Relationship of the Academic Rating and Board Examination Performance of the Electronics Engineering Graduates

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ABSTRACT

The study is intended to look into the relationship of the academic ratings of the Electronics Engineering (ECE) graduates of a university in Davao City, Philippines. This research also aimed to make a profile of the performance of the graduates in the board examination of the country.

This study used a descriptive-correlational method and is concerned with relationship of the two variables: the independent variables, which are the academic ratings of the students and the dependent variables, which are the board examination ratings. The research employed 199 ECE graduates who took the board examination. Upon the availability of data, the profile of the graduates in terms of academic rating and board exam performance was presented categorically as Outstanding, Very Satisfactory, Satisfactory, Average, Below Average, Poor and Very Poor. Using Pearson Product-Moment Correlation Coefficient, the relationship between the independent and dependent variables was established. All the three-board examination subjects suggest moderate correlation to the academic grades of the ECE graduates as illustrated by the equivalent correlation coefficients. In conclusion, there is a substantial relationship between the academic achievement and the board examination rating of the ECE graduates in all subjects.

Keywords: Academic performance, Board Examination, Electronics Engineering, Engineering Education.

INTRODUCTION

As a profession that has to be thought-out, engineers play a substantial role in facilitating to mold and develop a better nation. In the Philippines, the Commission on Higher Education (CHED) was mandated by Republic Act 7722 to administer tertiary education including engineering education. Accordingly, the CHED technical panel recommends course outlines for all subjects in each academic program. In this method, the university professors and instructors lay emphasis on the points provided by the technical panel concerning the subjects.

For the time being, engineering educators of the Philippines pose a substantial concern for globalization of services. In this case there will be free flow of services among countries and therefore professional services have to be

liberalized. Due to the increasingly importance of human services, an appropriate move has to be done in order to stress greater impact and promotion of engineering education for globalization. In this age of globalization, modern professionals are challenged to learn, analyze and innovate. Another key to globalization is sustaining knowledge-based education through interdisciplinary ways (Carillo, 2006).

The Professional Regulation Commission (PRC), a Philippine government agency that regulates the practice of professionals, plays a significant role in assessing engineers for practice through Board Examinations. The commission must live up to the expectation of the end users and with that thorough screening of graduates must be implemented. Failures in the board examinations are well thought out as an accepted reality. But still questions are solicited on what seems to be the issue of failures in the board examinations.

According to Arcelo (1998), relevance in education refers to the congruence of the curricula and the type of academic programs offered by schools with the need of students and developmental requirement of the economy and the society. Thus there is a call to assess the resemblance of the board examination questions to the CHED technical panel recommended subject course outlines.

Faced by the dilemma of the failure in licensure examinations for engineering, there is a call to assess the aspects that greatly influence the performance of the graduates since humanity is promoting highly technical and scientific amenities and services. Statistics from PRC shows that less than half of the engineering examinees pass the licensure examination, which is the permit to practice the profession.

Problem Statement

The study aimed to make a profile of the performance of electronics engineering graduates of the University of the Immaculate Conception in the board examinations. Specifically, it sought to answer the following questions.

1. What is the academic achievement profile of ECE graduates on the board examination subjects namely, Mathematics, Electronics and Communications?
2. What is the licensure exam performance profile of the ECE graduates on the board examination subjects namely, Mathematics, Electronics and Communications?
3. Is there significant relation between the academic achievement of the ECE graduates and the ratings on the board examination on the following subjects:

    a. Mathematics
    b. Electronics
    c. Communications

Conceptual Framework

This research theorizes that the academic performance of an ECE graduate in the subjects which are part of the board exam can serve as basis in predicting performance in the ECE licensure examination. If an ECE graduate performs well in mathematics, electronics and communications classes then one will likely be having high ratings in the same subjects in the licensure exam as a result.

Thus the independent variables in this study are the academic ratings in mathematics, electronics and communications subjects while the dependent variables are the performance ratings in the different ECE licensure examination subjects as illustrated in figure 1.
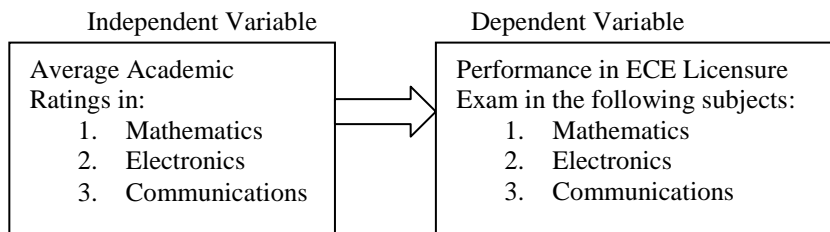
Independent Variable	Dependent Variable
Average Academic Ratings in: 1. Mathematics 2. Electronics 3. Communications	Performance in ECE Licensure Exam in the following subjects: 1. Mathematics 2. Electronics 3. Communications

Figure 1: Conceptual Paradigm

The mathematics, electronics and communications academic subjects will be categorized in accordance to the college curriculum. These independent variables are recognized to explain results on the performance in ECE licensure exam.

Definition of Terms

The terms used in this study are conceptually and operationally defined.

Academic Achievement. A value calculated as the average rating of all the college subjects categorized as Mathematics, Electronics, and Communications. This refers to the grades of students in Mathematics, Electronics and Communications.

Board Examination Performance. A value calculated as the rating of an examinee in the ECE Licensure Examination from the individual ratings of the board examination subjects.

Licensure Examination. This is the examination administered by the PRC in order for the graduates to practice their profession.

RESEARCH DESIGN AND PROCEDURE

The study used the descriptive-correlational method. This method of research design is founded on the assumption that reality is best described as a network of interacting and mutually-causal relationship (Davis, 2004). In particular, the researcher is concerned with the relationship of the two variables. The independent variable for this study is the academic achievement while the dependent variable is the board examination performance.

Source of Data

One source of the study is the data from the University of the Immaculate Conception, Office of the Registrar which will supplement the researcher of the necessary academic average ratings in mathematics, electronics and communications subjects. Another source of the data is the Professional Regulations Commission which will provide the researcher the result in the board examination of all ECE Licensure Examinees from UIC.

Research Locale

Due to availability of data, the study was conducted at the University of the Immaculate Conception, Davao City, Philippines. UIC is a catholic school originally established for girls. It is managed by the Religious of the Virgin Mary (RVM). From the time it was granted as a university last May 1992, UIC became responsive to the call of science and technology, and technological courses like Bachelor of Science in Electronics Engineering (BSECE) and Bachelor of Science in Computer Science were offered in the years 1993 and 1995 respectively (University of the Immaculate Conception Faculty Handbook, 1997).

Statistical Treatment

The following statistics were employed in the analysis of the gathered data.

1. Percentage of the Academic Achievement

In taking the academic rating, all subjects categorized as mathematics, communications and electronics present in the BSECE curriculum were averaged. Performances measured in terms of their academic grades were presented as follows:

Grades/Ratings	Verbal Description
95-100	Outstanding
90-94	Very Satisfactory
85-89	Satisfactory
80-84	Average
75-79	Below Average

70-74	Poor
Below 70	Very Poor

2. Board Examination Ratings

The available data from the PRC are presented in percentile rating in licensure examination subject. Also the board examination performances were classified in accordance below:

Grades/Ratings	Verbal Description
95-100	Outstanding
90-94	Very Satisfactory
85-89	Satisfactory
80-84	Average
75-79	Below Average
70-74	Poor
Below 70	Very Poor

3. Pearson Product –Moment Correlation Coefficient

Pearson Product –Moment Correlation Coefficient, introduced by Karl Pearson in 1901, was used in this study to establish relationship between the independent and the dependent variables. The size of the correlation varies from +1 through 0 to -1. The formula for Pearson r is:

$$r = \frac{\sum xy}{N(\sigma x \, \sigma y)}$$

Where:

$x =$		scores deviation for the independent variable, this variable could be x_1 for mathematics, x_2 for electronics and x_3 for communications
$y =$		scores deviation for the dependent variable, this variable could be y_1 for mathematics, y_2 for electronics and y_3 for communications
$N =$		Population size
$r =$		degree of relationship between X and Y
$\sigma =$		standard deviation

In calculating the score deviation for variables, $\acute{O}x$ and $\acute{O}y$, the following formulas are used:

$$\sigma x = \sqrt{\frac{x^2}{N}}$$

$$\sigma y = \sqrt{\frac{y^2}{N}}$$

4. T - test

$$t = r \sqrt{\frac{(N-2)}{(1-r^2)}}$$

Where: t = test statistics of the study

All interpretation were based on α = 0.05 level of significance using the two-tailed test.

RESULTS AND ANALYSIS OF DATA

Academic Achievement Profile of ECE Graduates

Table 1 shows the overall academic achievement profile of ECE graduates in mathematics, electronics and communications subjects.

Table 1: Overall Academic Achievement Profile of ECE Graduates

Ratings	Remarks	Frequency					
		Mathematics	%	Electronics	%	Communications	%
95-100	Outstanding	0	0	0	0	0	0
90-94	Very Satisfactory	5	2.22	3	1.33	2	0.89
85-89	Satisfactory	10	4.44	41	18.22	19	8.44
80-84	Average	87	38.67	123	54.67	146	64.89
75-79	Below Average	122	54.22	58	25.78	58	25.78
70-74	Poor	1	0.44	0	0	0	0
Below 70	Very Poor	0	0	0	0	0	0
		225	100	255	100	225	100

From table 1, it is in the communications subjects where students performed very well, getting the "average" performance level. The result also showed that 123 ECE graduates performed lower than the "average" level in mathematics. This means that the students have difficulty in getting higher marks in mathematics compared to electronics and communications subjects.

Licensure Examination Profile of ECE Graduates

The overall licensure examination profile is shown in table 2.

Table 2: Overall Licensure Examination Profile of ECE Graduates

Ratings	Remarks	Number of Students who took the Board Exam					
		Mathematics	%	Electronics	%	Communications	%
95-100	Outstanding	0	0	0	0	0	0
90-94	Very Satisfactory	2	1.01	0	0	0	0
85-89	Satisfactory	5	2.51	1	0.5	1	0.5
80-84	Average	19	9.55	13	6.53	8	4.02
75-79	Below Average	23	11.56	37	18.59	41	20.6
70-74	Poor	54	27.14	64	32.16	68	34.17
Below 70	Very Poor	96	48.24	84	42.21	81	40.7
		199	100	199	100	199	100

Basing on table 2, the total number of graduates who took the board examination is 199 out of 225 and 144 successfully passed the examination.

In this table more examinees belong to the "poor "and "very poor" profile. The implication is that more values are seen on the lower range of the mean so that it goes to show that more graduates did not perform well in the licensure examination.

Graduates performed well in mathematics compared to electronics and communications subjects in the board examination.

Correlation between Academic Achievement and Board Examination Ratings

Table 3 shows the correlation result between the academic achievement and the board exam rating. The understanding of the values for correlation was based on the following:

0.0 to +0.19	weak correlation (almost negligible relationship)
+0.20 to +0.39	low correlation (small relationship)
+0.40 to +0.69	moderate correlation (substantial relationship)
+0.70 to +0.89	strong correlation (marked relationship)
+0.90 to +1.00	very high correlation (perfect association)

Table 3: Correlation between Academic Achievement and Board Examination Rating

Year	Mathematics		Electronics		Communications	
	r-value	Remarks	r-value	Remarks	r-value	Remarks
1998	0.52	Moderate Correlation	0.21	Low Correlation	0.41	Moderate Correlation
1999	0.68	Moderate Correlation	0.63	Moderate Correlation	0.68	Moderate Correlation
2000	0.44	Moderate Correlation	0.3	Low Correlation	0.42	Moderate Correlation
2001	0.39	Low Correlation	0.55	Moderate Correlation	0.55	Moderate Correlation
2002	0.53	Moderate Correlation	0.44	Moderate Correlation	0.55	Moderate Correlation
Overall	0.51	Moderate Correlation	0.51	Moderate Correlation	0.58	Moderate Correlation

Generally, table 3 indicates that there is substantial relationship in all of the subjects shown in the overall correlation index between the academic achievement and the board examination ratings.

The significant relation between the academic achievement and the board examination ratings as tested results to 8.32 in mathematics and electronics while 9.99 in communication. All the value were greater than the critical value of t which is 2.201 for a 0.05-level of significance therefore there is a significant correlation between academic achievement and board exams' rating.

CONCLUSION

The researcher presents the following conceptual statements as conclusion of the study:

1) The academic achievement profile of the ECE graduates on the board examination subjects is "below average" in mathematics and "average" in electronics and communications subjects.

   With the "below average" academic grades in mathematics, it is recommended that mathematics instructors encourage students to devote more time in learning and solving mathematical problems. For students to hold accountable with time, instructors are urged to grade assignments and let the students write a weekly summary of time spent in studying. The summary could be in the form of solved problems and researches not within the assignments given.

2) The licensure examination subjects is "very poor" in all the board examination subjects.

   In order for students to perform well in the board examination, instructors have to expose their students to theories and definitions of different terms associated in electronics and communications by readings, researches and other activities that would enhanced theoretical foundation and not to focus on mere calculations. The engineering department must create an assessment committee for the board examination. Graduate surveys should be done to obtain the opinion of graduates about the learning outcomes and areas of strength and weaknesses in their learning. Assessment should be ongoing to sustain commitment of all faculty members.

3) There is a substantial relationship between the academic achievement and the board examination rating of the ECE graduates in all the subjects.

   It is also concluded that alignment of the subject contents in the PRC Board Examination and course outline CHED Technical Panel is necessary and should be further enhanced.

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