

BY USING POPBL METHOD AS A LEARNING PROCESS FOR THE COURSE EC301-COMPUTER NETWORKING FUNDAMENTALS

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Abstract

This paper is to determine the effectiveness of using POPBL method to understand and acquire troubleshooting skills in computer networks as prescribe in the learning outcome of EC301-Computer Networking Fundamentals course using the OBE approach. Through this method, students are able to create a computer network system using WLAN (Wireless Local Area Network) by hand-on or practically (CLO4) and identify the problems faced by students in the campus to access the Wi-Fi signal during implementation of the project (CLO5). A study has been carried out on a group of 17 students who attended the course. The results showed that the project is one of the methods in problem based learning, suitable to teach this course effectively.

Keywords : OBE, POPBL, CIDOS

1.0 Introduction

The tide of changes in technical education that occurs in our country make the process of educating students more complex. Today, changes need to be implemented in the teaching and learning process to be more creative and innovative. Modern engineering profession now needs graduate who possess softskills and competencies in each specific fields. Hence, educators should be sensitive to changes in technology and should be able to adapt to any changes.

In line with the implementation of Migration Project [nhesp 2010]. OBE has become the key factors in contributing to the flexible and innovative teaching and learning environment. Various methods have been used in the process of teaching and learning from kindergarten to the highest level in Institutions of Higher Learning with the help of Learning Management System (LMS) in helping the implementation of effective and efficient teaching and learning activities

The present learning environment has shown that students cannot see clearly the importance of the knowledge they learn in the classroom or laboratory to be applied in the real-world life later. Indeed, learning is not only limited to the content taught in the classroom in a day or syllabus that needs to be completed by the end of the semester. Learning occurs naturally because knowledge are formed together with other skills such as generic skills.

According to Koehn, E.(2011), studies shows that learning based on problems-solving has enabled students to be more motivated to learn, students' attendance increased because they enjoy the learning proses, improved cooperation among group members, increase the retention of information in a long time, expanding the information available and this will spur on lifelong learning.

According to the Group Assessment of Teaching of 21st Century Skills (Julie E, 2012) skills that need to be available to workers in the 21-century are:

- a) Critical Skills and troubleshooting skills
- b) Working in Group, leadership and collaboration.
- c) Ability to communicate and use the media effectively
- d) Literacy and fluency in the use of information and communications technology up to date.

2.0 Literature Review

Some research has been carried out at various countries to identify the personal abilities and technical skills of graduates required by the industry today. The results have expressed some concerns among current graduates (Julie E.Mills, 2013). These graduates of engineering should have strong communication skills and teamwork. But they do not meet the criteria. They need to have a wider perspective in issues of their profession such as social, environmental and economic issues. Unfortunately they don't have the knowledge. Eventually they managed to become a graduate who is knowledgeable and have basic skills in engineering sciences and computers. But unfortunately they do not know how to apply in daily work practices.

National accreditation reviews reports for engineering programmes in countries like USA, UK and Australia (Berliner, 2011) emphasized the revised engineering program criteria of "what has been taught" to "what I've learned". As a result of the report all engineering programs began using the concept of learning OBE in the educational system. Communication skills, team work, awareness of social, economic and environment is an important element in the criteria changes. Each country recommended focusing the criteria requirements in designing the engineering programs.

Instructional delivery method is one of the key factors in producing graduates who are innovative and creative. Lecturers have to liberate themselves from the old thinking that had plagued them in learning delivery techniques. Teaching methods in higher education institutions (HEIS) should be adapted according to the changing environment, and to attract and engage students actively in the learning process. Students are no longer only been saddled with lectures and tutorials are often boring,

but also a lot of innovations, ideas and new approaches tried and fully implemented to tap into existing talent and train them to use knowledge and skills learned in daily work practices. In short, traditional methods are no longer the best way to provide students with a variety of skills to meet the needs of the industrial sector.

Today, the concept of OBE has been adopted by most of the centre of higher education in many country. It is able to produce a conducive learning environment more effective and flexible. The curriculum in the form of OBE used by Polytechnic students while stressing to teaching, learning and assessment are focused to students. But the impact and acceptance by citizens of the polytechnics are still low where the instructor-centred method is still widely practised.

Students who are in College, polytechnics, institutes and universities are students who have been through low level learning through practicing "rote learning". They have been spoon fed with information where else "meaningful learning" should be implemented. Rote learning will result in "meaningful learning" seem useless because it was not deemed to be applied but only to be learning for knowledge sake. (Hussain, 2003: 45-50). POPBL is one of the ways to make students' learning becomes more meaningful.

2.1 Project-oriented Problem-Based Learning (POPBL)

Project-oriented and Problem-based learning (POPBL) is a student centric approach is an effective approach to improve the quality of learning, encouraging active participation, cooperation, quick feedback on the learning process, a deep understanding of the subject and referring appropriate students' learning through independent learning (Tim Anderson, 2007). The most preferred skills in POPBL is problem solving skills. According to Nor Ratna Masrom, 2006: Without the knowledge and problem-solving skills, students will not be able to implement and apply PBL method properly and efficiently. The desire to solve problems prompted students to perform independent learning and teaching among peers (peer teaching) within the Group and between groups. It was found suitable for use not only in increasing students' knowledge and skills but also able to support the development of generic skills such as problem solving skills, skills, work in groups, interpersonal skills and so on. Students could build through PBL critical and creative thinking skills, analyze and solve the problem (Nor Aishah Abdul Aziz (2013).

POBL is one of the alternative learning method through project work instead of teaching (Akbar, & Rosenorn, d. Borch, Helbo & Madsen 2007). POPBL is an educational discipline by nature where it can be divided into two themes, namely, project-based and problem-based learning that involves daily lives issues (Krüger-Basener & Kosuch, 2009; Uziak, et al., 2010). Problem-based learning requires students to develop and build the foundation for the synthesis of knowledge from various disciplines (knowledge) while project-based learning requires a wide range of theories and related knowledge (know-why) (Moesby, 2005; Ruhizan, et al., 2011; Uziak et al., 2010).

2.3 CIDOS Resources Using POPBL

CIDOS or Curriculum Information Document Online System (Norashida, 2012) is an academic management system based on Moodle platform developed for the purpose of teaching and

learning on-line by the Curriculum development and Evaluation Division, Department of polytechnic education. It contains details of the curriculum program in the Polytechnic, learning materials in various forms, information sharing space, free space, free space evaluation forum and other information related to teaching and learning. Students can access and assessment provided by the lecturers at any time. Various sources of information learning can fit into this CIDOS to enable students and lecturers to use it as a source of reference and it is also a source of collaboration among all polytechnics in Malaysia. In this study, CIDOS used as a source of POPBL to access and use as a learning materials on-line at any time. Sources of information POPBL uploaded into CIDOS to enable students to use it when needed.

3.0 Methodology

From the research, the researchers have designed a POPBL framework, as shown in Figure 1 below, that consists of three main stages:

Stage 1: Uploaded all the materials that relate to the project into the CIDOS platform.

Stage 2: Students are grouped randomly, identified the problem or the project as given and collecting students feedback on POPBL method

Stage 3: Conducting the post-mortem, comparing the final result and analysing the end results of the POPBL implementation.

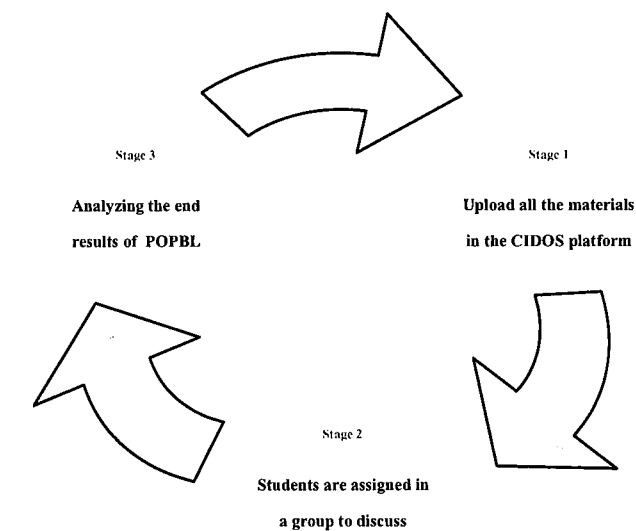


FIGURE 1

Teaching and learning process using the POPBL method. This group of students have been given training and coaching few times on how to use the POPBL in the process of learning and problem solving. Sources of information related to implementation method and information learning materials POPBL were uploaded into the CIDOS e-learning system to enable students to access and use the materials as needed at any time.

The study applied the quantitative method that were also integrated with interview of the students who experienced the POPBL method to obtain feedback and suggestions to improve the

learning method. Finally the final semester examination results for POPBL class were compared to conventional classes of the same course

4.0 Discussion

Analysis of this study consisted of two types of findings from questionnaire and analysis of the semester-end examination results of the POPBL and conventional classes. In Figure 1, the results of questionnaire from item 1 to 10 in *Table 1.1* indicates that, students are highly satisfied for using POPBL method in the learning process of POPBL in the process of learning. Agree with the fact that the POPBL implementation method involves students actively in the learning process as well as in improving communication skills and self-confidence. This method can help students understand the topic more clearly again and the knowledge can be used to solve the problem. This POPBL method good relationship between the students and facilitators. Results of the interviews with facilitators implies that the students are able to present the project assignment creatively and innovatively. Students have fun when resolving a problem in team and this creates competition among each group in the outcome presentation. Students exchanged ideas and creative thinking in solving problems in the group.

Based on the comparison of the results of the examination for the two groups POPBL method and conventional method. Students who experienced the POPBL (DET5S3) obtained better scores compared to the conventional method. The results of the examination showed that all the students who experienced POPBL method (DET5S3) obtained more than 3.3. In addition the final examination marks for both groups were also examined (Figure 3.0) and it was found that the students scored higher by using the POPBL method compared to the conventional method, as shown in Figure 3.0. In conclusion, POPBL method has proven is more effective in the process of teaching and learning this course compared to conventional method.

5.0 Conclusion

The study has been successful in achieving its objectives in which it has addressed several research questions that have been raised previously regarding by using POPBL as a method in the process of learning. The findings from this study implies that POPBL gave very positive result for students to explore the knowledge and developed skill to solve problems encountered. Students will feel confident in themselves, communicate, share information and have the initiative to find the information they need. More importantly, this learning method can engage students actively and creatively in the process of learning.

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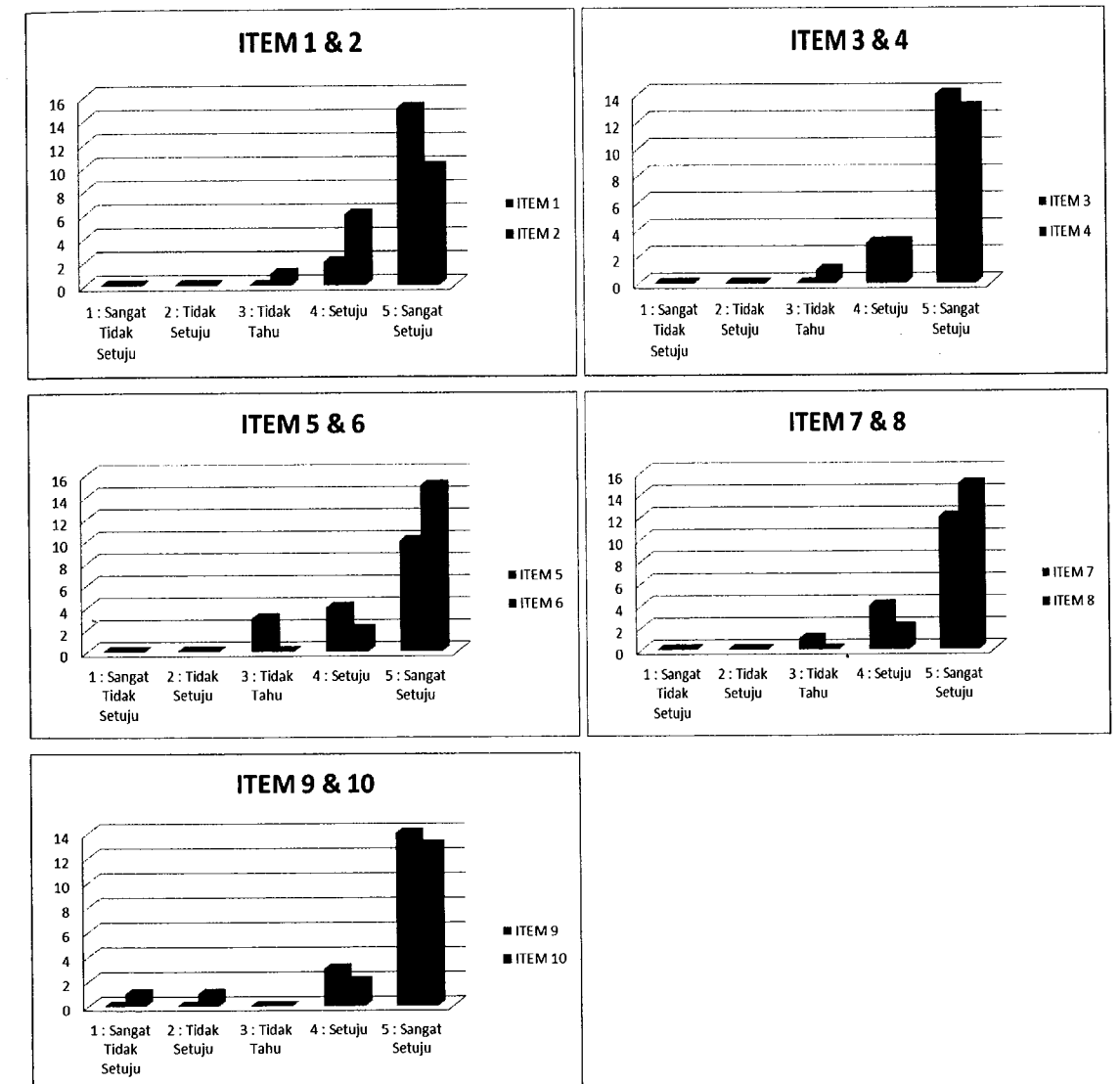
Appendix

Table 1.1 : The Results Of The Questionnaire In The Course Of Implementation POPBL
EC301-Computer Networking Fundamentals

Item	1(Sangat Tidak Setuju) n	2(Tidak Setuju) n	3(Tidak Tahu) n	4(setuju) n	5(Sangat Setuju) n
1. Konsep pembelajaran POPBL ini melibatkan pelajar secara aktif dalam proses pembelajaran	0	0	0	2	15
2. Projek POPBL dalam kursus ini membantu saya dalam memperbaiki kemahiran komunikasi dan keyakinan diri.	0	0	1	6	10
3. Projek POPBL dalam kursus ini menghasilkan perhubungan yang baik antara rakan sebaya dan membolehkan saya menyiapkan tugas dalam pasukan.	0	0	0	3	14
4. Kaedah POPBL dalam kursus ini membolehkan saya memahami sesuatu topic dengan lebih jelas lagi	0	0	1	3	13
5. Projek POPBL dalam kursus ini telah membantu saya dalam memperbaiki kemahiran membuat pembentangan	0	0	3	4	10
6. Projek POPBL dalam kursus ini telah membantu saya dalam pembelajaran sendiri.	0	0	0	2	15
7. POPBL ini lebih berkesan dalam mencapai objektif pembelajaran	0	0	1	4	12
8. Kaedah pelaksanaan POPBL ini sangat membantu dalam menyiapkan tugas saya serta membantu dalam menyelesaikan masalah.	0	0	0	2	15
9. Projek POPBL dalam kursus EC301 Computer Networking Fundamentals ini menggalakkan saya untuk menyatupadukan konsep dan kemahiran dari pelbagai bidang.	0	0	0	3	14
10. Menerusi kaedah POPBL ini hubungan saya bersama rakan sebaya dan fasilitator menjadi lebih erat lagi.	0	0	2	2	13

n denoted number of students

Figure 2.0 : Evaluation Questionnaire From Item 1 to 10



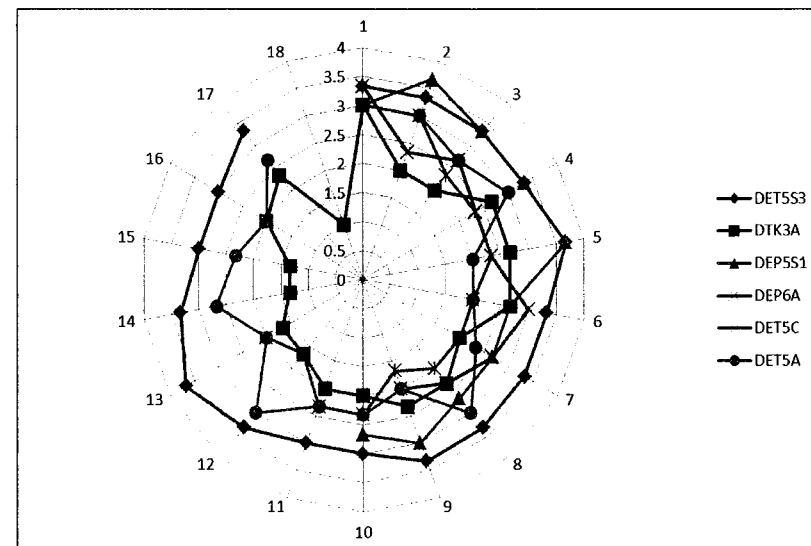


Figure 3.0: Comparison of Final Results For POPBL Method and conventional