

# Implementation of Facebook study groups as supplements for learning management systems in adult ODL environments

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## Implementation of Facebook study groups as supplements for learning management systems in adult ODL environments

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### Abstract

*As an open and distance learning (ODL) institution, Wawasan Open University (WOU) employs a blended approach for delivering courses to its undergraduate and postgraduate students, who are entirely adult learners. In this approach, the use of a learning management system (LMS) is absolutely crucial for student support as well as the enhancement of the whole learning experience to compensate for the lack of face-to-face interaction between the students and the academics. WawasanLearn, the open source, Moodle-based LMS system used by WOU, is a comprehensive online tool that enables students and academics to effectively interact in a virtual environment. However, analysis of data from several semesters shows that the rate of student interaction on WawasanLearn is low with respect to the sharing of knowledge.*

*In order to qualitatively and quantitatively identify the factors contributing to the student participation rate in WawasanLearn, a survey was conducted among the undergraduate students studying in various disciplines including science and technology, business administration, liberal studies, education, languages and communication. Feedback regarding the manner of support students expect from WawasanLearn was gathered from close to 550 students throughout Malaysia. Another purpose of the survey was to identify whether and why students are drawn to participate more frequently in social networking platforms such as Facebook (facebook.com).*

*As a result of the findings of the survey, a pilot project was implemented to study the use of Facebook groups as study groups for supplementing WawasanLearn. These study groups were run in parallel to WawasanLearn for seven course modules over two consecutive semesters. This paper discusses the findings of this pilot project with respect to the implementation of Facebook groups as supplements to the LMS in an adult ODL environment.*

**Keywords:** Social networking, Facebook, Moodle, open distance learning, ODL, learning management systems

## **Introduction**

The core business of Wawasan Open University (WOU) is open distance learning (ODL). The students of WOU are mostly working adults who pursue undergraduate and postgraduate degree programmes on a part-time basis in disciplines such as science and technology, business administration, education, languages and liberal studies. WOU adopts a blended approach for course module delivery. Due to the limitations in technology infrastructure such as the bandwidth in the Asian region (Bates, 2001), self-directed learning materials are provided to the students on CDs together with prescribed textbooks. The continuous academic interaction between teachers and learners is facilitated by a Moodle (version 1.8)-based learning management system (LMS) named *WawasanLearn*.

The course module delivery at WOU consists of two components: (i) self-study using self-directed study materials specifically designed for ODL by academics functioning as *course coordinators* and instructional designers working in course development teams; and (ii) tutor support provided by subject-matter experts through monthly face-to-face tutorial sessions, telephone counselling and online counselling via *WawasanLearn*. As the students of WOU are scattered throughout Malaysia, the university operates learning centres or regional offices in the cities of Penang, Kuala Lumpur, Ipoh, Johor Baru, Kota Baru and Kuching to provide students access to physical libraries, tutorial sessions as well as administrative support. However, due to the geographic distribution of the learners, the primary point of continuous interaction among students, tutors and course coordinators is *WawasanLearn*.

Given the importance of *WawasanLearn* in the course module delivery at WOU, a number of studies have been conducted to determine whether student interaction is at a satisfactory level. Teoh et al. (2010) argue that student interaction on *WawasanLearn*, in both the undergraduate and postgraduate levels, is low and further reduces as a semester progresses. Looking at other ODL institutions around the world, it becomes apparent that many of these institutions are heavily dependent on online student support systems for the effective delivery of course modules (Macintyre & Macdonald, 2011) and that the lack of participation and interaction in online LMS is not a problem unique to WOU. According to Mason and Weller (2000), established distance learning institutions such as the Open University of UK also face low numbers when it comes to such participation.

As a possible solution for the low rates of participation on dedicated student support channels, more and more institutions have started looking at Web 2.0 technologies and social networking to include the “always on” learner (Baird & Fisher, 2006). Wang et al. (2003) suggest that learner interaction on social networks becomes easier because the profile of each learner acts as an icebreaker for the interaction. It was also found that forming small study groups in more informal spaces is conducive to the progress of the student (Stacy, 2002).

Facebook has become a popular social networking platform in recent years and many studies have been done on its potential use in a formal learning environment. As discussed by Madgea et al. (2009), learners form connections with peers on Facebook prior to joining higher educational institutions and tend to use it even more after joining. Learners even seem to gain self-esteem and confidence through the use of Facebook (Ellison, Steinfield & Lampe, 2007). Ophus and Abbitt (2009) have found that many learners find use for Facebook in their learning with respect to the ease and convenience of communication. It was also found that learners tend to communicate and perform more as a response to self-disclosure of teachers on Facebook (Mazer, Murphy & Simonds, 2007).

The literature suggests that quite a number of studies on the use of Facebook by students have been conducted in recent times. However, the possibility of supplementing the official LMS of a university with Facebook has not been studied in detail. This research project attempts to marry *WawasanLearn* and Facebook in a real-world learning environment to fulfil the learning needs of adult ODL students.

## Methodology

The continuous interaction via *WawasanLearn* is critical for the successful delivery of course modules at WOU. To identify (i) how useful *WawasanLearn* is in terms of fulfilling students' learning needs, and (ii) why students are drawn to participate more frequently in social networking forums such as Facebook, a survey was conducted online as well as offline in all WOU regional offices in Malaysia. The survey collected 542 responses from undergraduate students in various disciplines.

The survey instrument was designed to identify (i) features which would increase the frequency of logins into *WawasanLearn*; (ii) the extent of Facebook use by adult ODL learners; and (iii) which features of Facebook attract adult ODL learners to log on to it frequently.



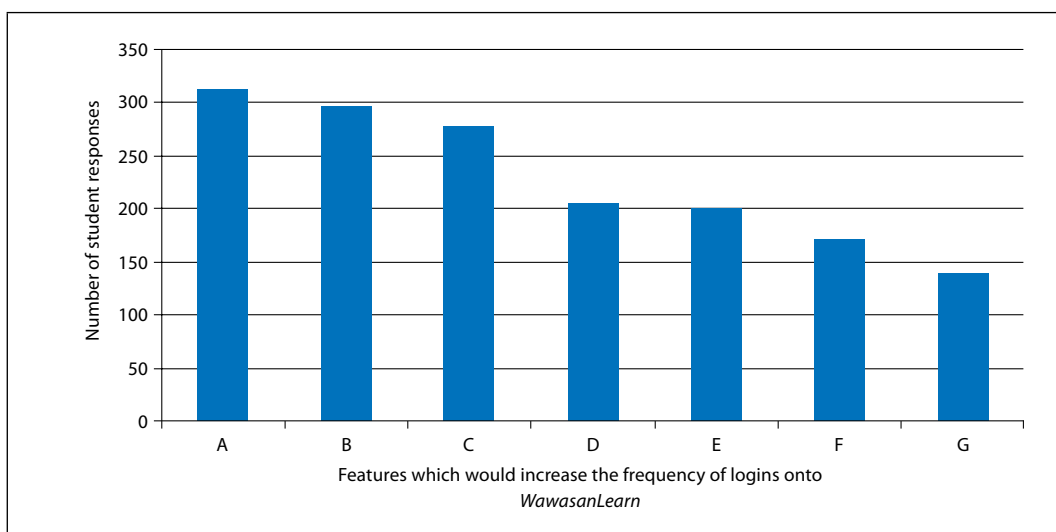
## Results

### Features which would increase the frequency of logins onto *WawasanLearn*

A frequency analysis of the data was done to identify the features that would encourage students to log in more into *WawasanLearn*. **Figure 1** arranges the features listed in **Table 1** in descending order of importance according to the number of student responses.

Legend	Feature
A	More interactive and exciting material (video, images, animations, e-books, audio books and so on).
B	More quality discussions (the course coordinators and tutors initiating discussions about current happenings in the industry/research with respect to the course).
C	Faster response time (course coordinators and tutors responding to students faster).
D	A better user interface (a more appealing and user-friendly interface).
E	The ability to read about or view the research/other academic/professional activities of course coordinators, tutors and colleagues.
F	A more intuitive and user-friendly chat application which can be used through the LMS system.
G	A proactive approach to discussions — students receive an e-mail/SMS as soon as a new message is posted.

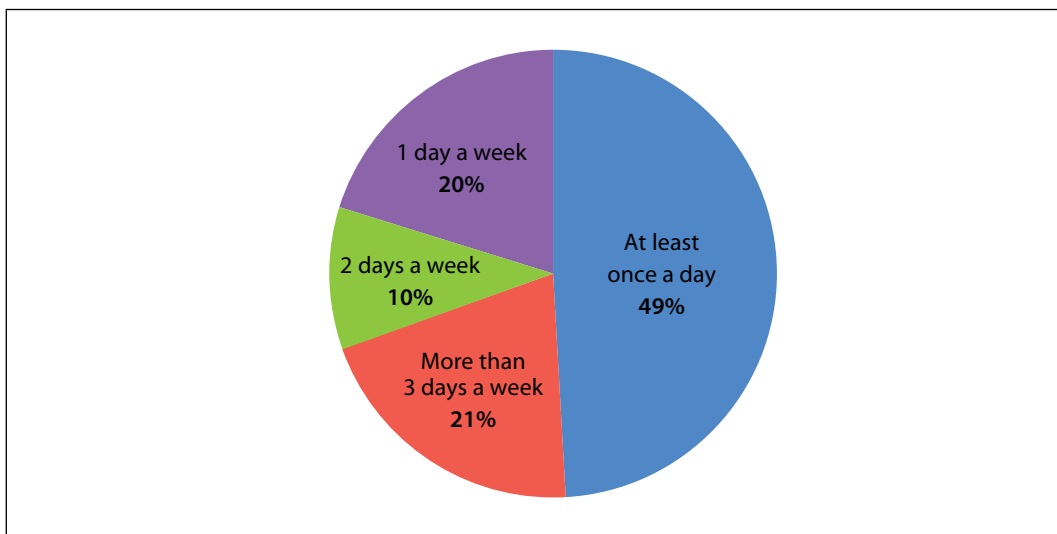
**Table 1** The list of features



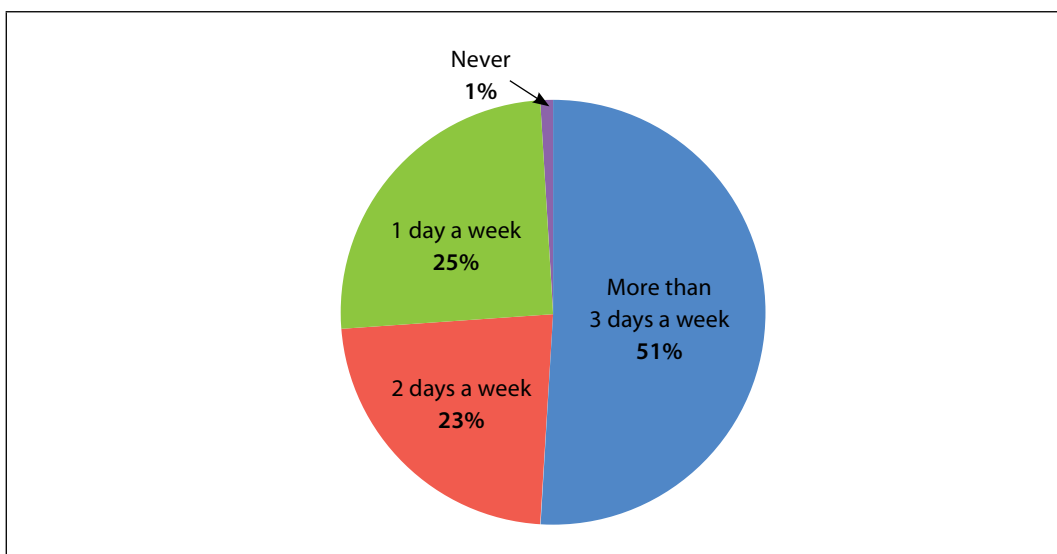
**Figure 1** The features of *WawasanLearn* which would increase the frequency of logins (in descending order according to the number of responses)

### Extent of the use of Facebook by learners at WOU

Analysis of the survey results revealed that 83% of the students subscribed to Facebook. A frequency analysis of the number of logins into Facebook per week, shown in **Figure 2**, revealed that 70% of the students who subscribed to Facebook log in at least three days a week. Analysis of the number of logins into *WawasanLearn* for the Facebook subscribers, shown in **Figure 3**, revealed that only 51% logged into *WawasanLearn* more than three days a week. This comparison indicates that there is a possibility of increasing teacher-learner interaction if Facebook is used as the medium for it.



**Figure 2** Frequency of logins into Facebook



**Figure 3** Frequency of logins into *WawasanLearn* by Facebook subscribers

The following are the key attractions of Facebook which were identified from the students' feedback:

- The ability to interact with friends, colleagues and family in a virtual space.
- Instant updates via e-mails and SMS with respect to related activities.
- User-friendly interface which is easy to navigate.
- The ability to follow the progress of friends and colleagues with respect to research and work.
- The ease of organising events and inviting friends and colleagues to participate.
- The ability to share images, links and videos easily and the ability to receive comments on them.
- The ability to send out messages to an individual or a group from within Facebook.
- The ability to view the profiles of friends and colleagues.
- The ability to see who is online and instantly chat with them.

## **Discussion**

To effectively increase the frequency of logins into *WawasanLearn*, the important features identified in **Table 1** will need to be incorporated into the LMS. The current *WawasanLearn* system, based on the Moodle (1.8) platform, was found to be incapable of effectively addressing these requirements independently. As this was the version of Moodle implemented at WOU during this study, the necessity for identifying an external platform which could supplement *WawasanLearn* became apparent.

Since 83% of the students who participated in the study were subscribers of Facebook and 70% of them interacted on it more than three days a week (**Figure 2**), in contrast to the 51% who interacted on *WawasanLearn* (**Figure 3**), Facebook was found to be a suitable candidate to supplement *WawasanLearn*. By comparing the top four features that would increase the frequency of logins into *WawasanLearn* against the key attractions of Facebook, it can be deduced that all the key features which are currently lacking in *WawasanLearn* can be provided by Facebook. **Table 2** maps the key features learners require on *WawasanLearn* to the key attractions of Facebook which increases the frequency of logins.

No	Key features which would increase the frequency of logins into <i>WawasanLearn</i>	The key attractions of Facebook
1	A better user interface	<ul style="list-style-type: none"> <li>• User-friendly interface which is easy to navigate.</li> <li>• The ability to view the profiles of friends and colleagues.</li> <li>• The ability to follow the progress of friends and colleagues with respect to research and work.</li> </ul>
2	More quality discussions	<ul style="list-style-type: none"> <li>• The ability to share images, links and videos easily and the ability to receive comments on them.</li> <li>• The ability to interact with friends, colleagues and family in a virtual space.</li> <li>• The ease of organising events and inviting friends and colleagues to participate.</li> </ul>
3	Faster response time	<ul style="list-style-type: none"> <li>• Instant updates via e-mails and SMS with respect to related activities.</li> </ul>
4	A proactive approach to discussions — students receive an e-mail/SMS as soon as a new message is posted	<ul style="list-style-type: none"> <li>• The ability to send out messages to an individual or a group from within Facebook.</li> <li>• The ability to see who is online and instantly chat with them.</li> </ul>

**Table 2** Mapping of the required features of *WawasanLearn* to the key attractions of Facebook

However, by analysing the findings from WOU's perspective, it was realised that Facebook alone would not be able to effectively serve the needs of the adult ODL students. Therefore, a hybrid approach, which marries the pedagogical soundness of the Moodle-based *WawasanLearn* with the social interactivity of Facebook, was needed.

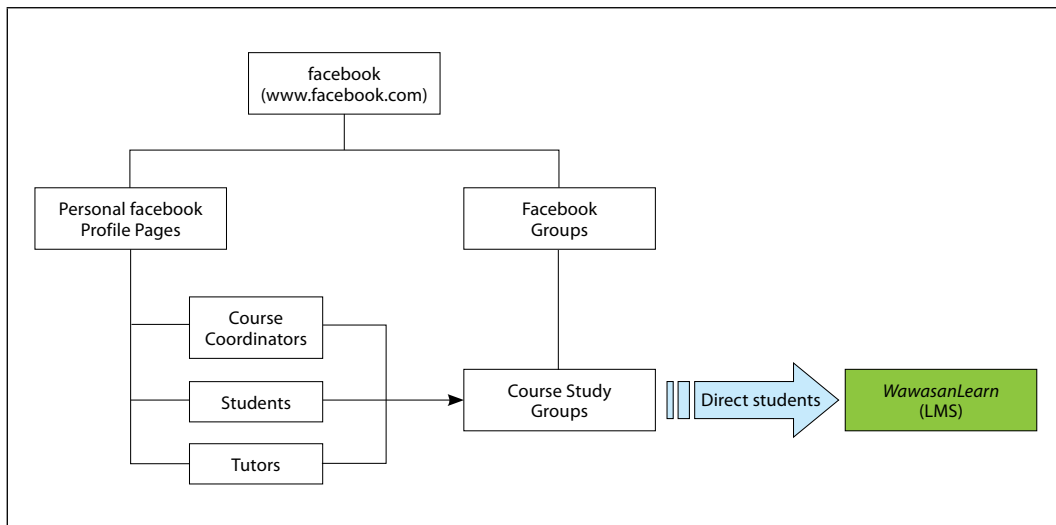
## WOU Facebook study groups

A pilot project was initiated at WOU to study the feasibility of using Facebook as a supplement to *WawasanLearn* with the aim of increasing student satisfaction. Facebook study groups were formed for several IT-related courses in the School of Science and Technology (SST) as shown in **Table 3**.

	Course code	Course name	Duration of FB study	No. of participants
1	TCC222/05	Operating Systems	1 semester (S1/2010)	29
2	TEC305/10	Website Design and Development	1 semester (S1/2010)	07
3	TAI303/05	Intelligent Systems for Decision Support	1 semester (S1/2010)	05
4	TCC123/05	Visual Programming	1 semester (S2/2010)	33
5	TAI201/05	Human Computer Interaction	1 semester (S2/2010)	21
6	TCC236/05	Data Structures and Algorithms	1 semester (S2/2010)	12
7	TEC304/10	Electronic Commerce	1 semester (S2/2010)	07
	<b>Total number of participants over two semesters (12 months)</b>			<b>114</b>

**Table 3** Facebook study groups

These study groups were systematically structured, as shown in **Figure 4**, to allow effective student interaction with course coordinators and tutors. The course coordinator in charge of a particular course module was assigned the role of administrator, which allowed him/her to moderate the postings, send out notifications to all group members, organise events and manage the member list. Tutors were also invited to join the group. Only the students enrolled in a particular course were allowed access to the study group for that course to ensure that discussions and postings were kept confidential.



**Figure 4** Structure of the Facebook study groups

Results of the pilot study showed that Facebook study groups can be very effective in supplementing *WawasanLearn*. However, the best results were achieved when the Facebook study groups were used as message boards to inform students of new developments, discussions or resources available on *WawasanLearn*. This approach encouraged the students to access the LMS more frequently due to the prompt communication, as a posting on the study group’s “wall” appears instantly on a student’s personal “wall”. In addition, the “Message All Members” feature was used to send instant messages to the study group members about new developments on *WawasanLearn*. This “push-information” approach was found to be very effective as messages are forwarded instantly to the members’ e-mail addresses in contrast to the “pull-information” approach of the LMS where learners need to proactively log in to retrieve information. The pilot study also confirmed that Facebook cannot be effectively used as a replacement for *WawasanLearn* due to its inherent limitations, such as the inability to host documents, presentations and multimedia materials, and legal implications. However, security and privacy were not found to be issues as the groups did not have access to the personal profiles of the learners.

A survey was conducted among the pilot project participants at the end of the second semester of 2010 to gather their feedback. The majority indicated that they would want to join Facebook study groups in the future but noted that they found it inefficient to switch between the two systems, namely *WawasanLearn* and Facebook, to keep up-to-date on the latest information regarding their course modules. The students further indicated that they preferred to use only Facebook to extract information available on *WawasanLearn*. As a result, a Facebook application called “faboodle” that will integrate *WawasanLearn* with Facebook is currently under development.

## **Conclusion**

Analysis of the data from several semesters indicated that the frequency of participation on the Moodle (ver.1.8)-based LMS of WOU called *WawasanLearn* was low. A study was conducted in the form of a survey among the adult ODL students at WOU to identify the factors which contributed to the frequency of logins into *WawasanLearn*. The study also aimed to identify the extent of the use of the Facebook social networking platform (facebook.com) by students and determine why they were drawn to participate more frequently on this social networking platform.

The analysis of the data identified several key features which would increase the frequency of logins into *WawasanLearn*. It further identified Facebook as an ideal supplement to *WawasanLearn* as the key features were already available on this platform. As a result, a pilot project was initiated in the School of Science and Technology which used Facebook groups as study groups to supplement *WawasanLearn*. The pilot project was run for two semesters over one year and feedback was gathered from the participants at the end of the project. The feedback indicated that the students found the Facebook study groups to be effective tools for their learning and that Facebook and *WawasanLearn* should be integrated instead of being run as two separate platforms. The next move for the authors is to implement a Facebook application which effectively integrates Facebook with *WawasanLearn*.

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## Assuring the quality of online teaching and learning: The case of Wawasan Open University

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### Abstract

*The dynamic business environment and powerful market forces in the 21<sup>st</sup> century are challenging leaders at open universities to compete successfully in the national and global higher education stage. The notion of quality is becoming an important and overriding issue with the paradigm shift in the education landscape due to the rapid penetration of Internet usage. Open universities are experiencing pressure from numerous stakeholders to become more client-focused, particularly in their provision of technology-enhanced education to systematically support the learning experience of open distance learners. In the pursuit of establishing institutional and national/regional-based quality assurance practices, Asian open universities should pay particular attention to one of the key components within the overall QA framework; that is, the web-based teaching and learning on the online learning management system (LMS). The assurance of quality in the web-based teaching and learning component is vital to support the effective and efficient delivery of open and distance education within the blended approach adopted by many open universities.*

*In this study, the authors first examine the dimensions of quality assurance of key services that are closely associated with web-based education in the online LMS of Wawasan Open University (WOU). The authors then analyse the pattern of interactions in the LMS to determine the actual activities of learners in the web-based environment. By synthesising the findings, indicators that address diverse facets and components of quality relevant to web-based teaching and learning in the LMS are identified. The authors then discuss the application of the quality components within the overall QA framework in WOU to further enhance the quality of its web-based teaching and learning component. Assessment of learners' satisfaction in WOU is carried out to determine the effectiveness of the QA components in the LMS. The QA components identified in the web-based teaching and learning within the LMS are then recommended to Asian open universities for integration into their overall QA framework.*

**Keywords:** quality assurance, e-learning, web-based teaching and learning, online learning management systems

## **Introduction**

The dynamic business environment and powerful market forces in the 21<sup>st</sup> century are challenging leaders at open universities to compete successfully in the national and global higher education stage. Some educators (such as Nissenbaum & Walker, 1998; Trinkle, 1999) have concerns that open distance education may compromise the quality of education as delivered by conventional institutions. The notion of quality is becoming an important and overriding issue with the paradigm shift in the education landscape (Unesco, 2009) and the rapid penetration of Internet usage in education (Rovai & Downey, 2010).

Open universities are experiencing pressure from numerous stakeholders to become more client-focused, particularly in their provision of technology-enhanced education to systematically support the learning experience of open and distance learners. As open universities in Asia and around the world are actively developing and maintaining their respective institutional and national/regional-based quality assurance (QA) frameworks and practices, particular attention should be given to one of the key components within the overall QA framework; that is, the web-based teaching and learning in the online learning management system (LMS). The assurance of quality in the web-based teaching and learning component is vital to support the effective and efficient delivery of open distance education within the blended approach adopted by many open universities.

Extensive studies have been done on the overall management of quality assurance of higher education (such as Hoecht, 2006; Houston, 2008; Pillay & Kimber, 2009; Shah, Wilson & Nair, 2010; Kettunen, 2010; Latchem, 2011) and also in the context of open distance education and/or e-learning (such as Jung, 2005; Belawati & Zuhairi, 2007; Jung & Latchem, 2007; Jung 2009). However, specific studies on the development of quality assurance components that address learners' expectations and activities with regards to LMS in the context of Asian open universities are limited.

Delivering a high level of service quality to clients is important to service organisations, including higher education institutions (Brochado, 2009). Service quality has been identified as a robust predictor of student satisfaction (Stevenson & Sander, 1998; Helgesen & Nasset, 2007). Consistent with findings from previous research, recent literature (such as Lee, 2010; Udo, Bagchi & Kirs, 2011) indicate that service quality is a key factor of customer satisfaction in the educational and e-learning setting. Flexibility, responsiveness, interaction, student learning, technical support, and technology of online learning influence the satisfaction levels of students enrolled in Internet-based online classes (McGorry, 2003). Rovai (2003) suggested that the quality of technology, support services, and course design and instruction must be evaluated in order to monitor student satisfaction and performance in online education. In evaluating the service quality of e-learning, Zhang, Zhu, Hu and Li (2004) stated that organisations must ensure adequate understanding of the needs and expectations of customers, and should gather customer feedback and satisfaction with the services provided.

Hence, students' feedback within universities has increasingly become a vital concern in delivering quality education within the vigorous demand and supply setting of higher education institutions (Marcua, Zaharie & Osoian, 2009), including open universities. Student evaluation of teaching is a fundamental system for assuring teaching quality at higher education institutions (Bie & Meng, 2009). The identification of appropriate QA components for web-based delivery of education via the LMS demands consideration of the various facets of input to the QA system, particularly from the open distance learners in the context of open universities. Using the expectations of students to develop a quality assurance model (Stevenson, Muda, Karlsson, Szeky, Sander & Read, 2000) is one of the key ways of creating an effective system for ensuring the quality of the teaching and learning process.

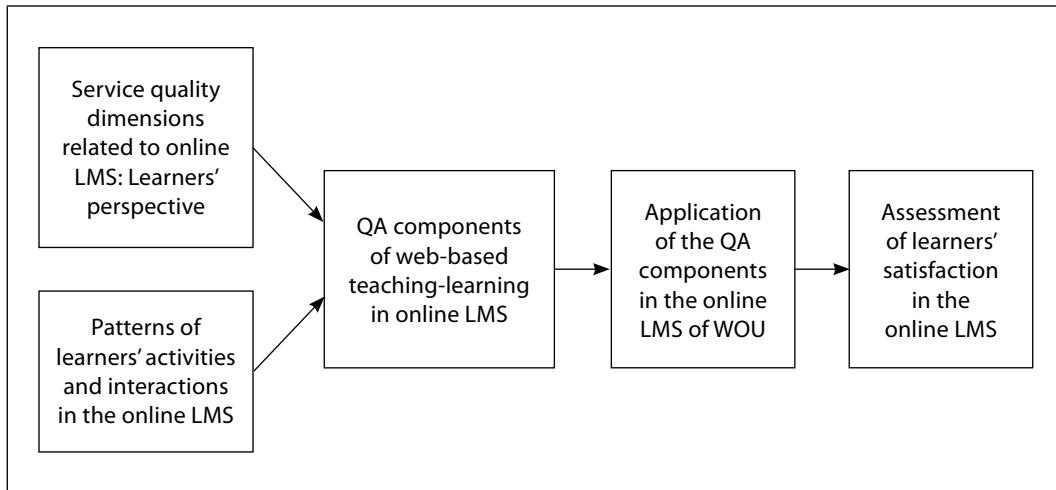
## Research framework and research methodology

In this study, the authors present an analysis of the identification, development and assessment of QA indicators and practices of web-based teaching and learning via the LMS in Wawasan Open University (WOU). This study focuses on the expectations and the actual activities in the LMS that are related to the satisfaction of the key stakeholder; that is, the open distance learner. This framework is in line with the ISO 9001 international standard for quality management systems, which promotes a process approach in conjunction with the Plan-Do-Control-Act quality improvement cycle introduced by Deming. In addition, related benchmark indicators of the Malaysian Qualifications Agency with regards to aspects of the delivery of quality education are also addressed.

The main objectives of the study are:

1. To examine the dimensions of the quality of key services that are closely associated with the LMS from the open distance learners' perspective.
2. To investigate the actual pattern of learners' activities and interactions in the LMS.
3. To identify the QA components of web-based teaching and learning in the LMS based on the findings.
4. To discuss the application of the QA components in the LMS of WOU (known as *WawasanLearn*) and the assessment of learners' satisfaction with the web-based teaching and learning platform.
5. To provide recommendations to open universities on the integration of QA components within web-based teaching and learning in their overall QA framework.

**Figure 1** shows the conceptual framework of this case study.



**Figure 1** Conceptual framework of the case study

The authors carried out a survey and interviewed students to obtain the primary data, and performed content analysis of the activities in the LMS to analyse the secondary data. Specifically, the authors first examined the dimensions of the quality of key services that are closely associated with the LMS by administering a questionnaire to a sample of 408 active undergraduate learners from the inaugural January 2007 semester intake undertaking business programmes. The questionnaire was formulated based on the dimensions of service quality (SERVQUAL) measures; namely reliability, assurance, responsiveness, empathy and tangibility (Parasuraman, Zeithaml & Berry, 1988). In order to determine the service quality expected of the web-based teaching and learning in the LMS, the SERVQUAL instrument was customised by consolidating the 'expectation' section into ten items/statements with a 9-points Likert scale across the five dimensions of service quality. Learners were asked to rate whether the service quality provided was higher than (7–9), met with (4–6), or lower than (1–3) their expectations of each dimension. To assess the relative importance of the different service quality dimensions to learners, five statements were formulated, in which respondents were required to weigh the dimensions by allocating a total of 100 points among the five dimensions of service quality.

The authors also conducted an analysis (via a cross-sectional study) of the pattern of interactions in the LMS of selected courses offered by the School of Business and Administration at the end of the semester. Content analysis and quantitative analysis were conducted on indicators to measure the students' interaction with online content in terms of the pattern/activity level and frequency of assessing online learning resources, as well as the types of online learning resources preferred. Learners' interaction with the web-based resources and interaction in online forum discussions were investigated based on Moore (1989) and the dimensions of exchanges by Oliver and McLoughlin (1997), and Oliver, Omari and Herrington (1997).

Learner interaction in the online learning environment can be categorised into the social, procedural, expository and cognitive dimensions. Hillman et al. (1994) argued that intervening technologies enable learners to communicate with the content as well as interact with their teachers and other learners. Technologies that deliver instructions to distance learners are often classified as two-way interactive or one-way non-interactive (Bates, 1995).

Web-based resources in *WawasanLearn* were grouped into five categories to identify the preference of materials by learners:

WB1: Static pages (e.g., Welcome Letter, Course Overview Information and User's Guide)

WB2: Folders of course content (e.g., Attachment files including presentation files, reading materials, past year examination questions, etc.)

WB3: Hyperlinks to external websites (e.g., websites that are related to the course content)

WB4: Online discussion forums (asynchronous)

WB5: Online quizzes

By synthesising the findings, indicators that address diverse facets and components of quality relevant to web-based teaching and learning in the online LMS were identified. The authors then discussed the application of the quality components within the overall QA framework in WOU to further enhance the quality of its web-based teaching and learning component. Assessment of learners' satisfaction in WOU was done to determine the effectiveness of the QA components in the online LMS.

## Background of Wawasan Open University

The vision of Wawasan Open University is to be a vibrant community that inspires lifelong learning, supports innovation and nurtures all-round personal growth. This vision is clearly reflected in its mission statement, which declares that the university is committed to the expansion of opportunities in higher education and to teaching excellence aimed at increasing the level of knowledge and scholarship among all Malaysians. Owned by the Wawasan Education Foundation, WOU offers accessible, flexible and affordable education to the adult community in support of lifelong learning. For WOU, quality underpins and undergirds everything it does. WOU benchmarks its academic programmes, courses, course materials and the entire learning process against international best practices in order to produce well-rounded, knowledgeable and competent professionals.

WOU opened its doors to students in January 2007 with 11 undergraduate programmes. The first postgraduate programme was offered in the January 2008 semester. The academic year in WOU consists of two semesters: January to June and July to December. Currently, there are 38 programmes offered by the four faculties, which are the School of Business and Administration, the School of Science and Technology, the School of Foundation and Liberal Studies, and the School of Education, Languages and Communications.

Since its establishment in 2006, the university has expanded in keeping with its goal of reaching working adults across the nation. There are now six regional offices — in Penang, Ipoh, Kuala Lumpur, Johor Baru, Kota Baru and Kuching — and three regional support office — in Petaling Jaya, Klang and Subang Jaya — that offer learning support and services to the students. Over 8,000 people in Malaysia, aged between 21 and 71 years, have experienced the learning opportunities at WOU with the majority of them falling within the 21–30 age group.

## **WOU education delivery model**

### **Course materials**

The comprehensive self-contained course materials (some of which include textbooks) that are provided by WOU either in print or CD form enables its students to engage in learning activities at any time and at any place to suit individual learning styles and needs. These materials for self-learning are developed using a course development team (CDT) approach. The CDT comprises academic experts (local or international), instructional designers and language editors. The input from an external course assessor is part of the quality assurance process of WOU course development.

### **Learning support services**

To assist students in their studies, WOU provides the following quality learning support services:

- Tutorials conducted by part-time tutors with relevant subject expertise and experience. Tutors are also available for consultation/counselling via the telephone at appointed times twice a week.
- *WawasanLearn* is a Moodle-based learning management system (LMS) that provides online learning support on a 24×7 basis. It enables students to access supplementary materials and links to relevant websites, and to participate in forum discussions with their course mates, tutors and course coordinators.
- Extensive electronic library resources that can be accessed at any time and from any place that has an Internet connection.

- Advisories on administrative matters from the regional offices, registry, as well as the call centre.
- Regional offices equipped with computer labs, libraries and free access computer terminals.

### **Assessment**

The mastery of the learning outcomes of WOU courses is evaluated via an assessment strategy that consists of two components: continuous course assessment (e.g., tutor-marked assignments) and a final examination. To pass a WOU course, students are required to pass both components. An external examiner system is in place as part of the WOU QA process to ensure that examination papers and exit standards are in compliance with national and international norms.

### **Open entry system**

WOU is one of six universities in Malaysia approved by the Ministry of Higher Education (MOHE) to admit students through the open entry system (OES). The OES enables mature students ( $\geq 21$  years for undergraduates and  $\geq 35$  years for postgraduates) with minimal academic qualifications to be admitted provided they meet conditions stipulated by the MOHE. This makes WOU programmes more accessible compared to those of conventional universities.

### **4.5 Multiple exit points and flexible progression pathway**

In support of the Government's efforts to promote the lifelong learning culture, WOU has introduced a series of awards at various levels as outlined in the Malaysian qualifications framework. These awards provide multiple exit points upon a ladder of academic attainment to enable Malaysian citizens to progressively enhance their level of personal and professional achievement. Students can determine their course load for each semester and the choice of their study programmes.

### **Quality assurance system in Wawasan Open University**

WOU is committed to providing a rich learning experience to its students and to meeting the needs of industry. WOU firmly believes that this commitment must be underpinned by a sound quality assurance system that covers all aspects of the university's operations. The academic standards of WOU are benchmarked against international best practices.



## **Quality assurance management**

Quality assurance at WOU is directed from its highest policy bodies such as the Board of Governors and the Senate and managed by the Deputy Vice Chancellor (Academic), who chairs the Quality Assurance Committee (QAC). The QAC is responsible for developing and implementing the university's QA systems and processes. A Quality Assurance Unit (QAU) headed by a manager coordinates and oversees the implementation of QA processes across the university, monitors compliance and recommends continuous improvement measures. The QAU also manages and maintains the quality management system documentation, namely, the quality policy, quality manual, document procedures and quality records. At the school/departmental level, a quality task force oversees the implementation and review of QA systems and processes. The quality task force works with the QAU and reports to the QAC to keep the university informed on all QA-related matters and continuous improvement plans. All committees operate under clearly defined standing orders with minutes recorded and archived.

## **Quality assurance policy**

The Quality assurance policy that governs the WOU quality assurance system has the following objectives:

1. to establish the necessary quality assurance framework, procedures and performance indicators to achieve the vision and mission of the university;
2. to inculcate a culture of quality and ensure all members of the university community take responsibility for the quality and standard of their work performance;
3. to rigorously and continuously monitor to ensure that the policies are implemented effectively;
4. to develop and incorporate an effective feedback mechanism that enables the QAC to make informed decisions on any need to modify or improve the quality standards of the educational programmes in a timely manner.

## **Quality assurance procedures**

WOU has developed an overarching policy document, entitled the Standard Operating Procedures (SOP) Framework that requires all schools/departments to document their respective processes and procedures based on a prescribed format. This ensures that essential information is consistently provided and disseminated to all relevant stakeholders.

The Quality Assurance Unit maintains a record of all the university SOPs, which is easily accessible and regularly updated. In building a shared responsibility for the quality assurance culture and achieving a greater level of transparency across various levels in WOU, the electronic versions of all SOPs are published in the staff online portal (intranet). All procedures and systems introduced to manage quality can only be improved through the active involvement of all the relevant stakeholders in the university.

## Findings and discussion

### Dimensions of quality assurance of key services associated with the online LMS

As indicated in **Table 1**, a total of 122 replies were obtained out of the 408 questionnaires that were distributed. The response rate was almost 30%. Of the 122 respondents, almost 60% were male. Most of the respondents were in the 21 – 30 age group, while nearly one-third were between 31 – 40 years old. The majority of the respondents (52%) have diploma qualifications and had undergone at least 11 years of formal primary and secondary education and two years of studies at college level. All respondents were working adults with most of them (63%) holding non-managerial level posts.

Demographics	Percentage (%)
<b>Gender</b>	
Male	58
Female	42
<b>Age group</b>	
21– 30	51
31– 40	33
41– 50	15
51 – 70	1
<b>Academic qualifications</b>	
PMR/SPM or equivalent of O-Level	47
Diploma or equivalent of GCE A-Level	52
Degree	1
<b>Employment level</b>	
Managerial	37
Non-managerial	63

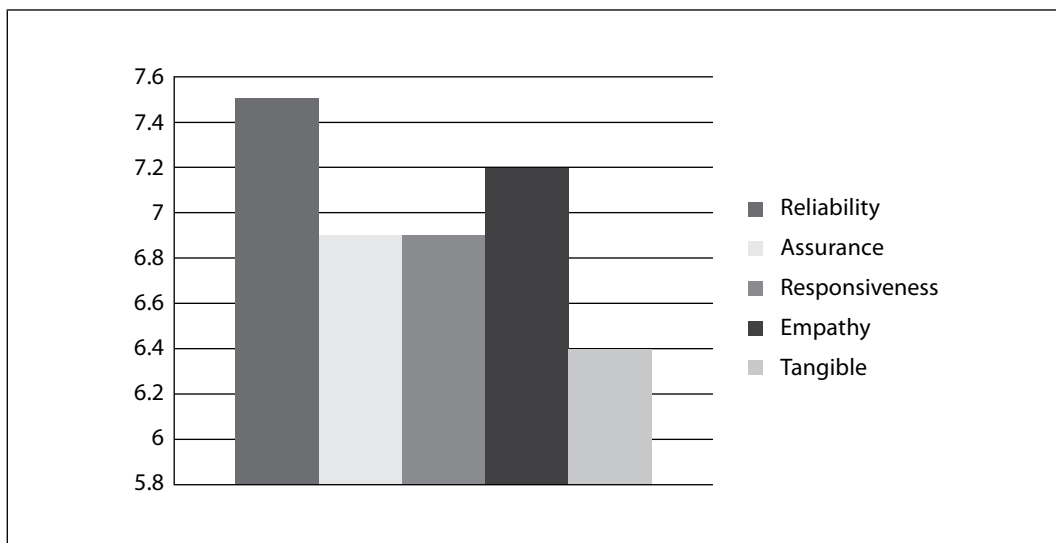
**Table 1** Demographics of the respondents ( $n = 122$ )

*Key findings: Level of satisfaction by service dimensions*

The level of satisfaction for all five service dimensions, as indicated by the mean scores of the 122 replies, ranged from 6.4–7.5 points on the 9-point scale as shown in **Table 2**. This result indicates that the service quality of online teaching and learning over the WOU LMS has met and slightly exceeded the desired service level of the respondents in their inaugural semester. As depicted in **Figure 2**, the level of satisfaction was the highest for the reliability service dimension, followed by the empathy, responsiveness, assurance and tangibles dimensions.

Statement no.	Statement	Dimension	Mean score	
1	The learning management system, <i>WawasanLearn</i> , is accessible at all times.	Reliability	6.9	7.5
2	The web-based resources for courses are available in <i>WawasanLearn</i> by the start of the semester.	Reliability	8.0	
3	<i>WawasanLearn</i> is helpful and informative enough to support your learning.	Assurance	6.6	6.9
4	The content of the web-based resources is appropriate and relevant to the course syllabus.	Assurance	7.2	
5	The tutors and course coordinators are prompt in replying to your questions posted in <i>WawasanLearn</i> .	Responsiveness	7.1	6.9
6	When you interact with the RO staff on administrative matters related to <i>WawasanLearn</i> , they are ready to assist.	Responsiveness	6.7	
7	When you interact with the RO staff regarding a specific administrative problem in <i>WawasanLearn</i> , they are courteous and willing to help.	Empathy	6.3	7.2
8	When you interact with the tutors and course coordinators regarding a specific academic issue in <i>WawasanLearn</i> , they are willing to guide and share.	Empathy	8.0	

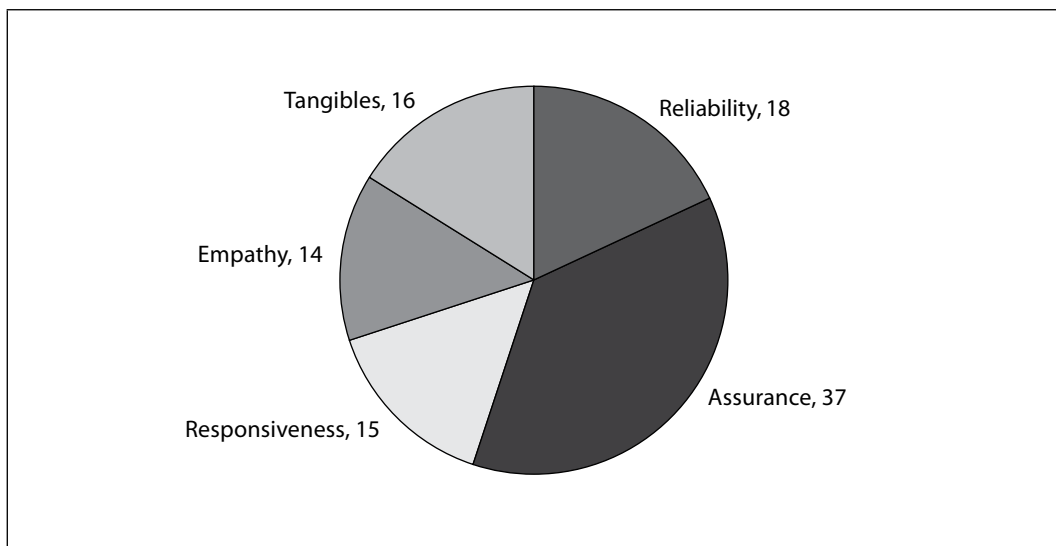
9	The user interface of <i>WawasanLearn</i> is attractive and easy to navigate.	Tangible	6.2	6.4
10	The quality of the files and other web-based resources posted on <i>WawasanLearn</i> is good and they are accessible.	Tangible	6.5	

**Table 2** Service quality level of satisfaction: Mean scores**Figure 2** Mean service quality scores of the service dimensions in the online LMS

Although the mean scores of the level of satisfaction for all five dimensions seem encouraging, there were some areas of service in the online environment that needed improvement. The tangibles dimension clearly required improvement as did some sections of the other dimensions. Specifically, the user interface of *WawasanLearn* and the clarity/accessibility of the files required further improvement. As the target learners are working adults for whom time is a limiting factor, an interface which is easy to navigate for speedy retrieval of information is required. The academic staff (course coordinators and tutors) and the regional office staff need to be trained to provide better support on administrative and academic issues raised in *WawasanLearn*. The current level of competency has to be enhanced by providing training, particularly to academic staff in areas such as the development and management of course content, content enrichment and learner support in an ODL environment. In addition, the materials and information posted in the LMS should be relevant to the course content so that learners find them useful and informative. A proper monitoring system must be put in place to regularly monitor the quality, relevancy and currency of the materials posted.

*Key findings: Relative importance of overall service quality dimensions*

In terms of the relative importance of the service dimensions, the most important area, as highlighted by the respondents, was the assurance dimension (**Figure 3**). The other service dimensions in order of relative importance sequence were: reliability, tangibles, responsiveness and empathy.



**Figure 3** Relative importance of service quality dimensions in the LMS from the learners' perspective

*Key findings: Level of satisfaction versus relative importance of the five service quality dimensions*

The survey result showed that the assurance dimension is perceived by students to be the most important service quality area, but the level of satisfaction (as indicated by the mean score) for the dimension was ranked third (out of five), as shown in **Table 3**. The assurance dimension speaks about the competency, expertise and courtesy of service staff as well as their ability to deliver trust and confidence to the students. This dimension relates to the knowledge, skills and courtesy of the university's academic and administrative staff, which will instil confidence among the students and ensure the quality of online teaching and learning. When learners have acquired a fulfilling learning experience, they will subsequently share this with their peers, colleagues or family members, and thus they will be the most reliable marketing tools of the institution.

Dimension	Ranking as per level of satisfaction	Ranking as per relative importance
Assurance	3 (mean score = 6.9 / 9.0)	1 (average points allocated = 37)
Reliability	1 (mean score = 7.5 / 9.0)	2 (average points allocated = 18)
Tangibles	5 (mean score = 6.4 / 9.0)	3 (average points allocated = 16)
Responsiveness	3 (mean score = 6.9 / 9.0)	4 (average points allocated = 15)
Empathy	2 (mean score = 7.2 / 9.0)	5 (average points allocated = 14)

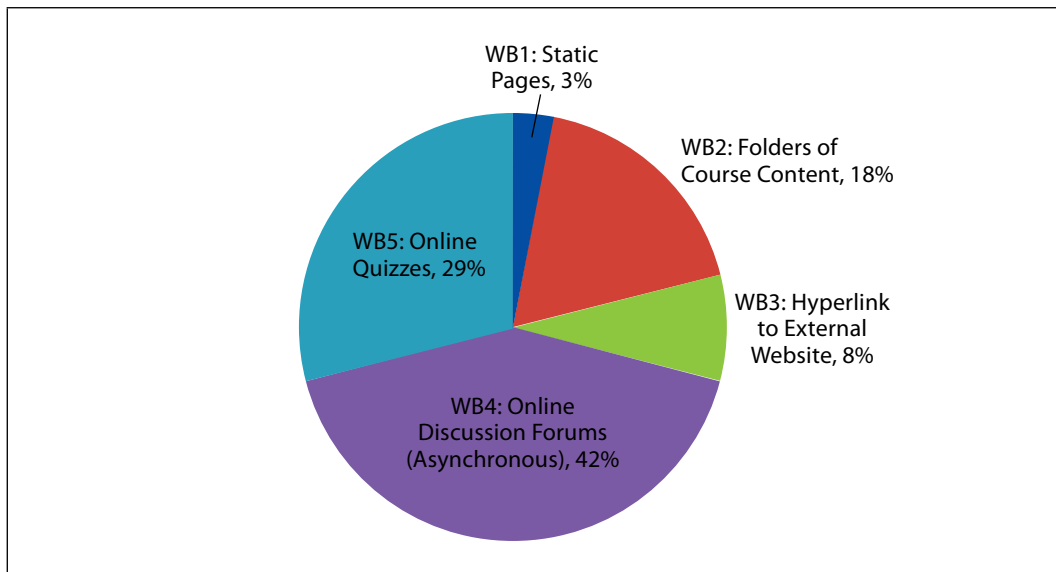
**Table 3** Level of satisfaction versus relative importance of the five service quality dimensions

One of the key concerns in delivering quality web-based teaching and learning over the LMS involves understanding and managing learners' expectations effectively. As reflected in the above results, all identified dimensions of service quality should be addressed in formulating the QA components for the LMS. In the case of WOU, particular attention must be given to the dimensions of assurance, responsiveness and tangibles.

### Pattern of activities and interactions in the Online LMS

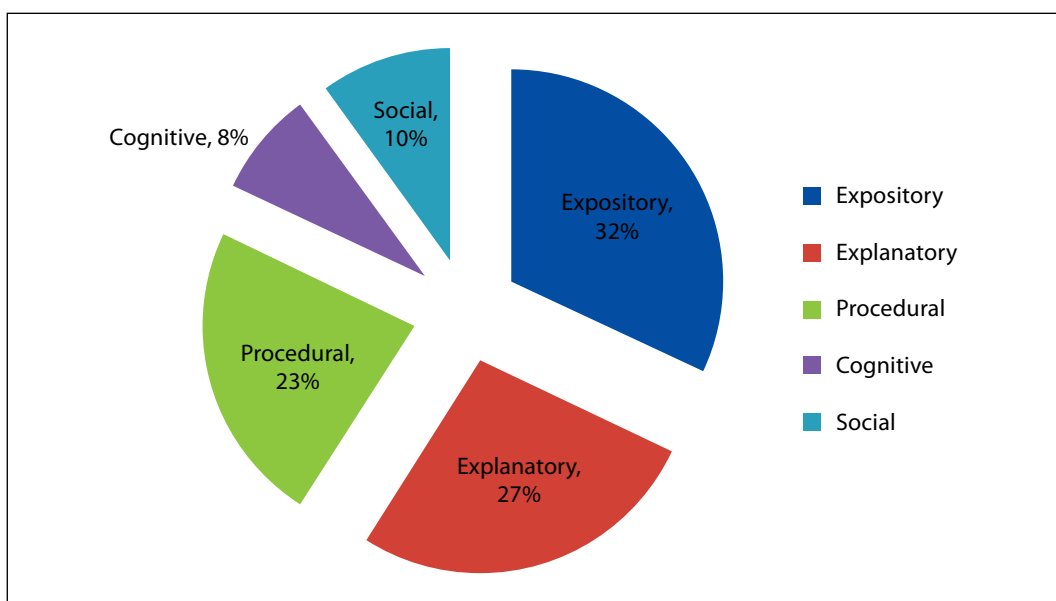
An analysis of the actual pattern of activities and interactions in *WawasanLearn* of the inaugural batch of learners sampled in this case study was conducted in the last semester of their undergraduate studies. From the log files obtained, the activity level of the learners was the highest in month 2, followed by month 5 in a six-month semester in WOU. Similar patterns were observed for the other courses sampled. The average participation rate ( $[\text{No. online} / \text{No. enrolled}] \times 100\%$ ) for the courses was around 89% and the average time spent online per student during the semester was 23.2 hours.

A further investigation was conducted on the most active course (highest in activity level divided by the number of students), which had 132 students. An analysis was done to determine the preferences of the learners based on their access to the various online resources posted in the course. As shown in **Figure 4**, learners accessed online forums the most and seemed to favour online quizzes (which did not contribute to the course assessment) as well. Access to downloadable course materials was average due to the nature of these resources, which are non-interactive. Access was lowest for static pages, followed by hyperlinks to external websites.



**Figure 4** Distribution of learners' access to online resources

In further examining the online discussion forums, it was noted that the course had an average of five discussions per tutorial group forum, which were mostly initiated by the tutor. However, learners preferred to interact in the public forum (with a total of 138 discussion topics initiated) as they exchanged ideas and engaged in online discussions with their peers from all regional offices. The exchanges in the forums were also transcribed based on the social, procedural, expository and cognitive dimensions to better understand the activities and dimensions of interaction. The results are presented in **Figure 5**.



**Figure 5** Dimensions of interactions in the online discussion forums

The expository dimension was the most dominant (32%), followed closely by exchanges in the explanatory dimension (27%) and procedural dimension (23%). The cognitive dimension was the least dominant for the learners (8%), while the social dimension accounted for 10% of the total interactions. The expository dimension involves demonstration of knowledge/facts without much further elaboration, while the explanatory dimension refers to elaborate explanation of knowledge and content developed based on learners' responses. It was observed that learners utilised the online forums mostly to seek understanding of course concepts and knowledge of the subject matter. However, exchanges in the cognitive dimension, which involves providing constructive feedback and detailed commentary on course content using critical thinking that leads to knowledge development, were lacking. In addition, it was found that the most active thread in the public forum had 32 replies and the interval between responses was an average of five hours. As for the tutorial group forum, the interval between replies was observed to be 31 hours on average. This finding shows that the learners preferred to interact in the public forum rather than in the specific tutorial group forum.

### **Summary of findings from interview sessions with learners**

In addition to the survey and content analysis discussed above, interview sessions were also conducted with 15 representatives from the same group of learners to gather in-depth understanding of their expectations and concerns with regards to the WOU learning management system, *WawasanLearn*. Findings from the interview sessions were analysed along key themes associated with the quality concerns of the LMS, i.e., institutional, technological, faculty (course coordinators and tutors), instructional design and pedagogical factors.

The learners interviewed were generally satisfied with the technical aspects and the provision of online teaching and learning in *WawasanLearn*. They also highlighted that the main strength of *WawasanLearn* is its accessibility. This feature caters to the needs of working adults as their study or learning hours vary based on personal, job or family commitments. Besides that, bandwidth had been increased from two megabits per second (Mbps) in the January 2007 semester to six Mbps in the current semester.

However, several issues were brought up by the learners who were interviewed. The learners commented that the layout of the page, placement of the online materials and navigation within the discussion topics in the online forums needed to be refined. They suggested that the layout of the page be simplified and that the online resources should be placed in a more systematic and structured way so that information could be easily found. While the content published enabled information dissemination, learners also highlighted that some of the contents posted were not updated and might create ambiguity. In addition, there were also concerns relating to ethical issues; for example, in certain cases *WawasanLearn* was used as a platform for personal agenda.



Learners also indicated their concern over the responsiveness of some academic staff in addressing questions they had posted in the online forums. Some of the staff members and a number of learners were not active in the forums and this dampened the enthusiasm as well as motivation of the learners to participate in the online environment. Learners also suggested that academic staff post more interesting materials and initiate thought provoking discussions related to the assignments of the course to increase the participation rate of the learners. Some learners were of the opinion that some materials posted for certain courses were not directly related to the course content.

Along with the dimensions of service quality identified earlier, the actual activities of learners in the online learning environment as well as the qualitative feedback from learners discussed above were taken into account in developing the appropriate QA components for web-based teaching and learning in the context of WOU.

### **Application of quality assurance components in the LMS within the overall QA framework**

In order to address the various facets of the QA components in web-based education that have been identified, WOU has developed QA measures for online teaching and learning activities as part of its overall QA framework. The development of these QA processes is in line with the institution's vision, mission and the key areas specified in its quality policy. The QA components for web-based teaching and learning in the LMS are documented in the standard operating procedures (SOP) for *WawasanLearn*. In addition to sections on administrative matters and processes related to *WawasanLearn*, the SOP details several key components of QA for teaching and learning in the web-based system, which are aimed at delivering quality service in the online environment to WOU's learners.

In the SOP, the purpose of *WawasanLearn* in supporting a collaborative learning community and offering multiple modes of learning — from self-paced coursework (e.g., web-based seminars and classes, downloadable audio and video materials) to group learning (online forums) — thus creating a comprehensive learning experience, is first explained.

In the aspect of governance in the LMS, the main stakeholders of *WawasanLearn* (i.e., administrators comprising educational technologists, IT support staff, course coordinators, tutors and students) and their responsibilities are clearly outlined. In addition, the rights and privileges of each stakeholder are stated. The workflow involved in granting access to *WawasanLearn* is depicted in flowcharts with quality objectives specified in the key processes. These flow charts illustrate the processes from the perspective of students, tutors, course coordinators as well as other users/staff.

Next, a detailed list of processes involved in the setting up of *WawasanLearn* for every new semester is presented. Several quality concerns, particularly of accuracy and timeliness, are addressed.

While the layout of *WawasanLearn* has been standardised across courses for a more structured view and easy navigation, specifications for materials and content in *WawasanLearn* have also been established. In particular, course coordinators are required to populate their respective course(s) every semester a week prior to the commencement of the semester with items such as course overviews, TMA questions, samples of marked TMAs, specimen exam papers and supplementary course materials.

A quality objective has been set for turnaround time in responding to a learner's question posted in the online forums. All queries posted in the online forums should get a response within 48 hours. In addition, a detailed guide on posting a web or text page, which provides advice on the clarity and appropriateness of online materials, is also provided to the academic staff.

Further, the rules and ethics of using *WawasanLearn* have also been developed for all users of the LMS platform.

Finally, the activities and specific roles of stakeholders involved in updating, upgrading and maintaining *Wawasanlearn* are explained as well.

### **Assessment of learners' satisfaction with the web-based teaching and learning in *WawasanLearn***

At the end of every semester in WOU, an assessment of student satisfaction is obtained using a feedback form and student dialogue sessions. Survey questionnaire forms, which solicit feedback and evaluation on the quality of all aspects of the delivery of open distance education and student support services, are given to students. These forms include a section to gauge the level of student satisfaction with the quality of the LMS. An investigation of the results obtained from the students' evaluation of the semesters in 2010 showed improvement in all items related to *WawasanLearn* in the questionnaire. A similar response was also obtained on the provision of learning support via the LMS during the dialogue sessions.

### **Conclusion**

This study identified several important quality assurance issues of the key services closely associated with web-based teaching and learning in the LMS. In particular, learners' expectations and needs, along with their actual behaviour in the web-based environment, provided a holistic view in identifying quality components associated with the LMS. The lessons learnt from this case study suggest recommendations for open universities on the integration of QA components within web-based teaching and learning in their overall institutional QA framework.

To ensure that the quality of the student learning experience via the LMS is not compromised, quality assurance mechanisms and measures such as staff training and development in the pedagogical and technical aspects of online teaching and learning need to be implemented, in addition to the evaluation of student experience and learning outcomes.

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## Instructional design strategies for stress-reduced online collaboration in Asia's high context culture

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### Abstract

*Online collaboration allows the learners to exchange ideas and views beyond time and space constraints and can improve the richness and quality of learning experiences. It promotes co-construction of knowledge, offers authentic learning contexts, and also enables learners to become more cognitively and affectively engaged. However, there is also evidence that online collaboration presents psychological difficulties or stress for learners. Even though a certain level of stress can stimulate a learner's physical and mental functions and enhance learning performance, it is generally agreed that persistent or excessive stress leads to negative beliefs, and results in poor learning performance. This paper will explore instructional design strategies that help learners mitigate stress in an online collaborative learning environment in the Asian context, based on the results of a study that identified important factors influencing learners' stress in online collaboration where English was used as a medium of communication. Four stress factors in English-based online collaboration in a high context culture in Asia are: Self-efficacy, instructional design, technology use, and collaborative process. Instructional strategies to promote self-efficacy, especially language self-efficacy, match Asian learners' learning styles to online collaboration, reduce fear of using online technologies in interactions, and scaffold and facilitate collaborative process will be offered in the paper. The paper will highlight the importance of considering both individual features of learners and socio-cultural aspects of learning environments in instructional design.*



## **Introduction**

Online collaboration allows learners to exchange ideas and views beyond time and space constraints. It has been proven to improve the richness and quality of learning experiences, promote co-construction of knowledge, and enable learners to become more cognitively and affectively engaged (Kurokami et al., 2001). There is also evidence that online collaboration presents psychological difficulties or stress for learners. Online collaborative learning is often text-based and asynchronous, and the use of the unfamiliar mode of communication may bring about stress. In high context societies like Japan where people feel more stressful without face-to-face communication, text-based online discussions present a great challenge. It is generally agreed that excessive amount of stress leads to negative beliefs, and results in poor learning performance (Akgun & Ciarrochi, 2003).

A study conducted by Jung, Kudo and Choi (in preparation) in a Japanese university context was a venture to identify the stress factors of online collaboration when using English as a foreign language (EFL). The study attempted to discover factors affecting stress of the learners who are in a collaborative learning situation using EFL, identify the co-relation between those stressor factors and learner variables such as major experience in online collaboration and technology skill, and suggest viable instructional strategies to reduce stress in online collaboration. This paper will discuss the findings of the study with a special focus on the four stress factors identified. Then, based on the discussions, it will explore instructional strategies to design stress-reduced online collaboration in a high context culture in Asia.

## **Stress factors in online collaborative learning in English**

The study which was carried out with 226 students from six Japanese universities (Jung, Kudo and Choi, in preparation) in 2010 revealed that there are four stress factors: *Self-efficacy*, *instructional design*, *technology use*, and *collaborative process*.

Students' low *self-efficacy* or lack of confidence in the task and use of English appears to be the main factor causing stress in online collaborative learning in English.

Poor *instructional design* is also a critical factor affecting students' stress in online collaboration. Use of inappropriate, or lack of strategies in designing, facilitating and supporting online collaborative teaching and learning environment is a great concern of the students.

Lack of skills or anxiety in *technology* use is found to be another stress factor for students who are engaged in online collaborative learning. The fear of technical errors and difficulties in applying technical skills appear to be the major concerns.

*Collaborative process* itself seems to cause stress in online collaborative learning. Students express difficulties in dealing with group decision-making and group dynamics, and lack of support during collaborative learning.

After identifying these four stress factors, the relationship between these factors and the selected learner variables was examined. The selected learner variables include: experience with the Internet, experience with online collaboration, English writing and reading skills. Results show that for engineering/ICT major group, the experience with the Internet and *technology* use factor were negatively correlated. English reading skill was related negatively with *self-efficacy* factor. For non-engineering/ICT major group, the experiences with the Internet and *self-efficacy* factor were positively correlated. The level of experience in online collaboration was correlated with *self-efficacy* and *technology use* factors. English reading skill was negatively related with *self-efficacy* factor for the non-engineering/ICT major group.

The findings suggest four principles to reduce stress and improve learning achievement in online collaboration using English:

1. Promote self-efficacy, especially in English language related tasks before engaging learners in online collaboration in English.
2. Apply teaching strategies that match with learners' learning style.
3. Reduce fear of using online technologies in interactions, and
4. Adopt appropriate facilitating strategies during the collaborative process.

## Instructional design strategies to mitigate stress in online collaboration

**Table 1** presents specific instructional design strategies that could be applied to design and implement stress-reduced online collaboration for Asian learners in a high context culture.

Four principles Timeline	1) Promoting self-efficacy	2) Matching design strategies with learning style	3) Reducing technology-related fear	4) Facilitating collaborative process
Prior to online collaborative session	<ul style="list-style-type: none"> <li>Analyse students' prior learning experiences and language competencies.</li> <li>Plan support for learners with different experiences and language competencies.</li> </ul>	<ul style="list-style-type: none"> <li>Choose tasks which are appropriate to learners' needs and learning objectives.</li> <li>Design collaboration structure with specific objectives and outcome statements.</li> <li>Estimate precise and realistic timetable for collaboration.</li> <li>Design reward system related to the desired behaviours.</li> </ul>	<ul style="list-style-type: none"> <li>Provide short online technology hands-on training.</li> <li>Offer personal technology support to learners with low technology skills.</li> </ul>	<ul style="list-style-type: none"> <li>Take account of collective cultural expectation.</li> <li>Set clear rules regarding types of collaborative activities and assessments for collaboration that are comprehended by all the learners.</li> <li>Create heterogeneous groups.</li> <li>Assign a facilitator and clearly present individual roles during online collaboration.</li> </ul>

During and initial stage of collaboration	<ul style="list-style-type: none"> <li>• Provide frequent encouragement with positive feedback to individual learners.</li> <li>• Offer frequent and timely group support during collaborative group work.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide instructor-led activities offering clear direction and expectation for group task aims, protocols and procedures at the initial stage.</li> <li>• Introduce more learner-directed collaboration after the initial, instructor-led activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Set up a 'just-in-time' online support system (e.g., FAQ) using simple language for both technical problems and problems related to collaboration process.</li> <li>• Offer on-going technology support when needed.</li> </ul>	<ul style="list-style-type: none"> <li>• Assign clear role(s) to each group member for a collaborative task.</li> <li>• Facilitate group activities or encourage active facilitation of the assigned facilitators.</li> <li>• Promote social interactions by providing spaces for social interactions, encouraging profile exchanges, or involved in <i>getting acquainted</i> or <i>ice breaking</i> online activities.</li> </ul>
Evaluation		<ul style="list-style-type: none"> <li>• Promote self-reflection of own collaboration through journal writing.</li> </ul>		<ul style="list-style-type: none"> <li>• Combine individual and group assessments.</li> <li>• Set clear evaluation criteria.</li> </ul>

**Table 1** Strategies to reduce stress of Asian learners in a high context culture in online collaboration using a foreign language

**Promoting self-efficacy:** Before the online collaborative session, it is crucial to analyse learners' prior learning experiences in online collaboration, technology use and language competencies and then, based on the result of this analysis, develop a plan for appropriate learner support. Our study shows that among language competencies, writing/reading abilities are the most important. As Lipponen (1999) argues, writing is an essential competency required for text-based online discussion. We can identify each learner's writing/reading level via a short writing and reading test, a short grammar quiz, or a short survey asking their perceived language level before engaging learners in online collaboration. As Barkley et al. (2005) suggests, we can provide an opportunity for trial collaboration, requiring them to compose an essay in English collaboratively, and identify their writing/reading level from it. Once each learner's language level and prior experience are identified, needs-based support can be planned. Providing a series of short practice writing and/or reading sessions would be an effective supporting strategy for those with low language competencies and self-efficacy.

Once the session begins, two kinds of supports can be provided to improve self-efficacy of the learners. One is to provide individualised positive feedback or encouragement, and the other is to offer task-related support to each collaborative group. As Bandura (1997) argues, personal encouragement provided to individual learners is critical to improve their self-efficacy. For those with low language self-efficacy, the instructor's affirmative comments on their postings would encourage learner participation. In addition to the individualised feedback, task-related and timely verbal support that promotes the group members' belief that the task is within their capabilities, would help group members gain confidence in completing the tasks.

**Matching design strategies with Asian learners' learning styles:** Our study confirms that preparing well-structured collaborative tasks, specific objectives and outcome statements, precise timetable for collaboration, and timely rewards to the desired behaviours is important at the preparation stage. A study by Hofstede & Hofstede (2005) points out that Japanese ranks high in Uncertainty Avoidance Index (UAI), indicating that they tend to avoid unclear language. The blending of instructor-led collaboration at the initial stage and more learner-led later can control every suggestion listed above. Collaboration led by an instructor who values and manages the objectives and goals of the collaboration provides valuable learning guidance. At the later stage, learners can take control over their own learning.

Self-reflection can reduce stress for Japanese who are merely expressive in the learning conditions, thinking about reactions from others. The heavy dependency on passive learning prevents them from constructing their own knowledge. The individual reflection can also be effective for sharing their responsibility in a group. The self-reflection in the form of journal or personal note at evaluation stage would provide a valuable opportunity for taking part in the collaboration.

**Reducing technology-related fear:** Providing short online training units and/or offering personal support prior to collaborative learning seem to be effective to learners with low technology skills. Hands-on practice sessions for skills development or installing support function in the learning management system (LMS) would be useful. Setting up a ‘just-in-time’ online toolkit for both technological problems and those related to collaboration process can also be helpful. The cognitive tools function as scaffolds to assist learners beyond their capability. The online toolkit covers a wide range of problems: technical troubleshooting, advice for collaborative learning strategies, decision-making and time management. The cognitive tools for linguistic problems such as translation (e.g., Google translator) and resourceful online dictionary (e.g., Weblio) are helpful. It is important not to confuse learners by overloading cognitive capacity. The cognitive tools should be placed in order and limited in the media-rich learning environment.

**Facilitating collaborative process:** In a collectivists’ learning culture, setting clear rules in advance and applying a heterogeneous grouping strategy contribute to group cohesion by helping learners understand the agreed rules and their responsibilities prior to collaboration. During collaboration, Japanese often feel uncomfortable under the open-ended learning. The students from the collectivist culture are passively interdependent, which precludes them from taking individual responsibility in the group. Our study suggests that assigning clear role(s) of each member in collaborative task facilitates group activities. The facilitator will play an important role in monitoring and observing whether the distribution of work is done properly.

Another effective strategy to facilitate collaborative process is to ‘promote social interactions by providing spaces for social interactions, encouraging personal profile exchanges, or involve in ice breaking activities’. In a high-context culture, learners face unnecessary tension from the strangers but once they know each other, this tension will ease. A short Skype meeting or a blended face-to-face session will be helpful for this purpose.

Our study suggests that at the evaluation stage, it is important to evaluate both group work and individual performance. As Barkley et al. (2005) suggests, assigning each group to write a group dialogue journal will help assess individual contributions to the group work.

## Conclusion

This paper is an attempt to propose a set of design strategies for English-based online collaboration, based on an empirical study conducted in a high context culture in Asia. We hope that our discussions will help university instructors to design and develop an effective and more enjoyable online collaborative learning environment. However, the effects of the suggested strategies need to be empirically examined in high context cultures with regard to reducing stress, facilitating collaboration and promoting learning outcomes. These strategies in **Table 1** still need to be elaborated as more specific tactics are applied to different cultural contexts.

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## Course delivery and module learning via learning objects (knowledge map) in mobile learning environment

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### Abstract

*This paper focuses on the integration of the learning objects and knowledge map as the learning sequence suggestion in the mobile learning environment and explains the technologies involved, the applications and the issues of usability, accessibility, evaluation and effectiveness. Mobile learning has open up new path for learning support and opportunities to reach wider audience (learner) for education. This research focuses on using the knowledge map to store the characteristics of each learning object via concept schemas and represent the corresponding learning accessibility in the mobile learning environment. The proposed architecture provides a medium for the learning accessibility of learners through mobile applications and wireless portable devices such as smart phones, PDAs and tablet PCs. The approach using the combination of “touch” and “observe” spatial learning objects provides an intelligent solution to creating, sharing and improving the efficiency of mobile learning. The proposed mobile learning environment architecture consists of knowledge map components mainly, navigation, concept schemas and learning object path. By using these knowledge structures, this study may enhance and enrich the concept and activity of adaptive learning in different individuals and communities. The spatial knowledge map constructed was useful in identifying the characteristics of the learning objects (e.g., learning object 1: lesson with navigating sentences, learning object 2: lesson with navigating sentence and code explanation, etc) and automatically matches the most appropriate learning content and path suitable for learners. The architecture of the platform discussed in this study using the learning objects approach and knowledge map would facilitate a more widespread use of mobile learning, including courses or modules delivery of individualised learning path and learning style analysis.*

### Introduction

The proposed architecture in this paper is derived from the potential of extending e-learning to mobile e-learning (mLearning) with the rapid generation of knowledge- map (K-Map) and the growth of mobile users. The availability of advance mobile technologies and sophisticated contents provided for mobile users have actively engaged more mobile users in learning activities. According to Yuen and Wang (2004), the demand for mLearning which provides learning opportunities for learners to “learn while you earn on the go” has grown (Fu et al., 2010). Mobile e-learning introduced the wireless teaching and learning to the world and is



useful for the organisation. The focus of this research is to present the learning objects using K-Map (Zheng et al., 2010) via mLearning. K-Map is used as a tool to combine digital resources and the e-learning environment that integrated related digital and module resources with knowledge which is turned to the form of map for better understanding of learners. K-Map can serve as a learning platform by the active work with, e.g., expert information addressed in direct bilateral exchanges or project-oriented documents. In this case, knowledge is not a static supply of interlocked learning processes, but is continuously generated and associated with the actors (learners). The challenge in an information-rich world is not only to make information available to people at any time, at any place, and in any form, but specifically to present the right knowledge at the right time in the right way in an ubiquitous mobile computing environment (Yan & Xiao, 2009). The significance of K-Map is reflected on the integration of knowledge concepts and the right cognition and values for the learners. By using these technologies, K-Map and learning objects, the proposed architecture in this research generates various learning object navigations in mobile presentation layer and prepares the learners to observe using the aid of concept schemas. Concept schemas stored in K-Maps consist of generic concept data structure that contains mainly the concept attributes, theory explanations, links to definitions, descriptions, examples or learning objects in e-Learning.

The goal of this paper focuses on extending the delivery of e-Learning to mobile, smartphones and handheld devices, and providing additional reach to new groups of learners with the use of learning objects.

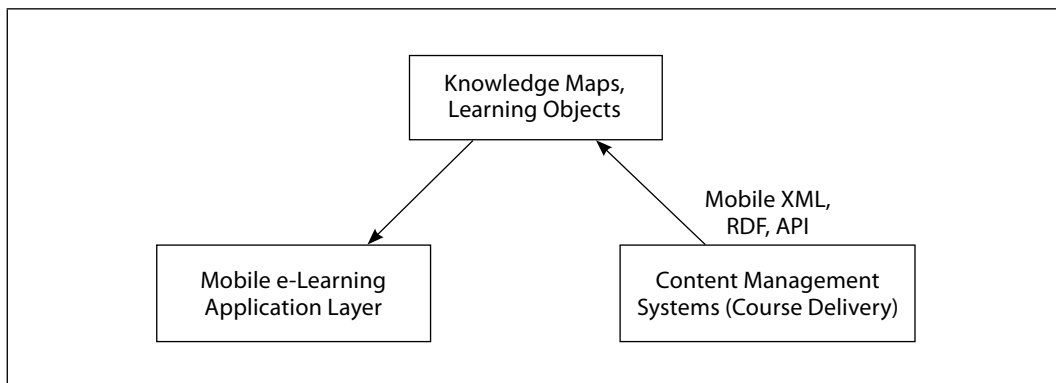
## **Knowledge map in mobile e-learning (mLearning)**

In the mobile learning environment, K-Map assists in acquiring relative content presentations and build corporative knowledge path to enable students to learn more effectively (Zheng et al., 2010). The main function of K-Map to achieve knowledge sharing and reusing is adapted and implemented in the mLearning approach. K-Maps are node-link representations in which ideas are located in nodes and connected to other related ideas through a series of labelled links or learning objects in the same domain or learning module. K-Map differs from other similar representations such as mind maps, concept maps and graphic organisers in the deliberate use of a common set of labelled links that connect and represent ideas. Links have arrowheads to indicate the direction of the relationship between ideas.

Since e-learning techniques have grown quickly nowadays to complement the conventional learning system, integration of K-Maps and learning objects has been a tendency to improve the creation, organisation and delivery of a learner-oriented knowledge management system (KMS) in mLearning environment. K-Map can be used as primary sources for knowledge mapping, adjunct aids to navigation processing, organisation of ideas, and story-board assistance in e-Learning.

The K-Map implemented into mLearning combines several knowledge oriented information systems, mainly (Yan & Xiao, 2009):

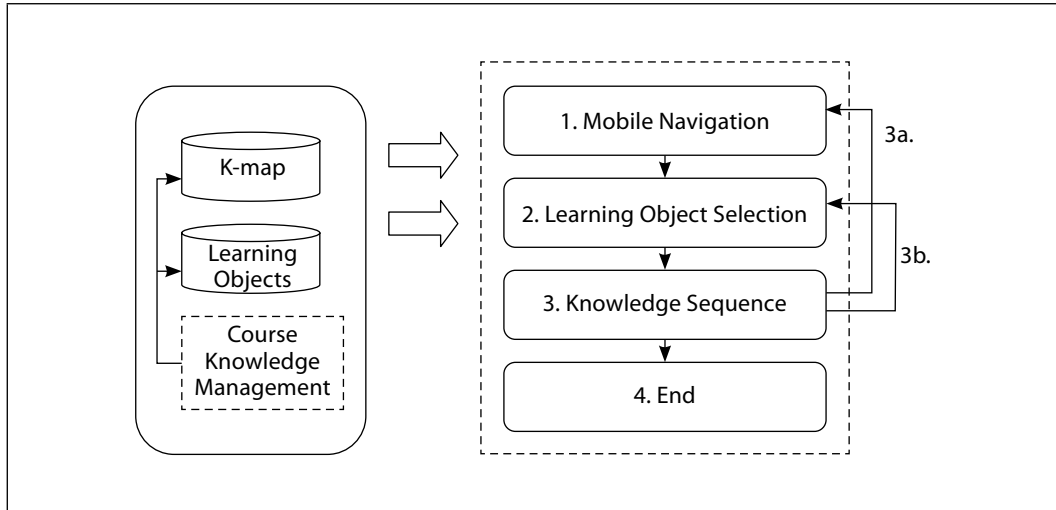
1. Transition of flexible learning and individualisation (learning wherever and whenever one wants to).
2. Individualisation of learning (self navigation of necessary learning objects or components by individual learning format).
3. Course interactivity (learning environment with direct access and communication with course provider and peers in real time).
4. Transition of Relational Data Format (RDF) via knowledge management systems (KMS)/content management systems (CMS).



**Figure 1** Roadmap of K-Map and learning objects in mobile architecture

## Learning objects in mobile e-learning

The proposed architecture in **Figure 2** consists of K-Map and learning objects that compromised the navigating system generating various types of learning objects based on relational schemas and concept schemas.



**Figure 2** Course delivery sequence via mobile e-Learning using K-Map and learning objects

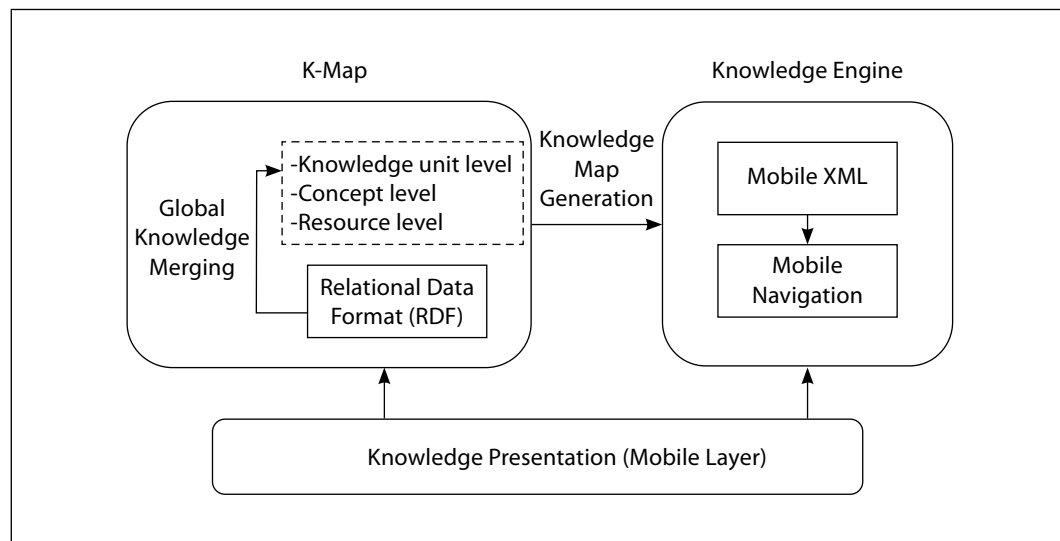
**Figure 2** depicts the flowchart of the navigation using the mLearning environment with the implementation of K-Map and learning objects. The first two steps, step 1 and step 2, are locating the suitable learning path through identification of relational schemas, concept schemas and related learning objects from K-Map. The navigating system generates human readable navigation sentences for students in step 3. If there is no further learning objects to learn, the navigating system goes to the last step, which is step 4. If there is any other learning object required for learning in the same learning spot, the system goes back to step 1 “Mobile Navigation” via step 3a and, if there is any other learning object that is required for learning but is located in other spots, the system goes to step 2 “Learning Object Selection” using step 3b.

	mLearning	K-Map mLearning	Moodle
Descriptions, features	Handheld learning platform with dynamic web contents	K-Map in mLearning is introducing the concept maps in order to achieve meaningful learning for learners	Moodle is a course management system which is easy to develop, maintain and use through the modular manner
Learning theory support	Dynamic pages	Dynamic pages, Meaningful learning	Dynamic pages, Constructivism
Concept maps support	No	Yes, Concept Map, Learning Objects	No
Specification support	SCORM, IMS	SCORM, IMS, RDF	SCORM, IMS

**Table 1** Comparison of related research in e-learning systems

## Constructing knowledge maps in mobile presentation framework

In mobile learning environment, K-Maps application for knowledge presentation is proposed to enable learners with the multi-level navigation and collaborative interaction. Here, we will discuss about how to achieve those goals via displaying and implementation of managing knowledge maps.



**Figure 3** Proposed framework of K-Map implementation

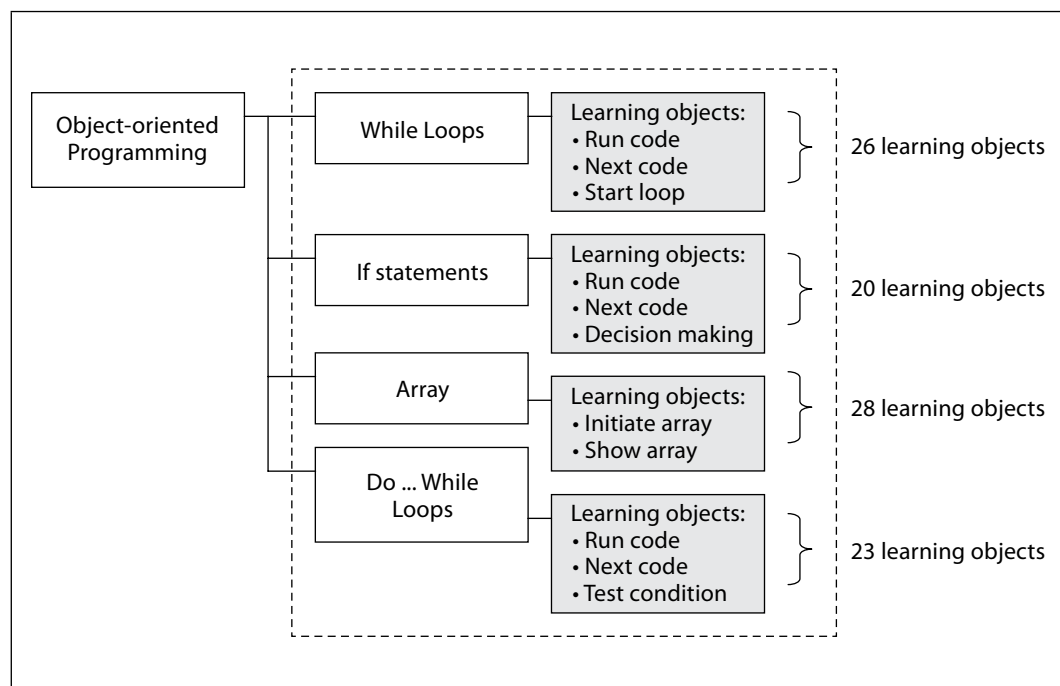
In **Figure 3**, the K-Map presents the acquired knowledge of concepts and knowledge resources with inherent association at different level: the concept level, knowledge unit level and resource level (Kuo et al., 2007).

The concept level is similar to ontology which presents the domain concepts and concepts' relations. The knowledge unit level (Wei et al., 2009) comprises knowledge units and knowledge units' cognitive associations, i.e., the "pre-order", "analogy" or "illustration" relationship between knowledge units. The knowledge unit level also bridges the gap between concepts and resources, as knowledge units are connected to their core concepts in the concept level, and connected to their occurrences at the resource level. As the facility of providing multi-granularity and multi-level mode for e-learning, knowledge maps should be designed to be beneficial for both knowledge presentation and information management. The following criteria were adapted for spatial K-Maps module creation (Yan & Xiao, 2009):

1. K-Map navigation: this application provides learners with a knowledge map based interface (instructional management system, IMS), which enables them to navigate through the inherent associations of domain knowledge, and pinpoint their learning objective through the knowledge unit, concept and resource level approach.

2. Collaborative Relational Data Format (RDF) construction: Global knowledge maps can be enriched by allowing users to create knowledge maps on local resources in RDF format. K-Map generation is designed to eliminate manual annotation that enable learners to improve the quality using the three level of knowledge map extracted from RDF.
3. K-Map merging: When the user-created knowledge maps are reviewed and accepted, they can merge those local knowledge maps into the global knowledge protocol. During this process, duplicated nodes and edges will be automatically eliminated.

The K-Map structure consists of concept schemas (Wang et al., 2009) as shown in **Figure 4**. Concept schema is the generic concept data structure in memory which stores the concept attributes and links to definitions, descriptions, examples or learning objects. The links that connects each concept schema are known as relation schema. The hierarchical relationship of *Java Programming* from upper level (theory) to lower level (practices and code executions) is shown in **Figure 4**.



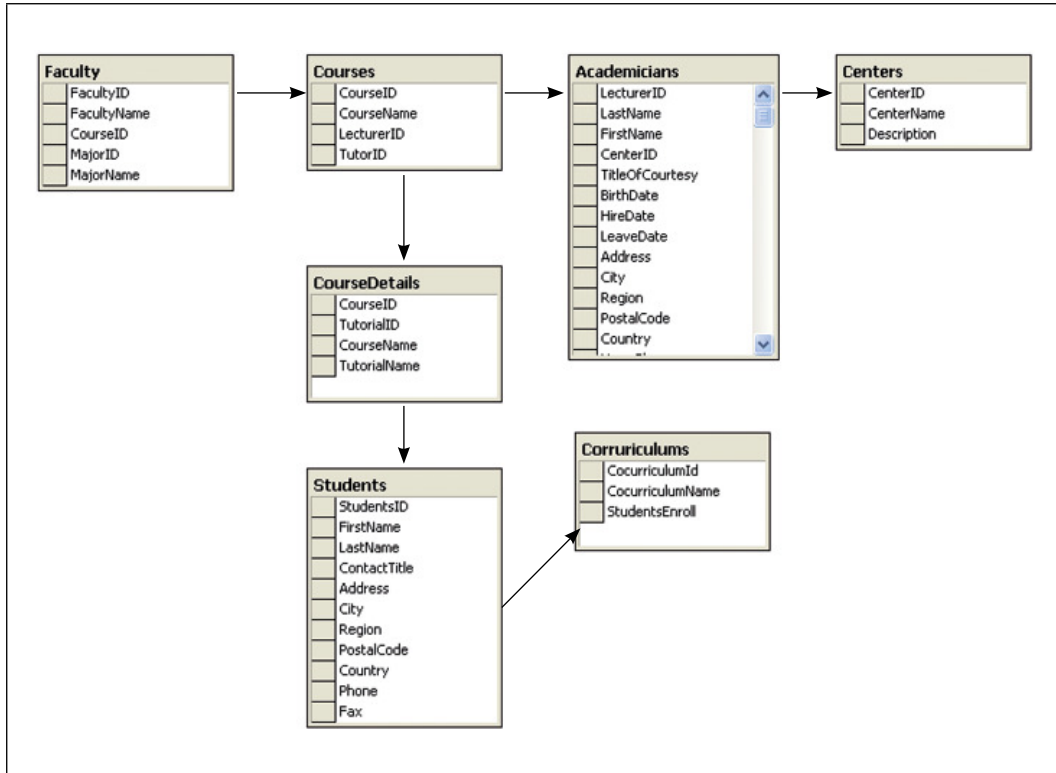
**Figure 4** Knowledge map structure constructed using concept schemas

## K-Map implementation and evaluation in mLearning

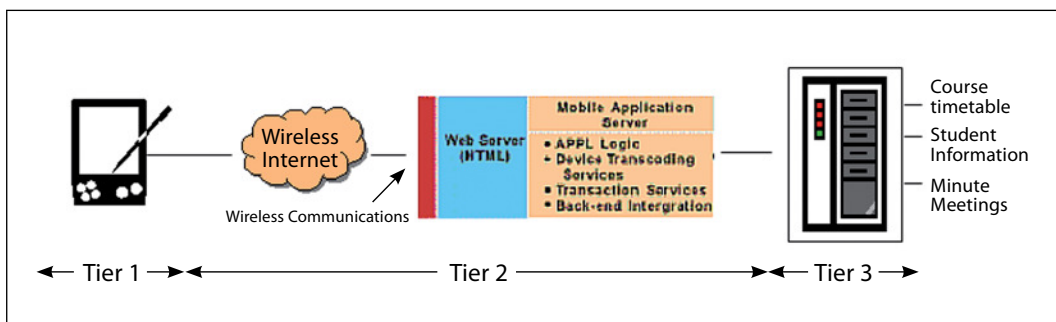
In the implementation of mobile learning environment, K-Maps application for knowledge presentation is proposed to help learners in the multi-level learning object path and collaborative interaction. This is because K-Maps can guide learners with inherent associations among knowledge within different granularities, composing of chapters specified by the knowledge content provider. In this section, the focus is on describing how the development of a system can achieve meaningful learning from theory to practice through the K-maps and learning objects in three-tier surrounding. The system is divided into three tiers: the instructional tier, learning tier and technological tier.

Integration of K-Map in knowledge management tool with mLearning helps learners to discover the knowledge. We can use it as a knowledge collecting means to gather knowledge from database and perform the codification of knowledge. To construct a K-Map, first we should collect the ideas from the information resources; second, we collect the information needed by the knowledge maps and lastly, we give the ideas and information orders and combine them. Instructional tier emphasised that the better instructional qualities are based on the theory of instructional design, context and resources (Wang & Lee, 2008). In terms of authors, they are responsible for integrating the knowledge-creating process into instruction. It facilitates the author to make suitable instructional concept maps through the concept maps of a spatial learning domain. In the instructional tier, problem-solving learning, collaborative learning and resource-based learning, which are associated with concept maps in specific learning modules are created. Therefore, they will produce a learner-centred instructional process through systematic design of instruction (i.e., analysis, design, development, implementation and evaluation). **Figure 5** shows the instructional level that consists of courses information (i.e., CourseID, CourseName, LecturerID, TutorID). Authors acquire feedback from the concept maps made by learners to improve their instructions.

Course delivery and module learning via learning objects  
(knowledge map) in mobile learning environment



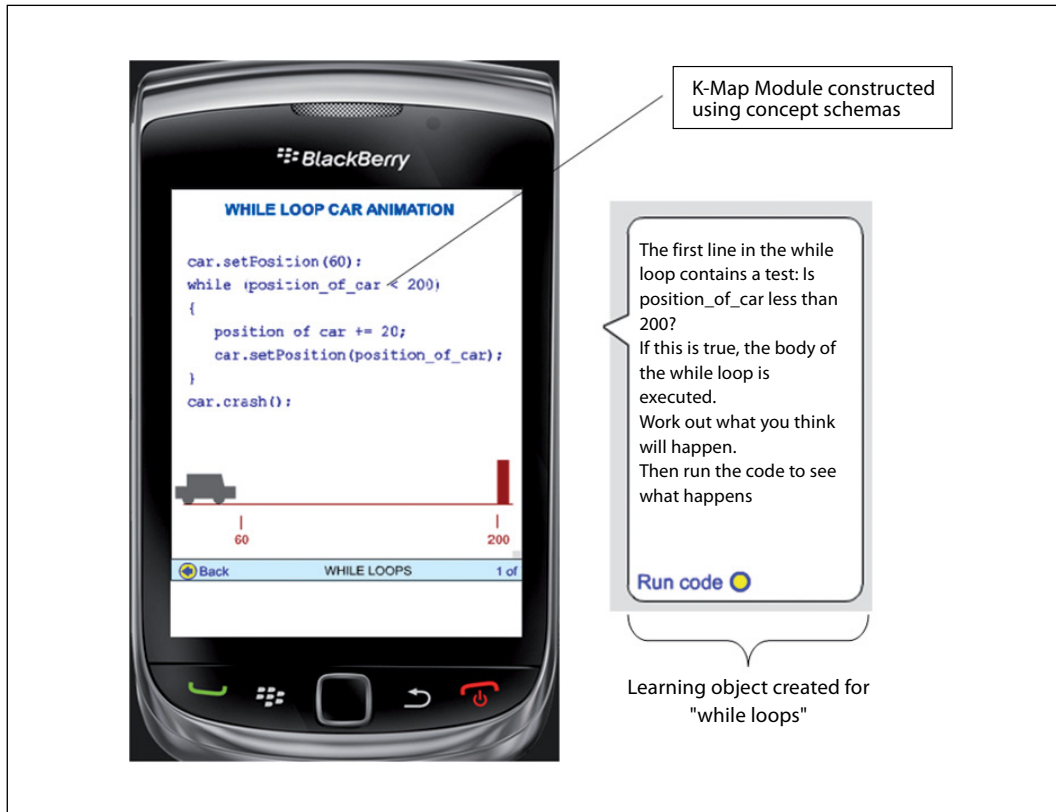
**Figure 5** mLearning Database Central



**Figure 6** Learning tier and technology tier in mLearning Architecture

Learning tier emphasised that the better learning qualities are based on the five attributes of meaningful learning (Wei et al., 2009). In terms of learners, they use the concept maps to study knowledge, facilitate thinking, clarify misconception and evaluate learning effort. In the technology tier, the learners emphasised that using existing technology of learning to support the above three tiers can be implemented successfully. Therefore, the unified process (UP) was adopted to realise the KMLS in practice (Wei et al., 2009).

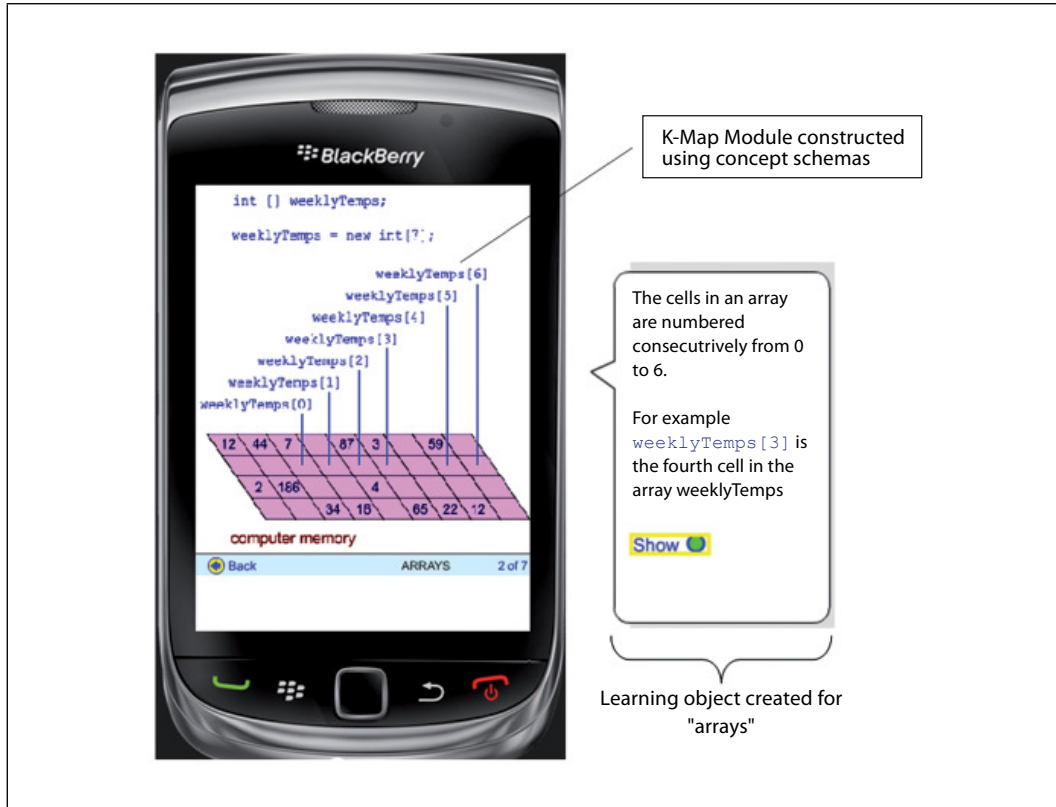
**Figure 7** depicts the learning object for “while loops” in problem solving technique as the fundamental concept in *Java Programming*.



**Figure 7** mLearning with K-Map  
(Example of learning objects created within the page for “while loops”)

In this section, we focus on a specific knowledge domain, *Java Programming* and use concept mapping to identify key concept, sub-concept, generalised concept, non-generalised concept and show the relationships between them, which are formed concept maps of a specific domain. The K-Map linking process can transform the knowledge assets and learning objects in **Table 2** (i.e., code execution and navigation sentences) into the instructional design, context and presentation as depicted in **Figure 7** and **Figure 8**.





**Figure 8** mLearning with K-Map  
(Example of learning objects created within the page for "Arrays")

Learning modules	Number of K-Maps	Number of learning objects
While Loops	25	26
If Statements	21	20
Arrays	31	28
Do...While Loops	24	23

**Table 2** Learning objects constructed using knowledge maps within the learning modules

## Conclusion

The presented delivery model for module learning in mLearning which is managed by using dynamic KMS, can be further researched and improved. This paper described how K-Maps and learning objects may be implemented to enhance the learning experiences and module learning in the wireless environment. Mobile e-learning is a new trend of e-learning which will be essential to educational institutions by implementing suitable concepts and relational

schema architecture and display the distribution of a learner's knowledge. There is a demand to maintain and manage a large amount of data in an educational institution efficiently which made the emergence of mobile technology necessary. The approach which uses the combination of both K-Maps and learning objects plays an important role in mLearning. The ultimate goal of K-Map integration in mLearning is to provide an intelligent solution to store the characteristics of learning objects and provide learning accessibility in mLearning environment. It is hoped that such approaches would facilitate widespread use of mLearning, including group discussions between learners, course participants and academicians, for further research.

## Future work

The future work involves the deployment of competency assessments onto mobile phones for more courses delivery, capturing the assessment output including learners' feedbacks and synchronising back into the student's web based e-portfolio. This assessment was then reviewed by the course provider with feedback and mapped against competencies achieved in mLearning environment. Mobile e-learning may not always be of value, and sometimes your materials may not be suitable for display on a mobile phone. However, in many instances, these delivery models that incorporate learning object path are becoming increasingly popular.

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## Augmenting the learning management system of UP Open University

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### Abstract

*The University of the Philippines Open University (UPOU) has used Moodle, an open source course management system since 2007. While the application allowed the university to deploy all its courses online, Moodle still presents limitations. The compartmentalised nature of courses within the system inhibits the sharing of learning objects and resources across users. Furthermore, while it does have social networking capabilities to a certain degree (by many accounts more so than other learning management systems), Moodle provides little flexibility when it comes to collaborative learning. Technical issues also hampered the performance of a number of built-in functionalities, which in turn gets in the way of the learning experience. These limitations encouraged facilitators and students alike to opt for third party web applications to fulfil course requirements. This research project aimed to address these limitations by expanding upon the functionalities of Moodle. This was achieved through the installation of modules and plugins within Moodle itself and the integration of external web applications such as conferencing, blogging, e-portfolios and rich media content management through single sign on (SSO). This expansion brought about a number of achievements. First, learning activities were made available which were either new or improved upon what Moodle had by default. This expanded learning management system was piloted with two courses under the Bachelor of Arts in Multimedia Studies programme, which Moodle has been historically ill-equipped to accommodate on its own. Findings of this study were based on the analysis of performance as well as firsthand feedback from users, which in turn is to be used for the continual improvement of UPOU's online course deployment.*

### Introduction

For the past few years, the University of the Philippines Open University (UPOU) has made use of online course management systems to deploy its courses. It started with the commercial Integrated Virtual Learning Environment (IVLE) and then moved on with Moodle (Modular Object-Oriented Dynamic Learning Environment) in response to the UPOU system's advocacy towards the use of free and open source software. By the time of the migration back in 2007, almost all UPOU courses were deployed online through Moodle. Currently, UPOU offers its courses 100% online.

## **Course management system**

While Moodle is sometimes referred to as a learning management system (LMS), it is not technically accurate to do so. It is more appropriate to refer to Moodle as a course management system. Its core function is to act as an online platform for courses i.e., classrooms on the World Wide Web.

Moodle is widely used with over 53,000 registered active instances all over the world (<http://www.moodle.org>). The system owes its popularity to its flexibility, practicality and strong community support. However, there are a handful of underlying limitations hampering Moodle. First and foremost is its compartmentalised nature. The system does not allow for a direct or convenient means of sharing resources across different courses, resulting in unintentional redundancies. This is even more of a problem for integrative courses as communication and attempts to collaborate are not allowed without participants being enrolled across all involved courses. Lastly, while it may not necessarily be a problem for all users, technical issues hamper system performance. This compounds the bandwidth intensive nature of Moodle which subsequently compromises the learning experience.

In order to address these limitations, this study deems to find meaningful ways of expanding the core functionalities of Moodle and come up with an integrated learning management system suited for the needs of UPOU. Furthermore, considering the rather limited resources available to the study, it would also be ideal for this integration to be simple and cost effective to set up.

## **Multimedia content management system**

Moodle's support for links to external resources has improved through every version upgrade. However, sharing of university-exclusive user generated content across the entire system remains a problem. A viable solution to this is the integration of a separate content management system.

Joomla (<http://www.joomla.org>) is a popular general content management system (CMS) which is extensively used by UPOU. Through certain extensions, Joomla is able to 1) share a common user database with Moodle, and 2) accommodate uploading and publishing of content from users which can, in turn, be accessed more freely than they would normally be in Moodle.

## E-portfolio system

An electronic portfolio i.e., e-portfolio, is an organised compilation of artifacts (such as documents, images, video files, podcasts, audio files, slide presentations, spreadsheets, databases, etc.) that demonstrates knowledge, skills, values or achievements and that articulates the relevance, credibility, and meaning of the artifacts being organised and presented (Buzzetto-More, 2010). Compared to traditional portfolios, the nature of an e-portfolio allows more types of media support and is accessible to a much larger audience.

An e-portfolio system allows for a number of benefits on different fronts — possibilities a typical course management system cannot provide (Wilton, 2004).

Students — an e-portfolio system provides students space outside courses they are enrolled in, but still within the university's system. It is used as a means to make sense of academic and even personal expression beyond online classrooms. This helps to further increase the overall learning effectiveness of students and at the same time creates a more holistic learning environment for them. When used in education, e-portfolios are capable of making students more active and meaningful participants in the learning process (Buzzetto-More, 2010).

Faculty — for starters, an e-portfolio can act as an ideal assessment tool for skill-oriented courses where students are evaluated based on their ability to apply what they have learnt throughout their learning process compared to conventional assessment systems like sitting for semester examinations. The benefit of a holistic viewpoint is therefore not limited to students alone.

University/Institution — just like a general content management system, an e-portfolio system can also act as a repository of content exclusive to the university/institution. In other words, an e-portfolio system generates publicity for students and faculty. Should the university/institution deem it necessary, this transparency provides the university/institution opportunity to promote its students as well as its faculty. This exposure of e-portfolios to *the outside world*, so to speak, is an opportunity for students to showcase their work to their prospective employers, and for the faculty which would like to establish linkages to other organisations.

Mahara (<http://www.mahara.org>) is an open source e-portfolio system whose popularity has grown over the years due to its improved interface and increased recognition by many institutions that are beginning to focus on using e-portfolios in education. Moodle has also integrated with Mahara with no special bridge required.

## **Blogging**

Blogging is a potentially powerful assessment tool. It enables students to express themselves and their learning experience through narratives that teachers and facilitators may not have known otherwise through traditional assessment methods. Moodle supports blogs. Nevertheless, users generally prefer maintaining their own personal blogs and post academic entries there as well. External blogs such as WordPress or Blogger can be integrated directly to Moodle through its repository feature. Users will always have the freedom to use this feature but to have a more concrete link; external blogs can also be embedded within user e-portfolios via really simple syndication (RSS). With this feature, there is a greater opportunity for users to create their own learning stories which could serve as a basis for recognition and accreditation among peers (Schmidt et al., 2009).

## **Virtual classroom (WiZiQ)**

Distance learning has always been largely conducted asynchronously. However, there are instances where synchronous communication within classes is ideal. There is also evidence that interacting with teachers or facilitators in real-time is favoured by younger learners in UPOU. Moodle has a built-in chat function. The problem is that it is the only synchronous activity supported by Moodle. Due to system limitations of UPOU, this activity is compromised in terms of functionality and hence not reliable.

WiZiQ (<http://www.wiziq.com>) is a virtual classroom system supporting not just chat, but also audio and video conferencing. Additionally, WiZiQ has a virtual whiteboard with freehand drawing tools. All these functionalities allow for a limited level of collaboration where the designated teacher has full control. Teachers can also make use of the screen-sharing feature to demonstrate computer applications or to show anything in his or her computer desktop to the rest of the class in real-time.

While there are other video conferencing solutions available such as Skype, the main advantage of WiZiQ is that it can actually be directly integrated into Moodle through a plugin. A WiZiQ session can be added to a Moodle course site as an activity, just like forum discussions, quizzes and the like. These sessions can also be recorded. Participants who missed the live session can opt to download the recording and go through exactly what happened using the features supported by WiZiQ.

WiZiQ, however, is not without its weaknesses. As with any other online multimedia software, Internet connectivity is definitely an issue. While online chat requires minimal bandwidth, everything else requires a lot of it, and this can be a problem for any participant without a reliable broadband connection.

## Integration outcomes

Implementation of the integration of Moodle for pilot testing was carried out in March 2011 for a class of 25 students. This was a photography course under UPOU's Bachelor of Arts in Multimedia Studies programme. A previous offering of the course had already proved that using relevant multimedia resources and tools extensively resulted in increased academic performance and a high level of interaction (Librero, 2010). However, the previous class had not benefited from an augmented Moodle.

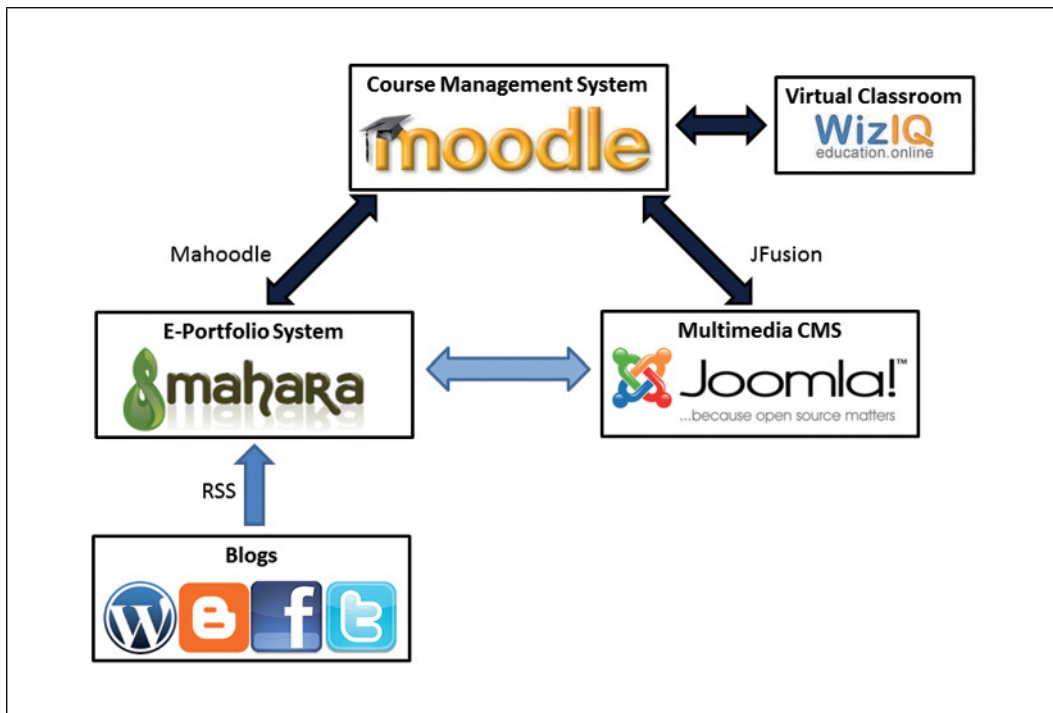
**Figure 1** shows a framework of integrated systems achieved as of this writing.

There are benefits to experience with this particular integration, as opposed to having all of these components disjointed from each other.

Single sign on — using only one account (or at the very least being under the illusion of having only one account) to access all of these systems is a significant step forward in terms of convenience and consistency.

Improved flow and persistence of native online resources — through Moodle's repository feature, it has become relatively easier to import learning resources. The integrated e-portfolio system, in turn, allows for students to copy resources from within Moodle to his or her respective e-portfolio. For example, if there is a discussion post or maybe an answer to a quiz that he or she is particularly proud of, it can be exported to Mahara. A multimedia content management system can also provide a permanent repository for text, image, audio and video produced through the course and it will still be available for perusal after the course sites or classes have closed at the end of each semester. Keeping blog entries within the respective personal accounts of students and faculty yield the same benefit.





**Figure 1** Moodle and other systems integrated to it

Enhanced learning experience — student feedback revealed that virtual classes via WiZiQ was of significant assistance, especially to those who are still not fully acclimated to using Moodle and online learning in general. Students also recognised the value of blogs and e-portfolios as they give them the opportunity to apply what they have learnt in a more practical manner and reveal aspects of what they have learnt which are difficult to assess via conventional examinations or assignments.

Practicality — the implementation of this Moodle integrated system was complicated and costly years ago due to limitations in resources. However, over the years, a lot of open source softwares have been developed and made available for free. Hence, issues pertaining to cost do not hinder the implementation of this integrated system. In relation to this study, the implementation of the Moodle integrated system was conducted by only one person with intermediate technical knowledge. No actual computer programming was performed. The pilot test only required low-cost web hosting. The most expensive component of the implementation is the subscription to WiZiQ. Scalability is only a minor issue, which means that in the event of full implementation within the university, cost increase will only be minimal relative to current expenses in maintaining the main course management system.

## Conclusion and recommendations

Integrated Moodle system has yield positive results. Students and faculty members involved during the pilot testing period have also expressed their satisfaction and appreciation as far as learning experience and convenience is concerned.

This paper is based on an on-going or long-term project to continuously search for means to augment and improve UPOU's learning management system. However, as of this writing, there are other systems which the university would consider for integration. Among them are the following:

Google Apps — UPOU already uses Google Apps primarily for email, document sharing and secondary course sites. Some users also employ Google Docs for online collaboration. This is a rich tool for learning and other university-related activities. However, there is no concrete integration between UPOU Google Apps and MyPortal (moniker for the university's Moodle instance). UPOU would do well to prioritise this integration.

Second Life — while there is evidence showing the decline of this once popular virtual world, there is still potential in Second Life as a learning tool. There have already been efforts to integrate the virtual world with Moodle. However, development has apparently halted, and the plugin does not support the latest version of Moodle.

Mobile Learning and Support — Internet connectivity is an issue in many parts of the Philippines. Nevertheless, people from the far reaches of the archipelago own and use mobile phones. UPOU must explore available mobile platforms and find means to integrate them with the learning management system to increase coverage and speed up communication.

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## Enhancing learning through the discussion forum

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### Abstract

*Asynchronous online discussion forums play an important role in adult online courses, and have many possible functions. Our experience in using the discussion forums in online courses for task-based collaborative discussion has led us to many questions about the optimal ways of using online discussion to support collaborative learning, such as how should instructors structure online discussions in a way that it promotes collaborative learning? What should instructors do to enhance learners' reflective thinking, critical thinking, or problem solving in online collaborative discussions? The challenges of using forum in learning have also been highlighted by many researchers. In this paper, we present a so-called "smart" discussion forum to support, monitor and facilitate task-based collaboration for the learning process of adult learners to advance their development of critical thinking.*

### Introduction

Online learning in open and distance learning which caters to adult learners differs from traditional face-to-face learning in many ways. One obvious difference is lack of direct face-to-face interactions among students or between students and instructor (Gao, 2009). The quality and quantity of student-student interaction and student-instructor interaction influence the quality for any course, online or face-to-face. In this regard, one of the challenges to teach online is to cultivate meaningful online interactions among adult students who have diversified background (Gao, 2009). To achieve this goal, the asynchronous online discussion forum is one of the most effective tools as it promotes reflection, frees learners from time and space constraints (Anderson, 1996) and provides abundant possibilities for communication. In online courses for adult learners, discussion forums have been used for a variety of purposes such as to discuss general issues of the subject matter; share and obtain resources and information from each other and more importantly act as centres for groups of students who work collaboratively on task assigned to them (Gao, 2009).

## **Problem statement**

Asynchronous online discussion forums play an important role in adult online courses, and have many possible functions (Dennen, 2008). At the same time, our experience in using discussion forums in online courses for task-based collaborative learning has led us to many questions about the best possible ways of using online discussion to support collaborative learning, such as how should instructors structure online discussions in a way to promote collaborative learning? What should instructors do to enhance reflective thinking, critical thinking, or problem solving in online collaborative discussions? In fact, online discussion forums do not always live up to these expectations (Gao, 2009). This is more so for online task-based collaborative learning implemented through discussion forum. When asynchronous discussion forum is used to support the understanding of the subject matter among learners, there have been both successful and unsuccessful situations (Gao, 2009). There are times when passionate discussions started with one student sharing a piece of reminiscent experience, when discussions came alive with a thought-provoking question, and when a group of students argued keenly about their ideas. There are also times, however, when discussions failed to achieve the preferred goal (Gao, 2009).

## **Objective**

The objective of this paper is to discuss the design and implementation of a smart forum to support, monitor and facilitate task-based collaboration for the learning process of adult learners to advance their development of critical thinking (CT).

## **Literature review**

Numerous researches have highlighted the effectiveness of asynchronous communication as a learning source. The prominent research in this field was conducted by Harasim (1990). Harasim discovered that asynchronous environment can be used to enhance the learning process. This can be achieved through the combination of active learning and knowledge construction. Environments that have interactive and asynchronous aspects enable active learning. According to Harasim, knowledge is constructed through generation, linkage and structuring of idea through online mode of communication. According to Du et al. (2005), there are three types of discussions or questions that can be implemented in an online learning environment via discussion forums, namely flexible peer discussion, structured topic discussion and task-based collaborative discussion. In terms of flexible peer discussion, learners are given few questions in a week and they need to respond to these questions. In structured topic discussion, the instructor will develop questions that need to be analysed and explained in detail by the learners. On the other hand, in task-based collaborative discussion, the instructor will not assign any questions to the learners but the learners must take the initiative to forward their questions or opinions and this strategy is normally used when the learners are given

online projects or assignment. Task-based collaborative learning is more promising as it is an established pedagogy which promotes learners' active contribution. The current computer supported collaborative tools fail to capitalise on the key functions of a forum as shown in **Table 1**.

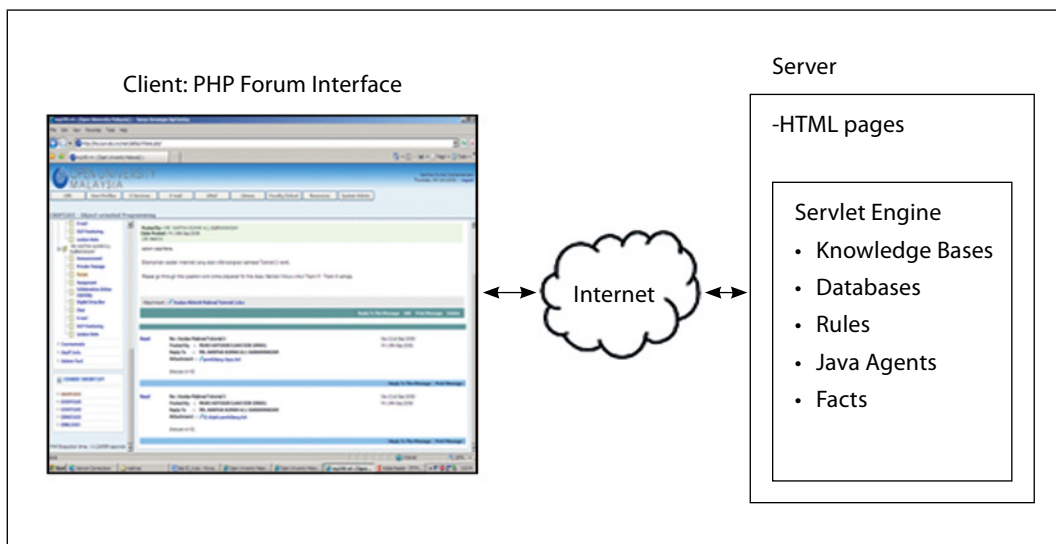
Tool	Platform	Task	Performance indicator	Roles
COLER (Constantino-Gonzales & Suthers, 2000)	Real time non-forum	Concept learning	Participation, agreement with group procedure	Coach
iDCLE (Inaba & Okamoto, 1996)	Real time non-forum	Concept learning	Advice	Coach
Gracile (Ayala & Yano, 1998)	Real time non-forum	Concept learning	Appropriate student helpers, learning tasks	Coach
HabiPro (Vizcaino et al., 2000)	Real time non-forum	Concept learning	Ideal participation, motivation	Coach
LeCS (Rosatelli et al., 2000)	Real time non-forum	Concept learning	Participation, group coordination	Coach
Group Leader (McManus & Aiken, 1995)	Real time non-forum	Concept learning	Trust, leadership, communication	Coach
Epsilon (Soller & Lesgold, 2000)	Real time non-forum	Concept learning and problem solving	Knowledge construction	Coach
<b><i>Our proposed "smart forum"</i></b>	Asynchronous — forum	Problem solving	Critical thinking	Coach

**Table 1** Comparison of various CSCL tools widely cited in the literature  
Source: Adapted from Soller et al., 2005

Besides the problems regarding the forum that has been highlighted earlier, not much attention has been given to the function of a forum as a collaborative learning platform. Most CSCLs focused on using chat as a learning platform. In addition, a forum embedded in a learning management system (LMS) is merely a dumb interface with no active functions. One other interesting aspect was the element of critical thinking has been overlooked in all the existing CSCL tools. Critical thinking is an important skill that learners should acquire. Thus, there is a need to develop forum-based tools to address these issues.

## System design

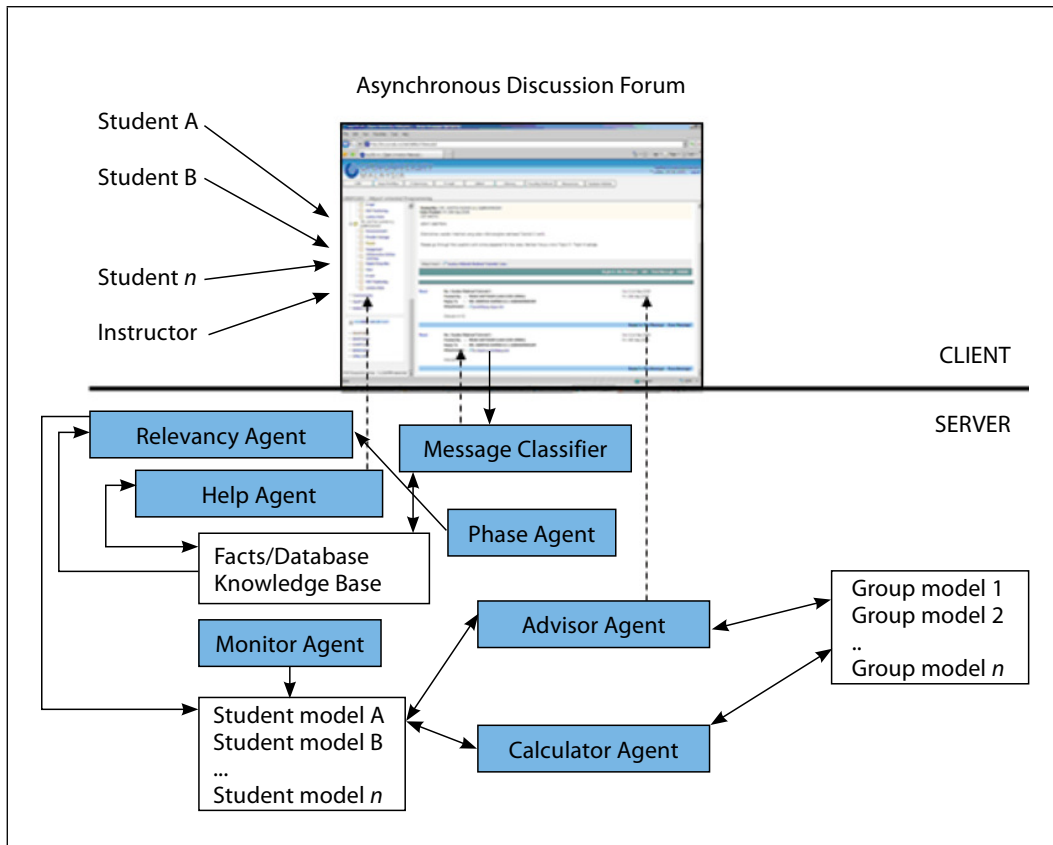
In this section, the design framework of the proposed smart forum system is discussed. The general overview of the system is shown in **Figure 1**.



**Figure 1** General overview of a smart forum

The proposed architecture of the system will use the agent approach which is based on the rule-based expert system framework. The agent approach is adopted due to its goal-oriented outcome in terms of the agent's ability to take action whenever necessary to fulfil the goal; capability to perform tasks given by the user autonomously; monitor the environment and adjust an event without direct intervention from the user. **Figure 2** shows the components that make up the proposed system. It has seven agents performing different tasks. The facts and rules for the agents will be stored in the knowledge bases. In a smart forum, students are given a task or problem to be solved through collaborative discussion in a small group. In order to engage in the discussion, students have to post their messages in the asynchronous forum using sentence openers provided in the forum. Only one sentence opener can be used per posting to start the discourse. Subsequent sentence(s) in the same posting should not use any sentence opener. There is no restriction on the number of words per posting but each

posting (which may consist of more than one sentence) must highlight a *single issue*. This will enable the agents to do their tasks efficiently. Sentence openers are pre-defined approach to start a conversation using menu or buttons.



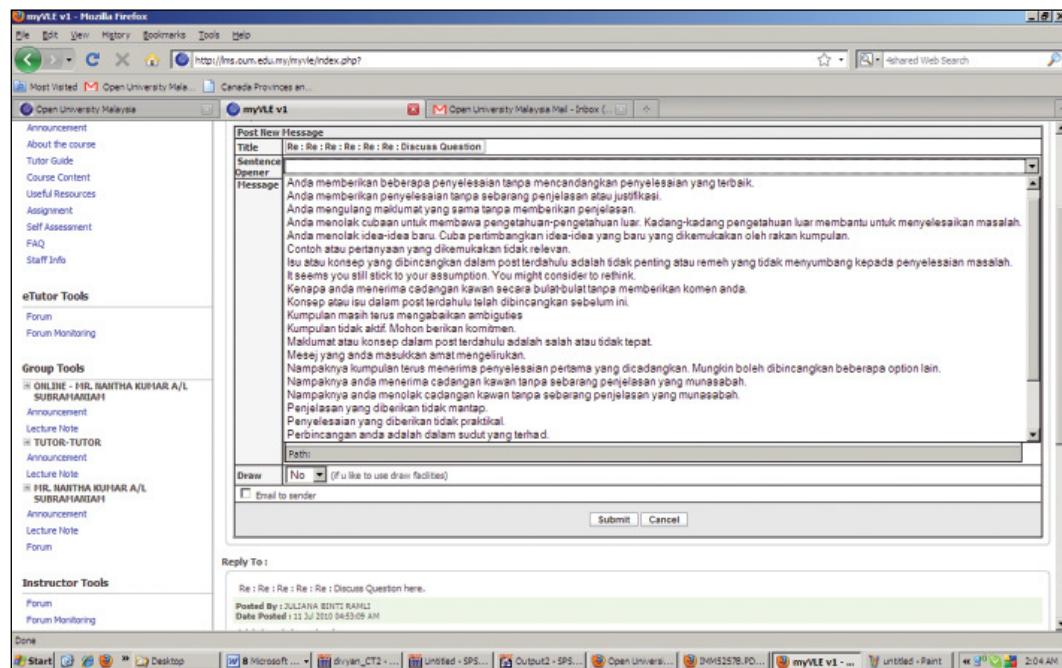
**Figure 2** Architecture of the smart forum

We are motivated to use sentence openers based on the result obtained by Baker and Lund (1996). In this study, the sentence opener that has been adopted is based on the Collaborative Skills Network (CSN) proposed by Israel (2003). Israel's (2003) model is adopted as it has included more "working on task" sentence opener which are appropriate for task-based discussions. In our proposed expert system, each message typed by students using the sentence openers will first be parsed by the *Message Classifier* agent that will do the following tasks:

- i. Identify which sentence opener that has been used by students and tutors. Tutors and students are given separate set of sentence openers (**Figure 3**).
- ii. Identify the main keywords used by students in completing the sentence (sentence closer) using the sentence opener. The analysis is done using Knuth-Morris-Pratt string matching algorithm.



- iii. Based on the sentence opener and sentence closer used by students, the agent will classify the message as either *discussion messages*, *not relevant message* (such as “how are you?”) or *specific question* from students on the domain or problem that needs to be resolved. The agent will ignore any other messages that cannot be classified.
- iv. If the message is classified as a discussion message, the agent will assign appropriate tag(s) available in Newman’s content analysis model (Newman et al., 1995). Here, a message can have more than one indicator depending on the keyword used in the sentence closer.



**Figure 3** Sentence openers are provided as pull-down menu (student view)

The **Calculator Agent** will calculate the critical thinking (CT) ratio of the individual learner and the groups for each of the category in the Newman’s content analysis model (Newman et al., 1995). Newman’s content analysis model has instantiated indicators of critical thinking via approximately 40 codes in categories such as relevance, justification, novelty and ambiguities, each with a plus or a minus appended to indicate whether the coded statement contributes to (+) or detracts from (–) critical thinking development. This model proposes several sets of paired indicators – 20 pairs, five independent positive indicators and one independent indicator. Rater only mark and count obvious statements, which can be phrases, sentences, paragraphs or messages containing one unit of meaning illustrating one or more of the indicators. In a smart forum, the calculator agent will automate all these processes. In calculating the CT ratio, messages that are relevant to the groups’ current phase in Garrison’s “practical inquiry model” (Garrison et al., 2001a; Garrison et al., 2001b) will be taken into consideration. It

will also calculate the cumulative CT ratio of learners and groups independent of the phases. The formula used by the calculator agent to calculate the CT ratio is given below:

$$CT = (x_+ - x_-) \div (x_+ + x_-)$$

$x_+$ : is the count of statements contributing to critical thinking for the coding category  $x_-$ : is the count of statements detracting from critical thinking for the category.

Positive numbers approaching 1 indicate the highest levels of critical thinking. Overall critical thinking ratio can be calculated by counting all the positive and negative postings in the forum and then apply the above formula.

The *Monitor Agent* will monitor students' participation level in the discussion forum. This agent will send postings/message or reminders in the forum to students who are not active by asking them to participate actively in the discussions in a week. This is to ensure that there are plenty of postings so that other agents can perform their tasks. The formula used to determine student activeness is based on the learners' out-degree centrality of their discussion (Suh & Lee, 2006):

$$d_o(M_o) = \frac{d_o}{(g - 1)}$$

$d_o(M_o)$ : Out-degree centrality for student  $M_o$

$d_o$ : sum of messages that the participant sends toward others

$g$ : number of participants in the group

Learners with high out-degree centrality are more active in providing information to others in a discussion or providing comments on the opinions of others. Newman et al. (1995) have also mapped the relevant indicators of content analysis to each of the phase in Garrison's "practical inquiry" model. If a message is tagged by the Classifier agent, the *Relevancy Agent* will use this mapping information to update the relevant parameters in the student model regarding the status of the current message posted by learners (i.e., whether the message is appropriate for the current phase or not). This is to ensure that students are in the same level of discussion and that there are no students ahead or left out in the discussion. The *Phase Agent* will keep track of the transition of the phases in the Garrison's "practical inquiry" model (i.e., initiation, exploration, integration and resolution). Only the tutor is allowed to change the phase of the group and the phase agent will notify the relevant agents if there is any change of phase for the groups. The phase agent will also identify in which phase a message has been posted by the student. This information is vital for the relevancy agent. The phase agent influences the calculator and relevancy agents i.e., information from phase agent is used by these two (calculator and relevancy) agents in executing their tasks. The *Help Agent* will provide possible answers for student's queries pertaining to the subject matter in the form of

FaQs in a new pop-up window. If the agent cannot give the possible answers or if the student is not satisfied with the answers given by the agent, the student has the option to alert the tutor by just clicking an alert button provided by the agent on the same screen. When this is done, the agent will send the user's searched keyword together with their email details to the tutor. The tutor can then reply to the student with the appropriate answer.

Information in students' and groups' model will be updated accordingly by the relevant agents as they perform their tasks. The student model for each of the student stored in the database table consists of the following information: CT ratio of the phase, overall CT ratio, magnitude of learners' activeness (out-degree centrality ratio), indicator of relevant message tags posted in a message for a phase, learners CT ratio of the prior phase and information on the relevant tags for the latest posting. The group model consists of the following information: overall CT ratio of the groups, CT ratio for each phase, CT ratio of the group's prior phase. Finally, the **Advisor Agent** will swing into action to complete the following tasks using all the messages classified as *discussion messages* and those that have been tagged by the Message Classifier agent earlier:

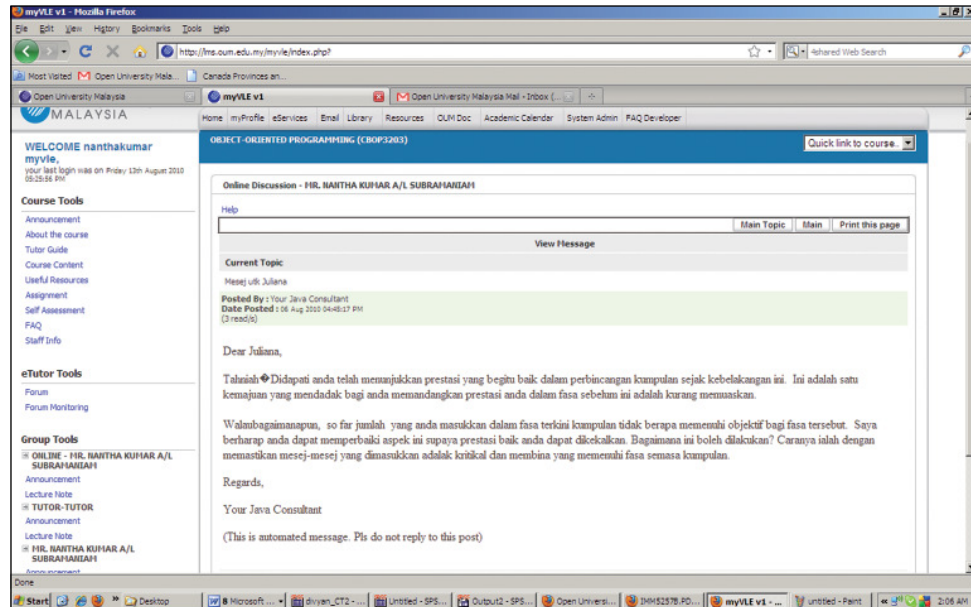
- i. Monitor learners' and groups' CT ratio in moving from one phase to another.
- ii. Based on (i) above and the status of the students' and groups' model (written in the form of rule), the advisor agent will give its feedback, advice or consultation to the students concerned and/or their group (**Figure 4**). The feedback/advice/message that satisfies the condition of a rule will be fired by the agent. The rule is written in the form of IF-THEN statement and stored in a knowledge base. An example of rule written for the learner is given below:

```
if ( (CT_phase_student[counterStudent] < 0.45) && (increaseBetweenPhases[counterStudent].equals("NO")) && (active[counterStudent].equals("NO")) && improveRelPhase[counterStudent].equals("NO")) && (improveRelCurrent[counterStudent].equals("NO")) && (CT_o[counterStudent] < 0.45) )
```

A total of 128 rules have been written for the learners. An example of rule written for the group is given below:

```
if ( (CT_O[counterGroup] < 0.45) && (CTPreStatus[counterGroup].equals("BAD")) )
```

A total of 64 rules have been written for the groups.



**Figure 4** Example of message sent by the agent to a learner

## Database and knowledge base

Databases used by the smart forum are elaborated in **Table 2** below.

Database	Description	Referred by agent
Pattern	This database has all the tags/indicators proposed in Newman content analysis model and the possible keywords (that matched these tags) that can be used by the learners in completing their message in a posting.	Classifier
AdviceLearner	This database contains all the messages that can be chosen by the agent when giving the feedback to the individual student.	Advisor
AdviceGroup	This database contains all the messages that can be chosen by the agent when giving the feedback to the group.	Advisor

**Table 2** Databases in the smart forum

A Knowledge Base (KB) is a special kind of database for knowledge management, providing the means for the computerised collection, organisation and retrieval of knowledge. It stores all the information required by the agent. The smart forum has two knowledge bases to store the rules needed by the advisor agent as depicted in **Table 3**.

Knowledge base	Description	Referred by agent
RuleLearner	It has 128 rules required by the advisor agent to determine the type of message/advice that need to send to an individual learner.	Advisor
RuleGroup	It has 64 rules required by the advisor agent to determine the type of message/advice that need to send to the group as a whole.	Advisor

**Table 3** Knowledge bases in the smart forum

## Learner and group models

Learner and group models have all the information about student's and group's status that are needed by the agent in making decisions. The relevant tables that represent student's model are given in **Table 4** below:

Table	Description	Referred by agent
StudentModel1	Stores information regarding a student's critical thinking ratio according to the discussion phases and the cumulative CT irrespective of the phases.	Calculator, Advisor
StudentModel2	Stores information regarding number of messages that are relevant and irrelevant for the current phase of the discussion and for the past phases respectively.	Relevancy, Advisor
Monitor	Stores information regarding a student's participation level in the forum.	Monitor, Advisor
StudentProgress	Stores information regarding a student's past performance and current performance in the form of percentage.	Advisor

**Table 4** Student model

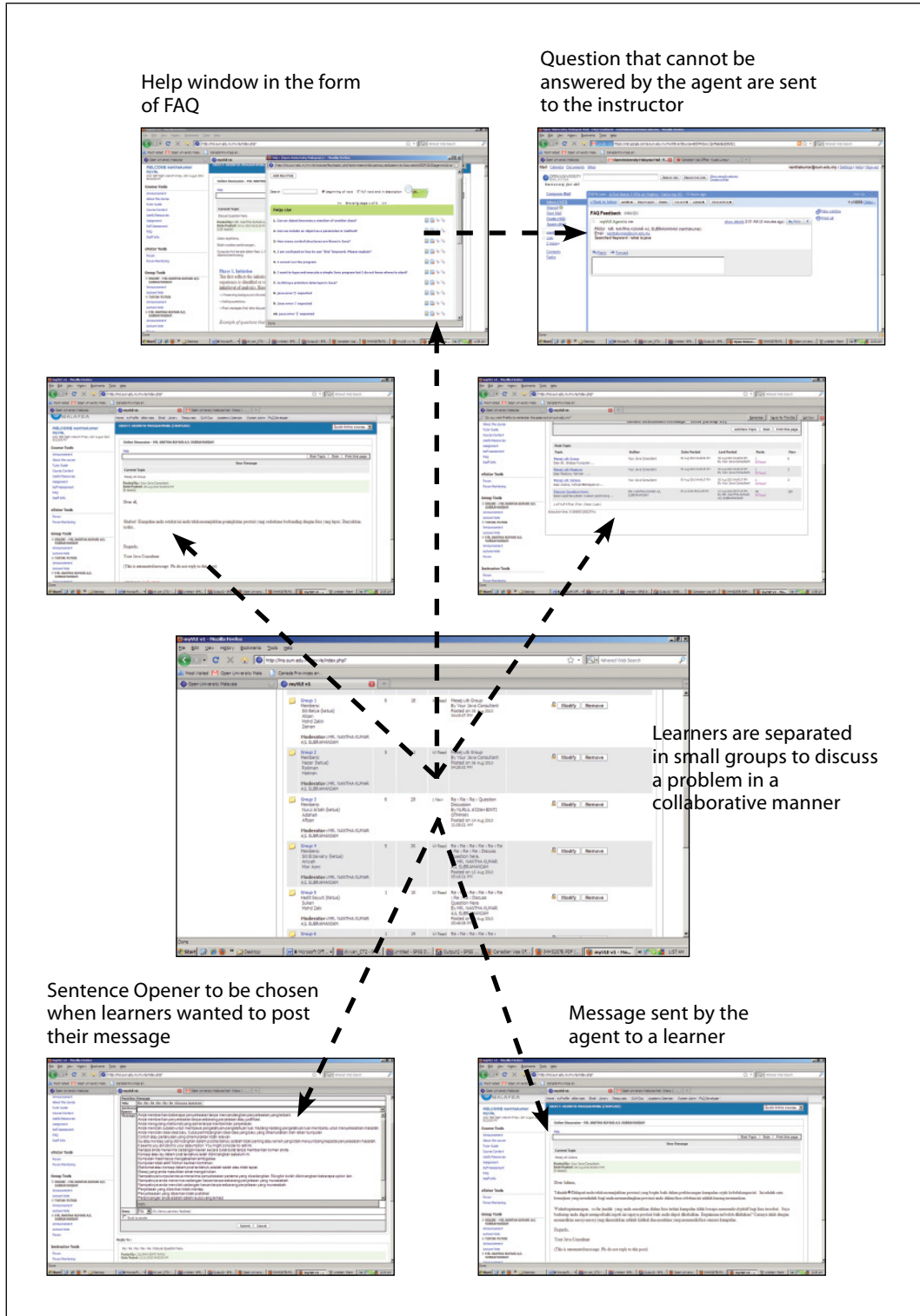
The group model is represented by one table as shown in **Table 5** below:

Table	Description	Referred by agent
GroupModel	Stores information regarding group's critical thinking ratio according to the discussion phases and the cumulative CT irrespective of the phases. It also contains the following information: <ul style="list-style-type: none"> <li>• Status of the group's phase transition</li> <li>• Group's current and past performances in the form of percentage</li> </ul>	Calculator, Advisor

**Table 5** Group model

## Implementation

The agents in the smart forum were built by integrating the JACK agent environment using Java programming. These agents were involved in back-end processing of a LINUX server. The forum platform from Open University Malaysia's learning management system known as myVLE has been used as the forum front-end interface. MySQL has been used as the database to store all the information processed by the agent. **Figure 5** shows the some of the main interfaces of the system.



**Figure 5** The implementation of the smart forum

## Learners' evaluation

The prototype of a smart forum has been evaluated by 20 learners who took a second year IT subject. They have been divided into six groups. Each group has 2–4 learners. They have used the system for one semester. At the end of the semester, a questionnaire was distributed to them. The questionnaire has 11 items and is measured using the Lickert scale of 1 (very weak) to 5 (very good). The mean score for all the items are shown in **Table 6** below.

	Item	Mean Square
1	How would you rate the user-friendliness of the forum?	3.75
2	How would you rate the ease of learning to use the forum?	3.75
3	How would you rate the accuracy of the forum? (accuracy refers to the correctness of the responses displayed by the forum)	3.5
4	How would you rate the usefulness of the "sentence openers"?	3.75
5	How would you rate the quality of the responses made by the forum? Quality refers to clarity and appropriates of messages responded by the forum.	3.75
6	How would you rate the usefulness of the forum for accomplishing your individual work?	3.5
7	How would you rate the usefulness of the forum for accomplishing your group work?	3.75
8	How would you rate the usefulness of the forum for collaborative discussions with your group members?	3.33
9	How would you rate the ease of using the forum interface for discussions with your group members?	4.0
10	How would you rate your overall satisfaction with the forum?	3.75
11	How would you rate the success of the forum? Success refers to whether you feel you learned more by using this forum than you would do without it.	4.0

**Table 6** Mean score of the items

The result shows that learners gave favourable responses for the smart forum. The smart forum managed to provide an opportunity for learners to increase their discussion capability in the context of CT development.



## Conclusion and future work

This paper has presented an architecture for a smart forum prototype which supports, monitors and facilitates adult learners' task-based collaborative discussion. The system was built using an agent approach utilising the conventional set-up of forums to enhance adult learners' critical thinking in solving a task/problem online collaboratively. The feedbacks from students show that the system has contributed to the enhancement of their capability and critical thinking skills on the subject matter. We are currently in the process of writing more rules for the system so that it can handle more problematic situations. We are also investigating ways to incorporate fuzzy logic and neural network in the system in order to increase the processing power of the agents.

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## Innovative practices in ODL — the experience of Open University Malaysia

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### Abstract

*With the advancements in communications technology brought about by the advent of the Internet and World Wide Web, attention has been drawn to Open and Distance Learning (ODL) as a mode for teaching and learning. In Malaysia, the establishment of ODL universities such as Open University Malaysia (OUM) has expanded the role of ICT in learning and knowledge generation. By leveraging on Internet technology, ODL universities are able to transmit education across the country and even globally. ODL sets about making quality e-learning and e-content more accessible to both facilitators and learners. Utilising this method, new opportunities are continuously created to make higher education more accessible to those who seek to improve and upgrade themselves. This paper examines OUM's practice of using the innovative technology of online learning and teaching to make higher education easily accessible to those that seek it. With greater advancements in technology, the future of higher education may lie more with ODL than with traditional face-to-face learning.*

**Keywords:** Open and distance learning (ODL), online learning, pedagogy, MyVLE, open university

### Introduction

Countries striving to attain developed status need to have a skilled and knowledgeable workforce. In other words, a nation's development can only be achieved if its people are well educated and possess the required professional expertise to help it move forward. Education has become a big business in Malaysia and if it is successfully carried out it will make a significant and sustained contribution to the nation's GDP. Under Malaysia's Economic Transformation Programme (ETP) 2010, the education sector is expected to contribute 4% of the country's Gross Domestic Product (GDP) and to directly enhance the lifetime earnings of Malaysians.

Malaysia targets to develop the first-world talent base that it needs by 2020. Education is expected to be a robust engine of growth and a high economic multiplier to the country. However, given the current emphasis on developing a skilled workforce and the quest for more postgraduate degree holders, there are several important opportunities for improvement such as having a more international focus and developing educational policies that are consistent, realistic and less subject to the vagaries of internal politics.

## **Globalisation and education**

The globalisation and knowledge without borders phenomena have enabled educational institutions to compete on a more level playing field on the international stage. Educational institutions today need to be able to not only fulfil current needs, but also to be proactive in modifying and reinventing present innovations for future applications. Malaysian higher education has been facing fundamental changes triggered by the effects of globalisation and the speed of change in communications technology.

Today, the global networks of the information society have brought about undoubted benefits to the government and the public, especially in terms of opportunities for trade, and economical access to communication, markets and technology. Higher education as a consequence, has also been caught up in this wave of globalisation. In fact, Scott (1998) has described the radical processes of globalisation as implicating higher education as the creator, interpreter and sufferer of such trends. The global education market is an intensely competitive one with universities aggressively promoting their programmes not only in-country but also abroad.

In Malaysia, education has progressed in line with the shift towards productivity and growth based on knowledge and innovation. Due to the close link between education and productivity, the relationship between the government and educational institutions will change to reflect market-oriented goals and to produce graduates who are well prepared for the job market. The goal is to produce graduates who are capable of carrying out research, are innovative and have the ability to utilise the latest in ICT.

The Malaysian government encourages lifelong learning programmes<sup>1</sup>, provides access to quality education and is expanding public institutions of higher learning. The aim is to ensure that the country will have human capital that is resilient, skilled and knowledge-driven to provide the impetus for its continual development and growth. Malaysian public universities have been providing degree programmes using traditional methods of teaching and learning. However, their capacities have been stretched to the limits and many of them have been unable to increase their intake of students without compromising quality. As such, institutions using other modes of learning and teaching are needed to increase the opportunities for continuous learning.

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<sup>1</sup>The role of OUM is to provide lifelong learning programmes with flexible entry requirements.

## Open University Malaysia's innovative practices

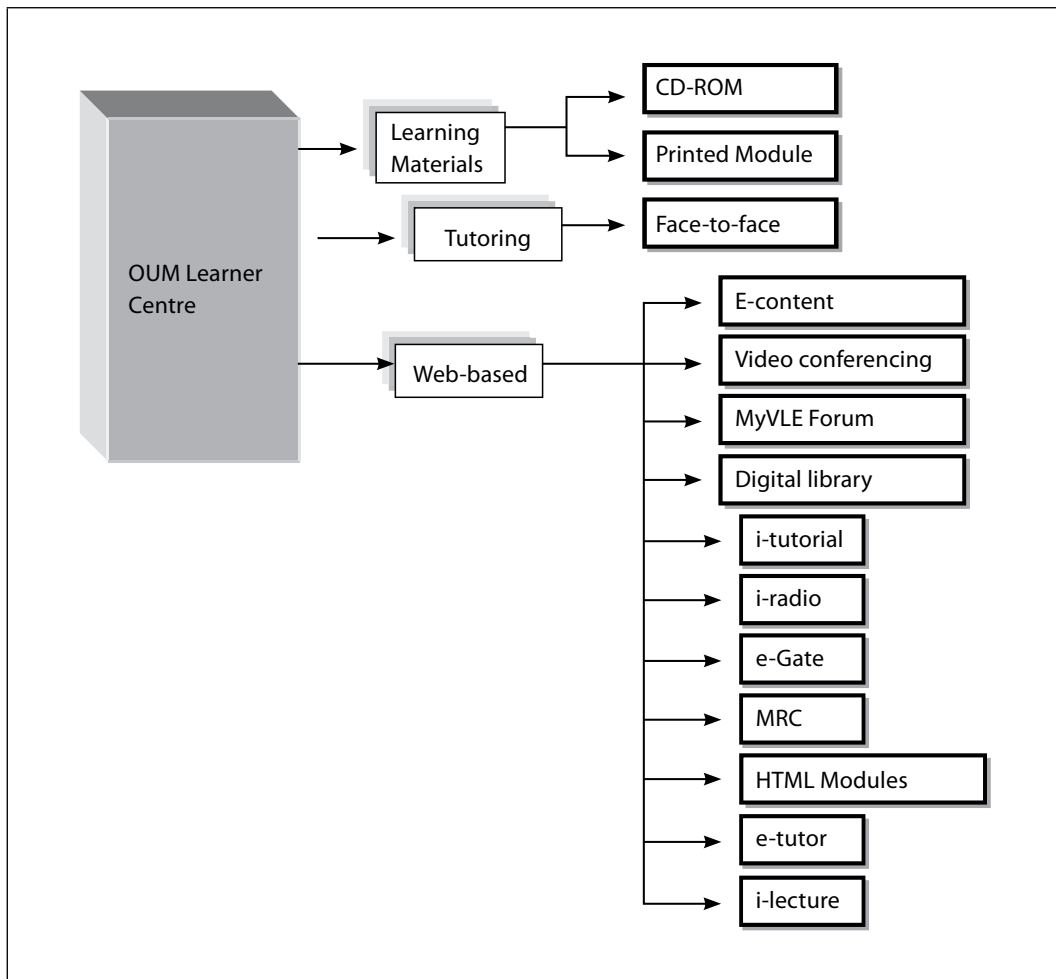
Lifelong learning can be promoted by using e-learning and open and distance education to increase accessibility. The Malaysian government has set up a National Council for Lifelong Learning, which provides the platform for policy formulation and coordination facilities. This action has encouraged the formation of open universities to cater to the demands for tertiary education, especially from working adults. Open University Malaysia (OUM) is the pioneer in the country in providing education to working adults using the latest technology compatible with e-learning and e-teaching.

OUM has improved its teaching and learning methods by adopting modern technology and a blended pedagogy. It recognises that higher education has to be continuously improved upon due to the persistent influence of global trends and its links to society. Within this context, it is useful to relate the role of OUM and show how it has steered tertiary education in Malaysia.

OUM was established based on the concept of providing higher education using the latest Internet technology, thereby allowing access to education for all. OUM is a private education provider and plays a vital role in encouraging innovation in course delivery, assessment methods and higher education curricula. Indeed, OUM was the first Malaysian ODL institution to be set up (in 2000) to fulfil the nation's aspiration of increasing educational opportunities for its people, especially its working adults.

Through the years, ICT and ODL have become synonymous with the way OUM operates its programmes (UNESCO, 2002). Indeed, Internet technology has increasingly become an indispensable tool for OUM's students (Abu Zarin et al., 2008) because the university has adopted the blended learning pedagogy that consists of three components: self-managed learning, face-to-face interactions and online learning. The blended pedagogy prescribes limited sessions of face-to-face tutorials and the use of printed learning materials alongside online coaching and forum discussions. In other words, its pedagogy is premised on self-managed learning (80%), face-to-face interaction (8%) and online learning (12%) (Abas et al., 2008).

While e-learning allows for freedom in self-learning, it requires much discipline and perseverance. From experience, the institution has observed that this strengthens a student's will to succeed and to achieve future advancements in his or her career. Certainly, this makes learning via OUM's methods a dualistic achievement — obtaining a degree (knowledge) and building character. Over the years, the university has developed and fine-tuned its web-education, taking advantage of the rapid technological advances occurring globally. **Figure 1** shows the current ODL model used by OUM and how it is carrying out its programmes for higher education.



**Figure 1** The current ODL model of OUM  
Source: OUM Portal (<http://www.oum.edu.my>)

OUM has developed a unique system for teaching and learning online. This system enables learners and tutors to interact online. Courses are delivered digitally and discussions are carried out online. This e-learning management system is called My Virtual Learning Environment (MyVLE). MyVLE allows the integration of various features such as instructor's and students' tools, technical support, administrative tools and functions that facilitate the teaching and learning process (OUM, 2005).

This method has given credence to digital education. It is now possible for students to learn outside the classroom and to interact with their peers online. This is the asynchronous feature which is significant to OUM's MyVLE approach in engaging both learners and tutors in an environment that permits the transmission and interaction of course materials between different parties at various locations. Indeed, this concept of "no classroom boundaries for learning" that is enabled by digital education also contributes to the empowerment of learners who are

geographically dispersed. It enables them to self- manage their learning. This innovative practice gives meaning to the phrase “democratisation of education”, which is one of the objectives of setting up open universities in Malaysia.

While MyVLE is OUM’s most frequently used innovation, the university has other web-based methods in place. These include a digital library that can be accessed from anywhere. Video conferencing has become an integral part of the operations of OUM. For instance, the use of video conferencing has made it unnecessary for PhD students to travel to Malaysia for the oral defence of their dissertations. Since 2009, four PhD qualifying exams and *viva-voce* sessions for nine master’s students and one PhD candidate have been conducted using Skype, the video chat tool.

In contrast, the “i-tutorial” appears to be less frequently used, perhaps due to the popularity and easy accessibility of other modes of learning such as print modules and digital library materials. The underlying concept for the university is that learners have a choice of selecting the most cost-effective system that allows them flexibility for learning interaction, whether through the web-based and/or multimedia modes together with printed modules. **Table 1** shows the increase of OUM’s innovative learning materials and its total graduates over the past 11 years. **Tables 2** and **3** respectively show OUM’s undergraduate and postgraduate enrolment in 2009 and 2010, and **Table 4** shows its cumulative enrolment from 2001 to 2011.

Items	2000	2011
Cumulative intake	753	104,362
No. of programmes (TOTAL)	4	60
Undergraduate (MQA/JPA: 18)	4	32
Postgraduate (MQA/JPA: 13)	–	26
BPG	–	2
Learning materials	29	1,664
Print based and study guide	–	1,084
HTML based	–	558
I-Cast	–	400
I-Lectures	–	18
Learning centres	12	47
Tutors/Facilitators	100	10,654
Graduates		32,342
Undergraduate		31,555
Postgraduate		787

**Table 1** OUM’s innovative learning materials and total graduates from 2000 to 2011  
Source: May 2012 preview slides, OUM



Year	Enrolment (Number of undergraduate learners)
2009	60,660
2010	55,591

**Table 2** Total OUM undergraduate enrolment in 2009 and 2010  
Source: OUM annual report 2010

Year	Enrolment (Number of postgraduate learners)
2009	2,413
2010	3,661

**Table 3** Total OUM postgraduate enrolment in 2009 and 2010  
Source: OUM annual report 2010

Year	Cumulative number of learners
2001	753
2002	7,625
2003	17,004
2004	26,682
2005	36,065
2006	53,352
2007	64,678
2008	75,750
2009	86,662
2010	89,000

**Table 4** OUM cumulative enrolment from 2001–2010  
Source: OUM annual report 2010

## Conclusion

OUM may consider improving MyVLE by designing and developing a more user-friendly and comprehensive learning system. Such a system would be multi-faceted and highly interactive. The system would integrate all existing learning objects under one platform, but it would be organised in a way that guides learners in their exploratory learning process. Creating such an integrated system with an all-in-one interface would provide learners with a level of accessibility that is not available with the present system. The current system appears to be

an “unintegrated model” that does not allow learners to communicate and visualise through a “unified whole model”. An integrated model system can serve as a springboard for OUM to become a leader in ODL education.

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