Collaborative Online Learning (COL) for Fluid Mechanics – A Case Study

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ABSTRACT

This paper describes the initial stage of design and implementation of Collaborative Online Learning (COL) for Fluid Mechanics at Open University Malaysia (OUM). The COL is a collaborative learning environment which relies on group discussion rather than one-to-one mentoring. Discussion is focused on tasks given, exploring questions and building knowledge together to present the experiential learning for successful implementation of COL. A case study has been conducted to a group of students studying Fluid Mechanics for Civil Engineering programme. Based on the questionnaire conducted, the potential of COL as a learning tool is very encouraging.

KEYWORDS: Online Collaboration Learning, Engineering Programme, Open and Distance Learning.

INTRODUCTION

Online forum discussion is a recent phenomenon and it is part of many teaching and learning programmes. The aim of online forum discussion is to facilitate the transparent discussion which offers direct accessibility to learning resources or materials. In distance education, discussion and sharing experiences have been identified as two of the most effective means by which adults learn (Williams, B., 2004).
According to Muthusamy, K., and Fadzil, M. (2004), collaborative learning refers to an instruction method in which learners at various performance levels work together in small groups to achieve a common goal. The learners are responsible for one another’s learning as well as their own. This will lead to success of one learner helps other learners to be successful. Learners and facilitators contribute to the process of knowledge construction by providing ideas and opinions, sharing experiences and simultaneously engaging in deep learning activities (OUM COL Model, 2004). Koehn (2000) reported that employers have indicated that they are not fully satisfied with the individualistic approach of the average engineering graduate. To support this statement, therefore, current conventional method of lecturing will not give the best solution. In this context, collaborative learning method is an additional method to solve this problem.

In Open University Malaysia (OUM), a pilot study of COL Model (Kuldip and Zoraini, 2004) was implemented in September 2004 for two (2) Teaching English as a Second Language (TESL) courses for in-service teacher trainees. In this year, a project team namely Collaborative Online Learning Team (COLT) was set up under the Center of Instructional Design and Technology (CIDT) department and each faculty proposed two courses to undertake this project. To begin with, the Faculty of Engineering and Technical Studies (FETS) selected Fluid Mechanics course for COL.
COLLABORATIVE ONLINE LEARNING MODEL

OUM has developed a model referred to as OUM Collaborative Online Learning (COL) Model (Kuldip and Zoraini, 2004) to assist and enrich the learning experience of OUM’s distance learners. The model comprises four components namely the task, instructional or support, discussion and knowledge construction. The components descriptions are as follows:

- **Online Collaboration**- by using the forum in my Learning Management System (*myLMS*) as a platform, learners and tutors or Subject Matter Experts (SME) can work together to share the common goals. For example, discussing the assignment task of a particular course or any course content related. In this virtual classroom, the chain of learning process take place such as gaining understanding of the task requirement, deliberating on ways to perform the task, sharing outcomes of the task and evaluating the outcomes of the task.

- **Task**- a course assignment.

- **Learning support**- online instructional support for the task and guidance from the tutor and subject matter expert (SME).

- **Discussion**- tutors and learners participate through asynchronous threaded discussions to solve problems related to the assignment.

- **Knowledge construction**- the outcome of the task which the learner learned from peers or tutors whether it is a new knowledge or improved the understanding of the knowledge.
Case Study: Group Learning of Fluid Mechanics for Civil Engineering

Background

Under the Faculty of Engineering and Technical Studies (FETS), a pilot study of COL Model has been selected and tested on the learners undertaking the Fluid Mechanics for Civil Engineering course. This course was taught in January 2005 semester which comprises of 185 learners throughout Malaysia. They were divided into 17 groups and led by their respective tutors. This course was administered by the dean of the faculty, course coordinator and subject matter expert. Prior to the first tutorial, the tutors were given tutorial session planning guidelines for all five tutorial sessions and power point slides to assist their teaching.

The course is an introduction to the principles of fluid mechanics, basically analysing the behaviour of fluid, either at rest or in motion. The learners are required to attend five tutorial sessions totaling ten hours of face-to-face interaction, self-managed learning with printed module given, online discussions— which is focused on the discussion of the required task assignment for this course. The learners also were equipped with the power point slides as the summary and a short-quiz with answers that are built in the myLMS. This short-quiz is an additional to the exercise and tutorial questions given in the printed module.

Task: Assignment

The task is designed to suit the requirements of the collaborative online learning and also it is based on the examination orientation. The learners need to complete an assignment (15% out of 50% continuous assessment) which includes three major
tasks and participation in online discussion (OLP) (5% out of 50% continuous assessment) based on the assignment task.

Measurement: Assessment of OLP

In order to encourage learners to participate in online discussion, they should be assessed by marks according to their discussion contributions. Under the COL course, the COLT members have formulated an integrated assessment to standardize the 5 percent marks given for OLP. Every tutor will give the learner a maximum of 2 points for frequency of contribution and a maximum of 3 points for quality of contributions. Hence, the total will be anywhere from 0 to 5 points (0 to 5 percent of total marks for the course).

myLMS Tool – forum

In OUM, myLMS tool is a platform where learners can communicate with their peers, tutors and SMEs. Under the main online discussion menu, there are three folders entitled General, COL Assignment and Open Discussion. The General folder is basically for the tutors and learners to post general information whereas the COL Assignment folder is meant for discussion on the assignment task and it is a graded discussion (5% of OLP). The open discussion folder is for discussions related to the course contents.

Threaded Discussion

Analysis was carried out on three tutorial groups and a total of 175 threaded discussions were analysed. Based on the finding, an average of 68.2 percent of three group discussion was COL discussion compared to Open Discussion where an average of three groups was 47.6 percent. Table 1 shows the COL discussion components in percentage. For all groups, the Guidance component scored the
highest percentage compared to other components. Through the Guidance component, tutors support learners in questions, leads and simplifying difficult course contents. Interdependence component scored the second highest percentage where learners helped each other by discussing and solving problems on their own. Only a small percentage of Extension component discussion involved. Minority of learners are recognized to go beyond their current ability to challenge the tasks given.

Table 2 gives a different scenario of Open Discussion. Six main categories were identified. Group 1 mainly focused on discussion related to exercises of the module, motivation and study skills. On the other hand, group 2 and group 3 discussed on the module content, laboratory discussion and revision for the final examination.

![Percentage of COL and Open Discussion between Groups](image)

Figure 1: Percentage of COL and Open Discussion between Three Tutorial Groups
Table 1: COL Discussion categories based on the COL Model between Three Groups

<table>
<thead>
<tr>
<th>COL component</th>
<th>Group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Interdependence</td>
<td>12.24</td>
</tr>
<tr>
<td>Guidance-Tutors</td>
<td>53.06</td>
</tr>
<tr>
<td>Extension</td>
<td>8.16</td>
</tr>
<tr>
<td>Total</td>
<td>73.47</td>
</tr>
</tbody>
</table>

Table 2: Open Discussion categories between Three Groups

<table>
<thead>
<tr>
<th>Open Discussion component</th>
<th>Group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Module contents</td>
<td>0.00</td>
</tr>
<tr>
<td>Exercises</td>
<td>12.24</td>
</tr>
<tr>
<td>Revision for final</td>
<td>0.00</td>
</tr>
<tr>
<td>examination</td>
<td></td>
</tr>
<tr>
<td>Laboratory discussion</td>
<td>0.00</td>
</tr>
<tr>
<td>Study skills</td>
<td>2.04</td>
</tr>
<tr>
<td>Motivation</td>
<td>12.24</td>
</tr>
<tr>
<td>Total</td>
<td>26.53</td>
</tr>
</tbody>
</table>

Results of Questionnaires

(A) Online Forum
Based on questionnaires carried out in one of OUM Learning Center, 94.6 percent of the learners agreed that online discussion is useful and important for distance learning. Majority of learners (96.4 percent) think that online discussion is effective in improving the learning of the course. Learner online interaction has become a critical component of the learning context in distance learning.

(B) Assignment Content
Learning task plays a major role in increasing and enhancing collaborative online discussion. Tasks designed must be able to capture the learner’s attention positively towards active participation in online discussion. From the survey carried out, about 64.3
percent of learners commented that assignment content was average, 33.9 percent was good and 1.8 percent found that it is not suitable in encouraging online forum discussion.

(C) Tutor’s Role
98.2 percent of learners agreed that tutor’s initiative is very important to encourage online discussion. Tutors should interact frequently and constructively with learners to gain a dynamic online discussion.

SUMMARY
This study is limited to small sample size. Our findings from the survey showed that the potential of COL as a learning tool is very encouraging. From the threaded discussion, it is found that using Assignment Task in COL is very effective to enhance the understanding of the subject matter. In addition to this, the Assignment Task is tailored to the final examination question where it promotes the understanding of the subject matter.

In conclusion, based on the survey conducted, two main factors contribute to the success of COL:
- Design of the task which can lead to dynamic discussion.
- Tutors interact frequently and constructively with the learners.

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REFERENCES


