
Performance of Civil Engineering Graduates in a Private University on Licensure Examinations from 2016 to 2019

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Abstract

The research assessed how well graduates with a Bachelor's degree in Civil Engineering from a private university in Isabela performed in the licensure examination from 2016 to 2019.

According to the data, candidates exhibited a low level of performance in the Licensure Examination from 2016 to 2019 with only two out of eight (2/8) batches that performed higher than the national passing rate. The first-time examinees' institutional passing rates got lower when compared to the national passing rates. The re-takers institutional passing rates also got lower performance when compared with the national passing rates. The variance of performance of the first-time examinees is superior compare to the re-takers in the Licensure Examination for Civil Engineers. The examinees find Structural and Construction subject as the most difficult to answer in the Licensure Examination for Civil Engineers followed by Mathematics and Surveying, and Hydraulics and Geotechnical Engineering as the easiest one. There is no significant difference in the performance of the graduates of Civil Engineering Program in a private university of Isabela in the Licensure Examination for Civil Engineers from 2016 to 2019. The researcher proposed several specific activities to improve the performance of the graduates of the Civil Engineering Program in the Licensure Examination.

Keywords: Civil Engineering, Licensure Examination, Performance, Passing Rate

1. Introduction

In the ever-evolving landscape of education and professional development, the performance of graduates on licensure examinations serves as a vital benchmark for the quality of an academic institution. Within the dynamic realm of Civil Engineering, where precision, innovation, and societal impact are paramount, the evaluation of graduates' performance on licensure examinations becomes even more crucial.

Civil Engineering, as a discipline, stands at the intersection of science, technology, and societal advancement. The individuals entering this profession bear the responsibility of shaping the physical infrastructure of societies, making their competence and knowledge pivotal. Licensure examinations, administered by authoritative bodies, serve as a rigorous test of graduates' preparedness, theoretical understanding, and practical application of Civil Engineering principles. The results of these examinations not only reflect the individual achievements of graduates but also shed light on the efficacy of the educational system that nurtured them.

This research embarks on a comprehensive exploration of the performance data gathered over the four-year period from 2016 to 2019. By analyzing the trends in pass rates, identifying patterns among successful candidates, and examining potential correlations with academic and extracurricular factors, this study aims to provide a nuanced understanding of the variables influencing the outcomes of licensure examinations. Additionally, it seeks to identify areas of improvement within the academic curriculum and teaching methodologies, thus contributing valuable insights to enhance the educational experience of future Civil Engineering students.

Through meticulous analysis and thoughtful interpretation of the data, this research endeavors to not only assess past performance but also offer actionable recommendations for the academic institution under scrutiny. By understanding the challenges faced and the strengths exhibited by Civil Engineering graduates, this study paves the way for targeted interventions, fostering an environment of continuous improvement and excellence within the realm of engineering education. This research explores into a significant facet of academic achievement, the performance of Civil Engineering graduates from a private university on licensure examinations spanning the period of 2016 to 2019. By scrutinizing the outcomes of these examinations, this study seeks to unravel patterns, analyze trends, and unearth valuable insights into the factors that contribute to the success or challenges faced by these graduates.

2. Background of the Study

The private university where this study was conducted was one of the twelve colleges and/or universities that offer BS Civil Engineering in Cagayan Valley where nine of which were outside the province of Isabela. In terms of engineering facilities, laboratories and equipment, the university has something to be proud of. Universal Testing Machine (UTM) to Digital Surveying Transits were some of their proudest facilities that others do not have. At present, the college of Engineering and Architecture continues to produce board passers in the annual Civil Engineering Board Examination. However, for consecutive years, the school passing rate of this continued to go lower despite offering on-date engineering facilities and laboratory equipment. Based on the results released by the Professional Regulation Commission (PRC) on their official website as compliance to R.A. 8981 or the so-called PRC Modernization Act of 2000 Section 7 – the act to monitor to performance of schools in Licensure Examination for Civil Engineers held last November 2019, the said University only gained 18.18% school passing rate or eighteen board passers out of ninety-nine (18/99).

Analysing the performance of civil engineering graduates of one of the Private University in Santiago City on the Civil Engineering Board Exams will determine effectiveness of the school in training and teaching their students with the new knowledge that the Board of Civil Engineers of the Professional Regulation Commission (PRC) is presenting to the Civil Engineering Board Exams. It could also reflect the performance of the instructors/professors in giving enough knowledge and ideas to their students. It could also determine the areas in which the graduates find difficult to answer. Consequently, the instructors could address specific subjects for the purpose of higher passing rate of the school for the next Civil Engineering Board Examinations.

3. Research Questions

1. How did the engineering graduates perform in the Licensure Examination for Civil Engineering from 2016 to 2019?

2. What is the performance of the first-time examinees in the Licensure Examination for Civil Engineers from 2016 to 2019?
3. What is the performance of the re-takers in the Licensure Examination for Civil Engineers from 2016 to 2019?
4. What is the variance of performance of the first-time examinees compare to the re-takers in the Licensure Examination for Civil Engineers from 2016 to 2019?
5. What is the performance of the graduates in the Licensure Examination for Civil Engineers relative to the following subjects:
 - 5.1 Mathematics and Surveying
 - 5.2 Hydraulics and Geotechnical Engineering
 - 5.3 Structural and Construction
6. Is there any significant difference in the performance of the graduates of Civil Engineering Program in a private university of Isabela in the Licensure Examination for Civil Engineers from 2016 to 2019?
7. What measures can be proposed to improve the licensure examination performance of civil engineering graduates of the University?

3. Conceptual Framework

The concept of the study is to analyze the performance of civil engineering graduates in a private university on licensure examinations from 2016 TO 2019. Specifically, it seeks to determine how the graduates are performing in the Licensure Examination for Civil Engineer, determine specific areas to which the graduates find difficulty and find for the appropriate solution of improving the performance of the graduates for the future licensure examinations.

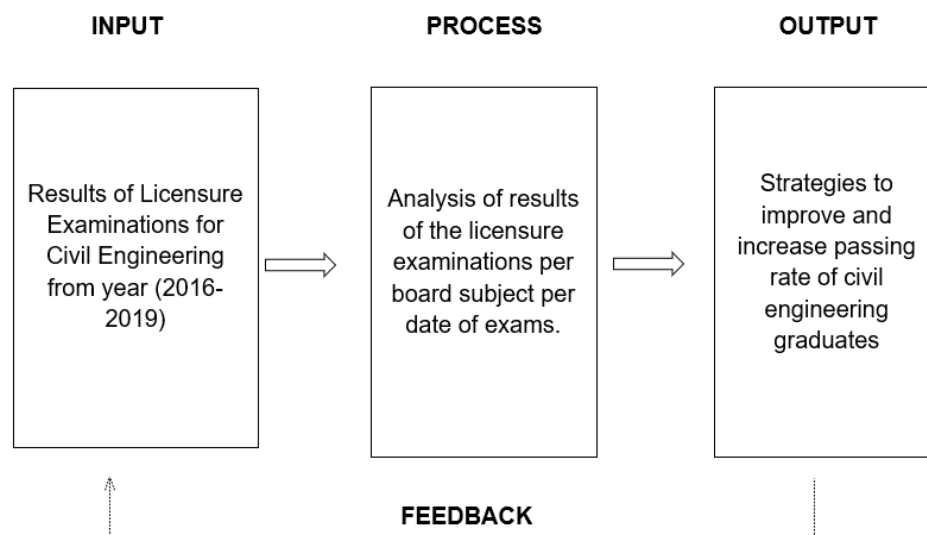


Figure 1. Paradigm of the Study

The input consists the results of Licensure Examinations for Civil Engineering from year 2016 to 2019 that are coming from the Professional Regulation Commission (PRC) and the data gathered by a survey questionnaire from the respondents.

The process includes the analysis of the data gathered from the PRC and results of the survey questionnaires; results whether tallied and analyzed.

The output includes the strategies to improve and increase licensure passing rate at Civil Engineering graduates.

4. Related Literature

Mtshali et al. (2022) states that one of the striking characters of civil engineering is its emphasis to the development of hands-on practical skills, innovation, and creativity. Civil engineering's unique epistemological feature is heavily geared towards equipping individuals with relevant skills for occupational safety.

Commission on Higher Education (2017) states that Civil Engineering is a profession that applies the basic principles of science in conjunction with mathematical and computational tools to solve problems associated with developing and sustaining civilized life on our planet. Civil Engineering works are generally one-of-a-kind projects; they are often grand in scale; and they usually require cooperation among professionals of many different disciplines. The completion of a civil engineering project involves the solution of technical problems in which information from numerous sources and myriad non-technical factors play a significant role. Some of the most common examples of civil engineering works include bridges, buildings, dams, airports and hangars, ports and harbors, highways and railways, tunnels, river and shore improvements, lighthouses, drydocks, irrigations, flood protection, drainage, water supply, and towers. Enumeration of any work in this section shall not be construed as excluding any other work requiring civil engineering knowledge and application. Civil Engineering is one of the broadest engineering disciplines both in terms of the range of problems that fall within its purview and in the range of knowledge required to solve those problems.

Licensure Exam Performance

Esguerra et al. (2023) reveal that the female graduates performed the same as their male counterparts in college. In the board examination, the female and male graduates performed the same in the Mathematics, Surveying and Transportation Engineering and Hydraulics and Geotechnical Engineering components of the board examination, but not anymore in the Structural Engineering and Construction component. As a whole, there is significant difference in the board performance of the 2018 female and male BSCE graduates, with more male graduates passing the licensure, meaning, they are not on the same level of capability in solving problems in the board examination. It was also found out that there exists significant relationship between their scholastic and board performances, suggesting that the subjects covering the three board components taken in college; namely: Mathematics, Surveying and Transportation Engineering, Hydraulics and Geotechnical Engineering and Structural Engineering and Construction, are significantly related to the board performance. In conclusion, there is no gender difference among the 2018 BSCE graduates in as far as their scholastic performance is concerned, meaning the female students could cope up with the rigors of the civil engineering education. There is also no gender difference in their scholastic performance and board performance along Mathematics, Surveying and Transportation Engineering and Hydraulics and Geotechnical Engineering. However, there exists gender difference in Structural Engineering and Construction, leading to the existence of gender difference in the board examination, taken as a whole. This suggests that the male graduates performed better in the board examination than the female graduates in one or more aspects, which may be due to lack of preparation or insufficient exposure to certain structural design and construction topics.

Mohammed (2017) evaluated the performances of the candidate engineers of the College of Engineering (COE) of the Tarlac State University (TSU) in the licensure examinations. The results of the four-year licensure examinations of the graduates of the COE with specialization in the fields of civil, electrical, electronics, and mechanical engineering were covered in this study. The research methods used in the study were descriptive and analytical approaches. The subjects of the study were the TSU College of Engineering graduates with specialization in civil, electrical, electronics and mechanical engineering. They took the board examination during the same year or not more than one year from the time of their graduation. Candidates who took the board examination more than once and/or beyond one year from the date of their graduation were not included in this study. For ethical consideration, all necessary procedures in acquiring the board examination results were strictly adhered to by the researchers. Likewise, the names and board examination results of the subjects of this study were treated with utmost confidentiality to protect their interest. The total numbers of first-time takers for the licensure examinations in engineering specializing in civil, electrical, electronic and mechanical engineering were 100, 106, 108, and 44 respectively. The statistical methods used in this study were the descriptive and inferential statistics. The analysis of variance was used to determine the variation among the four-year licensure examination performances of the candidate engineers in the fields of civil, electrical, electronics, and mechanical engineering. The study revealed that there was no significant difference among the four-year licensure examination performances of both the civil and mechanical engineer candidates. In contrast, the electrical and electronics engineer candidates' performances significantly differed within the evaluation period. To pass the examination, a candidate must obtain an average of seventy per cent, with no rating below fifty per cent in any subject: Provided, that an applicant who fails to obtain a passing average but who obtained at least seventy per cent in each of at least one-half of the total subjects given in the examination, may be permitted to take within two years from the date of his examination, another examination on the subjects in which he obtained a grade below seventy per cent. Should the examinee fail in the set of subject repeated in the second examination, he shall be required to take all the subjects in the next examination.

Poso (2020) developed prediction models to forecast the performance of the students in the Civil Engineering Licensure Examination based on their academic performance in different subjects. All the three (3) models have shown significant and high correlation results and minimal errors. It can be concluded, that based on the output models, the MatLab Neural Network Toolbox is very efficient in the prediction modelling using ANN. Therefore, it is recommended that the output models can be used in predicting the student's licensure examination performance in civil engineering. Higher Education Institutions (HEIs) will be guided in determining the student's predicted performance and to carry out measures to give priority to the low performers. The identified civil engineering students should be given higher priority during the conduct of major and correlation courses in their terminal year. The early prediction data can help institutions to implement solution to improve the actual performance during licensure examinations. Using the output models and equations, the students can easily identify their predicted licensure examination performance integrating their academic records from the school and likely will give them proper motivation to improve.

Callena et al. (2019) states that performance of higher education institutions in licensure examinations is reflective of the effectiveness of their curricular programs. This study employed a causal design to evaluate graduates' academic attributes that can potentially

determine the likelihood of passing the state-administered board examinations. Considered predictor variables are ratings in University admission test, average high school and college general point averages as well as course grades in major and professional courses. The test of significance of these variables was derived from a binary logistic regression. Results of the evaluation indicated that performance indicators varied across programs. The implications on students' academic attributes, the institution's admission and retention policy, assessment practices and quality assurance mechanisms are discussed.

Findings of Callena et al. (2019) study offered observations worth-considering in terms of the improvement of program delivery in the university. The positive significant influence of USEPAT in both Civil and Electrical Engineering in the main campus and of the High School GPA for Forestry program in Tagum Campus support the predictive validity of the entrance examination and the admission policy set by the university. It is very important to note that existing retention policy was not found supportive to the students' performance in the licensure examination. The assessment practices in the different programs may not have considered alignment with standards set in the Professional Regulatory Commission (PRC). The alignment should look at the whole program specification especially in the design of assessment and grading criteria. Similarly, quality assurance mechanism must be developed in the delivery of instruction. As the university embarked on the revisions of curricular programs in view of the incoming freshmen from the K-12 program, a relevant and viable monitoring and evaluation of instructional delivery should be in place. Implementation of outcomesbased curriculum must be accompanied with a systematic approach of gathering feedback. This ensures attainment of desired outcomes particularly in major and professional courses of the revised curricular programs offered in the university. This strategy leads to a functional quality improvement cycle within the system. The following recommendations are forwarded: Sustain the implementation of entrance examination as part of the selection process for incoming freshmen. Its design may be revisited to capture not only high school achievement but some other dimensions of intellectual ability and aptitude. Setting high cut-off score could be an advantage. Revisit instructional delivery and assessment practices of the teachers to match predetermined outcomes. Aligning them with the standard set by oversight agencies may also be necessary. Intensify conduct of monitoring and evaluation in the delivery of instruction. A more effective supervisory practice coupled with systematic conduct of evaluation of instruction is likewise strongly suggested. A longitudinal study may be designed on effectiveness of the newly revised OBE curriculum in terms of input, process, and outcome of the program.

Talaroc et al. (2021) revealed that Student Internship Grade (SIG), College Admission Test (CAT), and Terminal Competency Assessment (TCA) scores were the significant factors affecting the licensure examination performance of the RT graduates. The study concludes the need for the administrators and educators of HEI under study to be aware of the role that SIG, CAT, and TCA play in the licensure examination. These factors should be included in the college admission and retention policies, as well as in the formulation of education intervention programs, in order to improve RT graduates' performance in the licensure examination.

Graduates' Success

Abushandi (2021) states that there are many internal and external factors influence student success such as optimization of student support services, campus resources, teaching methods and learning outcomes achievement, and many others. Understanding student success due to

the global declining quality of undergraduate engineering students is very demanding. Post training or re-educating graduates is expensive and time consuming and can be prevented by if structured educational process took a place. The aims of this study were to identify student's success related factors and assess how a new teaching method will impact student success. Assessment of student success within civil engineering major was analyzed. After conducting the teaching method, a structured reflective questionnaire was carried out among 50 students targeting two modules namely traffic and transportation engineering from level three, and introduction to structural analysis and design from level two. Students' satisfaction and teaching method effectiveness emerged as significant indicators of student success. Statistical analysis was performed to evaluate student responses. Person correlation and Multiple Linear Regression were used to test and predict the relationships between the variables mainly gender, teaching method effectiveness, and overall evaluation. Gender plays a moderate to strong role in the response for method effectiveness indicator and overall evaluation indicators. The performance of Multiple Linear Regression was exceptionally well with very low average relative error (5%). Students are more likely to be engaged onsite rather than online to adjust their need and trigger academic support. Improving student support services, student's engagement, and update module materials to be more problem based are recommended to ensure students success. In addition, proper student's feedback analysis, formative and summative assessments were primary tools to improve teaching practices.

Polmear et al. (2020) explores undergraduate construction and civil engineering (CCE) students' perspectives on the skills they need to be successful in their future careers. Previous research has identified important outcomes and attributes for engineering students to inform curriculum development. However, discrepancies between skills emphasized in the curriculum and those valued in industry have been reported. This potential disconnection raises questions regarding what students are trained to prioritize through their formal education and professional socialization, which has implications for their workforce development. This study explores what skills students believe they need and how/where they learned the importance of these skills. This work aims to connect these perspectives with those expressed by industry. The theoretical framework underpinning this research is a set of competencies that recent graduates need when entering the workforce, as identified by experienced professionals in CCE. This study employed a qualitative approach to explore student perceptions through semi-structured interviews. In 2019, 13 undergraduate CCE students at four U.S.A. institutions completed an interview. The transcripts were analyzed with a combination of inductive and deductive coding. At least one participant described 15 of the 19 competencies included in the guiding framework. The greatest number of students identified Communication, Humility, and Teamwork as important for success in their future field. Emergent competencies were Personal Persistence and Passion for Work. Students expressed that they primarily learned the importance of these skills and practiced them in internships and out-of-class activities. Although a few participants mentioned the classroom, the results indicate an opportunity for engineering educators to better emphasize these competencies in their courses and provide opportunities to foster their development. This research contributes an understanding of where expectations of students already align with industry perspectives, what gaps still need to be closed, and how engineering educators can help prepare students for the realities of the workforce.

In 21st century, the major challenge in engineering education in India is to meet the demands of technical profession and emerging job market. Now a days the education pattern, nature of jobs and services are fast changing across the world. Skill is becoming a commodity that can be bought from low-cost providers anywhere across the globe. Also in the digital world, knowledge is no longer confined to experts only, rather computer and internet connectivity has empowered every citizen to look for anything and everything. In this context, the engineering education of any country is very critical/crucial for determining its global positioning as well as ensuring the prosperity of their citizens. So engineering education system should be modified to enable our students to develop the skills like creativity and innovation, communication, critical thinking, interpersonal skills, collaboration and teamwork. Communication and collaboration are identified as an essential competencies by almost all of the organizations who are seeking competent employees. All the professional/accreditation bodies like Accreditation Board for Engineering and Technology (ABET), Washington Accord or National Board of Accreditation (NBA), India have already elaborately stated about the students learning outcomes, program educational outcomes, list of competencies, professional/ethical responsibilities of engineers/ engineering educators/ academic institutions.

Nti Asamoah (2021) revealed that Kumasi Technical University exists to provide quality teaching, learning and research in engineering, science, technology and entrepreneurship to promote industrial development in Ghana. Since 2006, the Civil Engineering Department (CED) has utilized Competency-Based Training (CBT) concept of teaching and learning and as a result, has become an excellence center for the concept, theory and application of CBT for other departments in the university to emulate. Since the CED commenced Higher National Diploma and Bachelor of Technology (Top up) programmes in 1997 and 2009 respectively, there has been no tracer survey conducted on graduates. The objective of this paper is to track graduates to determine employability, progression to higher studies and to evaluate the CBT concept of teaching and learning. Data obtained from both print and online questionnaires were organised by MS Excel and analysed using IBM SPSS Statistics 22.0. It was ascertained that skills needed for industry performance were duly acquired through the programmes run. In addition, further study and project specialization significantly affected employment of graduates. It was concluded that though the CBT mode of training may be responsible for equipping graduates with adequate skills for the job market, it could be enhanced with research component to benefit graduates for further study. The study recommended that standard construction software be incorporated in the delivery of the Civil Engineering programme. Subsequently, the survey could be replicated in other departments and Technical Universities to inform facilitators and decision-makers.

Briones (2021) states that preparation to pass the licensure examination is vital at the very first stage of college life. The study aimed to determine the freshmen students' intrinsic and extrinsic factors as success predictors for their licensure examination. The descriptive-correlation method was employed to determine the intrinsic and extrinsic motivation and the significant differences between the respondents' motivation among colleges and between the factors. One hundred ninety-four (194) students were utilized as respondents of this study. FGD with five (5) deans from different colleges were employed for validation and intervention. Results revealed that between the factors, intrinsic is the highest motivating factor. Respondents believe that to pass the board exam, their effort to develop their own skills will bring them success. They also believe that providing material things and other support

for their family as an external motivation will just follow. The test on significant difference revealed that students' perception of motivation from among colleges have no significant difference. However, between the factors, a significant difference was noted. Activities on study habits and skills formation of students will boost intrinsic motivation and family-centered activities were seen as an effective intervention program.

Measures for Improving Board Performance

Dotong (2019) recommends that the College of Engineering may continue to strengthen the selection and retention policy to screen the students who have the capability academically and emotionally to pursue and finish the BS Mechanical Engineering program. The faculty members may prepare major examinations similar to the nature of licensure examination most especially to the professional courses and mathematics courses starting in the first-year level. The University may develop programs to strengthen the self-discipline, confidence and study habits of the students through co-curricular activities from recognized student organizations and during college days. The University may facilitate discussion on sharing of best practices of colleges with licensure examination. The College of Engineering may prepare an action plan on how to improve the academic performance of the students gearing towards higher performance rating with board notched.

6. Research Design

The descriptive method with data analysis was used in the research. The researcher relied on the results of the Licensure Examination for Civil Engineers in the conduct of the study. Upon the request of the dean, the Professional Regulation Commission (PRC), Manila provided the Civil Engineering Board Exam Results of the University from 2016-2019.

The analysis extended further by taking the ratings per subject per examination date to find out which board exam board subjects or areas the graduates found difficulty during exam. The data gathered from the PRC were analyzed and derive to answers to this study.

7. Study Site and Participants

The study considered the Civil Engineering examinees in one of the Private University of Isabela who took the Licensure Examination for Civil Engineers from May 2016 to November 2019.

8. Population, Sample Size and Sampling Method

The respondents of the study included 388 examinees of BS Civil Engineering of the University who took the board exam from May 2016 to November 2019.

9. Instruments

The researcher made use of the data from the results of the Licensure Examination for Civil Engineers from 2016 to 2019 from Professional Regulation Commission (PRC).

10. Data Analysis

For every date of licensure exams, mean rating per exam subject taken was computed. This was done for all the years of examination. The total mean was taken for the total of four years of licensure examination. Then, the mean score/rating were ranked. Mean passing of first time

takers and re-takers were compared and analyzed in contrast with the national passing rate in each examination.

As the batch of graduates, after getting the mean per subject per year, the proponent computed for the total mean rating and ranked them according to difficulty, with rank one as the most difficult, second as the average and third as the easiest among the three subjects.

11. Ethical Considerations

The researcher upholds the examiners right to self-determination. Deception or exaggeration regarding the purpose of the study is avoided by the researcher. The study data as well as the privacy and identity of the research participants remained extremely confidential, and their privacy was safeguarded.

12. Results and Discussion

1. What is the performance of the graduates in the Licensure Examination for Civil Engineers from 2016 to 2019?

Presented in Table 1 is the performance of the graduates in the Licensure Examination for Civil Engineers from 2016 to 2019.

Table 1. Performance of Graduates of University in the Licensure Examination for Civil Engineers from 2016 to 2019

| Date of Examination | Institutional | | | National Passing | Variance |
|---------------------|---------------------|-------------------|-----------------------|------------------|----------|
| | Number of Examinees | Number of Passers | Institutional Passing | | |
| May 2016 | 18 | 3 | 16.67 | 38.17 | -21.5 |
| November 2016 | 45 | 13 | 28.89 | 45.90 | -17.01 |
| May 2017 | 25 | 9 | 36.00 | 35.95 | 0.05 |
| November 2017 | 53 | 17 | 32.08 | 48.81 | -16.73 |
| May 2018 | 32 | 12 | 37.50 | 36.03 | 1.47 |
| November 2018 | 69 | 9 | 13.04 | 45.11 | -32.07 |
| May 2019 | 47 | 13 | 27.66 | 38.25 | -10.59 |
| November 2019 | 99 | 18 | 18.18 | 43.18 | -25 |
| Total | 388 | 94 | 26.25 | 41.43 | -15.17 |

Table 1 shows that only two out of ten (2/10) batch of examination performed higher performance than the national passing rate. On the whole, the University performed the highest in May 2018 by 1.47 percent followed by May 2017 with 0.05 percent above the national passing rate while the rest is below the national passing rate with May 2019 getting 10.59 percent lower than the national passing rate. As gleaned from the data, majority of the exams were below the national passing rate.

Table 1 also shows overall performance of the graduates in the Licensure Examination for Civil Engineers from 2016 to 2019. As gleaned from the table that in May 2016 there was eighteen

(18) graduates who took the examination and three (3) of them passed getting 16.67% institutional passing rate lower than the national passing rate of 38.17% while only thirteen (13) out of forty-five (45) graduates passed the examination on the month of November at the same year or 28.89% institutional passing rate lower than the national passing rate of 45.90%. In May 2017 nine (9) out of nine (25) takers passed the exam getting 36.00% institutional passing rate as against 35.95% national passing rate and seventeen (17) out of fifty three (53) passed the examination in November 2017 with 32.08% institutional passing rate compared to 48.81% national passing rate. In May 2018 exam there were twelve (12) out of thirty two (32) takers passed the exam with 37.50% institutional passing rate as compared to the national passing of 36.03% while only nine (9) out of sixty nine (69) passed the exam in the same year getting 13.04% institutional passing rate at 45.11% national passing rate. Thirteen (13) out of forty seven (47) graduates passed the exam in May 2019 or 27.66% institutional passing rate at 38.25% national passing rate and 18.18% or eighteen (18) out of ninety nine (99) passed the exam in November 2019 compared to 43.18% national passing rate.

As gleaned from the table that there was a total of ninety four (94) out of three hundred eighty eight (388) or 24.22% passed the licensure examination for civil engineers from May 2016 to November 2019 first timers and re-takers. It also shows that the mean of 26.25% institutional passing rate did not exceed the mean national passing rate of 41.43% in the following years as stated above with only two (2) out of eight (8) examinations higher institutional passing rate than the national passing rate. This implies a poor performance of the school in the said examination and should be given some interventions to improve the passing rate in the next examinations to come.

2. What is the performance of the first-time examinees in the Licensure Examination for Civil Engineers from 2016 – 2019?

Table 2. Passing rates of First-time Takers Passing Examinees against the National Passing Rates in the Licensure Examination for Civil Engineers from 2016 to 2019

| Date of Examination | First-Time Examinees | Number of Passers | Institutional Passing Rates | National Passing Rates | Remarks |
|---------------------|----------------------|-------------------|-----------------------------|------------------------|---------|
| May 2016 | 6 | 2 | 33.33 | 38.17 | Lower |
| November 2016 | 35 | 13 | 37.14 | 45.90 | Lower |
| May 2017 | 2 | 0 | 0.00 | 35.92 | Lower |
| November 2017 | 37 | 15 | 40.54 | 48.81 | Lower |
| May 2018 | 7 | 3 | 42.86 | 36.03 | Higher |
| November 2018 | 45 | 8 | 17.78 | 45.11 | Lower |
| May 2019 | 9 | 2 | 22.22 | 38.25 | Lower |
| November 2019 | 71 | 18 | 25.35 | 43.18 | Lower |
| Overall | 212 | 61 | 27.40 | 41.42 | |

Presented in table 2 are the comparative results of the first-time takers passing rates to the national passing rates in the licensure examination for civil engineers from 2016 to 2019.

The table reveals that from six (6) first time takers from May 2016, two of them passed the exam or 33.33% institutional passing rate as against to 38.17% national passing rate, while only thirteen (13) out of thirty five (35) first time takers from November 2016 passed the examination or 37.14% institutional passing percentage compared to 45.90% national passing rate. There is no passer in May 2017 with two (2) first time taker who took the exam getting 0% institutional passing at 35.92% national passing. However, there were fifteen (15) out of thirty seven (37) first time takers that passed the November 2017 examination with 40.54% institutional passing rate against 48.81% national passing rate. In May 2018, three (3) out of seven (7) first time passed the examination getting 42.86% institutional passing rate compared to 36.03% national passing rate while eight (8) out of forty five (45) first time takers passed the examination or 17.78% institutional passing rate in November 2018 at 45.11% national percentage. In May 2019 two (2) out of nine (9) first time taker passed the examination arriving at 22.22% institutional passing rates again against 38.25% national passing rate while eighteen (18) out of seventy one (71) examinees passed the exam getting 25.35% institutional passing rate compared to 43.18% national passing rate.

As a whole, there were sixty one (61) out of two hundred twelve (212) first time takers who successfully passed the licensure examination for civil engineers from May 2016 to November 2019 or 27.40% institutional passing rate against 41.42% national passing for the past 4 years. It could also be analyzed from the table that only one (1) out of eight (8) exams surpassed the national passing rates causing the mean institutional passing rate to drop to only 27.40%.

3. What is the performance of the re-takers in the Licensure Examination for Civil Engineers from 2016 – 2019?

Table 3. Passing rates of Re-takers Passing Examinees against the National Passing Rates in the Licensure Examination for Civil Engineers from 2016 to 2019

| Date of Examination | Re-takers Examinees | Number of Passers | Institutional Passing Rates | National Passing Rates | Remarks |
|---------------------|---------------------|-------------------|-----------------------------|------------------------|---------|
| May 2016 | 12 | 1 | 8.33 | 38.17 | Lower |
| November 2016 | 10 | 0 | 0.00 | 45.90 | Lower |
| May 2017 | 23 | 9 | 39.13 | 35.92 | Higher |
| November 2017 | 16 | 2 | 12.50 | 48.81 | Lower |
| May 2018 | 25 | 9 | 36.00 | 36.03 | Lower |
| November 2018 | 24 | 1 | 4.17 | 45.11 | Lower |
| May 2019 | 38 | 11 | 28.95 | 38.25 | Lower |
| November 2019 | 28 | 0 | 0.00 | 43.18 | Lower |
| Overall | 176 | 33 | 16.14 | 41.42 | |

Presented in table 3 are the passing rates of the re-takers of the licensure examination for civil engineers from 2016 to 2019. The table reveals that from twelve re-takers from May 2016, only one (1) passed the exam or 8.33% institutional passing rate as against to 38.17% national passing rate while zero (0) out of ten (10) re-takers from November 2016 passed the examination or 0% institutional passing percentage compared to 45.90% national passing rate.

There were three (9) out of twenty-three (23) re-takers who passed in May 2017 getting 39.13% institutional passing at 35.92% national passing and there were two (2) out of sixteen (16) re-takers who passed the November 2017 examination or 12.50% institutional passing rate against 48.81% national passing rate. In May 2018, nine (9) out of twenty-five (25) re-takers took and passed the examination getting 36% institutional passing rate compared to 36.03% national passing rate but only one from twenty-four (24) re-takers passed the examination or 4.17% institutional passing rate in November 2018 at 45.11% national percentage. In May 2019 the only eleven (11) out of thirty eight (38) re-takers who took the examination passed arriving at 28.95% institutional passing rates again against 38.25% national passing rate while no one from twenty eight (28) re-takers passed the examination getting 0% institutional passing rate compared to 43.18% national passing rate in November 2019.

As a whole, there were thirty three (33) out of One Hundred Seventy Six (176) re-takers who successfully passed the licensure examination for civil engineers from May 2016 to November 2019 or 16.14% institutional passing rate against 41.42% national passing for the past 4 years. It could also be analyzed from the table that there were two (2) examinations that got 0% passing rate and one (1) out of eight (8) exams surpassed the national passing rates causing the mean institutional passing rate to drop to 16.14%.

4. What is the variance of performance of the first-time examinees compare to the re-takers in the Licensure Examination for Civil Engineers from 2016 to 2019?

Table 4. Summary of Compared Passing Rates of First - Time Takers and Re-takers in the Licensure Examination for Civil Engineers from 2016 to 2019

| Date of Examination | First-Time Examinees | | Re-takers | | Variance |
|---------------------|----------------------|-----------------------------|-------------------|-----------------------------|---------------|
| | Number of Passers | Institutional Passing Rates | Number of Passers | Institutional Passing Rates | |
| May 2016 | 2 | 33.33 | 1 | 8.33 | -25 |
| November 2016 | 13 | 37.14 | 0 | 0.00 | -37.14 |
| May 2017 | 0 | 0.00 | 9 | 39.13 | 39.13 |
| November 2017 | 15 | 40.54 | 2 | 12.50 | -28.04 |
| May 2018 | 3 | 42.86 | 9 | 36.00 | -6.86 |
| November 2018 | 8 | 17.78 | 1 | 4.17 | -13.61 |
| May 2019 | 2 | 22.22 | 11 | 28.95 | 6.73 |
| November 2019 | 18 | 25.35 | 0 | 0.00 | -25.35 |
| Total | 61 | 27.40 | 33 | 16.14 | -11.26 |

Presented in table 4 is the summary of compared passing rates of first - time takers and re-takers in the licensure examination for civil engineers from 2016 to 2019. As gleaned from the table, in May 2016 two from the first-time takers passed the examination or 33.33% while 1 re-taker passed the examination or 8.33% institutional passing rate as compared to 38.17% national passing rate. In November 2016, thirteen (13) first time takers passed the examination or 37.14% while no one of the re-taker passed the examination or 0% institutional passing rate against 45.90% national passing rate. Again, no one from the first-time takers in May 2017

passed the examination or 0% passing rate while there were nine (9) re-takers who passed or 39.13% in contrast with 35.92% national passing rate. Fifteen (15) first time takers passed the examination or 40.54% passing in November 2017 while only two (2) re-takers passed or 12.50% passing against 48.81% national passing rate. In May 2018, three (3) first time taker passed the examination or 42.86% passing while nine (9) re-takers passed the examination with 36% institutional passing rate as compared to 36.03% national passing rate. In November 2018, eight (8) first time takers passed the examination with 17.78% passing while one re-taker passed or 4.17% passed the examination in contrast with 45.11% national passing rate. Two (2) passer for first time takers in May 2019 or 22.22% while eleven (11) re-takers passed the examination or 28.95 against 38.25% national passing rate. Eighteen (18) first time takers passed the examination in November 2019 or 25.35% passing while no re-takers passed or 0% with 43.18% national passing rate.

It shows from the data the passing rate in the month of May for first time takers with one (1) out of four (4) exams that got 0% passing and re-takers from the examination taken in November 2016 and November 2019 also got 0% passing percentage. This poor performance of the graduates from the examinations stated leads to a poor overall performance of the school in the said licensure examination compared to the national passing rates. It also reflects in the table that re-takers having mean passing rate of 16.14% affect the mean passing rate of the first time takers with 27.40% causing the institutional passing rate to decrease by significant figures as compared to the 41.42% national passing rate for the past 4 years.

Upon checking the variance of the examinations from the following years stated above, it was found out that the passing rates of the re-takers affect the performance of the first-time takers by 11.26% variance; showing a better performance of the first-time takers as compared to the re-takers. While the school can hardly do something with the re-takers, the school can do something to improve further the performance of the first time takers.

5. What is the performance of the graduates in the Licensure Examination for Civil Engineers relative for the following subjects:

3.1 Mathematics and Surveying

3.2 Hydraulics and Geotechnical Engineering

3.3 Structural and Construction

Presented in Table 5 is the mean rating performance of the graduates in the licensure examination for civil engineering from 2016 to 2019.

Table 5. Mean rating Performance of the examinees in the Licensure Examination for Civil Engineering from 2016 – 2019

| Date of Examination | Mean Performance | | |
|---------------------|---------------------------|---|-----------------------------|
| | Mathematics and Surveying | Hydraulics and Geotechnical Engineering | Structural and Construction |
| May 2016 | 57.61 | 59.83 | 46.72 |
| November 2016 | 65.67 | 66.13 | 53.22 |
| May 2017 | 58.20 | 64.56 | 56.92 |

| | | | | |
|-----------------------|------|-------|-------|-------|
| November | 2017 | 60.32 | 55.77 | 49.90 |
| May | 2018 | 56.63 | 67.04 | 55.32 |
| November | 2018 | 62.99 | 59.80 | 44.67 |
| May | 2019 | 64.07 | 66.64 | 54.77 |
| November | 2019 | 65.26 | 60.26 | 49.45 |
| OVERALL RATING | | 61.34 | 62.50 | 51.37 |
| Rank | | 2 | 3 | 1 |

As gleaned in table 5, none or zero (0) out of eight (8) batches of examination surpass mean performance of the subject Mathematics and Surveying than Structural and Construction Hydraulics and in November 2017, November 2018 and November 2019 exam that Hydraulics and Geotechnical Engineering got lower performance than Mathematics and Surveying. Structural and Construction took the majority of the lowest performance among all the subjects and examinations. It implies that majority of the examinees find Structural and Construction subject as the most difficult area to answer in their board examination as compared to Mathematics and Surveying and Hydraulics and Geotechnical Engineering.

Moreover, the table indicates that in May 2018 and May 2019, takers got the highest performance in Hydraulics and Geotechnical Engineering with 67.04% and 66.64% ratings, respectively. In November 2016 and November 2019 takers took the highest performance in Mathematics and Surveying with 65.67% and 65.26% ratings, respectively. May 2017 and May 2018 batches of takers got the highest performance in Structural and Construction subject with 56.92% and 55.32% ratings, respectively.

Further, the overall mean shows that Structural and Construction got the lowest mean of 51.37% and rank 1 followed by Mathematics and Surveying getting 61.34% mean as rank 2, and Hydraulics and Geotechnical Engineering as rank 3 with 62.5% mean. The ranking was based according to the level of difficulty in answering the three (3) areas in the licensure examinations for civil engineers. Structural and Construction being the rank 1, was the most difficult subject that the school should prioritize in giving intervention to improve the performance.

6. Is there any significant difference in the performance of the graduates of Civil Engineering Program of University in the Licensure Examination for Civil Engineers from 2016 to 2019?

Ho = There is no significant difference in the performance of graduates of Civil Engineering Program of the University from 2016 to 2019.

Ha = There is significant difference in the performance of graduates of Civil Engineering Program of the University from 2016 to 2019.

Table 6. Tabulated Performance of the graduates in Civil Engineering Program of the University from 2016 to 2019

| Actual Value | | | | | |
|--------------|------|------|------|------|-------|
| | 2016 | 2017 | 2018 | 2019 | TOTAL |
| P | 16 | 26 | 21 | 31 | 94 |
| F | 47 | 52 | 80 | 115 | 294 |
| T | 63 | 78 | 101 | 146 | 388 |

P = Passed, F = Failed, T = Total

Shown in Table 6 are the actual value of the performance of the graduates. It could be seen from the table that a total of ninety four (94) examinees successfully passed and two hundred ninety four (294) examinees failed the licensure examination from May 2016 to November 2019.

The chi-square statistic is 4.9326. The p-value is .176802. The result is not significant at $p < .05$. Hence, null hypothesis is accepted.

7. What measures can be proposed to improve the licensure examination performance of civil engineering graduates of the University?

The proposed intervention activities to raise the level of performance of the graduates in the Licensure Examination for Civil Engineers are as follows:

a. Mathematics and Surveying

1. Intensify the teaching of Mathematics and surveying formulas through more problem-solving exercises.
2. More actual field surveying work to apply the theories learned in the classroom.

b. Hydraulics and Geotechnical Engineering

1. Intensify the teaching of Hydraulics and Geotechnical Engineering through more problem-solving exercises taken from different books and other review materials and magazines.
2. More laboratory activities for students to conduct soil analysis and determine soil characteristics.

c. Structural Design and Construction

1. Increasing the background of Civil Engineering students in the theory of structures and mechanics.

Familiarization of design formulas and some empirical constants through drills on how to derive the formulas particularly on concrete and steel designs.

13. Conclusion

Based on the findings of the study, the following conclusions are drawn:

2. The examinees got a poor performance rating in the Licensure Examination from 2016 to 2019 with only two out of eight (2/8) batches that performed higher than the national passing rate.

3. The first-time examinees' institutional passing rates got lower when compared to the national passing rates.
4. The re-takers institutional passing rates also got lower performance when compared with the national passing rates.
5. The variance of performance of the first-time examinees is superior compare to the re-takers in the Licensure Examination for Civil Engineers.
6. The examinees find Structural and Construction subject as the most difficult to answer in the Licensure Examination for Civil Engineers followed by Mathematics and Surveying, and Hydraulics and Geotechnical Engineering as the easiest one.
7. There is no significant difference in the performance of the graduates of Civil Engineering Program in a private university of Isabela in the Licensure Examination for Civil Engineers from 2016 to 2019.

The researcher proposed several specific activities to improve the performance of the graduates of the Civil Engineering Program in the Licensure Examination:

7.1 Structural Design and Construction: (1) Increasing the background of Civil Engineering students in the theory of structures and mechanics; (2) Familiarization of design and formulas and some empirical constants through drills on how to derive the formulas particularly on concrete and steel designs.

7.2 Mathematics, Surveying and Transportation Engineering: (1) Intensify the teaching of Mathematics and surveying formulas through more problem-solving exercises; (2) More actual field surveying work to apply the theories learned in the classroom.

7.3 Hydraulics and Geotechnical Engineering: (1) Intensify the teaching of hydraulics and geotechnical engineering through more problem-solving exercises taken from different books and other review materials and magazines; (2) More laboratory activities for students to conduct soil analysis and determine soil characteristics.

14. Recommendations

Based on the findings and conclusion of the study, the following recommendations were made:

To Students

A graduate with a satisfactory grade should invest extra effort in their review class to guarantee success in the board examination.

To The Faculty

Encourage students' excellence through effective teaching methods, incorporating innovative approaches and updated materials. Instill values of determination and perseverance, cover the curriculum comprehensively, and promote regular attendance to maintain a consistent learning environment. Encourage both independent thinking and teamwork among students for holistic development.

Conduct Pre-Board Examination for the graduating Civil Engineering students in the school before giving permission to take the Board Examination. Only the graduating students who will pass the Pre- Board Examination handled inside the university will be allowed to take the Board Exam.

To the Middle Level Administrator

1. Enforce a rigorous monitoring system for faculty members' daily teaching schedules to ensure consistent completion of teaching assignments and thorough coverage of the learning plan. Implement uniform mid-term and final exams for subjects taught by multiple faculty members.
2. Uphold the college's retention policies strictly.
3. Encourage increased research efforts aimed at enhancing students' academic performance, both in their regular studies and in board examinations. Dayaday (2018) highlighted the importance of faculty strategies, curriculum, instructional materials, facilities, admission and retention policies, as well as review preparation and study behaviours, as crucial factors influencing board performance through surveys.
4. Allocate resources to enhance university equipment, software, applications, and facilities.
5. Offer targeted subject-specific training for instructors and professors to ensure their expertise in their respective subjects.
6. Implement a Faculty Development Program, including seminars, training sessions, and postgraduate studies related to the Structural and Construction subject, for instructors.
7. Facilitate strategic planning meetings involving the dean and civil engineering faculty to incorporate the mentioned recommendations into the program. These sessions can also serve as platforms to devise various strategies aimed at improving the university's passing rate.

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