Teaching Engineering Programmes via Open and Distance Learning- The Perceptions and Challenges

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ABSTRACT

This paper describes the experiences of teaching engineering programmes at Open University Malaysia (OUM). Teaching engineering programmes via Open and Distance Learning (ODL) is perceived to be more difficult and perhaps more challenging than the traditional university system. This is due to the constraints set by the engineering profession such as minimum face-to-face contact hours, the ratio of academic staff to learners and laboratory facility in order to obtain accreditation. The challenge is to overcome this perception by introducing new learning pedagogy to produce high quality and competent graduates. The teaching methodology at OUM is based on the blended pedagogical approach consisting of face-to-face tutoring, self-managed learning and online discussion forum. Additional approaches were implemented to enhance student learning experiences and understanding, that is, by using problem-based learning (PBL) and collaborative online learning (COL). This paper explains in detail the learning pedagogy at faculty of engineering and technical studies (FETS) of OUM.

KEYWORDS: Open and Distance learning, Engineering Programmes, Collaboration Online Learning, Problem-Based Learning.

1. INTRODUCTION

Malaysia is gearing towards a developed country by year 2020. This aspiration has been translated into various policies to produce a knowledgeable society that supports the knowledge-based economy. Education plays an important roles to ensure that the country have sufficient skillful and knowledgeable workforce to fulfill the demand of the industries [1]. Numerous academics institutions and training centers have been set up by the government to train and upgrade the capabilities of the workforce. OUM is one of the institutions set up by the government to democratize education. OUM offers diploma, undergraduates and post graduates programmes through the ODL mode. Through the ODL mode, learners can pursue their education without leaving their jobs.

Teaching of engineering programmes via the ODL mode is a challenging task. It is being perceived to be more difficult and perhaps more challenging than the traditional university system. It is due to the constraints set by the engineering profession such as minimum face-to-face contact hours, academic staff to learner ratio and laboratory facility. The challenge is to overcome this perception by introducing new pedagogical learning approach to produce high quality and competent graduates.

The foundation of the teaching methodology at OUM is based on the blended pedagogical approach consisting of face-to-face tutoring, self-managed learning and online discussion forum [2]. This paper will discuss the blended approach, the problem based learning (PBL) and collaborative online learning (COL) adopted by the FETS.

2. LEARNING MANAGEMENT SYSTEM

Learning management system (myLMS) is an e-learning platform developed by OUM. It supports and enhances online learning at OUM. It enables tutors and learners to bring the face-to-face classroom into virtual environment. Through myLMS, tutors and learners can access course materials and references, communication tools and collaborative tools such as online discussion forum for the purpose of teaching and learning [1]. The online discussion forum allows the learners to write to tutor or another learner, with or without attachment. The forum is open to all learners enrolled for the same courses. As such, any learners from different centre can participate in the forum to exchange ideas.

3. LEARNING PEDAGOGY

3.1 BLENDED PEDAGOGICAL LEARNING

OUM adopted blended pedagogical approach of learning [1]. It consists of three key elements:

a. Face-to-face tutoring
b. Self-managed learning (SML)
c. Online Interactions

Table 1 describes the breakdown of actual hours for the three credit hours courses on the respective blended learning modes.

Table 1: Blended Learning Mode

Blended Learning Mode	Hours
Understanding the course	5
Self-Managed Learning	60
Face-to-face Tutoring	10
Online Interactions	10
Assignment/s	20
Revision	15
Total	120

3.1.1 Self-Managed Learning

Upon registration, learners will be given printed module for supporting self-managed learning. The numbers of topic in the module vary from 9 to 12 topics. Learners are required to read an average of 2 to 3 topics before attending the tutorial. Refer to table 1, OUM expect the learners to allocate a minimum of 60 hours of self learning for each module. SML weighs 50% of the total learning hours. This excludes the online interactions and assignment hours, which indirectly form part of SML. This shows that ODL very much emphasize on the SML. As such, additional materials like CD-ROM and multimedia learning kits are also provided to the learners for self-learning.

3.1.2 Face-to-Face Tutoring

The learners meet five times per semester, two hours per tutorial and ten hours per semester. Although OUM offers ODL programmes, the face-to-face tutoring is very vital for the success of the ODL programmes. It is the forum for the learners to meet the tutor and to seek help or clarification on the related programmes. The forum also encourages learners to learn as a group to improve the effectiveness of learning through peer-to-peer learning.

3.1.3 Online Interaction

The online discussion forum allows the learners to write to tutor or another learner, with or without attachment. It is one of the many features of myLMS. The forum is open to all learners enrolled for the same courses. As such, any learners from different centre can participate in the forum to exchange ideals. This facility is very crucial for the ODL learners because the face-to-face meeting is limited to 5 meeting per semester.

3.2 PROBLEM-BASED LEARNING

PBL was invented by McMaster University medical school 30 years ago. It is a total integration approach to the learning system where the learning process moves towards learner-centred learning to produce competent graduate. Typical essential characteristics of PBL methodology [2] are described as follows:

a. Problems are designed to emulate real-world problem.
b. Problems used are complex and cover multiple objectives.
c. The problems are introduced first, before any learning occurs.
d. Student work in collaborative groups to gain multiple perspectives on possible solutions.
e. Student must have the responsibility of SML.
f. What student learned during their SML must be applied to the problem with reanalysis and resolution.
g. Analysis of what has been learned with the problem and a discussion of what concept and principles have been learned is essential.
h. Self and peer assessment should be carried out at the completion of each problem.
i. Examinations must measure learner progress towards the goals of PBL.

The PBL characteristics are aim at developing learner problems solving skills, self-managed skills, teamwork skills and effective communication skills during online interaction and face-to-face tutoring. The objective of incorporating PBL into the OUM learning system at FETS is to inculcate pro-active SML among the learners via myLMS platform.

3.3 COLLABORATIVE ONLINE LEARNING

OUM has developed a model referred to as OUM *Collaborative Online Learning (COL)* Model to assist and enrich the learning experience of OUM learners [3]. By using the forum in *myLMS* as a platform, learners and tutors or Subject Matter Experts (SME) can work together to share their point of views. For example, a discussion on the assignment task of a particular programmes. In this virtual classroom, the chain of learning process take place such as gaining understanding of the task requirements, deliberating on ways to perform the task, sharing outcomes of the task and evaluating the outcomes of the task. The model comprises of four components namely the task, instructional or support, discussion and knowledge construction. The components descriptions are as follows:

Task
Assignment related to the particular programmes.

Learning support
Guidance and support 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 improved the understanding of the knowledge.

4. LABORATORY SESSION

The laboratory session is important for the engineering programmes. The session allows the learners to apply the theory they learn in the module through hand-on experience. Although the engineering programmes are offered via ODL at OUM, the weightage of the laboratory session is on par as the conventional classroom-based university. There are 33 OUM centre nationwide (Malaysia). Hence, it is not economically viable to establish our own laboratory facilities at each centre. Instead, the faculty collaborates with Malaysia public universities and polytechnics in various states. The faculty prepares the laboratory sheet to meet the requirement of OUM programmes. The public university and polytechnic provide the facilities.

CONCLUSION

This paper presents the teaching of engineering programmes via distance learning mode at OUM. The combination of the learning pedagogy at the Faculty of Engineering and Technical Studies has shown the positive result. It influences the learners learning process and experience positively. The negative perception about teaching engineering programme via ODL can be overcome by producing all rounded and competent graduates. The high employability and career advancement of the learners / graduates can be used as a variable to determine the competitiveness of the engineering programmes offers via ODL at OUM. The challenges for the faculty is to convince the Board of Engineers, Malaysia (BEM) that the engineering programmes offers via ODL is on par if not better than the conventional university programmes.

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