Students Interaction in the Online Learning Management Systems: A Comparative Study of Undergraduate and Postgraduate Courses

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Sub-theme: No. 3 Methodology and Technology

Abstract

The quality of interaction between learner with online content is one of the imperative factors in determining the efficacy of web-based teaching-learning towards the creation and maintenance of sustainable learning communities. Interaction with content is an internal dialogue of reflective thought that occurs between learner and the substance. Interaction is often triggered and supported by events in the learning environment - on how the learner interacts with what is to be learned.

In this paper, a comparative study is conducted to explore whether there is any difference in learners’ interaction on the online Learning Management System (LMS) of undergraduate and postgraduate courses. Based on a framework developed for investigating learners’ interaction with online content in Wawasan Open University, data from the LMS log and activity database was extracted. The data is then analysed based on the pattern and behaviour of learners’ interaction with the online content of the courses. Further analysis is done by transcribing the discussions and exchanges of teacher and learners within the online forums, specifically investigating the dimension, depth and category of exchanges occurred. Based on the findings, several recommendations are proposed to enhance the design and delivery of web-based content, aiming at maximizing the efficacy of the online learning environment of undergraduate and postgraduate courses in open distance learning (ODL).

Introduction

Education is one of the crucial transformation pillars for human capital development. In order to fulfill social agenda and broaden the tertiary education opportunities in promoting lifelong learning, open distance learning (ODL) has emerged as one of the trend in Malaysia. The education sector has experienced a significant shift as it enters into a new era of online learning. High quality and effectiveness of ODL, particularly adult teaching-learning in tertiary education has become one of the crucial determinants to realize the country’s goal and agenda in today’s knowledge economy. Open distance education institutions in Asia and worldwide are facing vast changes brought by the increasing availability and sophistication of information and communication technologies (ICT), as well as the way these technologies are impacting the delivery of ODE programs (Murphy, Walker & Webb, 2001).

Following the rapid development of open distance education and the vast online resources made available by the Internet and Learning Management Systems (LMS), the quality of interaction between learner and web-based content is one of the imperative factors in determining the efficacy of online teaching and learning (Anderson, Rourke, Garrison & Archer, 2001; Kidd, 2005; Lim & Lee, 2007; Grant & Thornton, 2007) towards the creation and maintenance of sustainable learning communities. Interaction with content is an internal dialogue of reflective thought that occurs between learner and the material. Interaction is often triggered and supported by events in the learning environment - focusing on how the learner interacts with what is to be learned.
Background of Wawasan Open University (WOU)

Wawasan (Vision) Open University (WOU) with headquarters in Penang, is Malaysia’s first private and not-for-profit open university dedicated to (working) adult learners through the ODL mode. WOU opened its doors to the first batch of learners in January 2007. By January 2010 semester, there were a total of 5,466 learners who have experienced the WOU system. WOU currently offers 22 undergraduate and 3 postgraduate programs at six WOU regional and learning centers throughout the nation. WOU aspires to be a vibrant learning community that inspires learning, supports innovation and nurtures all-round personal growth, and commits to the expansion of opportunities in higher education and to teaching excellence aimed at increasing the level of knowledge and scholarship among all Malaysians. WOU believe in upholding high institutional standards, celebrating the diversity of its students, recognizing its employees, valuing citizens and the community, as well as practice academic freedom and fairness.

The WOU model of delivering open distance education involves the interplay of several key components, i.e. course materials and learner support system, assessment, open entry admission system, flexible progression pathways, multiple exit points and external peer review. The concept of ODL entails educational training and instruction that does not require a student to be physically present for classes at all time. The learning process is instead achieved through content that is transmitted electronically, over the telephone, by teleconferencing, and print/multimedia materials. In WOU’s technology enhanced ODL approach, the role of conventional lectures are replaced by a set of comprehensive self-contained course material (including textbooks) that is provided either in print or CD form. WOU provides learner support consisting (i) Tutors - part-time academics with relevant subject expertise who assist students in their studies through a number of two-hour long face-to-face tutorials conducted once every 4-5 weeks at the local Learning Centre; (ii) Telephone consultation by tutors; (iii) Online learning support on a 24X7 basis via WawasanLearn - a LMS based on open source system Moodle that enables learners to access additional supplementary materials, online quizzes, and forum discussions exchanges with teachers and peers; (iv) Extensive electronic library resources; as well as (v) The staff and facilities of the WOU Regional Offices which are equipped with computer labs, libraries and free access computer terminals. The mastery of learning outcomes of courses is evaluated via an assessment strategy that consists of a number of assignments (40% or 50%) and a proctored final examination (50% or 60%).

Literature Review and Research Questions

Many researchers have focused on instructional considerations in response to the need to plan, design and deliver distance and/or online courses. The analysis of open distance learner’s interaction with online content and online forums in the web-based learning environment is viewed as an area worth to be explored. This is aimed at discovering strategies to address the needs for undergraduate and postgraduate learners based on their learning behavior in the virtual environment.

Moore (1989) categorized learner-content interaction to three types, namely learner-content interaction, learner-instructor interaction, and learner-learner interaction. Interaction with content is an important feature of education as the learner’s interaction with the content helps in clarifying the learner’s understanding of the subject matter and even to generate knowledge (Moore, 1989). Collins and Berge (1996) highlighted that learners tend to combine the new knowledge acquired by interacting with content, with their prior knowledge on that subject matter. Hence, interaction can be synthesized as an active process which requires learners to do more than passively absorb information. Increased interaction can improve learner motivation, achievement, and attitude toward learning (Hillman, Willis, & Gunawardena, 1994). According
to social constructivist theory, learning environments that encourage active participation, interaction and dialogue provide students with opportunities to engage in a process of knowledge construction as they try to create meaning from new experiences (Jonassen, Davison, Collins, Campbell, & Bannan Haag, 1995).

In addition, Hillman et al. (1994) argued that intervening technologies enable learners to communicate with the content as well as interact with teacher and other learners. In fact technologies that deliver instruction to distance learners are often classified as two-way interactive or one-way non-interactive (Bates, 1995). It is crucial that teachers encourage learners to interact with the subject matter aiming at constructing new knowledge in the learning process (Moore & Kearsley, 1996). Oliver, Omari & Herrington (1997) explored the learner interaction in the online learning environment on the dimensions of social, procedural, expository, and cognitive.

Learners’ interaction with the online content - comprises web-based resources and the interaction in forum discussions within the online learning environment were investigated based on various literature in the related research area. These include the model of interaction by Moore (1986) and the dimensions of exchanges by Oliver and McLoughlin (1997). Researchers commonly use primary data gathering techniques such as questionnaires and interviews to obtain data on learners’ interaction with printed materials, and or learners’ experience/perception with online course. However, as learners’ interaction with online content increases, it is crucial to obtain actual feedback as to assess the usefulness of the online materials as well as the exchanges that occur in the online discussion forums. A recent study in UK by Jeffoate (2010) indicated that postgraduate students’ engagement with online course material and activities can be increased if the materials selected for an online course describe specific techniques they can apply in their working lives. There lies a vital question of whether there is any difference in terms of learners’ preference of online resources and interactions in the online learning environment of undergraduate and postgraduate learners. If so, this leads to discovering appropriate strategies to be adopted by open distance educators in addressing the needs of these two groups of students.

Synthesizing the related literature, this study aims to answer the following research questions:

1) What is the pattern of learners’ interaction with online content based on the frequency/activity in accessing online content and the types of learning resources preferred in the LMS?

2) What is the pattern of learners’ interaction with peers and teachers based on the dimensions of interaction, depth of discussions and categories of exchanges in the online forums?

3) Is there any difference observed in the pattern of learners’ interaction with online content and in the online discussion forums for undergraduate versus postgraduate courses?

**Methodology**

To ensure comparability, data from the LMS of a sample undergraduate course (herein referred to as UG1) and a sample postgraduate course (herein referred to as PG1) of similar nature were selected from courses offered by School of Business Administration in January 2010 semester. Both courses that were selected had significant online resources available and incurred active participation in the online discussion forums. A cross sectional analysis was done at the end of the semester. This study was undertaken mainly using content analysis and quantitative analysis on indicators defined to measure the students’ interaction with online content, i.e. pattern/activity
level and frequency of assessing online learning resources, as well as types and feedback capability of online learning resources. Three indicators, namely dimension of interaction, thread level of discussion, and category of exchanges were further employed to measure the students’ interaction within the online forum discussions.

In order to track the access of online content by the learners, web-based resources in the LMS were grouped into five categories:

- **OR1**: Static pages (e.g. Welcome Letter from Course Coordinator, Course Overview Information and User’s Guide)
- **OR2**: Folders of course content (e.g. Attachment files including reading materials, case studies, past year examination questions, and summaries of the study unit in the form of word documents etc.)
- **OR3**: Hyperlinks to external websites (e.g. educational and related websites that were related to the course content)
- **OR4**: Online Discussion Forums (asynchronous)
- **OR5**: Online Quizzes

Based on Oliver and McLoughlin (1997) who explored the dimensions of interaction by classifying interaction activity into five parts, i.e. social, procedural, expository, explanatory and cognitive; social dimension can be defined as to include discussions of a social nature which are not directly associated with the course content, while procedural dimension involves explanation on course related procedures, requirements and administrative issues. Expository dimension involves demonstration of knowledge/facts without much further elaboration while explanatory dimension refers to elaborate explanation on knowledge and developed content based on learner’s response. Finally, cognitive involves providing constructive feedback and detailed commentary on course content via critical thinking which leads to knowledge development.

The content of the web-based interaction - by initiator and respondents, are categorized into four groups of exchanges, i.e. from teacher to group, from teacher to individual learner, from individual learner to teacher and from individual learner to group. In a teacher to group category of exchanges, the teacher initiates a discussion and addresses it to all students in the group. As for the depth of interaction, Thread=1 means there is no reply to the posting initiated, Thread=2 refers to only one ensuing reply, Thread=3 with two replies, and Thread >= 4 indicates that there are at least three replies to a discussion topics started.

**Findings and Discussion**

**Online Learning Resources in WawasanLearn**

*WawasanLearn* has been in-use since year 2007 in WOU and English is the medium of communication despite learners’ diverse language background. *WawasanLearn* has good editing ability which is GUI-based and has strong monitoring function via statistical reporting feature and log function. Among the common functions available are static course materials (e.g. uploaded files, text pages, web pages, links and directories), as well as interactive and social course materials (e.g. online quizzes, asynchronous forum boards and synchronous chats). Layout of the main page of a sample course in WOU is shown in Appendix A.

The left panel of the course page shows the activities (e.g. various online resources, online forums, online quizzes), the administration related functions, and a link to other courses that the learner is enrolled. On the right panel, learners are able to view the latest news of the course (which is currently set as announcements from the teacher), upcoming events (e.g. online quizzes open), calendar (which is a two-way tool that study activities are planned for the learners, and
the individual learners are able to set in the calendar his/her own study plan), messaging capability (to communicate on a one-to-one basis with teacher and other learners), as well as other applications relevant to the course. The essence of the online resources designed for the course contains in the main window of the page. In this section, learners are able to access all the online forums (which serve specific purpose e.g. Announcements from the teacher, Public forum, as well as Group discussion forums based on tutorial topics of the semester). In addition, learners are able to access the supplementary course materials and other resources in place to facilitate their learning. These are categorized based on the five tutorial / five study units for the course. Common resources within each study unit/ tutorial include a folder that contains additional summaries/notes in presentation files and documents, hyperlinks to relevant external websites, online quizzes and other online activities. While most of the online resources are made in place at the start of the semester, the teachers were observed to constantly post additional resources and initiating/replying to forum discussions along the semester.

**Summary of Key Information of the Courses**

Figure 1 presents a summary of the key information of the samples selected for analysis in this study.

*Figure 1. Summary of Key Information of UG1 and PG1*

<table>
<thead>
<tr>
<th>Information</th>
<th>UG1</th>
<th>PG1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of learners enrolled for the course</td>
<td>231</td>
<td>193</td>
</tr>
<tr>
<td>Average age</td>
<td>29</td>
<td>35</td>
</tr>
<tr>
<td>Gender (Male/Female)</td>
<td>45% Male, 55% Female</td>
<td>58% Male, 42% Female</td>
</tr>
<tr>
<td>Participation rate (%) (No. Online / No. Enrolled)*100%</td>
<td>96</td>
<td>99</td>
</tr>
<tr>
<td>Average time online (hours)</td>
<td>21.5</td>
<td>24.8</td>
</tr>
<tr>
<td>Average frequency of access over a semester (times) (Total No. of Access/ No. of Learners Online)</td>
<td>11.6</td>
<td>17.3</td>
</tr>
</tbody>
</table>

Despite the number of learners enrolled for UG1 was higher than the number of learners in PG1, the absolute value of the number of learners enrolled for the course was of lesser significance with regards to the main objectives of this study. The key measurement in this study was based on percentage and not absolute value, and subsequent analysis was done focusing on relative measurement of the pattern of learners’ access to the online content during the semester. In quantifying the participation rate and total of access, redundant data from the log files of the activities in LMS has been eliminated to ensure a true reflection of the learners’ learning pattern with the online content. Learners in PG1 were higher in average age, with slightly more male learners and higher participation rate, longer average time online and higher average frequency of access over a semester.

**Pattern of Access/Activity Across Time in WawasanLearn**

The pattern of access/activity across time in a semester in the LMS of both courses is shown in Figure 2 below.
It is observed that frequency of learners going online was somewhat evenly distributed throughout the semester for both courses. Peaks in activities of both courses were observed during the tutorial weeks, the highest on the second month (tutorial 2 week) of the 18-weeks semester, and with a declining trend towards the end of the semester. However, the activity level for UG1 was lower than PG1 during the start of the semester. Postgraduate learners seem to be more initiated and independent in accessing the LMS for online resources, while undergraduate learners’ access to the LMS improved after they have attended the first tutorial. For UG1, the activity level in LMS declined immediately after tutorial 2 with a slow pick-up for the subsequent two tutorials. However, the activity level in the LMS for PG1 sustained at a higher level than UG1 even though the activity shown a steady drop. This indicates that the motivation for learning for postgraduate students is mainly to obtain knowledge rather than merely examination-oriented. Access to the LMS of UG1 depicts similar trend with PG1 a week before the examination. However, the postgraduate learners appeared to be doing earlier preparation for revision as the activity level improved to another peak a week before the last tutorial of the semester.

Learners’ Interaction with Online Content in WawasanLearn

The evaluation and feedback capability of the online resources were investigated in terms of whether it permits one-way non-interactive or two-way interaction between learner-content to evaluate the outcome of learning arising from the interaction. Online content that allow social presence would be the welcoming message posted by the teacher. Procedural related content comprises mainly text files or web-pages that present the generic information about the course such as learning objectives/outcomes and assessment tasks. Interaction with online learning materials that involves demonstration of knowledge and facts without much further elaboration represent interaction at the expository dimension. Online learning resources that are contained in the explanatory dimension may include materials uploaded e.g. presentation slides and additional
notes in word document that explain the essential concepts about the course. This may also be sharing of frequently-asked questions from learners in the previous semesters which could be presented in a webpage. These resources help learners to clarify any doubts that they have and to reinforce their understanding on the basic principles of the course content. The final dimension of interaction with online content at cognitive level involves providing constructive feedback and detailed commentary on course content via critical thinking that leads to knowledge development. Online learning resources that permit interaction at this level include online tests / quizzes. The exchanges in the online discussion forms would cover all these dimensions.

Figure 3 shows an analysis from the log files of the learners’ use of online resources in WawasanLearn of UG1 and PG1.

*Figure 3. Distribution of Use to the Various Online Resources in WawasanLearn*

<table>
<thead>
<tr>
<th></th>
<th>UG1</th>
<th>PG1</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR1: Static Pages</td>
<td>30%</td>
<td>4%</td>
</tr>
<tr>
<td>OR2: Folders of Course Content</td>
<td>3%</td>
<td>17%</td>
</tr>
<tr>
<td>OR3: Hyperlinks to external websites</td>
<td>15%</td>
<td>9%</td>
</tr>
<tr>
<td>OR4: Online Discussion Forums</td>
<td>30%</td>
<td>17%</td>
</tr>
<tr>
<td>OR5: Online Quizzes</td>
<td>41%</td>
<td>53%</td>
</tr>
</tbody>
</table>

Based on the analysis, it was found that the undergraduate and postgraduate learners preferred to use Online Discussion Forums the most (41% and 53% respectively), but did not access much of the Static Pages (3% and 4% respectively). Learners in UG1 spent more time in accessing the Online Quizzes (30%) than the postgraduate learners (15%), but learners in PG1 (17%) favour more on the Hyperlinks to External Websites compared to the undergraduate learners (9%). It was also observed that the both the undergraduate (17%) and postgraduate (11%) learners accessed the Folders of Course Content almost equally, with slightly higher access from the former.

Learners from UG1 were keen to participate in the online quizzes prepared by the teacher and include numerous types of questions such as multiple choice questions and true/false questions. Each time the learners attempt the online tests; questions would be extracted from the questions bank in the LMS and be presented to the learners. Upon completion of the test, learners will know the score and obtained answers to questions attempted. Online quizzes have become a web-based resource that allows real-time assessment to the learners’ learning. Despite scores obtained are not taken into account as part of the course marks in WOU, online quizzes are perceived as a valuable learning resources to test learners’ own understanding and be more well-prepared for examination. This reflects the undergraduate learners’ higher uncertainty avoidance as they aim to better perform in the final examination via practice exercises and constantly test their knowledge. They have also shown preference in accessing the resources from folders of course content which include mostly topic exercise questions, answers to the exercises in the printed materials and lecture notes. These resources mainly explain and elaborate the essential concepts of the study unit. Hence, in terms of the dimension of interaction with this type of online content, it would more be at the expository or explanatory level.
On the other hand, learners from PG1 have shown greater preference in exploring the external web links provided which are related to the course topics. They have demonstrated initiatives to learn something more as well as to broaden their thinking, and not just confined to course materials. Generally, undergraduate learners still perceived printed/online learning materials as most reliable and authoritative in determining their learning outcome from the course and may face difficulties in grasping the main points arising from browsing and reading from other external websites. Learners in PG1 utilized more than 50% of their time participating in the online discussion forums that allow asynchronous exchanges of ideas among peers and with teacher. This indicates that they value online resources which allow for 2-way communication and also suggests that they are getting acquainted with active involvement in the online environment. It was also noted that postgraduate learners seek to acquire knowledge for self-enhancement and to apply the knowledge gained in their daily work life, in return of recognition from others.

Learners’ Interaction with Teacher and Peers in the Online Discussion Forums

In this study, the content of exchanges preserved in the online discussion forums is viewed as one of the important learning resources that are present in the online learning environment. Thus, learners’ access to the online forum has been one of the indications of learners’ interaction with the online content. Discussions in the online forums are often a reflection of learners’ thinking process of the course content. Learners’ discussions on the online forums create a learning environment that reflects online collaboration effort. In the forums, learners are able to view the entire process of the queries raised, the analysis of the queries and how the queries are resolved or concluded among their teacher and peers. Hence, learners are able to extend the knowledge and clear any doubts that they have about a subject, despite not posting any responses.

There were a total of 181 discussion topics initiated in the Forums of UG1 and 168 discussion topics for PG1. Figures 4, 5 and 6 depict an analysis of exchanges transcribed from the Online Discussion Forums in WawasanLearn of UG1 and PG1.

Figure 4. Dimension of Interactions in the Online Discussion Forums in WawasanLearn

![Figure 4. Dimension of Interactions in the Online Discussion Forums in WawasanLearn](image)

For online discussions in UG1, Procedural dimension was the most dominant (29%), followed closely by exchanges at the Expository category (27%) and the Explanatory dimension (23%). On the other hand, exchanges in PG1 indicated Explanatory (33%) as the most dominant dimension, followed by Expository (25%) and Cognitive (19%). While Cognitive dimension was the least dominant for the undergraduate learners (9%), Social exchanges were the least for the postgraduate course (8%).

8 | Page
As shown in Figure 5, most discussions in UG1 remained at Thread=2 (40%) and Thread=3 (25%), while Thread=4 accounted for only 20%. However, for PG1, 58% of the discussions proceeded to the fourth thread and beyond. For both courses, there were very few messages (5% for UG1 and 2% for PG1) which remained at the first thread without any ensuing reply.

With many formal education setups are still heavily exam-orientated, learners’ questions and concerns tend to gravitate towards examination procedures and strategies, as shown in the dominant Procedural dimension for UG1. Web-based interactions not only fulfilled the learning requirement, but also addressed the social need for bonding and friendship. This finding also highlights the elements of collectivism in Malaysian culture particularly in the case of UG1 with exchanges at Social dimension accounted for 12%.

The findings have also indicated that postgraduate learners aim to gain more knowledge in their learning activities as reflected in the exchanges at explanatory dimension. At the same time, the results implied that they are quite independent and could easily adapt to a web-based mode of education. As observed in PG1, learning was the acquisition of knowledge or skills from others and a change in understanding of external things and oneself. Learners in PG1 portrayed independent thinking in articulating their views on the discussion topics and appreciated the support and sharing of knowledge by teachers and peers in the web-based learning environment. Furthermore, they are intrinsically motivated in enrolling for the course to improve the economic growth and self-respect based on ability and competence. It appeared that PG1 learners appreciated the online platform for subject matter related discussions at slightly higher level of dimension of interaction. These included demonstration of knowledge/facts with elaborated explanation based on peers and teacher’s responses, as well as providing constructive feedback and detailed commentary on course content via critical thinking. Statistics for UG1 indicated a high level of Thread 2 interaction activity due to the fact that most exchanges were at the Procedural dimension and were geared towards obtaining a single direct answer to a query.

Figure 6. Categories of Exchanges in the Online Discussion Forums in WawasanLearn
As shown in Figure 6, most messages were initiated by the teacher to the group of students (49%) in UG1. Messages from student to teacher accounted for 30%, and student to group for another 20% for discussions at undergraduate level. Meanwhile, learners in PG1 posted most discussions to their group/peers (50%), while 25% of the discussions were initiated by the student to teacher and 24% of the discussions were initiated by teacher to group. Similar observation occurred for both UG1 and PG1 that least exchanges happened for the category of teacher to student as they usually utilized the Messaging system in LMS for one-to-one communication.

For undergraduate courses, the teacher often planned the learning tasks and followed up with directives or instructions, which was particularly visible at the beginning of the course. Teaching-learning activities for UG1 appeared to be more teacher-centered as compared to PG1. Learners in PG1 appeared to value sharing and exchanges of knowledge with their peers, and teacher was viewed as facilitator. Discussions at PG1 were very much learner-centered with the learners engaging in deliberation of thoughts with their fellow course mates.

The above findings have also shown that both undergraduate and postgraduate learners, in general, are adapting well to the online learning environment. In fact, the postgraduate learners have shown great participation and utilization of the online resources in the LMS.

**Recommendations and Conclusion**

Various elements such as the types of web-based resources, functions and usage of the resources, interactivity and feedback capability of the resources and so on often influence the learners’ interaction with online content. It is indeed important to consider these elements and the interplay among them in improving learners’ frequency of access to the online resources and their level of participation. While the selection and delivery of online content should take into consideration practical guidelines of a good web-based content such as accessibility, flexibility, interactivity, ease of navigation, motivational value and its effectiveness, the online environment should be sustained in catering for the needs of the students.

As general guidelines, the online learning environment should always allow for quality interaction between the learners and content, learners and teacher, as well as learners and peers. The design and organization of online learning materials should be closely related to the intended learning outcomes, and not by merely having loads of materials to supplement the existing materials. Online learning materials need to be congruent with the learning objectives of the course. Providing as much resources as possible to the learners tends to be thought as effective teaching, however, this could actually divert the learners’ attention away from focusing on the intended learning outcomes to be achieved and possibly caused information overload. The interaction with content should not just be a one-way interaction via purely text display or conversion of learning materials to digital forms. The organization of online learning materials may include other forms which have the capability of providing immediate feedback and stimulate the learning process. The knowledge exchanges generated from interaction among the learners and between learners and teacher have become the essential learning materials for open distance learners. As ODL learners tend to feel lonely throughout their journey of acquiring knowledge, timely feedback plays a vital role to eliminate the negative feelings associated with on-line learning. Feedback can be broadly defined as the exchange of information between learner-instructor, learner-learner and learner-LMS with regard to an action, event, or process that results in enhanced student learning. Appropriate training is crucial to equip teachers with necessary facilitation skills towards enhancing learner-centered interaction in the web-based learning environment, acknowledging the fact that teachers are managers of learners learning experience.
This study has uncovered differences in the online learning behaviour of undergraduate and postgraduate learners. Based on the findings above, several recommendations are proposed to enhance the design and delivery of web-based content, aiming at maximizing the efficacy of the online learning environment of undergraduate and postgraduate courses in open distance education.

Teachers could actually plan the phased availability of online content based on the habits of learners’ access to the online resources during the semester. This has also serves as a mean to promote and sustain the motivation of the learners in utilizing the online learning environment. Based on the analysis of the pattern of access/activity in the LMS, activity level for undergraduate courses can be further enhanced in the beginning of the semester by the teacher contacting the students before the commencement of the first class and welcome them to the course. In order to sustain the interest of the undergraduate learners, throughout the semester, teacher can upload further online activities after each tutorial. On the other hand, as postgraduate learners are more independent and motivated to acquire/share knowledge, constant updates about the course content there are relevant to the industries (e.g. case studies) can be posted in the LMS for their discussions.

In addressing the findings on the learners' interaction with online resources, more online quizzes can be made available to the undergraduate learners for them to test their understanding of the course content. Teachers should incorporate more variety of question types via establishment of a questions bank to capitalize on the effectiveness of online tests. From the scores recorded and analysis of questions attempted by the learners, teachers would then be able to improve on the course content delivery. As for the postgraduate courses, discussions in the online forums should be further encouraged while higher level questions can be posted as online quizzes for the courses. While hyperlinked websites serve as additional learning materials that supplement the course content, the number of hyperlinks made available for the undergraduate learners should not be too many as it may divert the learners’ attention. In this case, it is more effective if teachers could summarize and arrange the main points from supplementary readings for learners.

As for improving the interaction in the online discussion forums for undergraduate courses, teacher can initiate more discussions to guide exchanges at higher level of dimension, weaning learners away from too much on procedural matters. This will then lead to them engaging in deeper interactions in the forums. At the same time, online teaching-learning for undergraduate courses should be moving towards student-centered learning. Teachers for these courses can first create a 'safe' and welcoming environment in encouraging the learners to initiate discussions in the virtual space. Teachers need to capitalize on various techniques to break the ice as well as to create a friendly web-based learning environment in order to eliminate the gap caused by distance and non-face to face communication particularly for undergraduate learners. Once the learners are used to the web-based communication environment, they will adopt and participate in online communication.

As a conclusion, the quality of interaction between learner and online content, as well as learner-teacher-peers has to be ensured in achieving efficacy of web-based teaching-learning towards the creation and maintenance of sustainable learning communities.
References


Appendix A:
A Snapshot of the Main Page of a Sample Course in WawasanLearn

BBM 205/05 Business Accounting I
Welcome! Have a great semester!
- July 2010 TMA Submission Deadlines
- Student Guide for Online Assignment Submission
- Link to Online Assignment Submission System

ANNOUNCEMENTS
- Welcoming Letter from Course Coordinator
- Announcements from Course Coordinator
- Announcements from Tutor

ONLINE FORUMS
- Public Forum
- Group Discussions
- Tutorial 1
- Tutorial 2
- Tutorial 3
- Tutorial 4
- Tutorial 5

SUPPLEMENTARY COURSE MATERIALS AND RESOURCES
For your reading pleasure - articles from Accountant Today

Course Overview
- A Brief Introduction about the Course
- Suggested Learning Schedule
- Learning Assessments
- Terminology

Unit 1
Supplementary Materials for Unit 1
Online Activities
- Accounting Basics
- The Accounting Equation
- Chapter 1 Quiz 1
- Chapter 1 Quiz 2
Tutorial 2
Supplementary Materials for Unit 2
Online Activities
- About Accounting
- The Accounting Cycle
- Glossary of Accounting Terms by MAB
- Chapter 2 Quiz 1
- Chapter 2 Quiz 2
- Chapter 3 Quiz 1
- Chapter 3 Quiz 2
- Chapter 4 Quiz 1
- Chapter 4 Quiz 2

Tutorial 3
Supplementary Materials for Unit 3
Online Activities
- About Inventory
- Chapter 5 Quiz 1
- Chapter 5 Quiz 2
- Chapter 6 Quiz 1
- Chapter 6 Quiz 2

...continue to next page
Tutorial 4
Supplementary Materials for Unit 4

Online Activities
- Accounting Information System
- Accounting Software
- Internal Control
- Bank Reconciliation
- Chapter 7 Quiz 1
- Chapter 8 Quiz 1
- Chapter 9 Quiz 2
- Chapter 10 Quiz 2

Tutorial 5
Supplementary Materials for Unit 5

Online Activities
- Receivables
- Payables
- Bad Debt
- Investment
- Chapter 9 Quiz 1
- Chapter 10 Quiz 2
- Chapter 11 Quiz 1

Assignment File, Self-Test and Online Quizzes
- Tutor Marked Assignments (TMAs)
- Finished your Revision? Test your understanding here!

Guide for Tutors
- Student: e:ucm.ac.uk/elearn/learning/july2010
- TCTutor Forum
- Tutor Handbook 2010
- Permission to use hypertext
- Supplementary Materials for Tutors (Slides etc.)
- Latest Tutor Guide for Online Assignment Submission