

A Longitudinal Study of First Year Engineering Students' Performance at the Universiti Kebangsaan Malaysia: Before and After the Implementation of the OBE Approach

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Abstract: - In the 2005/2006 academic sessions, the Faculty of Engineering at the Universiti Kebangsaan Malaysia, started implementing the outcome based educations (OBE) approach beginning with the first year courses. As to observe the effectiveness of the OBE approach, this study is conducted. The aim of this study is to evaluate first year students' performance before and after the implementation of the OBE approach. In this study, the overall performance measured quantitatively using the grade point average (GPA) achieved by the first year engineering student of groups before and after the implementation of the OBE approach. Statistical analysis was done to identify the impact of the OBE approach on students' performance. Comparisons made with results obtained from previous studies revealed some interesting observations.

Key-Words: - Comparison, Effectiveness, Engineering students, Outcome based education, Students' performance.

1 Introduction

What is the OBE approach? OBE, like most concepts in education, has been interpreted in many different ways. OBE can be viewed in three different ways—as a theory of education, or as a systemic structure for education, or as classroom practice. According to Spady [1], "Outcome-Based Education means clearly focusing and organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences. This means starting with a clear picture of what is important for students to be able to do, then organizing the curriculum, instruction, and assessment to make sure this learning ultimately happens" [1]. In an OBE system, it is often suggested that "learners are responsible for their own learning and progress" [2].

If educators want to succeed with outcomes-based education, they need to adopt the position that "there is no such thing as failure, only feedback and results ... success depend on how well we process the feedback we get regarding our efforts" [3]. Preliminarily, this observation is to compare the performance of the groups, "before OBE" and "after OBE" as to identify the impact of the OBE approach among the engineering students.

In order to create a smoother transition from education to practice, some argue that engineering education need to give more emphasis on teamwork, communication, knowledge retention and the ability to synthesize and make connections between courses and fields [2]. Emphasises on developing these professional skills are also highlighted in [3]. Specialised technical courses might be more appropriately covered in more advanced postgraduate programs as this will encourage continual professional development as expected of professional engineers [4].

2 Methodology

The data used in this study was obtained from the Faculty of Engineering's database. In this study, comparison will be made between the current third year students' GPA obtained in their first year of studies (the batch before the implementation of the OBE) and the second year students' GPA obtained in their first year of studies (the batch after the implementation of the OBE) to measure first year students' performance after the implementation of the OBE approach.

Table 1 and Fig. 1 illustrate the distribution of students according to four engineering departments

and two batches/groups such as before and after the implementation of the OBE. The distribution of students across the departments is approximately similar between groups before and after the OBE. The percentages calculated are within groups/batches. In addition, the plot of Fig. 2 shows the distribution of respondents based on the ethnic groups before and after the implementation of the OBE approach.

Table 1: Distribution of respondents by department and groups before and after OBE

Department	Batch	
	After OBE	Before OBE
Civil Engineering	109	101
%	27.5	25.7
Mechanical Engineering	104	102
%	26.2	26.0
Electrical Engineering	107	118
%	27.0	30.0
Chemical Engineering	77	72
%	19.4	18.3
Total	397	393
%	100	100

OBE approach, the percentage of excellent students decreases to 22.9% of 397. This is similar to the students who achieved good academic performance where the percentage drops to 52.6%. However, for students who achieved GPA below 2.99, the percentage of students under this category increases after the implementation of the OBE approach.

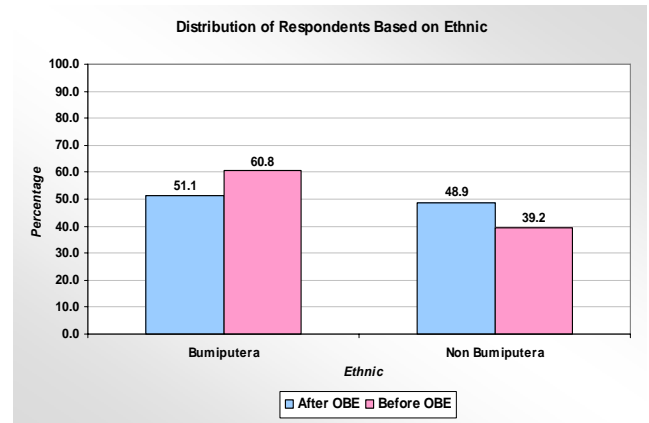


Fig. 2: Distribution of respondents based on the ethnic groups before and after OBE

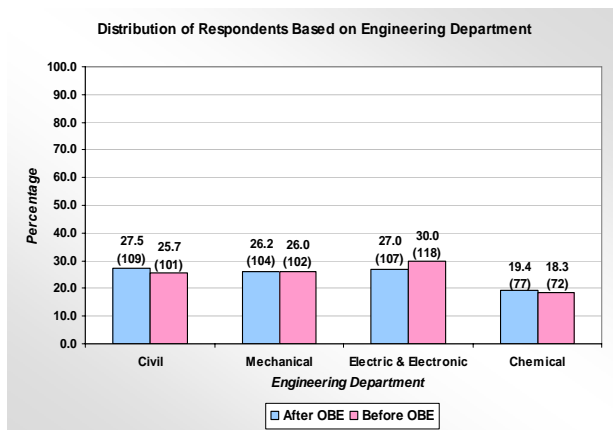


Fig. 1: Distribution of respondents by department and groups before and after OBE

3 Results and Discussions

In this study, the GPA is segregated into four groups of performance (Refer to Fig. 3 for the results) such as,

- i) 3.50 – 4.00 (Excellent),
- ii) 3.00 – 3.49 (Good),
- iii) 2.50 – 2.99 (Average), and
- iv) Below 2.49 (Poor).

Majority of students of group “before OBE” (62.6% of 393) achieved good academic performance while 30% of them were excellent. Only 1% had achieved GPA below 2.49. After the implementation of the

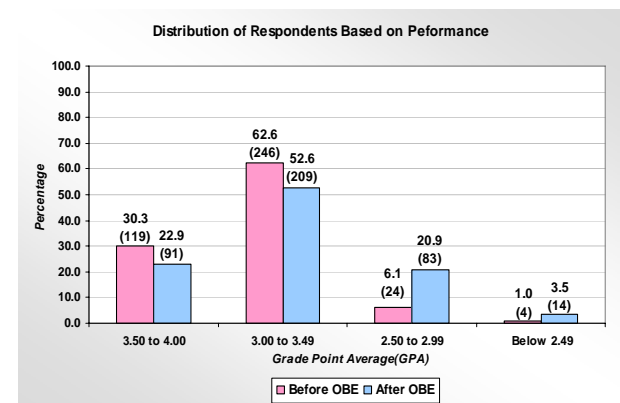


Fig. 3: Distribution of Respondents Based on Performance

Another interesting observation from this study is the students’ performance based on ethnicity. As shown in Fig. 4 and 5, a slight increment of percentage is observed among non Bumiputera students with GPA 3.00 to 3.49.

Fig. 6 to 9 illustrate the categories of performance such as,

- i) 3.50 – 4.00 (Excellent),
- ii) 3.00 – 3.49 (Good),
- iii) 2.50 – 2.99 (Average),
- iv) Below 2.49 (Poor) before and after OBE based on departments.

In overall, the percentages for categories such as excellent and good decline after the OBE approach while average and poor performance increase. However, a different scenario is observed for

chemical engineering department. The percentage of excellent students of this department increases after the implementation of the OBE. None of the chemical engineering students scored GPA below 2.49 before and after OBE. It may be due to the enrolment of students to this department were from Matriculations', which many of them were high performers.

As for good category of performance, the percentages decline across the departments. In overall, percentages of average and poor performance increase for all departments.

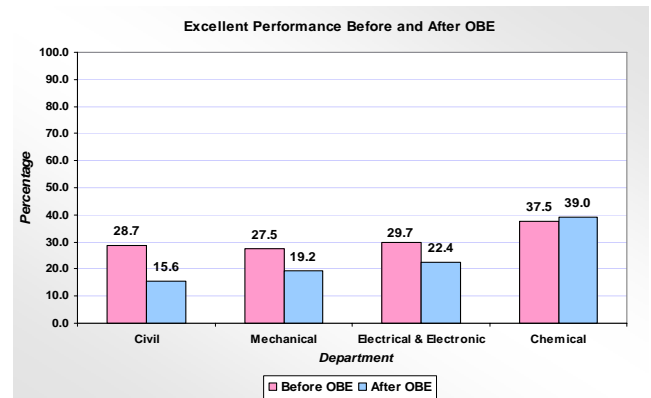


Fig. 6: Percentage of students with excellent GPA based on department

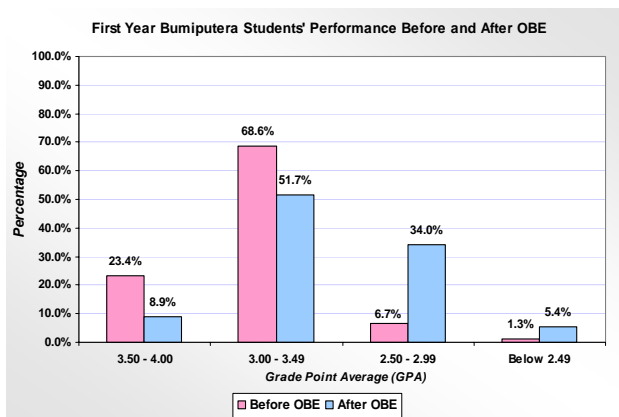


Fig. 4: Distribution of Bumiputera respondents based on performance according to groups before and after OBE

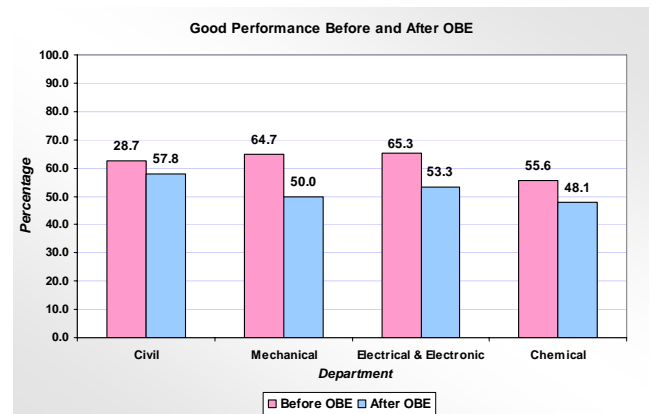


Fig. 7: Percentage of students with good GPA based on department

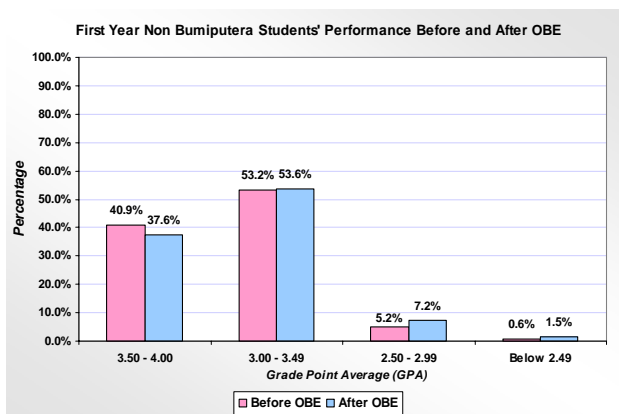


Fig. 5: Distribution of non Bumiputera respondents based on performance according to groups before and after OBE

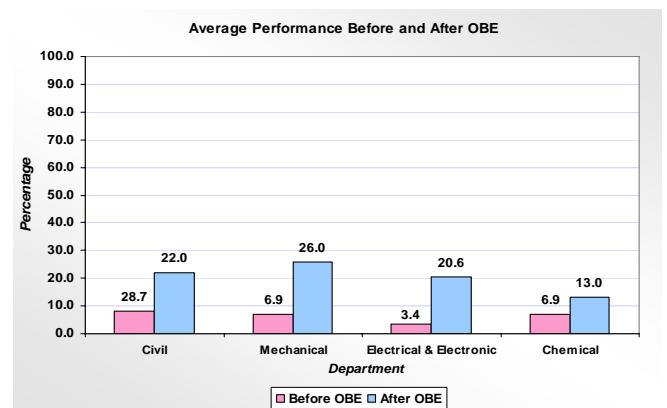


Fig. 8: Percentage of students with average GPA based on department

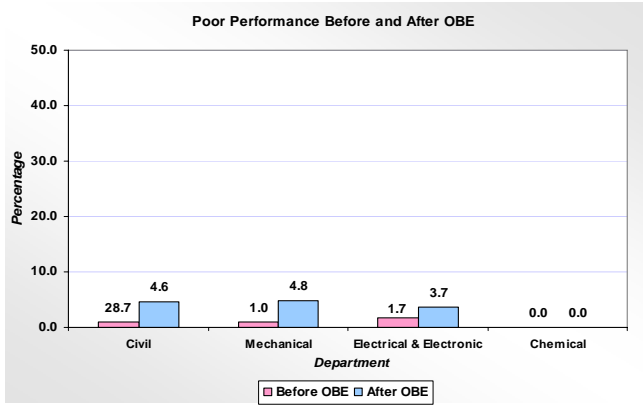


Fig. 9: Percentage of students with poor GPA based on department

4 Conclusions

This paper reports the performance of the first year engineering students before and after the implementation of the OBE approach in the Faculty of Engineering, Universiti Kebangsaan Malaysia (UKM). In overall, the performance decreases as the students need to cope up with new environment of studies which consists of method, assessment and language used in the classroom.

References:

- [1] W. Spady, *Outcome-based education: Critical issues and answers*, American Association of School Administrators, Arlington, USA, 1994.
- [2] P. Cockburn, *Building a brighter future: Curriculum 2005*, Department of Education, Pretoria, 1997.
- [3] FV. Alessi, ODDM: *The gentle bulldozer. Quality Outcomes-Driven Education*, April 11-18th, 1991.