

# Factors Affecting the Engineering Students' Performance in the OBE Assessment Examination in Mathematics

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## Abstract

Outcomes-Based Education provides another way in similar perspective of assessing the performance of the university students. This study aimed to determine the factors affecting the performance of engineering students in the assessment examination. Descriptive type of research method with regression analysis was utilized in the study. Results showed that no significant difference in the scores was found between the scores of male and female, between students who graduated in private school and public school, between family income, mother's educational attainment, father's educational attainment, and distance of the residence to the school. They would like a job that involves mathematics and they like to do things related to mathematics were the students' attitudes that predicted the results of the OBE assessment examination in mathematics.

**Keywords:** Mathematics, Outcomes-based Education, Student Performance, Engineering

## Introduction

Education is very important to everyone; it helps to gain respect and recognition. Education can be used by an individual to reach his specific target or goal in life. Nonetheless, the importance of education in society is indispensable. Those who have earned enough education direct the path of development and progress of their country. However, different cultures view learning in various forms. Teachers, therefore, should continuously compare, analyze and evaluate the methods being used in order to motivate students and to make the learning as effective as possible.

Whether the method of teaching being used is traditional or outcome based education, the need to evaluate the effect of the methods used to the student achievement is still necessary. Slaughter (2007) report said that factors affecting student achievement are varied and complex and failure to consider multiple factors may lead to erroneous or simplistic answers to very complicated questions.

To support the initiative of CHED to develop graduates who are globally competitive, Lyceum of the Philippines Batangas launched the implementation of Outcome Based Education (OBE) in all its academic first year program last June 2012.

The primary aim of OBE is to facilitate desired changes within the learners, by increasing knowledge, developing skills and/or positively influencing attitudes, values and judgment. OBE embodies the idea that the best way to learn is to first determine what needs to be achieved. Once the end goal (product or outcome) has been determined the strategies, processes, techniques, and other ways and means can be put into place to achieve the goal (Butler 2004). In the implementation of OBE, one of the requirements is the assessment examination. The purpose of students' assessment examination is to determine the effectiveness of the system being implemented by the learning institution. Assessment is a systematic and on-going process of collecting, interpreting, and acting on information relating to the goals and outcomes developed to support the institution's mission and purpose. According to Sand (2004), the assessment answers the questions: what we are trying to do? How well are we doing it? and how can we improve what we are doing? Assessment begins with the articulation of the outcomes. Writing measurable outcomes involves describing the first three.

Conversely, student's academic performance isn't always an absolute measure of student's intelligence. Factors, such as demographic profile and attitudes toward the subject, can affect academic performance. They are important factors to consider in every learning institution. They play an important role in the success or failure of the student's academic life. One complexity of investigating the relationship between the demographic profile and attitudes of students toward mathematics is that it is relatively a neglected topic in the literature as few studies examine these variables.

The researcher, a faculty member of LPU-B, under Mechanical Engineering department involved in the implementation of OBE, find it necessary to determine the effects of demographic profile and attitudes of engineering students on their OBE assessment examination. The findings of this research would provide relevant data that may be used by the engineering department of LPU-B in the improvement of the implementation of Outcome Based Education.

### **Objectives of the Study**

The purpose of this study was to determine the factors affecting the performance of engineering students in the assessment examination. Specifically, this study aimed to determine the demographic profile of first year engineering students studying in LPU-Batangas in terms of: gender, high school attended, family income, mother's educational attainment, father's educational attainment, and distance of school from the student's residence; to determine the results of the OBE Assessment Examination of engineering students in mathematics; to identify the attitude of engineering students towards mathematics; to test if there are differences in the results of engineering students' OBE assessment examinations in mathematics when they are grouped according to their demographic profile; to determine the predictors among the student's attitude in their OBE assessment examination in mathematic; and to propose an action plan to enhance the performance of engineering students in OBE assessment examinations.

### **Hypothesis of the Study**

Ho<sub>1</sub>: First year engineering students' demographic profile and OBE assessment examination has no significant relationship

Ho<sub>2</sub>: Student's attitude and OBE assessment examination results have no significant relationship.

### **Literature Review**

Outcome-Based Education (OBE) is an education philosophy organized according to several basic beliefs and principles for the learners to practice in order to become successful in life when they finish their studies. It starts with the belief that students can benefit from any educational program only when the instructional outcomes can be measured as a result of any instructions (Mohayidin et al., 2008).

In Outcome-Based Education (OBE) System the only role of the educator is to enable and encourage all learners to achieve desired outcomes. It requires the students to demonstrate the required skills (output) that they have learned. While, traditional education focuses on the resources (inputs) that are available to the students (Killen, 2000). Outcomes-based education is not a single idea or set of procedures. Rather outcomes-based education is like democracy –there are many different versions practiced in different ways in different places, all with the label outcomes-based education (Lawson & Askill-Williams, 2007).

Curriculum content should flow clearly from the most general valued outcomes, to related more specific outcomes, to class lesson activities. Assessment should be integrated with these outcomes in a coherent manner. In this way the program of study for a student within and across year levels would have a clear relationship to curriculum goals (Farooq & Shah, 2008).

The assessment method is strongly influenced by the assessed learning outcomes. Different types of learning outcomes require different assessment methods. For example, knowledge-type learning outcomes can be assessed using multiple-choice tests while such kind of activity is less appropriate for assessing skills (Crespo et al., 2010).

Higher math's ability is often believed to go hand-in-hand with greater levels of general intelligence. At the same time, many students have a negative attitude towards math (Buckley, 2013). Several studies have shown that males do better than females on tests of mathematical ability, but conversely, females do better than males at tests involving verbal ability (Westby, 2006), while Reardon (2011) claimed that the socioeconomic status of a child's parents has always been one of the strongest predictors of the child's academic achievement.

According to Raychaudhuri, Debnath, Sen and Majumder (2010), boys are showing better result than the girls and the distance of school from students' house are positively related. If the school is near the resident of the student, he/she can easily attend the school regularly.

A team of University of Illinois education professors has found that public-school students outperformed their private-school classmates on standardized math tests. According to the researcher, schools that hired more certified teachers and had a curriculum that de-emphasized learning by rote tended to do better on standardized math tests" (Lubienski, 2009).

Moreover, the amount of time parents spend in child-care activities (broadly defined) has increased in particular, the researcher investigated the extent to which the rising income inequality of the last four decades has been paralleled by a similar increase in the income achievement gradient. As the income gap between high- and low-income families has widened, has the achievement gap between children in high- and low-income families also widened (Reardon, 2011).

After having seen all the inter-relationships between different factors with the academic performance of the students, it has become clear that pupils from poor family background residing in urban achieve higher scores than others residing in urban with intimate economic family background. Large number of girls performing better than boys in the Sherubtse College also implicates the higher probability of achieving the goal of women empowerment in future (Jigme, 2012).

The idea that both genders have equal math abilities is widely accepted among social scientists. Teachers and parents play a negative role by guiding girls away from math-heavy sciences and engineering. One reason is because parents and teachers continue to hold stereotypes that boys are better in math, and that can have a tremendous impact on individual girls who are told to stay away from engineering or the physical sciences because 'Girls can't do the math (Tenenbaum, 2010).

Females do not prefer mathematics at higher level because they perceive it as a male domain. All professions requiring higher level knowledge of mathematics are dominated by male community. Many barriers are there for the female students to have their career in mathematics (Farooq & Shah, 2014).

The major challenge faced by researchers attempting to estimate the causal effect of family income on children's outcomes has been the endogeneity of income. Children growing up in poor families are likely to have adverse home environments or face other challenges that would continue to affect their development even if family income were to increase substantially. Furthermore, year-to-year changes in family circumstances like parental job loss or promotion, illness, or moving to a new neighborhood may affect the family income as well as family dynamics and parenting behavior. The latter poses a problem for traditional empirical studies that fail to separately identify the effects caused by changes in income from the effects of changes in other unmeasured family circumstances (Dahl & Lochner, 2012).

The definition of 'positive' or 'negative' attitude toward mathematics clearly depends on the definition of attitude itself. From both an educational and a theoretical perspective, the most interesting outcome of the reading of the essays is that 'success' in mathematics has many deeply different meanings. In some essays 'succeeding' is identified with school success, i.e. with getting good marks, and thus it is up to the teacher to acknowledge one's success. In some other cases, 'succeeding' is identified with 'understanding' (Zan & Di Martino, 2012).

Private education is often associated with higher tuition and consequently a higher socioeconomic status, a perceived 'better' peer group, and more flexible curriculum and school guidelines. Public and private education is offered throughout the world and has been

an issue of debate that often pares down to parental preference or choice-based on a variety of factors (Deraney & Abdelsalam, 2012).

Looking particularly into the NAT results, Department of Education (DepEd) singled out low reading competence as a primary factor for the failure of public school students in mathematics. With this problematic condition, reading cannot be taken for granted if mathematics performance needs to be enhanced. Based on the findings, the poor reading comprehension skills of students is consistent with their performance in mathematics (Imam et al., 2013).

Contrary to popular belief, we can find no evidence that private schools actually increase student performance. The study suggests vouchers for private schools are unnecessary because — once you control for socioeconomic status — students at private schools aren't performing any better than those at public schools. The study says that it is "the kinds of economic and resource advantages their parents can give (students)" — as well as the level of parental involvement in their kids' education —that determines success or failure in high school (Cloud, 2007).

The working paper of Dayioglu and Turut-Asik (2004) revealed that a smaller number of female students manage to enter the university and when they do so, they enter with lower scores. For example, there is a relationship between school success and how much time and effort an individual spends on homework each night, but school success is also related to the type of home an individual comes from.

The degree of impact of parental involvement on an individual's academic success may vary. Some studies show that when the parents who have lower levels of education are more involved, the effect is greater and more positive than when parents who have higher levels of education are involved (Shapiro, 2009).

According to Reardon (2011), the causes and relationship between family socioeconomic characteristics and student achievement has been the subject of considerable disagreement and debate.

The research of Kiamanesh & Mahdavi-Hezaveh (2003) indicated that males outperformed females in math achievement at the junior high and high school levels; there were also significant differences in attitudes toward math between the two groups. He recognized that the math achievement and interest of boys are better than the girls. Research findings show that students' performance in mathematics is due to factors such attitude towards mathematics, self-concept, home environment, parental education, schools climate and culture, educational level of students' parents, home educational resources, socioeconomic status of the family, home language versus language of test and providing quality homework assistance by parents are among factors that can explain variance in academic achievement.

## **Method**

### **Research Design**

The focus of the study was to gather information on the factors affecting the student's performance in the OBE assessment examination in mathematics through descriptive type of research.

On the second phase of the research, a quantitative survey was conducted to the first year and second year engineering students in LPU-B. The data collections for this research study were based on the questionnaire technique and from the result of the OBE assessment examination.

### **Participants**

The participants of the study were the total population of the respondents comprised of 81 first year and 50 second year engineering students enrolled in general and computer engineering program.

### **Instruments**

The main data gathering instrument used in this study was the researchers' made questionnaire. Questionnaire is one of the most effective and popular instruments that is efficient in collecting a certain kind of information or data. In the development of the questionnaire, the researcher conducted library research so that relevant questions can be formulated. A survey instrument was developed to gather necessary information for the study. For scoring purposes, a five points Likert scale were used. The questionnaire was divided into 2 functional areas of relevance:

Part 1 – The demographic profile of the respondents included in the questionnaire are the gender, high school attended, family income, mother's and father's educational attainment and distance of school from the student's residence.

Part 2 – The respondent attitudes toward mathematics. The instrument was subjected to content validation through the expertise of the Department Chairs and Dean of the College of Engineering.

### **Procedures**

The researcher personally administered, distributed and collected the final copies of the questionnaires to the first year and second year engineering students in LPU-B. During the distribution of the questionnaires, the researchers guaranteed the confidentiality of all the information gathered.

Upon the retrieval of the questionnaire, the researcher simultaneously conducted informal interview to validate the information provided in the survey instrument. Both open and close-ended questions about the topic were asked to generate a more comprehensive and insightful understanding of the topic under study.

### **Data Analysis**

For items under respondents' profile and attitudes toward mathematics, the frequency counts and percentages were used for scoring purposes. A Likert scale of 1-5 for the questionnaire that required choices was used. The collected data were treated using SPSS program to facilitate the analysis and interpretation as basis for critical analysis. Questionnaires with three or more missing data were excluded in the analysis.

Weighted Mean and Standard Deviation: This method was used to determine the responses to be obtained from the Likert scale of 1 to 5 posted in part 1 and part 2 of the questionnaire. To facilitate the interpretation, the weighted means were interpreted in this manner: Strongly

agree/Highly Positive: 4.50 - 5.00; Agree/Positive: 3.50 - 4.49; Neither disagree nor agree/Neutral: 2.50 - 3.49; Disagree/Negative: 1.50 - 2.49; Strongly disagree/Highly Negative: 1.00 - 1.49.

T-test and One Way ANOVA were the statistical tools used to compare the means of the results of the OBE assessment examination of the respondents when they were grouped according to their profile variable. Multiple Regressions was used to determine the predictor of student performance among the stated attitude of the engineering students towards mathematics.

## Results and Discussion

Table 1 presents the demographic profile of the respondents in terms of gender, high school attended, family income, mother's educational attainment, father's educational attainment, and distance of school from the student's residence.

As shown in table 1, there were 131 respondents composed of 102 male and 29 female, 81 were 1st year and 50 were 2nd year regardless of what engineering program they belong. With regard to high school attended, 78 respondents graduated from private high school and 53 from public high school.

Table 1

*Respondents' Demographic Profile (N= 131)*

Demographic Profile		Frequency	Percent
Gender	Male	102	77.9
	Female	29	22.1
High School Attended	Private	78	59.5
	Public	53	40.5
Family income	Less than 10,000	23	17.6
	10,000 to 14,999	23	17.6
	15,000 to 19,999	19	14.5
	20,000 to 24,999	17	13
	25,000 to 29,999	13	9.9
	30,000 to 34,999	10	7.6
	35,000 to 39,999	4	3.1
	40,000 and above	22	16.8
	Medicine	5	3.8
Mother' Educational Attainment	Engineering	4	3.1
	Architect	2	1.5
	college graduate of other program	51	38.9
	Undergraduate	69	52.7
Father's Educational Attainment	Medicine	3	2.3
	Law	2	1.5
	Engineering	15	11.5
	college graduate of other program	46	35.1
Distance of School from Student's Residence	Undergraduate	65	49.6
	less than 1 km	40	30.5
	1 to 3 km	15	11.5



3.1 to 5 km	15	11.5
5.1 to 7 km	8	6.1
more than 7 km	53	40.5

Standards of living of the respondents were heterogeneous -- 35.2 percent of the respondents belong to the bracket of less than 15,000 pesos per month and 16.8 percent belong to the bracket of more than 40,000 pesos per month. Interestingly, since they were engineering students, it was presumed that the educational attainment of the most of the parents of respondents were engineering graduate but 52.7 percent of the respondents' mother were undergraduate and only 3.1 percent were graduate of engineering program. Similarly, 49.6 percent of the respondents' fathers were undergraduate and only 11.5 percent were graduate of engineering program. From 131 respondents, 30.5 percent were residing less than 1 km away from the LIMA campus, and 40.5 percent were residing more than 7 km away from the campus.

Table 2 shows the results of the OBE Assessment Examination in Mathematics between passed and failed when the engineering students were grouped according to profile.

Table 2

*Percentage Distribution of Respondents on the Result of OBE Assessment Examination in Mathematics according to their Profile*

		Passed	%	Failed	%
Gender	Male	21	16.03	81	61.83
	Female	7	5.34	22	16.79
	Total	28	21.37	103	78.62
High School Attended	Private	17	12.98	61	46.56
	Public	11	8.4	42	32.06
	Total	28	21.38	103	78.62
Family Income	less than 10000	9	6.87	14	10.69
	10,000 to 14,999	4	3.05	19	14.5
	15,000 to 19,999	5	3.82	14	10.69
	20,000 to 24,999	1	0.76	16	12.21
	25,000 to 29,999	2	1.53	11	8.4
	30,000 to 34,999	2	1.53	8	6.11
	35,000 to 39,999	1	0.76	3	2.29
	40,000 and above	4	3.05	18	13.74
	Total	28	21.37	103	78.63
Mother's Educational Attainment	Medicine	1	0.76	4	3.05
	Engineering	0	0	4	3.05
	Architect	0	0	2	1.53
	College graduate of other program	12	9.16	39	29.77
	Undergraduate	15	11.45	54	41.22
	Total	28	21.37	103	78.62
Father's Educational Attainment	Medicine	1	0.76	2	1.53
	Law	0	0	2	1.53
	Engineering	4	3.05	11	8.4



Distance of School from the Student's Residence	College graduate of other program	7	5.34	39	29.77
	Undergraduate	16	12.21	49	37.4
	Total	28	21.36	103	78.63
	Less than 1 km	7	5.34	33	25.19
	1 to 3 km	3	2.29	12	9.16
	3.1 to 5 km	4	3.05	11	8.4
	5.1 to 7 km	2	1.53	6	4.58
	More than 7 km	12	9.16	41	31.3
	Total	28	21.37	103	78.63

From 28 students who passed the examination, 16.03 percent of them were male and 5.34 percent were female and from 103 respondents, who failed the examination, 61.83 percent were male and 16.79 percent were female.

Most of respondents in this study graduated from private high school (69.54%). From 81 respondents who graduated from private high school, 16 passed and 65 failed the OBE examination and from 53 respondents who graduated from public high school, 11 passed and 42 failed.

With regard to family income, 21.37 percent passed the examination and 78.36 percent failed. Only 6.87 percent who passed in the OBE examination, came from the family with "less than 10,000 income bracket" followed by "15,000 to 19,999" income bracket (3.82%), while 14.5 percent who failed the examination came from the family with 10,000 to 14,999" income bracket followed by 13.74 percent with the 40,000 and above income bracket.

None among the respondents who took the examination whose mother with engineering and architecture as the educational attainment passed the examination and none among the respondents who took the examination whose father with law as the educational attainment passed the examination.

Table 2 revealed that 35.88 percent of the students, who failed, were residing more than 5 km away from the school and 42.75 percent were residing less than 5 km from the school. For the students who passed the examination, 10.69 percent were residing more than 5 km away from the school and 10.68 percent were residing less than 5 km from the school.

As shown in Table 3, students agreed that math is important to them, on rank number 1 followed by their agreement on the need of math.

Table 3

*Attitudes of Engineering Students toward Mathematics*

<b>Attitude</b>	<b>WM</b>	<b>VI</b>	<b>Rank</b>
a. Math is exciting	3.96	Agree	6
b. I never get tired of doing Math	3.08	Neutral	12
c. I like to do things related to math	3.36	Neutral	11
d. Math help me understand life	3.78	Agree	9
e. Good mathematical knowledge makes other subject easier	3.86	Agree	8
f. Math is not boring	3.92	Agree	7
g. Math is important	4.60	Strongly Agree	1
h. Math is useful for me in Life	4.37	Agree	3
i. It is important to be good in math	4.27	Agree	4
j. I need Math	4.56	Strongly Agree	2
k. Math Is necessary at work	4.07	Agree	5
l. I would like a job that involve mathematics	3.73	Agree	10
<b>Composite Mean</b>	<b>3.96</b>	<b>Agree (Positive)</b>	

The respondents agreed that math is useful in their life, it is important to be good in math, math is necessary at work, math is exciting, math is not boring, good mathematical knowledge makes other subject easier, math helps them understand life, and they like a job that involves mathematics.

On the other hand, they neither agreed nor disagreed that they like to things related to do math and they never get tired of doing math. The composite mean score of 3.96 signifies that that the attitude of engineering students toward mathematics is positive.

Farooq and Shah (2008) concluded that positive attitude towards mathematics leads students towards success in mathematics. Students' success in mathematics depends upon attitude towards mathematics. Attitude towards mathematics plays a crucial role in the teaching and learning processes of mathematics. It effects students' achievement in mathematics. The teaching method, the support of the structure of the school, the family and students' attitude towards school affect the attitudes towards mathematics. Usually, the way that mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and context dependent way stands to alienate many students from mathematics.

Table 4 shows the differences in the results of engineering students' OBE Assessment Examinations in Mathematics according to demographic profile.

Table 4

*Differences in the Results of Engineering Students OBE Assessment Examinations in Mathematics According to Gender and High School Attended*

		WM	t-value	p-value	Interpretation	Decision
Gender	Male	1.21	-0.41	0.68	Not significant	Accept
	Female	1.25				
HS Attended	Private	1.41	0.141	0.89	Not significant	Accept
	Public	1.40				

An independent-samples t-test was conducted to compare the results of the OBE assessment examination for male and female. Table 4 shows that there was no significant difference in the scores for male and female. The findings of this research conform to the findings of Janet Hyde, professor of psychology and women's studies at the University of Wisconsin-Madison. She said that the mathematical skills of boys and girls, as well as men and women, are substantially equal, according to a new examination of existing studies in the current online edition of journal Psychological Bulletin (Tenenbaum, 2010). Contradictory, Kiamanesh and Mahdavi-Hezaveh (2003) found out that males outperformed female in math achievement at the junior high and high school levels.

Table 4 also shows that there was no significant difference in the scores of students who graduated in private school (WM=1.41, SD=0.49) with those who graduated from public school (M=1.40, SD=0.50).

Contrary to popular belief, according to Cloud (2007), there is no evidence that private schools actually increase student performance. The study suggests vouchers for private schools are unnecessary because — once you control for socioeconomic status — students at private schools aren't performing any better than those at public schools.

On the other hand, Imam, Abas-Mastura and Jamil (2013) concluded that by comparison, students in private schools performed better in two areas, reading comprehension and mathematics, than students in public schools. Lubienski (2009) discovered that after holding demographic factors constant, public school students performed just as well if not better than private schools students on standardized math tests.

Table 5

*Differences in the Results of Engineering Students OBE Assessment Examinations in Mathematics According to demographic profile*

Demographic Profile	F value	P-Value	Interpretation	Decision
Family Income	1.1	0.37	Not Significant	Accept
Mother's Education	0.44	0.78	Not Significant	Accept
Father's Education	0.61	0.66	Not Significant	Accept
Distance of school from the student's distance	0.18	0.95	Not Significant	Accept

As shown in Table 5, there is no significant difference in the student's performance in the OBE assessment examination when they were grouped according to family income as manifested by the F-value of 1.1 with probability value of 0.37.

According to Dahl and Lochner (2012), understanding the consequences of growing up poor for a child's well-being is an important research question, but one that is difficult to answer due to the potential endogeneity of family income. Past estimates of the effect of family income on child development have often been plagued by omitted variable bias. That is, children growing up in poor families are likely to have home environments or face other challenges that would continue to affect development even if family income rose substantially. But number sense is one area of mathematical knowledge found to be particularly weak among low-income children.

There is no significant difference in the student's performance in the OBE assessment examination when they were grouped according to parents' educational attainment as manifested by the F-values of 0.44 and 0.61 with probability value of 0.78 and 0.66 for mother's and father's education, respectively.

According to the findings of Shapiro (2009), the GPA of an individual was not influenced by parental education level. Also GPA did not show a decreasing pattern with decreasing parental education level.

There is no significant difference in the student's performance in the OBE assessment examination when they were grouped according to distance of school from their residence as manifested by the F-value of 0.18 with probability value of 0.95. The findings of this study contradicted the findings of Falch, Lujala & Strom (2011). He revealed that distance to higher education institutions affects participation in higher education and later outcomes wherein the increased in real travel time from parent's home to the nearest upper secondary school decreases the probability of graduating on time. He also found that a higher number of unique study tracks within 30 minutes commuting distance from the parent's home have a significant positive impact on the propensity to graduate on time.

Table 6 shows that of the tested variables, only two variables appeared to be significantly related to OBE assessment examination of the students, these variables were: I would like a job that involve mathematics which has a Beta of .255, a t-value of 2.99 and probability value of .003, and I like to do things related to math which has a Beta of .255, a t-value of 2.640 and probability value of 0.009.

Table 6

*Best Predictors among Students' Attitude in Their OBE Assessment Examination Results in Mathematics*

Independent Variable	Regression Coefficient		t-value	Sig	Adj. R-Square	F Value	Sig. of F
	B	Beta					
I would like a job that involve mathematics	0.13	0.26	2.99	0.003	0.14	11.29	<0.001
I like to do things related to math	0.14	0.23	2.64	0.009			

The Beta coefficient reveals that when the students like a job that involve mathematics and to do things related to math, then the greater the probability that the student will pass and get higher grade in the assessment examination.

The adjusted R-square 14% indicates that the explanatory power of the variables students like a job that involve mathematics and to do things related to math contribute 14% on passing the assessment examination, where 87% were probably made by variable not included in the conceptualization.

The F (11.29) value for ANOVA and is statistically significant at <.001. This indicates that the combination of the variables students like a job that involve mathematics and to do things related to math significantly predicts the OBE assessment examination for mathematics.

According to Farooq (2008), attitude towards mathematics plays a crucial role in the teaching and learning processes of mathematics. It effects students' achievement in mathematics. Interest and attitude in the subject are the special predictors for the students' participation and success in the subject.

### **Propose Action Plan**

This Action plan is a collaborative effort involving the Dean and faculty members from Engineering of Lyceum of the Philippines University with the goal of helping the engineering students to pass the OBE examination. The action plan aimed to ensure that all engineering students have positive attitude towards mathematics and ensure that all engineering students pass the mathematics assessments.

### **Conclusions**

There were 131 respondents composed of 102 males and 29 females, 81 were first year and 50 were second year, 103 failed and 28 passed in the OBE assessment examination in mathematics. Respondents strongly agreed that math is important, and they need math, but they nether disagree nor agree that they like to things related to math they never get tired of doing math. The attitudes of engineering students toward mathematics were positive.

No significant difference in the scores was found between the scores of male and female, between students who graduated in private school and public school, between family income,

mother's educational attainment, father's educational attainment, and distance of the residence to the school.

They would like a job that involves mathematics and they like to do things related to mathematics were the students' attitudes that predicted the results of the OBE assessment examination in mathematics.

### **Recommendations**

Explain to the students the relevance and importance of the topics before the formal lecture. Give examples that provide excitement to the students. Explain the relationship of the topics to their other subjects. Boring examples should be avoided like problems with long and complicated solutions. Explain to the students how the subject matters are being used in the job, as much as possible; give assignments that will gain the interest of the students. Provide review class before the assessment examination.

### **References**

- Brookstein, A., Hegedus, S., Dalton, S., & Moniz, R. (2011). Measuring Student Attitude in Mathematics Classrooms. Kaput Center for Research and Innovation in STEM education. Retrieved from [http://www.kaputcenter.umassd.edu/downloads/products/technical\\_reports/tr4\\_studentattitude.pdf](http://www.kaputcenter.umassd.edu/downloads/products/technical_reports/tr4_studentattitude.pdf). April 1, 2014
- Buckley, S. (2013). Deconstructing Math's Anxiety: Helping Students to Develop a Positive Attitude towards Learning Math. Australian Council for Educational Research. Retrieved from <http://www.acer.edu.au/media/deconstructing-maths-anxiety/>. April 23, 2014
- Butler, M. (2004). Outcomes Based/ Outcomes Focused Education Overview. Retrieved from [https://www.google.com.ph/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&uact=8&ved=0CEgQFjAF&url=http%3A%2F%2Fwww.kfshrc.edu.sa%2Fsaudization%2Ffiles%2FOutcomes%2520Based%2520Education.doc&ei=c0pvU4mWLSaRkgWRilGoDA&usg=AFQjCNHMD6QYdA4Y4TNMe\\_ZK\\_nGwpGyvYg&bvm=bv.66330100,d.dGl](https://www.google.com.ph/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&uact=8&ved=0CEgQFjAF&url=http%3A%2F%2Fwww.kfshrc.edu.sa%2Fsaudization%2Ffiles%2FOutcomes%2520Based%2520Education.doc&ei=c0pvU4mWLSaRkgWRilGoDA&usg=AFQjCNHMD6QYdA4Y4TNMe_ZK_nGwpGyvYg&bvm=bv.66330100,d.dGl). May 11, 2011.
- Cloud, J. (2007). Are Private Schools Really Better? Retrieved from <http://content.time.com/time/nation/article/0,8599,1670063,00.html>. May 5, 2014
- Dahl, G. B., & Lochner, L. (2012). The Impact of Family Income on Child Achievement: Evidence from the Earned Income Tax Credit. American Economic Review 2012, 102(5);1927-1956. Retrieve from <http://econweb.ucsd.edu/~gdahl/papers/children-and-EITC.pdf>. April 19, 2014.
- Deraney, P. M., & Abdelsalam, H. M. (2012). Private vs. Public school Education as a Predictor for Success for Female Students at a Private University in Saudi Arabia. Journal of Arts, Science & Commerce, E-ISSN 2229-4686: ISSN 2231 4172. Retrieved from [http://www.researchersworld.com/vol3/issue3/vol3\\_issue3\\_1/Paper\\_01.pdf](http://www.researchersworld.com/vol3/issue3/vol3_issue3_1/Paper_01.pdf). May 5, 2014.
- Falch, T., LujalaPaivi., & Strom, B. (2011). Geographical constraints and educational attainment. Working Paper Series No.9/2011. Retrieved from [http://www.svt.ntnu.no/iso/wp/2011/9\\_Geographical%20constraints.pdf](http://www.svt.ntnu.no/iso/wp/2011/9_Geographical%20constraints.pdf)
- Imam, O. A., Abas-Mastura, M., & Jamil, H. (2013). Correlation between Reading Comprehension Skills and Students' performance in Mathematics. International Journal

- of Evaluation and Research in Education (IJERE) Vol.2, No.1, March 2013, ISSN: 2252-8822. Retrieved from <http://www.iaesjournal.com/online/index.php/IJERE/article/download/1803/1029>. May 5, 2014.
- Killen, R. (2008). Outcomes-based education: Principles and possibilities. Unpublished manuscript. University of Newcastle, Faculty of Education.
- Lawson, M. J., & Askeil-Williams, H. (2007). Outcomes-based Education. Discussion Paper. Association of Independent Schools of SA. Retrieved from [http://www.ied.edu.hk/obl/files/practical\\_guide\\_5.pdf](http://www.ied.edu.hk/obl/files/practical_guide_5.pdf). April 20, 2014
- Lubienski, C. (2009). Public Schools Outperform Private Schools in Math Instruction. ScienceDaily. Retrieved from <http://www.sciencedaily.com/releases/2009/02/090226093423.htm>. May 11, 2014.
- Lurenberg, F. C., & Irby, B. L. (2008). Writing a successful Thesis and Dissertation. Corwin Press, Inc.
- Mohayidin, M. (2008). Implementation of Outcome-Based Education in Universiti Putra Malaysia: A Focus on Students' Learning Outcomes. International Education Studies. <http://www.bangladeshsociology.org/BEJS%207.2%20%20Factors%20Affecting%20Students.pdf>
- Reardon, S. F. (2011). The Widening Academic Achievement Gap Between the Rich and the Poor: New Evidence and Possible Explanations, Published Master's Thesis. Stanford University. Retrieved from <http://cepa.stanford.edu/sites/default/files/reardon%20whither%20opportunity%20%20chapter%205.pdf>. March 9, 2011
- Sand, O. (2004). Writing Measurable Learning Outcomes. Annual Texas A&M Assessment Conference. 2004.
- Shapiro, M. A. (2009). Parental Education Level: Academic Involvement and Success. Published Thesis. University of Michigan. Retrieved from <http://deepblue.lib.umich.edu/bitstream/handle/2027.42/63901/shap?sequence=1>. April 23, 2014.
- Slaughter, S. D. (2007). Demographic Profiles Associated with Academic Performance for Third Grade Students in North Forest and Aldine Independent School Districts in Texas. Published Dissertation, Texas A&M University. Retrieved from <https://repository.tamu.edu/bitstream/handle/1969.1/ETD-TAMU1284/SLAUGHTERDISSERTATION.pdf?sequence=1>. May 11, 2014.
- Steven Darryll Slaughter. (2007). Demographic Profiles Associated with Academic Performance for Third Grade Students in North Forest and Aldine Independent School Districts In Texas. Published dissertation, Texas A&M University.
- Tenembaum, D. (2010). Large study shows females are equal to males in math skills. News, University of Wisconsin – Madison. Retrieved from <http://www.news.wisc.edu/18508>. April 6, 2014.
- Westby, J. C. (2006). Gender and Academic Performance in English Communication Courses in a Japanese University. Journal of the Institute for Second Language Development. Retrieved from <http://www.jisld.org/articles/genderperformance.html>. March 9, 2014
- Zan, R., & Di Martino, P. (2012). Attitude Toward Mathematics: Overcoming The Positive/Negative Dichotomy. Tmme Monograph3, Italy Retrieved



from [http://www.math.umt.edu/tmme/monograph3/Zan\\_Monograph3\\_pp.157\\_168.pdf](http://www.math.umt.edu/tmme/monograph3/Zan_Monograph3_pp.157_168.pdf). April 19, 2014 43600 UKM Bangi, Selangor Malaysia