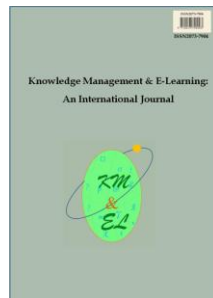

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Using knowledge management to improve learning experience of first-trimester students

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Abstract: To address the lack of insights into the engagement of tertiary students to manage knowledge at a course level, a knowledge management approach is proposed to allow students to interact with lecturers inside and outside a large lecture hall to create, disseminate, use and evaluate knowledge. The proposed approach was applied to an undergraduate business computing related course conducted at the offshore campus of an Australian university in the third trimester of 2012. The proposed KM approach was evaluated using quantitative analysis. The findings show that the majority of the students agreed that the computerized tool (Facebook) could enhance their learning experience by allowing students to ask for, share, discuss, and extend knowledge. In particular, the KM approach provided additional channels and platforms for the first-trimester students who were passive and preferred not to seek help from lecturers directly for cultural reasons.

Keywords: Knowledge management; First trimester; Learning experience; Facebook

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1. Introduction

Higher education institutions (HEIs) are considered as key players in the knowledge business as they are heavily involved in knowledge creation and dissemination (Rowley, 2000). However, HEIs are currently facing a number of challenges, to which HEIs have to respond by changing the way they teach, conduct research, and manage the institution and its various stakeholders (Cranfield & Taylor, 2008). One of the biggest challenges is the drastic increase in number of students due to both the democratization and massification of higher education and the continuous demand for knowledge workers in the knowledge economy (Economist, 2005). For example, the Australian Vice-Chancellor's Committee (2002) foresees that more than 60% of Australians will have completed some higher education by 2020.

The demands for quality teaching, programs and curricula are higher than ever because students view education as a commodity to be bought. If a university fails to deliver their expectations, students have a lot of alternatives such as study in other local or overseas universities, study by means of distance learning, and study in offshore campuses established by overseas universities. To attract and retain students, universities are no longer concentrating solely on traditional research activities but are also focusing

on developing university-wide infrastructure that will lead to the improvement of teaching quality.

Unfortunately, public funding for higher education has been tremendously reduced in some countries, thus pressuring universities to rely on students' tuition fees. For instance, universities including Melbourne, Monash, Adelaide and Sydney in Australia decided to boost their income by accepting more fee-paying local students who have relatively lower scores than those of HECS-funded students (MacNamara, 2007). HEIs now contain a diverse range of students in their lecture halls instead of only highly selective groups of top-tier students. The pressure of having both a large student cohort and decreased government funding has forced HEIs to put a large number of students in one lecture hall especially for courses at the introductory level (MacGregor, Cooper, Smith, & Robinson, 2000).

Similar to other knowledge-intensive organizations, the concept of knowledge management (KM) has been used to secure competitive advantages in HEIs. Scholar knowledge (such as research findings, journals and conference proceedings), teaching and learning materials (such as lecture slides), and institutional policies and procedures are created, categorized and stored in electronic knowledge bases to enable academics, executive and administrative personnel and students to have easy access to the knowledge. This research aims to investigate a KM approach to enhance the learning experience of first-year tertiary students in the context of higher education. In this paper, learning experience is defined as the transaction between teacher (as pedagogue and subject expert) and the engaged community of learners, in which the teacher and learners collaboratively construct core concepts and schema based on important ideas and information (Garrison & Vaughan, 2008).

The rest of the paper is organized as follows. The second section presents related literature on application of KM in HEIs. The third section discusses the impact of large lecture courses on first-year tertiary students in HEIs. A KM approach is proposed in the fourth section. The fifth section describes the case study. The sixth section presents evaluation method and research findings. The seventh section discusses research findings and implications. Finally, conclusion is given in the eighth section.

2. Application of knowledge management in higher education institutions

Other than commercial organizations, practices of KM have recently been extended to the higher education industry. Research conducted by Cranfield and Taylor (2008) shows that four out of seven HEIs in the United Kingdom were engaging in either institutional-wide KM or faculty-wide KM. Rowley (2000) argued that KM in higher education should focus on four objectives: to enhance knowledge environment, to manage knowledge as an asset, to create knowledge repositories and to improve knowledge access. As most of the HEIs are sizeable in terms of their populations, the challenge is to ensure the four KM objectives embrace all HEIs' stakeholders, including faculty members, associated researchers, executive and administrative personnel, and students.

HEIs have started to digitalize strategies, policies, procedures, guidelines, and teaching and learning materials as well as research outputs so that they can be stored in electronic repositories. The digitized materials are made available for stakeholders through the Intranet/Internet. Although HEIs are regarded to be more willing to share knowledge, that may not always be the case. For example, administrators tend not to take the initiative to share knowledge unless they are asked to (Cranfield & Taylor, 2008).

Some academics deter to share certain aspects of their knowledge as they consider knowledge as proprietary and a source of differentiation (Ho, Cheng, & Lau, 2008; Piccoli, Ahmad, & Ives, 2000) but some of them are more likely to share if the knowledge created and shared can benefit faculty members by advancing the knowledge cycle, thereby making contributions for the good of society (Basu & Sengupta, 2007), and distinguishing HEIs in the academic market place. In addition, knowledge creation and dissemination are rewarding to academics in terms of reputation, salary, promotion, and opportunities to participate in further research (Rowley, 2000).

A number of research studies have been conducted to investigate how HEIs engaged with managing and collaborating knowledge across various departments and faculties. For example, Kidwell, Linde, and Johnson (2000) proposed to apply KM principles to staff at universities by providing intranet portals for financial services, procurement and human resources. This set of KM principles was designed to manage administrative knowledge but not scholarship, and teaching and learning knowledge. Piccoli, Ahmad, and Ives (2000) proposed a conceptual KM model consisting of research, production and learning engines that could be implemented by teams of faculty members, researchers, and students to acquire, generate, codify, store, share and apply scholars' knowledge in universities. However, the proposed KM model only relies on faculty members and researchers to contribute knowledge. Other than retrieving knowledge, the model does not provide any functionalities for students to share, extend and comment on knowledge.

In addition, Omona, van der Weide, and Lubega (2010) developed a KM framework to support knowledge development and transfer in HEIs. These include academic services and learning (such as teaching, research and content development), student life cycle management (such as management of student recruitment, admission and records), institutional development (such as market research and management of alumni and academic profiles), and enterprise management and support (such as human capital management and operations support). Although it covers administrative, academic, and scholar knowledge, this high-level KM framework does not provide any details on how to manage the knowledge itself.

Significant efforts have been made to manage scholar knowledge by developing knowledge management systems (KMS) and KM processes in many research-based HEIs. Additionally, digital libraries and full-text databases hosted by professional associations (such as the Association for Information Systems) and publishers (such as ScienceDirect and Springlink) have been established to allow academics, researchers, and scholars to access and download publications gathered from journals, books, magazines, conferences, workshops, protocols, technology standards as well as professional and educational activities. Most of these libraries and databases not only provide an electronic repository for storing and categorizing digitized publications, but also provide an intelligent search functionality to maximize the effectiveness of the knowledge retrieval process.

It is not unusual for HEIs to adopt a KM approach to manipulate teaching and learning materials. A common approach is for HEIs to store and disseminate lecture slides and other relevant materials in virtual learning environments (VLEs) such as Blackboard. However, KM practices that allow students to participate directly within an academic environment are limited. One way to engage students in KM is to use web communication and collaboration tools (such as wiki) in collaborative knowledge creation and sharing (Biasutti & El-Deghaidy, 2011; Pifarre & Staarman, 2011). These tools can be adopted as an ongoing documentation of student research projects, a collaborative annotated bibliography for prescribed readings, a media to allow students to

edit and comment directly on publishing course resources, a knowledge base to share reflections and thoughts as well, and a linked network of resources used to map concepts (Duffy & Burns, 2006).

3. Impact of large lecture to first year tertiary students

Due to the pressure of having a large student cohort and reduction of government funding, HEIs have been forced to increase the lecture sizes by putting many students in one lecture class. Some research studies have shown that lecture size has minimal impact on student achievement (Gleason, 2010), but the majority of them have demonstrated that lecture size is inversely proportional to student achievement and student satisfaction (Bedard & Kuhn, 2008; Cuseo, 2007; Kokkelenberg, Dillon, & Christy, 2008; Light, 2001; Lindsay & Paton-Saltzberg, 1987). In other words, student achievement and satisfaction decrease as lecture size increases. Many researchers have studied the impact of large lectures and they have made two important findings:

- Large lectures discourage academic-student interactions and deter students from asking questions (Cuseo, 2007; Karl & Yoels, 1976; Stones, 2006; Wulff, Nyquist, & Abbott, 1987).
- Large lectures reduce the depth of students' thinking in lecture halls (Cuseo, 2007) and evidence shows that there is a strong association between small lecture size and the development of higher-order cognitive processes (Pascarella & Terenzini, 2005).

Cuseo (2007) and Walker, Cotner, Baepler, and Decker (2008) identified a number of challenges encountered in large-sized lecture environments, including low overall learning experience, low level of academic performance, lack of immediate feedback on student understanding, reduced depth of student thinking inside a lecture, and reduced breadth and depth of course objectives and course assignments used by students outside a lecture.

Stones (2006) surveyed over one thousand university students from twelve HEIs in the Birmingham area and found that 82% of the students preferred small-sized tutorials and seminars rather than large lecture settings as students wanted to have some interactions with academic staff rather than just listening to academic staff. Furthermore, 60% of students would be deterred from asking questions in the presence of a large number of students in a room. Additionally, interacting with academic staff has significant impact on learning even though it occurs outside of lecture halls (Trowler & Trowler, 2010).

Statistics show more than half of the students who withdrew from HEIs did so in their first year (Consortium for Student Retention Data Exchange, 1999). Moreover, withdrawal rates for first-year students are more than 25% at four-year HEIs and almost 50% at two-year HEIs respectively (ACT, 2003). One factor that might be contributing to those rates is the practice in higher education of lecturing them in huge, introductory general-education classes (Cuseo, 2007).

Yorke and Longden (2008) studied the first year experience of full-time undergraduate students in 25 HEIs in the UK and also identified factors that influenced 462 identifiable "non-returners" who had left their programs of study during, or at the end of academic year 2005-2006. The findings indicate that poor learning experience is one of the causes which makes it hard for students to transit into higher education from

high schools. In particular, the large lectures made them feel as though they could not ask questions. They also felt that if they missed something there was nothing they could do, because academics staff tended to leave after delivering the lecture, with no time or opportunity for students to ask questions.

Students who commence their first year of degree programs in offshore campuses of Western universities located in Asia also need to go through a similar transition from high school to higher education. They may find it more difficult to adapt due to the fact that most of them come from a local education system with very little understanding of the foreign education system. Hence the approach of lecturing in a large lecture hall may have an impact on those first year students in terms of learning experience.

To promote student and academic staff interaction in large lectures, Chickering, and Ehrmann (1987) suggested information technology (IT) can increase opportunities for students and faculty to interact and such an IT-facilitated interaction is crucial to learning and satisfaction. Their suggestion is echoed in another research study representing a sample size of 8000 students enrolled in more than 40 online degree programs that investigate the level of successfulness of the online learning environment at the State University of New York (Shea, Fredericksen, & Pickett, 2001).

Knowledge management has been extended to HEIs to manage scholar knowledge, and institution policies and procedures. However, practices of KM to manage knowledge for students are only limited to the adoption of VLEs and web communication, and collaboration tools to store and disseminate knowledge. In this research, a KM approach is proposed to address the lack of insight from research into engaging tertiary students in the KM process. The proposed approach incorporating a computerized tool, has been developed to allow students to interact with academic staff both inside and outside a large lecture hall to create, disseminate, use and evaluate knowledge at course level in the setting of higher education.

4. A knowledge management approach to enhancing learning

In HEIs, academics are responsible for giving lectures to tertiary students for a particular course. As illustrated in Fig. 1, a lecture delivered by an academic generally consists of both tacit and explicit knowledge. All teaching and learning materials such as lecture slides are regarded as forms of explicit knowledge, whereas verbal explanations and descriptions as well as demonstration given by the academic are considered as forms of tacit knowledge.

Knowledge understanding is more emphasized than memorization, as understanding supports thinking alternatives that are not readily available if one only memorizes facts (Bransford & Stein, 1993). Knowledge understanding can be defined in terms of mental activities contributing to the development of understanding; those activities include relationship construction, knowledge justification and explanation, individual knowledge construction, and knowledge extension and application (Carpenter et al., 2004).

These four activities can be categorized into two types. The first three activities are closely related to knowledge creation in which: 1) relationship construction enables students to create new knowledge by relating incoming knowledge to knowledge that they already understand, 2) knowledge justification and explanation allow students to work together in a community with the aim of sharing and creating new knowledge, and 3) knowledge construction involves the construction of new knowledge by individual

students through their own activity. The last activity concerns extending and applying incoming knowledge to solve problems not explicitly taught to students.

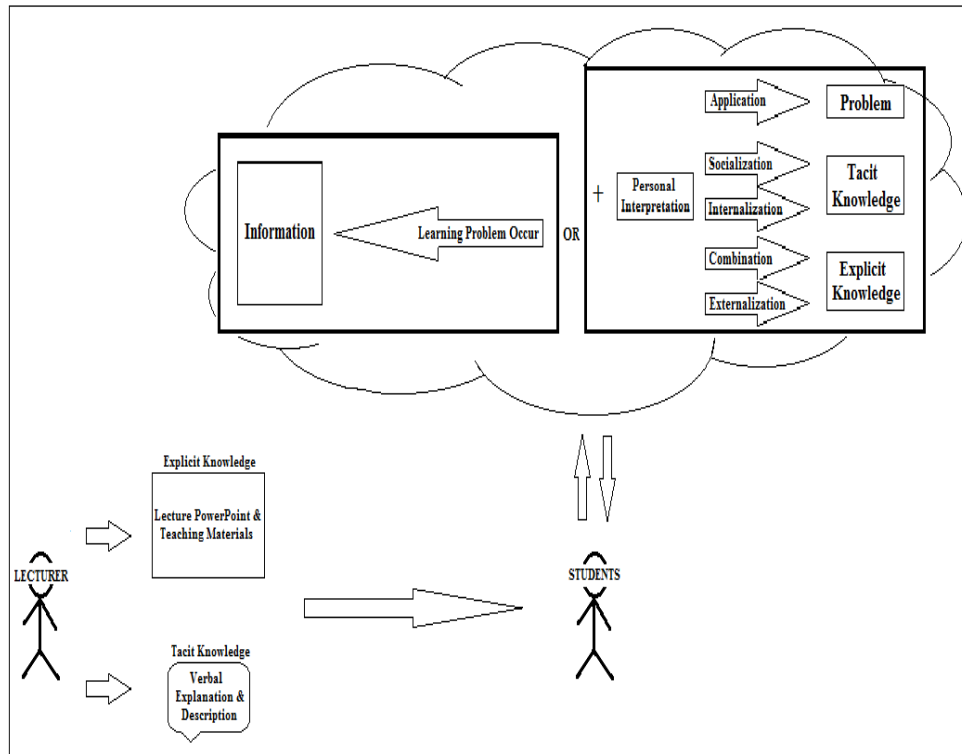


Fig. 1. Student learning in a lecture

By adding their personal interpretation of experiences, beliefs, and commitments, students should be able to use incoming knowledge to solve relevant problems, both in assessments and in the real world if they can understand the knowledge. Another benefit of being able to understand knowledge delivered by the academic is that students can make use of the incoming knowledge to create their own set of knowledge. To achieve, the students need to make use of socialization, internalization, externalization and combination to transform teaching and learning materials, verbal explanations and descriptions, and demonstration into a new set of tacit and explicit knowledge.

However, the knowledge application and creation process may halt if students experience learning problems. The major learning problem includes “failure to understand” the knowledge delivered by an academic. One way to directly deal with this problem is by asking appropriate questions during lectures, but most of the teaching and learning environments actually discourage students from asking questions. For instance, students may be scared or too shy to ask questions in front of a large group of students in a lecture hall. Even though they have the courage to ask, they may lack the required language skills to formalize the questions. On the other hand, the academic also has very limited time and space to allow students to ask questions.

The students can still choose to ask questions through e-mail after lecture, or face-to-face during consultation time, but they may lose their motivation to ask or simply forget their questions if they cannot ask right away. Hence, failure to ask questions at the

right time may lead to shallow learning in which students are forced to memorize information about the knowledge rather than using incoming knowledge to create a new set of knowledge or to solve problems. To address this long-existing problem, we propose to develop a KM approach to enhancing students' learning experiences in lectures. The proposed KM approach aims to provide a systematic process to collect students' learning problems as well as to create, store, disseminate, use and evaluate knowledge that is required to solve the learning problems. Whenever students experience any difficulties in understanding contents of a lecture, they can choose to send their questions through (see Fig. 2):

- E-channel: Students can send their questions by accessing a designated communication application using smartphones, tablets, laptops or other computerized devices that have Internet access.
- Tele-channel: Students can send their questions to a designated mobile number in form of SMS messages using their smartphones and mobile phones.
- Manual-channel: Students can write down their questions on paper and put them in designated drop boxes after the lecture.

These three channels will allow students to communicate their difficulties to academics in any lecture environment regardless of time and space constraints. Students can send any questions anonymously without the concern of having negative consequences. Besides, these three channels can also address the problems of motivation, shyness, fear, and insufficient language skills that prevent them from asking questions in a lecture.

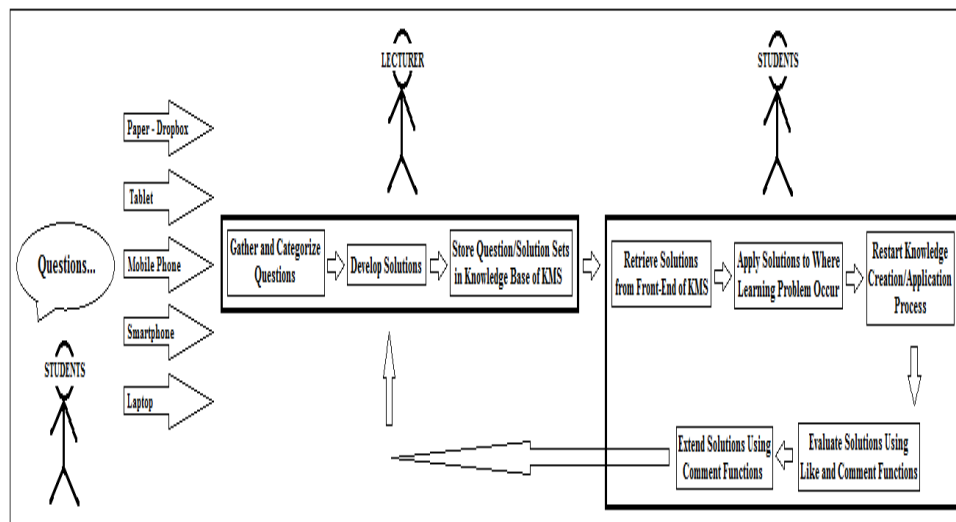


Fig. 2. Proposed knowledge management approach

The collected questions will be examined by an academic to remove duplicate questions. The academic can choose to break down a question if it is too complex or summarize several questions into one if they are too simple. Modified questions can then be categorized according to the requirements of each individual course using criteria such as topics and keywords.

The academic also needs to develop a solution for each question and store the question and solution pair in the knowledge repository of a computerized tool. To ensure the accuracy of knowledge, the course leader must choose an academic who is familiar with the course content and course structure to develop solutions to if the course is taught by more than one academics. It is also very important to ensure that the knowledge is created, stored and made available in a timely manner otherwise students may lose interest in retrieving and using the knowledge.

All students of the course will be informed when the knowledge is available so that they can retrieve and apply the knowledge to solve their learning problems or to create a new set of knowledge. If the retrieved knowledge is satisfactory, students can recommend the knowledge by leaving positive feedbacks in the comment area, or by simply clicking on the recommend button. The recommend button will show a number to indicate how many students have recommended the knowledge.

On the other hand, the students can further extend the knowledge by including additional insights, experiences, beliefs and commitments in the comment area. They can also use the comment area to report the insufficiency of the knowledge created by the academic. Based on the recommend and comment features, the academic can modify the knowledge accordingly to address its insufficiency.

5. The case study

This case study setting was an undergraduate course conducted on an offshore campus of an Australian university in South Asia. This business computing related course aimed to develop skills used to build solutions that meet the requirements of businesses to effectively integrate information and communication technologies into their operations and was taken by students enrolling in the first trimester of the Bachelor of Commerce and Bachelor of Business programs. The direct contact time of this course was 3.5 hours per week (for twelve weeks) in which 1.5 hours and 2 hours were allocated for lecture and tutorial respectively. While lectures were focused on theoretical knowledge, tutorials required students to learn how to build models using database and spreadsheet technologies. There were four assessments in the course including an analysis report (due in week 8), two in-class assessments (due in weeks 6 and 11) and a final exam (held in week 14). The proposed KM approach was implemented in this setting in the third trimester of 2012.

In the trimester, the course coordinator established 10 tutorial groups to be chosen by 217 students enrolled in the course. The majority of them were local students, plus four international students (from Australia, Finland and South Korea). He also assigned the first five tutorial groups to the first lecture and the rest to the second lecture. In other words, there were about 109 students in each lecture and less than 22 students in each tutorial group. The lectures were held in a big lecture hall that could accommodate 160 students whereas the tutorials were held in various laboratories that could each accommodate thirty students.

In general, students studying in the Bachelor of Commerce and Bachelor of Business programs resisted taking courses that were related to technology, as they preferred courses that could expand their foundational and specialized business knowledge; this course was no exception. Like most students in Asian countries, they tended not to ask any questions in lectures even though they did not understand. This tendency was reflected in the way they answered final exam questions, as they could only

write down definitions for questions that required application of theoretical knowledge. According to the experiences of academic staff from previous trimesters, students were more active during tutorials and they would ask questions if they could not follow demonstrations provided by academic staff.

All undergraduate students who are eligible to enroll in a degree program at this university must possess an International English Language Testing System (IELTS) score of 6.5 (or above) as all courses are taught in English at this offshore campus. If language proficiency was not a major concern, it indicated that students might not have sufficient confidence to ask questions in front of a large group of classmates within a big lecture hall. To improve their learning experiences, we decided to apply the proposed KM approach in which students could interact with academic staff by asking questions in lectures from weeks 1 to 8 of the trimester.

Following the approach, a Facebook page was created for use as a computerized tool as most of the students had Facebook accounts. Research shows that users had positive perceptions of using Facebook to motivate interactive communication and to cultivate a KM sharing environment as it provided an effective and robust platform to reflect upon prior knowledge, capture new experiences, manage a variety of contents and provide feedback (Chan, Chu, Lee, Chan, B., & Leung, 2013; Phosaard & Wiriyaipinit, 2011).

Other than knowledge storage and dissemination, the Facebook page could be used to collect questions sent electronically from mobile phones, smartphones, laptops and other mobile devices during lectures. A drop-box was also set up in the lecture hall to collect questions written on papers and a mobile phone account was established to collect questions in SMS format. On the Facebook page, students could leave feedback, or extend knowledge in comment fields, and they could also recommend knowledge by clicking on the “like” button inside or outside the lecture hall.

6. Evaluation method and findings

The case study was evaluated through the use of quantitative analysis. A survey instrument consisting of 18 questions was developed and deployed via an online survey tool to collect data from weeks 8 to week 10. The survey was broadly divided into three sections. Questions 1 to 7 were designed to collect data relating to profiles of respondents such as age and gender. Questions 8 to 11 aimed to identify learning behavior of students in lectures conducted in a big lecture hall. Finally, questions 12 to 18 were used to evaluate the effectiveness of the proposed KM approach implemented in this case study. The survey data was analyzed using a combination of descriptive and cross-tabulation analysis.

Out of the 217 students enrolled in the course, 49 students participated in the survey in which 36% were male and 64% were female. The majority of those students (82%) were in their first trimester of a bachelor degree program. Regarding their degree programs, 23% of participants were pursuing a Bachelor of Commerce, 43% a Bachelor of Business majoring in economics and finance, 18% a Bachelor of Business majoring in accountancy, 9% a Bachelor of Business majoring in business information systems and 7% a Bachelor of Business majoring in marketing. Despite 7% of them were enrolled as international students, their primary language spoken at home is still Vietnamese.

As shown in Table 1, only one third of students thought that class sizes were a major influential factor of learning in a big lecture hall. While class sizes seemed to have

less impact in a big lecture hall, most students believed that understanding PowerPoint slides, keeping up to date with their studies, coming to lectures having completed readings or homework, and the amount of contact with the lecturer in lectures had a high level of influence on their learning, with the frequencies 93%, 68%, 56%, and 54% respectively.

Table 1
Factors influencing learning in a big lecture hall

Influential Factors		None and a Little	Moderately and Very	Total
Class sizes that are too large	N	29	15	44
	%	65.9	34.1	100.0
Keep up to date with your studies	N	14	30	44
	%	31.8	68.2	100.0
Come to lectures having completed readings or homework	N	19	25	44
	%	43.2	56.8	100.0
Ask questions in lectures	N	29	15	44
	%	65.9	34.1	100.0
Understand PowerPoint presentations, explanations and descriptions delivered by a lecturer in lectures	N	3	41	44
	%	6.8	93.2	100.0
The amount of contact with lecturer in lectures	N	20	24	44
	%	45.5	54.5	100.0
The way the course is taught does not suit me	N	36	8	44
	%	81.8	18.2	100.0

Table 2
Perceived influence of large class size on learning

		Class sizes that are too large as an influential factor to learn in a big lecture hall				Total
		Not at all	A little	Moderately	Very	
Trimester 2 or above	Count	1	1	6	0	8
	% within Trimester	12.5%	12.5%	75.0%	0%	100.0%
	% within “Class sizes that are too large as an influential factor to learn in a big lecture hall”	5.3%	10.0%	42.9%	0%	18.2%
Trimester 1	Count	18	9	8	1	36
	% within Trimester	50.0%	25.0%	22.2%	2.8%	100.0%
	% within Class sizes that are too large as an influential factor to learn in a big lecture hall”	94.7%	90.0%	57.1%	100.0%	81.8%
Total	Count	19	10	14	1	44
	% within Trimester	43.2%	22.7%	31.8%	2.3%	100.0%
	% within “Class sizes that are too large as an influential factor to learn in a big lecture hall”	100.0%	100.0%	100.0%	100.0%	100.0%

When the cross-tabulation analysis was performed between trimesters that students were studying in and class sizes that were too large as an influential factor to

learn in a big lecture hall (see Table 2), 75% of students who were in their second trimester or above believed that class sizes influenced their learning in a big lecture hall whereas 75% of first-trimester students thought that class sizes had little or no influence on learning. As the relationship between class size and its influence on two groups of students (first trimester and second trimester or above) is statistically significant at less than 5%, this implies that big class sizes are more likely to affect senior students.

A striking finding was that 66% of the students believed asking questions in lectures had little to no influence in their learning (see Table 1). Using cross-tabulation analysis, the study found that senior students perceived asking questions in a big lecture hall was important to their learning, but first trimester students thought that was not the case. Table 3 shows that 75% of students who were studied in second trimester or above revealed that asking questions in a lecture was moderately or very important. In contrast, 75% of first trimester students felt asking questions in a lecture either was not important or had little importance.

Table 3
Perceived influence of asking questions in lectures on learning

		Asking questions in lectures as an influential factor to learn in a big lecture hall				Total
		Not at all	A little	Moderately	Very	
Trimester 2 or above	Count	1	1	5	1	8
	% within Trimester	12.5%	12.5%	62.5%	12.5%	100.0%
	% within "Asking questions in lectures as an influential factor to learn in a big lecture hall"	9.1%	5.6%	35.7%	100.0%	18.2%
	Count	10	17	9	0	36
Trimester 1	% within Trimester	27.8%	47.2%	25.0%	0%	100.0%
	% within "Asking questions in lectures as an influential factor to learn in a big lecture hall"	90.9%	94.4%	64.3%	0%	81.8%
	Count	11	18	14	1	44
Total	% within Trimester	25.0%	40.9%	31.8%	2.3%	100.0%
	% within "Asking questions in lectures as an influential factor to learn in a big lecture hall"	100.0%	100.0%	100.0%	100.0%	100.0%
	Count	11	18	14	1	44

Table 4
Preference of asking questions in a big lecture

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	21.1	27.3
	No	32	56.1	72.7
	Total	44	77.2	100.0

Although more than half of the students thought that the amount of contact with the lecturer was important (see Table 1), most of them (73%) still preferred not to ask

questions in a big lecture hall even if they found PowerPoint presentations, explanations and descriptions difficult to understand (see Table 4). The primary reasons why students preferred not to ask questions were that they were scared of asking questions in front of other students and in a big lecture hall, with the frequencies of 56% and 53% respectively (see Table 5). Nearly half of the students declared that they preferred solving problems by themselves rather than asking questions. Less than 40% were scared of asking inappropriate questions.

Table 5

Barriers that prevented students from asking questions

Reasons	Frequency (N=44)	%
Scared of asking questions in front of other students	17	53.1
Scared of asking questions in a big lecture hall	18	56.3
Scared of asking inappropriate questions	12	37.5
Prefer solving problems by myself	15	46.9

Table 6

Frequency of asking questions using the three channels

		Asking questions through the three channels in the past six weeks		Total
		Yes	No	
Trimester 2 or above	Count	2	6	8
	% within Trimester	25.0%	75.0%	100.0%
	% within “Asking questions through the three channels in the past six weeks”	8.7%	28.6%	18.2%
Trimester 1	Count	21	15	36
	% within Trimester	58.3%	41.7%	100.0%
	% within “Asking questions through the three channels in the past six weeks”	91.3%	71.4%	81.8%
Total	Count	23	21	44
	% within Trimester	52.3%	47.7%	100.0%
	% within “Asking questions through the three channels in the past six weeks”	100.0%	100.0%	100.0%

Table 6, shows that about 58% of first-trimester students had asked questions via the three channels in the past six weeks. In contrast, only 25% of students from second trimester and onward had asked questions using the three channels. As the relationship between asking questions and trimesters is statistically less than 10%, this result implies that the three channels are a useful media for the first trimester students who are not confident enough to ask questions in a big lecture hall or in front of other students. Among the three channels, the students rated the electronic channel as the most effective channel for knowledge learning as shown in Table 7.

According to Table 8, around 62% of students from second trimester or above, and 80% of first-trimester students had accessed Facebook in the past six weeks. Since

the association between trimester and accessing Facebook is not significant, this means that both senior and first-trimester students are equally likely to access Facebook.

Table 7

Perceived effectiveness of three channels for knowledge learning

Channels		Not at all	A little	Moderately	Very	Total
Electronic	N	0	3	12	6	21
	%	0	14.3	57.1	28.6	100.0
Telecommunication	N	3	6	10	3	22
	%	13.6	27.3	45.5	13.6	100.0
Manual	N	1	7	12	1	21
	%	4.8	33.3	57.1	4.8	100.0

Table 8

Frequency of access to the course page in Facebook

		Accessing Business Computing Page on Facebook in the past six weeks		Total
		Yes	No	
Trimester 2 or above	Count	5	3	8
	% within Trimester	62.5%	37.5%	100.0%
	% within " Accessing Business Computing Page on Facebook in the past six weeks"	15.2%	30.0%	18.6%
Trimester 1	Count	28	7	35
	% within Trimester	80.0%	20.0%	100.0%
	% within "Accessing Business Computing Page on Facebook in the past six weeks"	84.8%	70.0%	81.4%
Total	Count	33	10	43 ¹
	% within Trimester	76.7%	23.3%	100.0%
	% within "Accessing Business Computing Page on Facebook in the past six weeks"	100.0%	100.0%	100.0%

Table 9

Perceptions of using Facebook for knowledge sharing/discussion

Function		Not at all	A little	Moderately	Very	Total
Like/Dislike	N	4	9	10	9	32
	%	12.5	28.1	31.3	28.1	100.0
Comment	N	4	10	9	9	32
	%	12.5	31.3	28.1	28.1	100.0

¹ One student in Trimester 1 left this question (accessing Facebook's course page) unanswered. This means that, for that student, the unanswered question becomes "item nonresponse". SPSS treats it as a missing observation. The student was automatically dropped out/disregarded by SPSS in computing cross-tabulation between trimesters and accessing Facebook's course page (Table 8). This leads to a reduction in the number of observations for students in Trimester 1 from the original 36 to 35. The total number of observation becomes 43 instead of 44.

Facebook could provide a platform for students to share, extend, and discuss knowledge as approximately 60% of the students agreed that its like/dislike and comment functions had moderate or significant contributions to knowledge sharing and discussion (see Table 9). Finally, nearly 80% of students agreed that Facebook enhanced their learning experience in Business Computing (see Table 10).

Table 10
Perceptions of using Facebook to enhance learning experience

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	18	31.6	40.9
	Agree	17	29.8	79.5
	Neutral	7	12.3	95.5
	Disagree	2	3.5	100.0
	Total	44	77.2	100.0

7. Discussions

Our findings are inconsistent with research conducted in Western educational systems by Cuseo (2007), Walker, Cotner, Baepler, and Decker (2008) and Yorke and Longden (2008) as most of our respondents in the case study disagreed that big class sizes and asking questions were two major influential factors of learning, in particular those who were in their first trimester of their degree programs. This perception might be carried over from the local education systems as Asian students consider authors and lecturers as the final authorities who are always right (Chung, Kelliher, & Smith, 2006; Edmonds, 2013). In addition, Asian students often sit quietly in classes and listen to an academic's presentation, as Asian culture does not encourage people to argue, discuss and debate with teachers, parents or elderly people (Marambe, Vermunt, & Boshuizen, 2011). Students who ask questions and share knowledge in classes may be considered to be displaying rude and disrespectful behavior (Kirkebaek, Du, & Jensen, 2013; Liu, 2002; Nguyen, 2011).

Unlike first-trimester students, the senior students perceived that asking questions was important to their learning in a big lecture hall. These findings are consistent with other studies, which found that the more mature the university students are, the more likely they will ask questions in a lecture, as they have better understanding of the importance and effectiveness of being active in their learning (Barak, Lipson, & Lerman, 2006; Schmidt, Burgan, & Alletag, 2007). Senior students are aware of the benefits of asking questions because they know how to utilize available educational resources, and they had experiences dealing with assignments requiring more intensive information gathering and evaluation (Detlor, Booker, Serenko, & Julien, 2012; Shin & Edgar, 2013).

In fact, the culture of not asking questions needs to be addressed as early as possible, as most junior level courses are basic introductions to senior level courses. How well students perform in those courses determine how they will perform in senior level courses and achieve academic success during their senior year (Nonis, Philhours, Syamil, & Hudson, 2005). To change the culture, students must be clearly informed of the benefits of participating in KM activities. For instance, the proposed approach aims to provide solutions to any difficulties that students encounter in lectures. Simply by solving these difficulties, students can resume their knowledge creation process rather than just

memorizing information. The reward of contributing questions is the enhancement of their learning experiences, which can in turn improve their performance in assessments.

Similar to other studies (Cuseo, 2007; Karl & Yoels, 1976; Stones, 2006; Wulff, Nyquist, & Abbott, 1987; Yorke & Longden, 2008), our findings demonstrate students were deterred from asking questions in front of other students in a big lecture hall. Our research is also consistent with other studies that explored the application of IT to enhance student-faculty interaction and student participation (Chickering & Ehrmann, 1987; Shea, Fredericksen, & Pickett, 2001) as the majority of the students asked questions via electronic and telecommunication channels, accessed Facebook for knowledge sharing and discussion as well as appreciated the contributions of Facebook and its functions to knowledge sharing and discussion, and learning experience.

8. Conclusion

The lack of insight into the engagement of tertiary students to create, disseminate, use and evaluate knowledge at course level has driven the development of the proposed KM approach. The proposed approach includes a mechanism to engage students in the KM process by providing electronic, telecommunication and manual channels to ask questions in lectures when they fail to understand any incoming knowledge delivered by academics regardless of time and space constraints in any lecture halls. Knowledge developed based on students' questions can further be evaluated and extended using the comment and recommend features.

The proposed approach was applied to an undergraduate business computing related course conducted on the offshore campus of an Australian university during the third trimester of 2012. The approach was evaluated using quantitative analysis. The findings showed that the majority of the students agreed that the computerized tool (Facebook) could enhance their learning experience by allowing students to ask for, share, discuss, and extend knowledge. In particular, the approach provided additional channels and platforms for first-trimester students who were passive and preferred not to seek help from lecturers directly due to cultural reasons.

Two limitations of the study should be noted. First, with a response rate of 22.6%, non-response bias may limit the ability to generalize the research results. Second, we had to use Facebook as the tool to support knowledge sharing in the case study. Other social networking services such as Google + and Twitter were also taken into consideration, but Facebook was chosen due to its popularity in the region. One major weakness of using Facebook as the tool is that it can only list its contents in chronological order, and it does not provide a function to index its contents, thereby making it hard to find relevant knowledge.

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