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To Improve the Learning Experience of the First Trimester Undergraduate Students in an Australian University's Offshore Campus: A Knowledge Management Methodology

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Abstract

Due to the successful implementation of knowledge management (KM) in many commercial organizations, KM has been recently extended to higher education institutions (HEIs) to manage scholar knowledge, and institution policies and procedures. To address the lack of insight in regards to the engagement of tertiary students to manage knowledge at a course level, a KM methodology is proposed to allow students to interact with lecturers in and outside large lecture halls to create, disseminate, use and evaluate knowledge.

The proposed methodology provides electronic, telecommunication and manual channels to allow students to ask questions in lectures when they fail to understand any incoming knowledge delivered by academics regardless of time and space constraints. Knowledge developed based on students' questions can further be evaluated and extended using mechanisms to comment and recommend features. In additional, students are able to create new knowledge and to solve problems using incoming knowledge as the methodology which can enhance knowledge understanding throughout the learning process.

The proposed methodology was applied to a business computing course at an undergraduate level, conducted in an offshore campus of an Australian university in the third trimester of 2012. The methodology was evaluated using quantitative analysis. The findings show that the majority of the students agreed the computerized tool incorporated in the methodology (Facebook) could enhance their learning experience by allowing students to ask for, share, discuss and extend knowledge. In particular, the knowledge

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management system provided additional channels and a platform for those who are passive and preferred not to seek help from lecturers directly, due to cultural or other reason.

Keywords: Offshore Campus, Australian university, Knowledge Management, Knowledge Management tools, First Trimester, Tertiary Student, Learning Experience, Knowledge Understanding, Facebook.

Introduction

Knowledge is defined as a justified true belief that is rational, dynamic, humanistic and context-specific and can appear in the form of facts, attitudes, opinions, issues, values, theories, reasons, processes, tools, relationships, risks and probabilities (Coulson-Thomas, 1997; Nonaka, Toyama, & Konno, 2001). Ever since the establishment of the first university by Plato about 2400 years ago, universities and other higher education institutions (HEIs) have played an important role in knowledge transfer for higher education.

Until now, HEIs are still considered as key players in the knowledge business as they are heavily involved in the tasks of knowledge creation and dissemination (Rowley, 2000). However, HEIs are currently facing a number of challenges in which HEIs have to respond to by changing the way they teach, conduct research, and manage institution and its various stakeholders (Cranfield & Taylor, 2008). One of the biggest challenges is the drastic increase of the number of students due to the democratisation 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 form of higher education by 2020.

The demands for quality teaching, programs and curriculums are higher than ever as students view education as a commodity to be bought. If a university fails to deliver to student expectations, students can turn to many alternatives such as studying in other local or overseas universities, studying via distance learning and studying in offshore campuses established by overseas universities. To attract and retain students, universities are no longer concentrated solely on traditional research activities but also focused on developing university-wide infrastructure that leads to the improvement of teaching quality.

Unfortunately, public funding for higher education has been tremendously reduced in some countries, thus universities are more reliant 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 that have relatively lower scores than those Higher Education Contribution Scheme (HECS)-funded students who only required to pay a part of the tuition (Macnamara, 2007). HEIs now contain a diverse range of students in their lecture halls instead of high performing top-tier students. The pressure of having a large student cohort combined with a decrease of government funding has forced HEIs to put a large number of students together in lecture halls, this is especially true for courses at introductory levels (MacGregor, Cooper, Smith & Robinson, 2000).

Similar to other knowledge-intensive organizations, concepts of knowledge management (KM) have 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 institution 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. The KM approach is designed to allow students to interact with lecturers to manage knowledge at course level. The rest of the paper is organized as follows. The next section presents related literature on KM and its application in HEIs, followed by a discussion of the impact of large lecture to first

year tertiary students in HEIs. Research objectives and methods are described and a KM methodology is proposed and a case study is described. This is followed by the evaluation method and research findings and a discussion of research findings, implications and limitations. Finally, conclusion is given.

Background of Knowledge Management

Back in mid 1980s, management tools and techniques such as total quality management, downsizing and business process reengineering had been developed by western companies to aid in regaining market share in automotive and electronic appliance industries which were dominated by Japanese companies (Chase, 1997). However, both input and improvement were short-term, the methods used to develop solutions were generic and easily replicated by rivals (Sharkie, 2003). Once an approach was proven successful, the rival companies would duplicate and adopt the same practice. The practices of downsizing, outsourcing and business process reengineering had resulted in the loss of many experienced employees, along with their expertise and knowledge (Coulson-Thomas, 1997). The practices would further lead to the loss of inspiration and creativity as well as failing to secure a long term competitive advantage (Chase, 1997).

Companies are currently using the concept of KM to sustain long term competitive advantage by preserving organizational knowledge (Turban & Aronson, 2001). Knowledge is recognized as one of the most important management assets because knowledge enables organizations to utilize and develop organizational resources, enhance competitive abilities and develop sustainable competitive advantage (Neumann & Tome, 2011; Plessis, 2007; Sharkie, 2003; Wu & Lee, 2007).

KM seeks to manage and capitalize on knowledge that accumulates in the workplace using appropriate means and technologies (Abdullah, Ibrahim, Atan, Napis, Selamat, Hairudin, & Hamidon, 2008; Martensson, 2000). This is achieved by organizing formal, systematic and direct processes to create, store, retain, evaluate, enhance and increase organizational knowledge for future benefit of the organization (Leung, Lau, & Tsang, 2013; Martensson, 2000; Turban & Aronson, 2001). KM also aims to enhance the quality, content, value and transferability of individual and group knowledge within an organization (Mentzas, Apostolou, Young, & Abecker, 2001). Therefore, KM is capable of sustaining long term competitive advantage. Sharkie (2003) indicates rival company can easily duplicate and imitate the process of KM or even its technology, but it will be very difficult to copy the knowledge and skills which may reside within employees. The spirit of KM encourages organizations to create and use knowledge continuously and also to enable them to take initiative in innovating and enhancing products, services and operations.

In addition, Krogh, Ichijo, and Nonaka (2000) divide knowledge into tacit and explicit. Tacit knowledge (or know-how) is gained through individual insights overtime, is personal, complex and hard to communicate as well as codify as it resides within the person's mind and body in the focus of beliefs, assumptions, behaviours, perceptions, actions, procedures, routines, commitments, ideals, values and emotions (Goh, 2002; Martensson, 2000; Nonaka, Toyama & Konno, 2001). Conversely, explicit knowledge (or know-what) is structured and relatively simple. It can be captured, recorded, documented, codified and shared using formal and systematic language in the forms of manuals, patents, reports, documents, assessments, databases, scientific formulas and other information technology (IT) media.

There are variations among researchers in describing processes of KM. For example, Wiig (1997) divides the process into knowledge building, transforming, organizing, deploying and using, whereas Chait (1999) depicts that the KM process is based on capturing, evaluating, cleansing, storing, providing and using of knowledge. In this research, we adopted the KM process developed by Leung, Lau and Tsang (2013) in which the process is divided into five stages (see Figure 1): create, store, disseminate, use and evaluate knowledge.

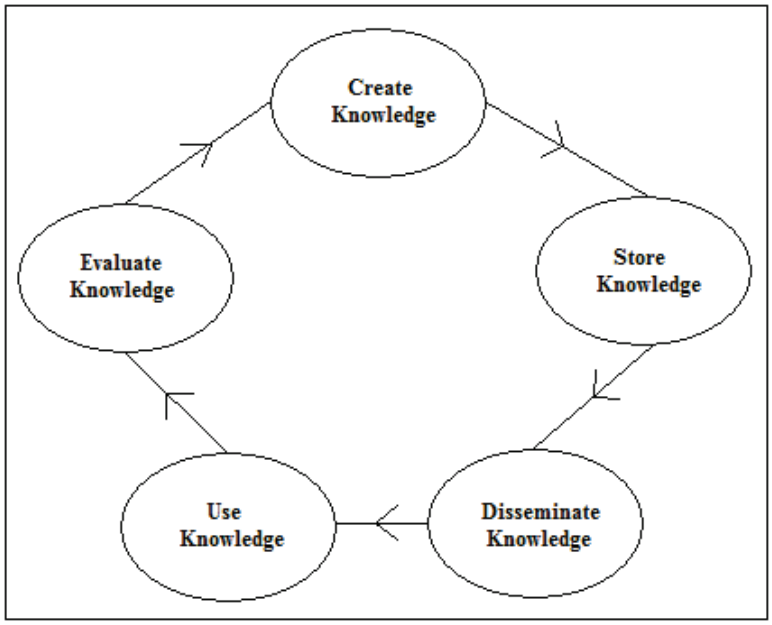

Figure 1: Five stages of knowledge management

Nonaka, Toyama, and Konno (2001) suggest that there are four methods to create organizational knowledge by means of interaction between explicit and tacit knowledge. The first method is socialization. It is the process of developing new tacit knowledge from tacit knowledge embedded within people or organizations through sharing experiences, observation and traditional apprenticeships. The second method is called externalization. This is the process of changing tacit knowledge into new explicit knowledge simply by transforming tacit knowledge in the form of documents such as manuals and reports. The third method is internalization. This is the process of embodying explicit knowledge as tacit knowledge by learning, absorbing and integrating explicit knowledge into an individual's tacit knowledge base. The last is called combination, this is the process of merging and editing "explicit knowledge from multiple sources" into a new set of more comprehensive and systematic explicit knowledge.

The storage and dissemination of knowledge is often linked with technology. Explicit knowledge created is collected and stored in databases or a knowledge base in which users can access the knowledge using "search and retrieve" tools through platforms such as intranets (Abdullah et al., 2008; Alavi & Leidner, 1999; Chen & Xu, 2010; Smith, 2001). The retrieved knowledge can then be used by knowledge workers to add value to current business processes, implement and coordinate organizational strategy, predict trends in the uncertain future, deliver new market values, create new knowledge, solve existing problems and so on (Bailey & Clarke, 2001; Metaxiotis & Psarras, 2006; Richtner & Ahlstrom, 2010). The fifth stage of KM is knowledge evaluation. This phrase eliminates incorrect or outdated knowledge (Alavi & Leidner, 1999). Organization must continue creating new knowledge to replace any knowledge that has become invalid or obsolete (Leung, Lau, & Tsang, 2013).

Application of Knowledge Management In Higher Education Institutions

Other than commercial organizations, practices of KM have recently been extended to higher education industry. A research conducted by Cranfield and Taylor (2008) shows that four out of seven HEIs in UK were engaging in either institutional-wide KM or faculty-wide KM. Rowley

(2000) argues that KM in higher education should focus on four objectives, namely to enhance the 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 population, the challenge is to ensure the four KM objectives embrace all HEIs' stakeholders that include faculty members, associated researchers, executive and administrative personnel, and students.

HEIs have started to digitalize strategies, policies, procedures, guidelines, teaching and learning materials as well as research outputs so that they can be stored in electronic repositories. The digitalized materials are made available for stakeholders through intranet/internet. Although HEIs are regarded to be more willing to share knowledge, it may not always be the case. For example, administrators tend not to take initiative to share knowledge unless they are asked (Cranfield & Taylor, 2008). Some academics avoid sharing certain aspects of their knowledge as they consider knowledge as proprietary and a source of differentiation (Ho, Cheng, & Lau, 2008; Ramachandran, Chong & Ismail, 2009) but some of them are more likely to share as the knowledge created and shared can benefit faculty members to advance knowledge cycle which in turn contributes to the good of society (Basu & Sengupta, 2007), and to distinguish HEIs in the academic market place. In addition, academics actively participating in knowledge creation and dissemination may be rewarded in terms of reputation, salary, promotion and opportunities to participate in further research (Rowley, 2000).

Townley (2003) studied more than fifty KM projects and identified seven factors that can lead to the success of a KM project in HEIs: 1) identify KM as a priority by institutional leaders, 2) provide KM training, 3) use existing data source in KM projects, 4) align personal and unit goals with KM projects, 5) adopt knowledge sharing and collaboration as a norm, 6) Coordinate KM when it reaches a critical mass and 7) change organizational philosophy and practice fundamentally. A number of researches 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.

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, learning, 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 profile), and enterprise management and support (such as human capital management and operation support). Piccoli, Ahmad and Ives (2000) proposed a conceptual KM model consisting of a research, production and learning engines that can be implemented by teams of faculty members, researchers and students to acquire, generate, codify, store, share and apply scholar knowledge in universities.

Significant efforts have been put to manage scholar knowledge by developing knowledge management systems (KMS) and KM processes in many research-based HEIs. Besides, digital libraries and full-text databases hosted by professional associations (such as 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 knowledge retrieval process.

It is not unusual for HEIs to adopt KM approaches to manage teaching and learning materials. A common approach is to store and disseminate lecture slides and other relevant materials in virtual learning environments (VLE) 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 (Parker & Chao, 2007; Raman, Ryan & Olfman, 2005). 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 as a linked network of resources used to map concepts (Duffy & Bruns, 2006).

Impact of Large Lecture to First Year Tertiary Students

Some researches show that lecture size has minimal impact on student achievement (Gleason, 2010) but the majority of them demonstrate lecture size is inversely proportional to student achievement and student satisfaction (Bedard & Kuhn, 2008; Cuseo, 2007; Kokkelenberg, Dillion, & 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 on large lectures and they have two important findings:

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

Cuseo (2007), Stagg and Lane (2010) as well Walker, Cotner, Baepler, and Decker (2008) identified a number of challenges encountered on large-sized lecture environments which include low overall learning experience, low attendance, low student emotional engagement, low level of student achievement and academic performance, lack of student preparedness, lack of immediate feedback on student understanding, reduced depth of student thinking inside a lecture as well as reduced breadth and depth of course objectives, course assignments and course-related learning strategies used by students outside a lecture. Another well-recognized issue is the increase of social barriers when group sizes grow which can make students standing out of a lecture feel uncomfortable (Bry, Gehlen-Baum, & Pohl, 2011).

Stones (2006) surveyed over one thousand university students from twelve HEIs in Birmingham area and found that 82% of the students preferred small-sized tutorials and seminars than large lecture settings as students wanted to have some interaction with academic staff rather than just listening. Furthermore, 60% would be deterred from asking questions with the presence of a large number of students in a room. Interacting with academic staff has significant impact on learning even though it is occurring outside of lecture halls (Trowler & Trowler, 2010). The values of such engagements between students and academic staff are no longer questioned as almost every reform report emphasized to varying degrees the important link between student engagement and desired outcomes of HEIs (Kuh, 2009).

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, withdraw 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 is the practice of higher education 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 programmes 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 them 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 as academics staff tend to leave after delivering the lecture, with no time or opportunity 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 to first year students in terms of learning experience. Garrison and Vaughan (2008) define learning experience as the transaction between teacher as pedagogue and subject expert and the engaged community of learners to collaboratively construct core concepts and schema based on important ideas and information.

Interaction is a major component of learning (Murray, Perez, Geist, & Hedrick, 2012) To promote student and academic staff interaction in large lectures, Chickering and Ehrmann (1996) 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. His suggestion is echoed in another research 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 in the State University of New York (Shea, Fredericksen & Pickett, 2001). The research shows students were about twice to report active participation online than in classrooms and 86% of respondents put more effort into online discussion and a classroom one. Moreover, students were about twice as likely to ask for clarification online than in classrooms and 69% of respondents were more likely to ask an awkward question online. Bry, Gehlen-Baum and Pohl (2011) proposed to use digital backchannels that allow students to communicate with lecturers using short microblog messages to allow academic staff to receive immediate concise feedback which aims at strengthening the awareness for students' difficulties.

Research Objectives and Methods

In this research, a KM methodology is proposed to address the lack of insights from research into engaging tertiary students in the KM process. The proposed methodology is developed to allow students to interact with academic staff in and outside a large lecture hall to create, disseminate, use and evaluate knowledge at course level in the setting of higher education. The methodology has a computerized tool incorporated to promote knowledge sharing.

This research investigates the factors that impact first trimester students to construct concepts and schema in a big lecture hall in an offshore campus of an Australian university located in South Asia. This research also investigates if the knowledge sharing nature of the computerized tool can improve the learning experience of students in a big lecture hall by establishing an interactive knowledge sharing platform to assist students to construct course specific core concepts and schema. The proposed KM methodology is developed using design science research methodology.

Design science research methodology focuses on the design and development of an artifact to provide a solution for a research problem (Hevner and Chatterjee, 2010). The artifact is illustrated in experimentation, simulation, case study, proof or scenario to observe and measure how well the artifact solves the research problem. We argue that design science is a desirable research methodology in our research as the focus of the study is on the creation of an artifact to impact first trimester students who are having lectures in a big lecture hall. In this research, the proposed KM methodology is the artifact to be illustrated in a case study conducted in the offshore campus

of the Australian university. The case study will then be evaluated using a survey instrument in the form of a quantitative questionnaire consisting of 18 close-end questions. It was demonstrated that the rich details of case studies when integrated with surveys are useful to aid in the interpretation of quantitative findings (Gable, 1994).

A Knowledge Management Methodology to Enhance Learning

In HEIs, academics are responsible for giving lectures to tertiary students for a particular course. As illustrated in Figure 2, 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 a form of explicit knowledge whereas verbal explanations and descriptions as well as demonstration given by the academic are considered as a form of tacit knowledge.

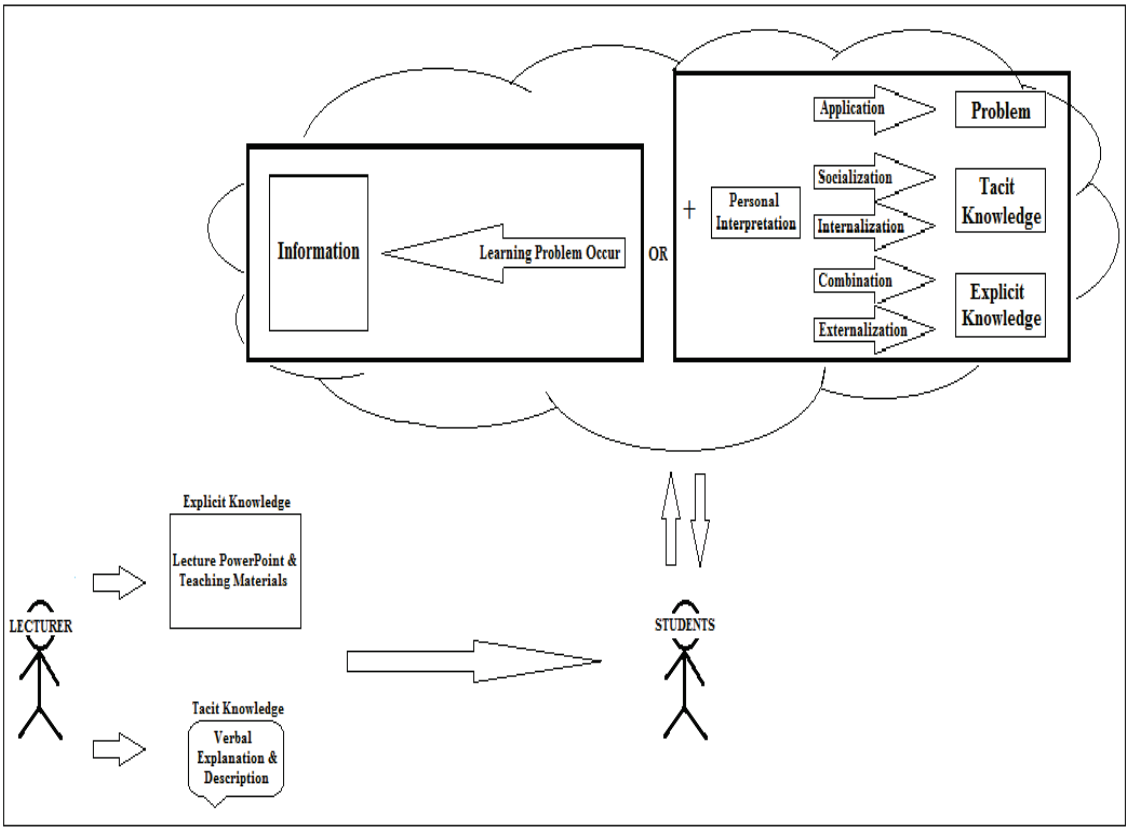

Figure 2: How students learn in a lecture?

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 activity contributing to the development of understanding that includes relationship construction, knowledge justification and explanation, individual knowledge construction, and knowledge extension and application (Carpenter, Blanton, Cobb, Franke, Kaput, & McClain, 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 is about extending and applying incoming knowledge to solve problems not explicitly taught to students.

By adding their personal interpretation of experiences, beliefs and commitments, students should be able to use incoming knowledge to solve relevant problems 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 students can make use of the incoming knowledge to create their own set of knowledge. To achieve this, the students need to make use of socialization, internationalization, 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, knowledge application and creation process may halt if students experience learning problem(s). 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 environment settings actually discourage students from asking questions. For instance, students may be scared or 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 email 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 superficial learning in which students are forced to memorize information 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 methodology to enhance student learning experience in lectures. The proposed KM methodology aims to provide a systematic process to collect student learning problems as well as create, store, disseminate, use and evaluate knowledge that are 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 Figure 3):

- 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 smartphone and mobile phones.
- Manual-channel: students can write down their questions on papers and put them in designated drop boxes at the end or after the lecture.

These three channels allow students to deliver their difficulties to academics in any lecture environment regardless of time and space constraint. Students can send any questions anonymously without the concern of having negative consequences. In addition, 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.

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 requirements of individual course such as topics and keywords.

The academic also needs to develop solution for each question and store the question and solution pair in the knowledge base of a computerized tool. To ensure the accuracy of knowledge, course leader must choose an academic who is familiar with 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 the knowledge is created, stored and make available in a timely manner otherwise students may lose interest to retrieve and use 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 simple 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 the insufficiency of the knowledge.

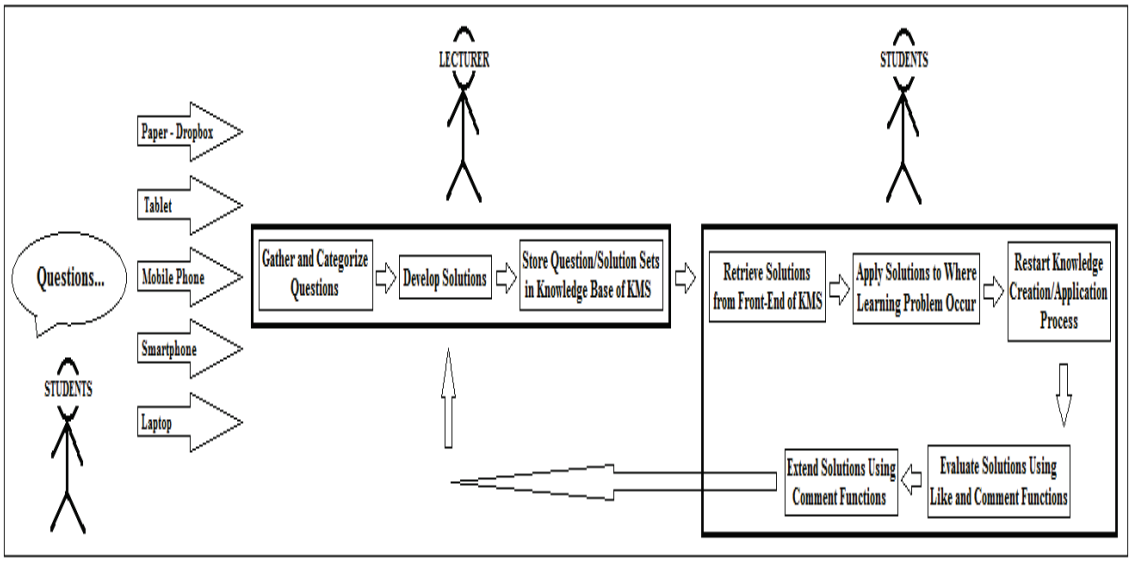

Figure 3: The proposed knowledge management methodology to enhance learning experience

The Case Study

This case study setting was an undergraduate course conducted in an offshore campus of an Australian university in South Asia. This business computing course aimed to develop skills used to build solutions that meet the requirements of business to effectively integrate information and communication technologies into its operations and is taken by students enrolling in the first trimester of the Bachelor of Commerce and Bachelor of Business. The direct contact hours of this course was three and a half hours per week (for twelve weeks) in which one and a half hours and two 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 eight), two in-class assessments (due in week six and eleven) and a final exam (held in week fourteen). The proposed KM methodology was implemented in this setting in the third trimester of 2012.

In the trimester, the course coordinator established ten tutorial groups to be chosen by 217 students enrolled in the course. Majority of them were local students with our international students coming 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 one hundred and nine students in each lecture and less than twenty-two students in each tutorial group. The lectures were held in a big lecture hall that could accommodate one hundred and sixty students whereas the tutorials were held in various laboratories that could accommodate thirty students.

In general, students studying in the Bachelor of Commerce and Bachelor of Business resisted to take courses that were related to technology as they preferred to study courses that can expand their foundational and specialized business knowledge and this course had no exception. Like most students in Asian countries, they tended not to ask any questions in lectures even though they did not understand. This could be reflected in the way they answered final exam questions as they could only write down definitions for questions that required providing application of theoretical knowledge. According to the experience 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 must possess an IELTS score of 6.5 (or above) as all courses are taught in English in 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 experience, we decided to apply the proposed KM methodology in which students could interact with academic staff by asking questions in lectures from week one to eight of the trimester.

Following the methodology, a Facebook page was created to be used as a computerized tool for knowledge storage and dissemination as most of the students have a Facebook account. Other than that, 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. In the Facebook page, students could leave feedbacks or extend knowledge in comment fields and they can also recommend knowledge by clicking on the "like" button inside or outside the lecture hall.

Table 1: Summary of questions received from mobile devices and drop box

Week	Questions From Mobile Devices	Questions From Drop Box
1	0	2
2	0	1
3	1	0
4	0	0
5	20	0
6	1	0
7	3	0
8	26	0

Verbal announcements were made to students in the lectures describing the application, purposes and mechanism of the KM methodology from week one to four. During the eight week duration, there were ninety-five students who joined the Facebook page and fifty-three questions were received in the lectures. Out of the fifty-three questions, only three of them came from the drop-box and the rest were sent to the Facebook page and mobile account. The received questions were summarized into thirty-seven and posted on the Facebook page with relevant solutions. As shown

in Table 1, only a few questions were asked in week one, two, three, six and seven. There was a big increase in week five and eight probably because two assessments were due in week six and eight. This can be confirmed by the nature of questions student asked as most of them are related to the application of course-specific knowledge. Although there are more than ninety-even views per each question and solution pair in average, student participations in evaluating and expanding the knowledge are far from satisfactory with less than three likes and one discussion in average (see Table 2).

Table 2: Summary of View, Like and Discussion on the Facebook Page

	Average	Maximum	Minimum
View (per question)	97.13	150	0
Like (per question)	2.51	12	0
Discussion (per question)	0.86	10	0

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 week 8 to week 10. The survey can be 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 aim to identify learning behavior of students in lectures conducted in a big lecture hall. Finally, questions 12 to 18 are used to evaluate the effectiveness of the proposed KM methodology 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% are female. Majority of them (82%) were in their first trimester of a bachelor degree program. Regarding their degree programs, 23% of participants were taken Bachelor of Commerce, 43% in Bachelor of Business majoring in economics and finance, 18% in Bachelor of Business majoring in accountancy, 9% in Bachelor of Business majoring in business information systems and 7% in marketing. Despite 7% of them were enrolled as international students, their primary language spoken at home is still Vietnamese.

As shown in Table 3, 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 lecture having complete readings or homework, and the amount of contact with lecturer in lectures had high level of influence in their learning, with the frequency 93%, 68%, 56%, and 54% respectively.

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 4), 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.

Table 3: Factors that influenced 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 4: Cross-tabulation between trimesters that students were studying in VS class sizes that are too large as an influential factor to learn in a big lecture hall

		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%

A striking finding is that 66% of the students considered asking questions in lectures had no or little influence in their learning (see Table 3). Using cross-tabulation analysis, it is found that sen-

ior students perceived asking questions in a big lecture hall was important to their learning, but first trimester students thought it was not the case. Table 5 shows that 75% of students who were studied in second trimester or above revealed asking questions in a lecture was moderately or very important. In contrast, 75% of first trimester students considered asking questions in a lecture was not important or had little importance.

Table 5: Cross-tabulation between trimesters that students were studying in VS asking questions in lectures as an influential factor to learn in a big lecture hall

		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%
Trimester 1	Count	10	17	9	0	36
	% 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%
Total	Count	11	18	14	1	44
	% 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%

Although more than half of the students thought that the amount of contact with lecturer was important (see Table 3), 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 6). The primary reasons why students preferred not to ask questions are that they were scared of asking questions in front of other students and in a big lecture hall, with the frequency of 56% and 53% respectively (see Table 7). 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 6: Preference of asking lecturer questions in a big lecture hall if PowerPoint presentations, explanations and descriptions were difficult to understand

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

Table 7: Barriers which prevented students from asking lecturer questions in a big lecturer

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 8 shows the methods students used to handle learning difficulties. Majority of them chose to seek help from lecturer/tutor using email (57%) and from classmate (75%) as well as to find relevant information online (52%) and read textbooks or other relevant materials (57%). Some students still tended not to seek help from lecturer using face-to-face communication, either in a lecture or consultation time, with 25% and 41 % respectively.

Table 8: Methods to handle learning difficulties

Methods	Frequency	%
Seek help from lecturer in a lecture	11	25
Seek help from lecturer/tutor in consultation time	18	41
Seek help from lecturer/tutor using email	25	57
Seek help from classmate	33	75
Find relevant information online	23	52
Read textbooks or other teaching and learning materials	25	57

To see whether the students who prefer not to ask questions in class are likely to ask question via the three channels, the cross-tabulation analysis was performed. The result indicates 1) about 53% of students who preferred not to ask questions in a big lecture hall, chose to ask questions through the three channels, and 2) half of the students who preferred asking questions in a big lecture hall, chose to ask questions using the three channels (see Table 9). The implication of this finding is that the three channels can be considered as a useful media for most students when they encounter learning difficulties in a big lecture hall. Among the three channels, the students rated electronic channel as the most effective channel for knowledge learning as shown in Table 10.

Table 9: Cross-tabulation between preferences toward asking questions in a big lecture hall VS asking questions using the three channels in the past six weeks

			Asking questions through the three channels in the past six weeks		Total
			Yes	No	
Preference of asking lecturer questions in a big lecture hall if PowerPoint presentations, explanations and descriptions were difficult to understand	Yes	Count	6	6	12
		% within "Preference of asking lecturer questions in a big lecture hall…difficult to understand"	50.0%	50.0%	100.0%
		% within "Asking questions through the three channels in the past six weeks"	26.1%	28.6%	27.3%
	No	Count	17	15	32
		% within "Preference of asking lecturer questions in a big lecture hall…difficult to understand"	53.1%	46.9%	100.0%
		% within "Asking questions through the three channels in the past six weeks"	73.9%	71.4%	72.7%
Total		Count	23	21	44
		% within "Preference of asking lecturer questions in a big lecture hall…difficult to understand"	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 10: The extend of channels that contributed to 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

From Table 11, students who preferred to ask questions in the big lecture hall, only 58% accessed the computerized tool (the Business Computing page on Facebook) in the past six weeks. However, the proportion of accessing the page increases significantly to 84% among the students who preferred not to ask questions. On the other hand, among the students who accessed the tool, 79% were those who preferred not to ask questions in a big lecture hall. In other words, the students who preferred not to ask questions in the lecture hall tended to access the tool more than those who preferred to ask questions. As the relationship between asking lecturer questions in a big lecture hall and accessing the tool is statistically significant at the level of less than 10%, the finding

implies that the tool incorporated in the KM methodology is an electronic means of learning for those who prefer not to ask questions in a big lecture hall.

Table 11: Cross-tabulation between preferences toward asking questions in a big lecture hall VS accessing Business Computing page on Facebook in the past six weeks

			Accessing Business Computing Page on Facebook in the past six weeks		Total
			Yes	No	
Preference of asking lecturer questions in a big lecture hall if PowerPoint presentations, explanations and descriptions were difficult to understand	Yes	Count	7	5	12
		% within "Preference of asking lecturer questions in a big lecture hall…difficult to understand"	58.3%	41.7%	100.0%
		% within "Accessing Business Computing Page on Facebook in the past six weeks"	21.2%	50.0%	27.9%
	No	Count	26	5	31
		% within "Preference of asking lecturer questions in a big lecture hall…difficult to understand"	83.9%	16.1%	100.0%
		% within "Accessing Business Computing Page on Facebook in the past six weeks"	78.8%	50.0%	72.1%
Total		Count	33	10	43
		% within "Preference of asking lecturer questions in a big lecture hall…difficult to understand"	76.7%	23.3%	100.0%
		% within "Accessing Business Computing Page on Facebook in the past six weeks"	100.0%	100.0%	100.0%

The computerized tool could provide a platform for students to share, extend and discuss knowledge as approximately 60% of the students agreed like/dislike and comment functions had moderate or significant contribution for knowledge sharing and discussion (see Table 12). Finally, nearly 80% of students agreed that the tool enhanced their learning experience in Business Computing (see Table 13).

Table 12: The extend of functions of the computerized tool that contributed to knowledge sharing and 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

Table 13: The computerized tool incorporated in the KM methodology can enhance learning experience in Business Computing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	18	31.6	40.9	40.9
	Agree	17	29.8	38.6	79.5
	Neutral	7	12.3	15.9	95.5
	Disagree	2	3.5	4.5	100.0
	Total	44	77.2	100.0	

Discussion and Implications

Cultural issues often play a very important role in the learning experience of students. In this research, most of the respondents chose not to ask questions during lectures when they experienced learning difficulties in a big lecture hall, in particular those who were in their first trimester in the Australian university as the majority of them believed large class sizes and asking questions in lectures have no or little impact to learning. Asian students often sit quietly in classes and listen to an academic's presentation as Asian culture does not encourage student to ask questions and share knowledge. Students who ask questions and share knowledge in classes may be considered as a displaying disrespectful behavior (Sue, 1990). Asian students also consider authors and lecturers as the final authority who are always right (Ladd & Ruby, 1999; Yap, 1997). Sooner or later, students will lack the self-confidence to ask questions in a big lecture hall or even in front of other students. Unfortunately, this mentality was carried over even when the first trimester students switched to a western education system by studying in the offshore campus of the Australian university.

Unlike first trimester students, the senior students perceived asking questions was important to their learning in a big lecture hall. Even though big class sizes is another important influential factor, they still chose to ask questions simply because they were aware of the benefits of asking questions. In fact, the culture of asking question and knowledge sharing can be changed by implementing a proper reward system (Goh, 2002). Unlike commercial organizations, reward systems such as promotion and salary increments cannot be applied to students. In HEI settings, students must be clearly informed of the benefits of participating in KM activities. For instance, the proposed methodology aims to provide solutions to learning difficulties that they encounter in lectures. Simply by solving these difficulties, students can resume their knowledge creation process rather than just memorizing information. In addition, knowledge can further be created, extended and evaluated through the recommend and comment features. The reward of contributing questions and knowledge is to enhance their learning experience which can in terms improve their performance in assessments.

Although technology itself adds no value to knowledge (Smith, 2001), technology provides many of the foundations for the development of specific KM tools to streamline KM processes (Jurisica, Mylopoulos & Yu, 2004). The computerized tool used in this research has demonstrated its capability of encouraging students to ask questions manually and electronically, especially to those who were more passive in class or those who preferred not to ask questions in a big lecture hall, in front of students or during consultation time. Furthermore, the tool not only provided a platform for students to share, extend and evaluate knowledge, it also allowed the students (who chose not to ask in class) to look for relevant knowledge.

Research Limitations and Future Research Directions

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 Facebook is the tool can only list its contents on chronological order and does not provide a function to index its contents that make it hard to find relevant knowledge. Hence, it is natural to extend this research by developing a customized knowledge management system that integrates a formal knowledgebase, E-channel and Telechannel as well as supports keyword indexing and advanced search functions. Another extension is to investigate 1) what type of questions (such as questions related to theory or practical application) student prefer to ask using the KM methodology, 2) how the methodology can be improved to support those questions.

Conclusion

HEIs have started to adopt KM to manage administrative and scholar knowledge due to the successful implementation of KM in many commercial organizations. However, the lack of insights into the engagement of tertiary students to create, disseminate, use and evaluate knowledge at course level has driven the development of the proposed KM methodology. The proposed methodology 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. Another major contribution of the KM methodology is that students are able to create new knowledge and to solve problems using incoming knowledge as the methodology can enhance knowledge understanding in their learning process.

The proposed methodology was applied to a business computing course at an undergraduate level conducted in the offshore campus of the Australian university in the third trimester of 2012. The methodology was evaluated using quantitative analysis. The findings show that majority of the students agreed the computerized tool incorporated in the methodology could enhance their learning experience by allowing students to ask for, share, discuss and extend knowledge. In particular, the methodology provided additional channels and platform for those who were passive and preferred not to seek help from lecturers directly.

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