Analysis of the Performance in the Licensure Examination for Bachelor of Science in Civil Engineering Graduates of a University in Isabela Province

Susan C. Vallejo
Isabela State University-Ilagan Campus

ABSTRACT

This study analyzed the civil engineering licensure performance of Isabela State University Bachelor of Science in Civil Engineering (BSCE) graduates using the descriptive type of quantitative research method. The study considered the 84 BSCE graduates for School Years 2009-2010, 2010-2011, and 2011-2012 of ISU-I who took the civil engineering licensure examination. Result revealed that the academic performance of the graduates along Mathematics and Surveying, Hydraulics and Geotechnical Engineering, and Design and Construction are all at fair level. The graduates obtained a good performance in their CE board examination and their rating is highest along Hydraulics and Geotechnical Engineering and lowest in Design and Construction. A better academic performance in Design and Construction and in Mathematics and Surveying predicts the passing in the Civil Engineering Board Examination. It is recommended that the university must focus more on the improvement or enhancement of the curriculum and acquisition of laboratory equipment for the program. Specialized faculty development program may also be considered to improve quality of instruction. A study that would enhance the scholastic rating of the respondents may be conducted.

Keywords: *academic performance, mathematics, surveying, geotechnical, design and construction*

INTRODUCTION

Civil engineering is a profession that deals with the design, construction and maintenance of the physical and naturally built environment. Civil engineering works include bridges, buildings, dams, airports and hangars, ports and harbors, highways and railways, tunnels, river and shore improvements, lighthouses, irrigations, flood protection, drainage, water supply and towers. The CE curriculum includes all these aspects and are divided into five tracks of specialization, namely: construction engineering and management, geotechnical engineering, water resources engineering, structural engineering and transportation engineering (CHED, 2017).

Isabela State University located at the City of Ilagan Isabela is the fourth largest campus of the university and has nine (9) academic programs, one of which is the BS Civil Engineering (BSCE). The program was offered in 1994 as approved by the Board of Regents and it started with only ten students and gradually increased its enrollment and eventually produced more civil engineers who are successful in the field (Vallejo, 2015).

Quality schools generally produce quality graduates that contribute great progress and development of the country that calls for global service. One criterion to assess the quality of graduates in engineering programs according to some certifying bodies is to increase percentage of passing in the board examination. The Commission on Higher Education bases accreditation decisions on evidence that engineering education programs should meet standards concerning program content, student quality, faculty quality and program autonomy. Reiterated that one important consideration in identifying good schools is the quality of graduates that will redound to high performance in licensure examinations.

Ferrer (2016) compared the performance from 2011-2015 of the four engineering programs in the licensure examinations of the overall institutional average passing. It was revealed that average passing rates for civil and electronics engineering are significantly lower than the overall average passing rate, while mechanical engineering has a higher average passing rate compared to the overall. However, the electrical engineering average passing rate showed no difference in the overall average performance of the respondents.

Llanes (2009) found out that civil engineering licensure performance of graduates is higher than the national performance and this is because the respondents attended the in-house-review program conducted by the school.

Similarly, Racadio et al (2014) considered the performance of BSCE graduates in the licensure examination and found out that it significantly correlates to their performance in Structural Theory l and type of residence.

Laguador and Dizon (2013) in their study found out that examinees of mechanical and electronics engineering graduates with high level of study habits and academic behavior obtained low performance in the comprehensive examination. Moreover, the affective domain is significantly related to and predicts respondents' performance in the licensure exam.

Bañez and Pardo (2016) in their study on LET performance of the University of Northern Philippines graduates revealed that respondents garnered above the National Percentage of Passing in major, professional and general education subjects in 2014 and 2015. LET performance in 2015 is significantly higher than in 2014. The passers with high achievement in professional education subjects attended LET review and with high College Admission Test have better overall LET performance in general education and professional education subjects. The respondents with higher achievement in general education subjects have better ratings in the major subjects.

For an academic institution to be able to attain its vision, quality of graduate measures should be employed to guarantee realization of its graduates (Neri, 2008). Thus, results of this study will hopefully contribute to the improvement and enhancement of the teaching and learning process in engineering education.

This study aimed to analyze the Licensure Examination Performance of graduates of BSCE from Isabela State University, Ilagan Campus from School Year 2009-2010 to 2011-2012. Specifically, it sought to: (1)determine the level of academic performance of the graduates along Mathematics and Surveying, Hydraulics and Geotechnical Engineering, and Design and Construction (2)determine the graduates' performance in the Civil Engineering Licensure Examination along Mathematics and surveying, Hydraulics and Geotechnical Engineering, Design, and Construction and (3) find out the significant predictors of the graduates' performance in the civil engineering board examination.

METHODOLOGY

The study used of the descriptive-evaluative method of research. It involved the 84 BSCE graduates of the Isabela State University during the School Years 2009-2010 to 2011-2012 who took the Civil Engineering Licensure Examination. Documentary analysis was also employed on the academic grades of the respondents from the ISU-I Registrar's Office and their Civil Engineering Board Examination ratings from the Professional Regulation Commission (PRC). Frequency and Percentages, Mean, and Regression Analysis were used to describe the respondents' academic performance and CE Licensure board examination rating.

The norms in interpreting the academic performance and CE Board Examination ratings are as follows:

Academic Performance	CE Board Examination Rating	Descriptive Rating
1.00 – 1.24	98-100	Excellent
1.25 - 1.49	95-97	Very satisfactory
1.50 - 1.74	92-94	Satisfactory
1.75 - 1.99	89-91	Fairly Satisfactory
2.00 - 2.24	86-88	Good
2.25 - 2.49	82-85	Fairly Good
2.50 - 2.74	78-81	Fair
2.75 - 2.99	74-77	Below Fair
3.00	70-73	Passing
Below 3.00	69 and below	Failed

RESULTS AND DISCUSSION

Tables 1, 2 and 3 present the distribution of graduates in terms of their academic performance in the three subject areas covered in BSCE program: Mathematics and Surveying, Hydraulics and Geotechnical Engineering, and Design and Construction.

Table 1
Distribution of Respondents in Terms of their Level of Academic Performance along Mathematics and Surveying

Rating	f	%	Description
1.75 - 1.99	3	3.57	Fairly satisfactory
2.00 – 2.24	4	4.76	Good
2.25 – 2.49	12	12.49	Fairly good
2.50 – 2.74	42	50	Fair
2.75 – 2.99	25	29.76	Below fair
Total	**84**	**100**	
Mean	**2.60 (Fair)**		

As seen in the table, in general, the mean of 2.60 indicates that the graduates performed **fair** in their Mathematics and Surveying subjects. Taken singly, the respondents, 42 (50%) performed **fair**, while 25 (29.76%) performed **below fair**. Nevertheless, there are three (3.57%) who obtained **fairly satisfactory** performance that ranges from 1.75-1.99. This implies that there are more graduates who attained low grades in Mathematics and Surveying subjects because they did not have the full grasp of their content.

Table 2
Distribution of Respondents in Terms of their Level of Academic Performance in Hydraulics and Geotechnical

Rating	f	%	Description
1.75 - 1.99	3	3.57	Fairly satisfactory
2.00 – 2.24	4	4.76	Good
2.25 – 2.49	12	12.49	Fairly good
2.50 – 2.74	28	33.33	Fair
2.75 – 2.99	37	44.05	Below fair
Total	**84**	**100**	
Mean	**2.63 (Fair)**		

As gleaned from Table 2, a great number of the respondents (37 or 44.05%) obtained **below fair** performance in Hydraulics and Geotechnical. Meanwhile, there are three (3.57%) of graduates with **fairly satisfactory** scores within the range from 1.75-1.99. This shows that the respondents did not perform well in subject 2 maybe because they lack the necessary equipment for laboratory to perform required experiments. This is supported by the overall mean rating of 2.63 which suggests that they only performed **fairly good** in this subject area.

Table 3
Distribution of Respondents in Terms of their Level of Academic Performance
in Design and Construction

Rating	f	%	Description
1.75 - 1.99	4	4.76	Fairly satisfactory
2.00 – 2.24	18	21.43	Good
2.25 – 2.49	38	45.24	Fairly good
2.50 – 2.74	23	27.38	Fair
2.75 – 2.99	19	22.62	Below fair
Total	84	100	
Mean	2.54 (Fair)		

As revealed in Table 3, a great percentage of the respondents (38 or 45.24%) performed **fairly good** in Design and Construction with grade range of 2.25-2.49. However, there are four (4.76%) who performed **fairly satisfactory**. On the overall, the graduates performed **fairly** ($\bar{X}$=2.54) in Design and Construction.

Table 4, revealed the overall level of academic performance of the Graduates.

Table 4
Overall Level of Academic Performance of the Graduates

Subjects	Academic Performance		
	$\bar{X}$	DR	SD
Mathematics and Surveying	2.60	Fair	0.23
Hydraulics and Geotechnical Engineering	2.63	Fair	0.27
Design and Construction	2.54	Fair	0.24
Overall	2.59	Fair	0.25

As seen from the table, the respondents' overall level of academic performance is **fair** ($\bar{X}$=2.59). Along three subject areas: Hydraulics and Geotechnical ($\bar{X}$=2.63), Mathematics and Surveying ($\bar{X}$=2.60) and Design and Construction ($\bar{X}$=2.54) their performance is at the **fair** level. Further, the standard deviation of .23, .24 and .27 along Math and Surveying, Design and Construction, and Hydraulics and Geotechnical Engineering respectively, reveal that their performance is most varied in Hydraulics and Geotechnical and less varied in Math and Surveying. Likewise, the overall SD of .25 suggests that their academic performance is very close with each other.

Tables 5, 6 and 7 present the respondents' performance in the CE licensure examination in the three subject areas covered in the BSCE program: Mathematics and Surveying, Hydraulics and Geotechnical Engineering, and Design and Construction.

Table 5
Distribution of Respondents in Terms of their Level of Performance in the CE
Licensure Examination along Mathematics and Surveying

Rating	f	%	Descriptive Rating
98-100	5	5.95	Excellent
95-97	5	5.95	Very satisfactory
92-94	2	2.38	Satisfactory
89-91	10	11.90	Fairly Satisfactory
86-88	9	10.71	Good
82-85	11	13.10	Fairly Good
78-81	16	19.05	Fair
74-77	9	10.71	Below Fair
70-73	8	9.52	Passing
69 and Below	9	10.71	Failed
Total	**84**	**100**	
Mean	**80.57 (Fair)**		

As gleaned from Table 5, on the overall, the respondents attained a **fair** level of performance in the CE licensure Examination as supported by the mean rating of 80.57. Getting the individual ratings, 75 (89%) passed this subject as supported by their ratings that range from 70 to 100%, and five (5.95%) obtained an **excellent** (100%) rating. However, nine (10.71%) obtained a failing mark. The result implies that most of them showed good understanding on the concepts and principles of Mathematics and Surveying.

Table 6 shows that the respondents obtained a **fairly satisfactory** ($\bar{X}$=86.49) overall performance in the CE Licensure Examination along Hydraulics and Geotechnical. Most 80 (95%) of the respondents passed this subject area with two (2.38%) who obtained 100 percent ratings. On the other hand, there are four (4.76%) who failed in Hydraulics and Geotechnical subjects. The **fairly satisfactory** performance of graduates indicates full grasp of the concepts in these areas and good background of the subject.

Table 6
**Distribution of Respondents in Terms of their Level of Performance in the CE
Licensure Examination along Hydraulics and Geotechnical**

Rating	f	%	Descriptive Rating
98-100	2	2.38	Excellent
95-97	26	30.95	Very satisfactory
92-94	12	14.29	Satisfactory
89-91	3	3.57	Fairly Satisfactory
86-88	8	9.52	Good
82-85	11	13.10	Fairly Good
78-81	9	10.71	Fair
74-77	7	8.33	Below Fair
70-73	2	2.38	Passing
69 and Below	4	4.76	Failed
Total	**84**	**100**	
Mean	**86.49 (Fairly Satisfactory)**		

As gleaned from Table 7, the overall **fair** ($\bar{X}$=71.27) performance of graduates in the CE licensure examination along design and construction reveals that the graduates have low level of understanding or the concepts of design and construction which could possibly be attributed to their limited exposure to actual engineering works or activities. The great number (24 or 28.57%) of failures in the said examination also support the low performance of the graduates in this area in the civil engineering examination.

Table 7
**Distribution of Respondents in Terms of their Licensure Examination
Performance in Design and Construction**

Rating	f	%	Descriptive Rating
89-91	4	4.76	Fairly Satisfactory
86-88	4	4.76	Good
82-85	9	10.71	Fairly Good
78-81	15	17.86	Fair
74-77	19	22.62	Below Fair
70-73	9	10.71	Passing
69 and Below	24	28.57	Failed
Total	84	100	
Mean	71.27 (Fair)		

The overall performance of the graduates in CE licensure Examination is presented in Table 8.

Table 8
Overall Performance of the Graduates the CE Licensure Examination

Subjects	CE Board Examination		
	X	DR	SD
Math and Surveying	80.57	Fair	12.47
Hydraulics and Geotechnical engineering	86.49	Good	12.10
Design and Construction	71.27	Passing	14.14
Overall	**79.20**	**Good**	**11.18**

As reflected on the table, the graduates obtained 79.20 (good) CE Board Examination rating. When the subjects were taken singly, the graduates achieved highest in the CE Board Examination along hydraulics and geotechnical engineering ($\bar{X}$=86.49) and lowest along design and construction ($\bar{X}$=71.27). The statistics shows that their board examination rating has greater variation (S.D. = 11.18) from the mean score ($\bar{X}$=79.20) compared to their academic performance.

Significant Predictors of the Graduates' Performance in the Civil Engineering Board Examination

Regression analysis was utilized to test if the graduates' academic performances along Mathematics and Surveying, Hydraulics and Geotechnical Engineering, Design and Construction have significant influence on their performance in the Civil Engineering Board examination. Results are presented in Table 9.

Table 9
Regression Analysis for Variables Predicting the Graduates' Performance in Civil Engineering Board Examination

		Unstandardized Coefficients		Standardized Coefficients	t	Sig. t	R	R^2	ΔR^2
		B	Std. Error	Beta					
Model	Variables								
1							.574a	.330	.322
	(Constant)	146.018	10.565		13.820	.000			
	Performance in design and construction	-26.337	4.146	-.574	-6.353	.000			
							.641b	.411	.396
	(Constant)	167.984	11.946		14.061	.000			
2	Performance in design and construction	-17.817	4.671	-.389	-3.814	.000			
	Performance in Math and Surveying	-16.729	5.015	-.340	-3.336	.001			

a. Predictors: (Constant), Performance in design and construction

b. Predictors: (Constant), Performance in design and construction, Performance in Math and Surveying

c. Dependent Variable: Board Exam Rating

The graduates' academic Performance in design and construction (β= -17.817, p<.01) and Performance in Math and Surveying (β= - 16.729, p<.01) have significant influence on their Performance in the Civil Engineering Board Examination (R=.641, F sig =.000). This shows that the respondents with higher academic performance in Design and Construction, and in Mathematics and Surveying tend to perform better in the Civil Engineering Board Examination. The corresponding linear equation is for predicting the Y, therefore, Y=167.984 - .17.817*(Academic Performance in Design and Construction) -16.729 *(Academic Performance in Mathematics and Surveying).

The R^2 value of .411 implies that 41.1 percent of the variance of the dependent variable is explained by the independent variables considered in the analysis, and 58.8 percent is attributed to other factors not included in the study. The above findings is supported by Tamayo, et al (2014) who revealed that grade point average, grades in design and construction, mathematics and hydraulics and survey subjects predict passing the licensure examination.

CONCLUSIONS

The academic performance of the graduates along Mathematics and Surveying, Hydraulics and Geotechnical Engineering, and Design and Construction are all at the **fair level**. The respondents obtained a good performance in their CE board examination and their rating is highest along Hydraulics and Geotechnical Engineering and lowest in design and construction. A better academic performance in design and construction and in mathematics and surveying predict the passing in the Civil Engineering Board Examination.

RECOMMENDATIONS

It is recommended that the university must focus more on the improvement or enhancement of the curriculum and acquisition of laboratory equipment of the program. Specialized faculty development program may also be considered to improve the quality of instruction and a similar study that would enhance the scholastic rating of the respondents may be conducted.

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