	11	4	
6-Jan-17	25	1	23	16	Date of Examination
7-Jan-17	26	0	8	11	
Total		107	127	80	

Table 2. Activities Log of Learning Communities in the Chat Group of Telegram

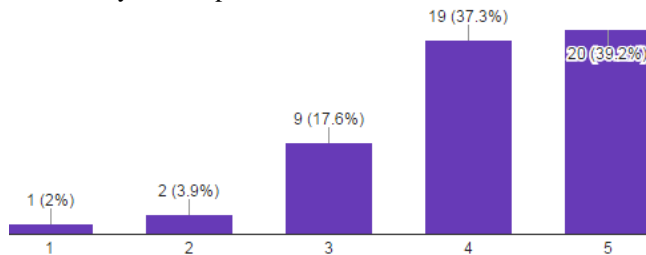
Graph 2a. Key Question 1 - The teacher was able to help me understand the key concepts, ideas and issues with Education Informatization.



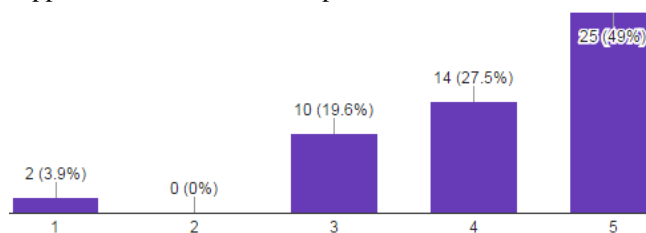
Graph 2b. Key Question 2 - I was intellectually stimulated and inspired by the teacher.



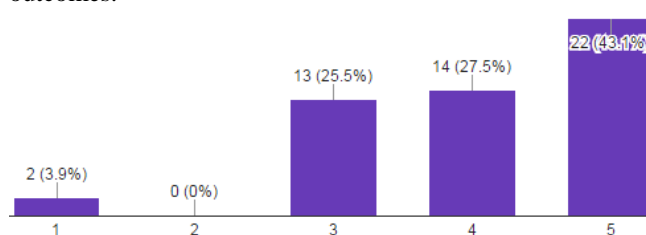
Graph 2c. Key Question 3 - The teacher provided me with timely and helpful feedback.



Graph 2d. Key Question 4 - The teacher was supportive when I needed help in this course.



Graph 2e. Key Question 5 - Overall, the teacher was effective in helping me achieve the course learning outcomes.



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