

Online learner interaction: comparative study on structured and less structured course content in learning management system

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Online Learner Interaction: Comparative study on structured and less structured course content in Learning Management System

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Abstract— One of the major challenges facing distance learning educators is to create an optimum course content that attracts learners and enhances their engagement. To this end, whether course content is highly structured or not is one of the contributing factors that impact learners' interaction with the learning material (Chadwick and Ralston, 2010). A comparative study between a structured and a less-structured course at the post graduate (masters) level were used for this study. This study looks into Oliver and McLoughlin's 5-dimensions of learners' learning interaction, in both a well-structured course and a less-structured course. The finding of this study shows that learners are less participative in a well structured course content compared to weak structured course content. Further exploration by the analysis of the five dimensions of the learners' interaction in the learning management system (LMS) concluded that in the less-structured course content, learners tend to be high in procedural activities such as administrative issues.

Keywords- *e-learning; learner interaction; online course content design; learning management system*

I. INTRODUCTION

e-learning has become popular in the past two decades, providing many benefits for learners, especially working adult learners. With the increasing interest in, and concentration on distance education, the concept of e-learning has seen phenomenal, exponential growth, especially in the Asian region. The growth is partly due to the globalisation and competitiveness of higher education and the development of information and communication technologies (ICT) which have brought a dramatic transformation to Asia (Jung, 2009). The e-learning model has gained paramount importance partly because of the class scheduling flexibility and the fact that the student can study according to their own schedule, which makes the learning experience easier to accommodate while working. Undoubtedly, the education door is now open to a much wider audience than ever before. The e-learning model has posing a challenge for e-learners (especially transition from face-to-face classroom lecturing to self-guided independent learning) but also for e-learning communities and the educators, who now need to create optimum learning content and a context that attracts learners and enhances their engagement (Tatković, Ružic and Tatkovic, 2006; Hossain, 2010). Whether course content is highly structured or not is one of the factors that impact learners' interaction with the learning management system (LMS) in the e-learning environment (Chadwick and Ralston, 2010).

II. BACKGROUND & LITERATURE REVIEW

Pedagogy for distance education is unique and requires a different instructional design tailored to the needs of e-learners. Some researchers have termed this online distance education pedagogy as electronic pedagogy (Natriello, 2005). Barker (2008) posited that online course design is a complex activity influenced by a wide range of factors from pedagogy to various technologically related factors. Studies on distance education courses contend that learning design which has highly structured course content is more likely to be successful compared to ill-structured course content, in promoting student learning (Kearsley and Lynch, 1996; Ostlund, 2008; Saba, 2005). The term structure refers to the elements in the course content design, such as the learning objectives, information presentations, activities, assignments, and feedback mechanisms that are uniformly controlled and organised in well structured manner.

Various researchers in the field of distance education (or e-learning mode) have reported that the most critical factors in this type of learning are course structure and interaction with the learners (Stein et al., 2005). Lee and Rha (2009) studied the influence of instructional design and management style on student achievement and resulting student satisfaction with the distance education environment. The researchers developed two web-based instructional programs. One course was developed in a highly structured, resource-based, self-learning mode, with little interpersonal interaction and the other course was used less structured materials with more interpersonal interaction. Their results suggested that a well-structured instructional program can be provided as a substitute for teacher's interaction. Learners from the well-structured instructional course can learn by themselves with very little interpersonal activities such as forum discussions. This is important for distance learning because there is in fact a computer mediated-separation between the teachers and the learners.

Because different ways of presenting instructional materials in e-learning have been found to have different effects on learners' achievement, researchers have become increasingly interested in understanding the role structural presentation of instructional strategies plays in learning. Hosie, Schibeci and Backhaus (2005) highlighted that when presenting course content in the online environment, it is always best practise to play it safe by never assuming anything. The idea behind this comes from the belief that since instructors are not able to have

a face-to-face classroom experience with their learners, it is very important to make sure the course content be organised in such a manner that it promotes a sense of continuity. The course content must be concise and explicitly clear to avoid any errors or discrepancies that confound the learners. In addition, Junk, Deringer, and Junk (2011) posited that learning management systems such as WebCT, Blackboard or Moodle, designed for online learners, must be well organised and have visually pleasing web content display to “astonish the customer”, since online learners are accustomed to surfing the Internet and viewing commercial sites developed by graphic designers, and have come to expect this level of development in any web-based environment.

The interactions between the instructors and learners occur when one gives instruction and the other responds, and it is a two-way communication. The interactions and relationship between instructors and learners in distance education are extremely important, since learners usually carry on a dialog with their instructors that are separated in both space and time (Mahaesh & McIssah, 1999). Moore (1991) defined this separation of geographical distance between learners and instructors as „transactional distance“. He claimed course structure and learner-instructor dialog are important elements in transactional distance. The theory posits that a rigid and inflexible program structure will reduce dialog, hence increasing transactional distance.

Oliver and McLoughlin (1997) explored the discourse of interaction and communication in live interactive television (video conferencing in our present time). They investigated five possible dimensions of interactions present in that context. They characterised the dimensions of interactions as: social, procedural, expository, explanatory and cognitive. Each of the interactions requires different classifying interaction activities such as social interaction involves conversations that establish relationship; procedural involves dialogue that exchanges information about procedures in general; expository involves demonstrating knowledge or skill in general; explanatory involves further extending knowledge and developing content in the conversation; and finally cognitive involves constructive feedback to a learner’s response resulting in internal reflection.

Based on Oliver and McLoughlin’s ideas, Wu and Teoh (2007) have done a comparative study on two distance learning higher institutions (one in Malaysia and another one in China) regarding learners interaction in learning management systems (LMS). They found that the explanatory dimension of interaction was the more dominant dimension in Malaysia’s learners than in its counterpart in China. The procedural dimension was the dominant dimension among China’s learners.

III. MODEL FOR THE STUDY

The researchers hypothesize that the design of the structural course content (i.e. well-structured versus weak-structured) would motivate learners to be more engaged in their materials on a continuous basis, which in turn will promote more learner interaction. Secondly, learners’ participation in online discussions, such as the discussion forums, which are mainly learner-dominated rather than instructor-dominated, could be effected by the course structure. For instance, learners who find

the course content in Learning Management System (LMS) helpful and informative, navigating and finding the information easily, may participate less in online forums, contrariwise, learners who find the course content is insufficient, may require more guidance or assistance, hence they may participate more in the online discussions.

Synthesising the review of literature from the previous section, the following figure 1 illustrates the research framework for this study.

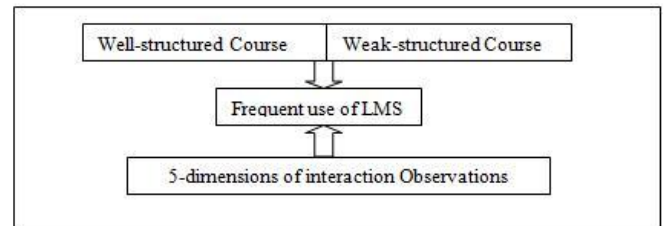


Figure 1: Research Framework

A. Research Questions

Q1: Are learners less participative in the LMS in a well-structured course compared to a weak-structured course?

Q2: What is the form of interactions, in the context of the five dimensions, in a well structured course compared to a weak-structured course in the online discussion forum?

Q3: What did the learners’ perceived course content display between a well- structured course and weak-structured course in LMS?

IV. METHODOLOGY

The study was conducted in January semester of 2011 at an e-learning higher institution in Penang Malaysia. All participants in this study are learners from two post-graduate courses, one course was well-structured and organised and the other course was less-organised and less-structured. Data was obtained from LMS as well as from survey questionnaire from two courses selected for this study. We conducted an end-of-semester Student Opinion Survey in both courses, giving students opportunities to respond to pre-coded questions based on 4-points scale (1-strongly disagree to 4-strongly agree) and open-ended questions. Both courses had a significant difference in terms of the level of structure in the course material presentation. The courses were: **Project course (B1)** and an **Operation Management (B2)** course. Both courses were taught in the January semester 2011 running from January of 2011 to June of 2011. A total of 117 learners enrolled in the B2 course and 45 learners were enrolled in the B1. Since the B1 is the prescribed last course that learners take before graduating, the course requires pre-requisites compared to the B2 course, hence, the enrolment is generally small. *The B1 course is designed to be more content dependent, less-structured and student learning is mainly self-guided in the LMS, although a project supervisor is assigned.* B1 is inherently less-structured as the objectives require the learners to synthesise the various bodies of knowledge from the previous courses and demonstrate soft skills such as critical thinking in completing the final project report. *The B2 course*

was presented in a more traditional well-organised and well-structured. In the B2 course common resources are included within each study unit/ tutorial in a folder that contains additional summaries/notes in presentation files and documents, hyperlinks to relevant external websites, online quizzes and other online activities, assignments, sample of assignments, and all necessary information pertaining to the course are included. On the other hand, resources presented in the B1 course contain only a folder for download which has information about conducting a final project.

On the student interaction construct for this study, the researcher adapted Oliver and McLoughlin's (1997) and Wu and Teoh's (2007) framework for analysis of interactions, in which the five dimensions of interaction is shown in table 1. The researcher characterised and coded the learners' interactions in the asynchronous forums (announcements from course coordinators, announcements from tutors, public forum, general group discussion, etc).

TABLE 1. FIVE DIMENSIONS OF INTERACTIONS

Dimension One: <i>Social</i>	Any discussions of social or personal greeting not directly associated with the course. For example, "Greetings! I am Janice Oh and I am new to course", "Hi, nice to meet you all in this forum" etc.
Dimension Two: <i>Procedural</i>	Any communication related to administrative procedures/ issues for the course. Some examples of this would be: "When is the assignment 1 due?", "Can I get an extension for my assignment 2, because I am going overseas for assignment...", etc.
Dimension Three: <i>Expository</i>	Any request that involves some demonstration of knowledge and facts which may or may not require further explanation. For example, "Operation Management is derived from the operation aspect of business", "What do methodologies in a study look like?", etc.
Dimension Four: <i>Explanatory</i>	Any discussions on the topic for the course as explanatory when there is a need for explanations or elaborations of certain ideas/theories/ concepts. For instance, "What are the pros and cons associated with working with small sample population for the study?", "Can you elaborate on the concept of variables, how to define it in a study?", etc.
Dimension Five: <i>Cognitive</i>	Cognitive discussions as those that require feedback and commentary via critical thinking that would lead to knowledge gains between the learners, CC, or tutors. Example would be "I know the literature review is the part where we review the available or related literature on my topic, but how can I find or locate good reference articles in our library? And, if our library doesn't have the articles or books where else might I find them?", etc.

V. FINDINGS AND DISCUSSION

Descriptive statistics were used to summarise the study findings. One hundred and sixty learners took part in the study with 43 learners from B1 and 117 learners from B2.

The number of learners for B1 is much smaller than B2 due to the nature of the program, as B1 is the final capstone project for learners who are near to the end of the programme, either of the last two semesters for the degree. As explained in previous section, B1 is a less-structured design and less informative while B2 is well-structured design and very informative in nature.

Research Questions

Q1: Are learners less participative in the LMS in a well-structured course compared to a weak-structured course?

The hypothesis for this question was that learners from the B1 course would be more participative in their interactions in LMS. The interaction responsiveness defined as the number of total postings and interactions collected throughout the semester.

TABLE 2 NUMBER OF POSTINGS FOR BOTH COURSES FOR THE SEMESTER.

Participative	B1	B2
Public Forum Postings	122	57
Announcement from Course Coordinator Postings	45	3
Announcements from Tutors Postings	3	12
Total Participative	170	72

This finding indicated that B1 learners have a high ratio of postings (170) compared to B2 which recorded 72 postings. The results imply that the B1 learners are perhaps more uncertain or need more guidance during their course and are communicating with their peers, tutors, and course coordinator, hence, they are using the LMS and postings are considerably higher in comparison to B2.

Q2: What is the form of interactions, in the context of the five dimensions, in a well structured course compared to a weak-structured course in the online discussion forum?

To answer this question, Oliver and McLoughlin's (1997) and Wu and Teoh's (2007) framework in analysing B1 and B2 were adapted. Table 3 shows the dimension of interactions in between B1 and B2.

TABLE 3. DIMENSION OF INTERACTIONS

Five Dimension of Interactions	B1	%	B2	%
<i>Social</i> (e.g. Welcome Message, not directly related with course content)	5	3	2	3
<i>Procedural</i> (Learning Obj/outcomes, assessment tasks, involve explanation on course related procedures, requirements and administrative issues)	95	56	12	17
<i>Expository</i> (Demonstration of knowledge without much further elaboration)	15	9	7	10
<i>Explanatory</i> (Elaborate explanation on knowledge and developed content based on learner's response)	16	10	29	40
<i>Cognitive</i> (constructive feedback and commentary on course content via critical thinking which leads to knowledge development)	39	23	21	30

The findings highlighted that B1 learners are high in *procedural* activities such as administrative issues and assessment requirements related to the course. At the same time, this may also imply that they are very dependent on the LMS and their tutors/supervisors, and course coordinator to gain knowledge from the course. Learners in the B2, however,

are mainly reflected in the *explanatory* dimension, which may indicate that they are exploring and elaborating the knowledge. It appears that B2 learners are more independent and concentrate on gaining knowledge in the course, which may imply they are self-confident in term of the course content presented in the LMS hence require less administrative support.

Q3: What did the learners" perceived course content display between a well- structured course and weak-structured course in LMS?

In this question, the data was extracted from the survey questionnaire of both learners of B1 and B2. Five distinct questions that target learners" perceived the course content layout were asked in the survey. Table 4 represents the summary result of the collected responses.

TABLE 4. ANALYSIS OF LEARNERS" PERCEIVED COURSE CONTENT DISPLAY IN LMS

Survey Questions	B1 (%)				B2 (%)			
	S D	D	A	SA	S D	D	A	S A
Content arrangement is clear, logical and orderly manner	-	25	70	5	-	-	80	20
Content display unfolds in a clear and understandable direction	-	10	75	15	-	5	65	30
Content display explains the knowledge and concepts well	-	-	80	20	-	-	95	5
Course organisation is what I was expected	-	-	90	10	-	-	100	-
Locating the resources is easy and simple	-	25	70	5	-	5	80	15

Note: SD = Strongly disagree, D = Disagree, A = Agree, SA = Strong Agree

Learners were asked to rate their opinion on whether they think the present course content arrangement is in a clear, logical and orderly manner. Eighty percent (80%) of B2 learners" rated agree and 20% rated strongly agree with the asked statement. Contrary, on B1 response, 25% rated disagree and 75% rated on either agree and strongly agree. The second question asked learners to rate the course content display was clear and presented understandable direction, and it was interesting to note that both groups do have some small percentage of them disagree upon the asked question. Ten percent (10%) of B1 learners perceived the course content display were not clear and was not presented in an understandable direction whereas only 5 percent from B2 learners has the similar opinion. Third question was seek to understand learners thought on the content display sufficient information for helping them learn the concepts well and gain knowledge by browsing the course content in LMS. Both groups agreed that the content did sufficiently provide and help them in gaining knowledge and understand the learned concepts well. Similar result was recorded on question four where all learners (100%) from B2 rated agree on perceived their course content was well organized and meet to their expectation. On the other hand, nearly 90% agree and 10% strongly agree with the asked of this question from B1. Finally, the last question seeks learners" input regarding locating the

information presented was considered easy and simple. Twenty-five percent of B1 responded disagree with locating the resource is easy and simple whereas only 5% B2 learners disagree.

However, it is noticeable that there is a vast difference in terms of content arrangement between B1 (75% agreed) and B2 (100% agreed). This may be an indication that B1 learners are dissatisfy towards the content arrangement compared to B2, where some of B1 learners found course content do not presented in a logical and orderly manner.

Overall, the results of above questions suggested that learners found the B1 is poorly structured and information posted in LMS are constantly changing which cause inconveniences for some learners. To some extent, active learner LMS participation is a matter of learners being comfortable with the medium. In this case, B1 learners having difficulty in getting supportive information from the LMS and the involvement in forum interactions were comparative high.

VI. CONCLUSIONS

In conclusion, learners in the well structured and organised course content in LMS show less anxiety and more independent to navigate the LMS resulting in higher motivation and enjoyment, as evidenced by result from research question #1 compare to learners in weak structured and less organised course content. Similarly, learners who are actively participating in the online forums were those that are finding the course content insufficient (weak structured or less organised) resulting more interaction in LMS. Evidence of high involvement of the course coordinator in *procedural* interactions such as involved explanations about course related procedures, requirements and other administrative issues in the forums for weak-structured course content design than for the well-structured course content.

The presented study provides an initial research model that may be expanded and generalised for future e-learning studies on the impact of structural. Although the limitation of only a simple study like this cannot prove "causality", this study did evidence that in distance education environment, learners need a well structured, well organised and informative course content for them to be self-guided, self-explored, and independent for continuity of learning. Future research is needed that looks at a much larger data set such as comparison from multiple e-learning institutions and add additional contextual variables such as learners" learning styles as a new factor into the structural course content design. It is also desirable to redesign this study to further explore the measures of motivation and enjoyment of learners in e-learning environment.

VII. RECOMMENDATIONS

To improve the learners" interaction in LMS especially inherently less structured course such as B1, the recommendations are that a *welcome posting in LMS* by the course coordinator detailing the differences between B1 and the highly structured courses. These differences include:

- No tutorial classes in B1 whereas there are 5 tutorial classes in the well structured courses.
- No units or chapters of study material whereas there are 5 units of study material corresponding to the 5 tutorial classes in the well structured courses.
- No fixed questions in the assignments in B1 whereas the opposite applies for the well structured courses.

By doing so, learners are informed, prepared and aware of the differences of the previous courses than in this B1 course. Hence, they are able to make a mental adjustment and adapting well to the structural different in content design.

A framework of the course assessment in table form posted in LMS to explain the difference in assessment between B1 and the well structured courses. B1 being an individual research project work by the learner necessitates individual meetings with the supervisor. To assists the learners in less structured courses, the recommendation is to have at least 2 tutorials at the beginning of the semester where the learners attend classes to revise on the fundamental concepts such as literature review, research methodology etc. The inclusion of the 2 tutorial classes serves to add structure to B1 course and bring a sense of familiarity to learners pre-conditioned to well structure courses.

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