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The Correlation Between Academic Performance in CELE-Related Subjects and CELE Performance Among Bachelor of Science in Civil Engineering Students at Nueva Ecija University of Science and Technology

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Abstract. This study investigated the relationship between academic performance in CELE-related subjects and CELE performance among Bachelor of Science in Civil Engineering (BSCE) students at Nueva Ecija University of Science and Technology (NEUST). A quantitative research design employing correlation analysis was utilized. The sample consisted of 322 random BSCE students who had taken CELE in the last five exam dates. The results revealed a significant positive correlation between students' performance in their Mathematics, Surveying, and Transportation Engineering (MSTE) and Structural Engineering and Construction (SEC) subjects during their BSCE program and their corresponding achievements on the PRC board exam. However, no significant correlation emerged between students' performance in their Hydraulics and Geotechnical Engineering (HGE) subjects during their BSCE program and their performance on the corresponding section of the PRC board exam. Additionally, the results indicated a significant positive correlation between students' weighted GPAs during their BSCE program and their performance on the PRC board exam.These findings suggest that strong academic performance in CELE-related subjects is associated with success on the CELE, highlighting the importance of a well-aligned curriculum and educational strategies. However, further research is needed to explore causative factors and provide a more comprehensive understanding of the dynamics influencing CELE performance.

Keywords: Academic Performance; Civil Engineering; Correlation; Licensure Examination

1. Introduction

The association between the academic performance of engineering students and their outcomes on the engineering board exam in the Philippines has been the focus of extensive research. Numerous investigations into this relationship

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have consistently uncovered compelling evidence, underscoring a robust correlation between academic achievement and success on the licensure exam. This correlation underscores the pivotal role of a strong academic foundation in engineering education and holds significant implications for both students and educational institutions.

A notable study conducted by Talandi (2018) identified several critical factors that exhibit a significant correlation with the performance of engineering students on the board exam. These factors encompass academic performance, study habits, attitude towards the examination, and support from family and friends. Among these variables, academic performance emerged as the most influential predictor of success, highlighting the fundamental importance of coursework in preparing students for the licensure exam.

Furthermore, this consistent pattern extends to specific engineering disciplines. Panganiban's (2017) research delved into the outcomes of electrical engineering graduates, while Santos (2016) explored those of civil engineering graduates, and Golla et al. (2019) investigated mechanical engineering graduates. In each of these studies, robust academic performance in coursework emerged as a critical determinant of success in their respective licensure examinations. These findings suggest that this correlation persists across a spectrum of engineering fields.

Beyond the empirical research, anecdotal reports and case studies have also served to reinforce the link between academic excellence and success on the board exam. Accounts of engineering students attributing their achievements to diligent academic work and going the extra mile are not uncommon, as highlighted in a 2018 article published in the Philippine Daily Inquirer.

However, it is worth noting that while these studies have been conducted in various educational institutions, there remains an unexplored research gap specific to the academic performance of Bachelor of Science in Civil Engineering students at Nueva Ecija University of Science and Technology and its relationship to their performance in the Civil Engineering Licensure Examination administered by the Philippine Regulation Commission (PRC). Specifically, to answer the question, what is the relationship between academic performance (on subjects included in the CELE) and CELE performance among Bachelor of Science in Civil Engineering students at NEUST?

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2. Methodology

Quantitative research employing correlation analysis was undertaken to achieve the research objectives. Correlation analysis, a statistical method, was employed to assess the strength and direction of the relationship between two variables. It serves as a valuable tool for discerning patterns and associations within data. In the context of this study, correlation analysis was applied to investigate the connection between the academic performance of students in the Bachelor of Science in Civil Engineering (BSCE) subjects featured in the Civil Engineering Licensure Examination (CELE) and their actual performance on the CELE.

2.1. Sampling Procedure

The study utilized a sample consisting of 322 random Bachelor of Science in Civil Engineering students at Nueva Ecija University of Science and Technology (NEUST) who had taken CELE in the last five exam dates. The sample size was considered sufficiently robust to yield statistically significant findings, adhering to the convention that a sample size of at least 100 participants is generally deemed adequate for correlation studies (Cohen, 1988).

To collect data on grades and CELE performance, information was sourced from the NEUST Registrar's Office and the Professional Regulation Commission. The data collection process was executed systematically and impartially. The researcher gathered data from all Bachelor of Science in Civil Engineering students who had taken CELE in the last five exam dates, regardless of their academic performance during BSCE and CELE results.

2.2. Data Analysis

For the data analysis, a correlation analysis was conducted to scrutinize the relationship between academic performance and CELE performance. The Pearson correlation coefficient was employed to quantify the strength and direction of this relationship. The Pearson correlation coefficient is a numerical value that ranges between -1 and 1. A coefficient of 1 signifies a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 denotes no correlation between the variables.

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3. Results and Discussion

3.1 MSTE (Mathematics, Surveying, and Transportation Engineering):

- Pearson's correlation: 0.178705913
- P-Value: 0.00134
- Result: Significant at $p < 0.05$

3.2 HGE (Hydraulics and Geotechnical Engineering):

- Pearson's correlation: 0.074447912
- P-Value: 0.185325
- Result: Not significant at $p < 0.05$

3.3 SEC (Structural Engineering and Construction):

- Pearson's correlation: 0.133250172
- P-Value: 0.016943
- Result: Significant at $p < 0.05$

3.4 Overall Correlation (PRC Board Exam Ratings and Weighted GPA):

- Pearson's correlation: 0.323325701
- P-Value: < 0.00001
- Result: Significant at $p < 0.05$

The above results indicate a substantial link between students' performance in their MSTE and SEC subjects during their BSCE program and their corresponding achievements on the PRC board exam. These findings suggest that students who excel in MSTE and SEC subjects during their BSCE program are more likely to perform well on the corresponding segments of the PRC board exam. Nevertheless, it's vital to underscore that correlation should not be mistaken for causation, and there may be additional, unaccounted factors influencing a student's performance on the PRC board exam.

Conversely, no significant correlation emerged between students' performance in their HGE subjects during their BSCE program and their performance on the corresponding section of the PRC board exam. This suggests that a robust relationship between these two variables may not exist. Possible explanations for this lack of correlation encompass the potential difficulty of the HGE portion of the PRC board exam, variations in the HGE curriculum at NEUST, or other factors not encompassed by the available data.

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Furthermore, the result underscores a significant link between students' weighted GPAs during their BSCE program and their performance on the PRC board exam. This suggests that students with higher weighted GPAs tend to fare better on the PRC board exam. However, it's crucial to acknowledge that while this correlation exists, it is relatively modest, and numerous other factors may influence a student's performance on the PRC board exam.

The 2023 University of the Philippines Diliman's study, on the other hand, uncovered a substantial positive correlation between the weighted grade point average (WGPA) in the civil engineering program and the passing rate on the PRC board exam, particularly in subjects like structural engineering and transportation engineering.

Similarly, research conducted by the University of Santo Tomas on 2023 identified a moderate positive correlation between the WGPA in the civil engineering program and performance on the PRC board exam. Furthermore, this study found significant correlations between the WGPA in subjects such as mathematics and hydraulics and performance on corresponding segments of the PRC board exam.

Conversely, the study conducted by De La Salle University (2023) reported a weaker positive correlation between the WGPA in the civil engineering program and performance on the PRC board exam. Furthermore, this research revealed that certain civil engineering subjects, including geotechnical engineering and construction management, did not exhibit significant correlations with performance on corresponding portions of the PRC board exam.

In summary, the result suggest a relationship between students' performance in BSCE subjects and their performance on the PRC board exam. Nonetheless, it's essential to remember that correlation does not imply causation, and numerous factors may influence a student's success on the PRC board exam.

Conclusions

In conclusion, this research provides valuable insights into the relationship between academic performance in CELE-related subjects and CELE performance among BSCE students at NEUST. The positive correlation suggests that strong academic performance in these subjects is associated with success on the CELE, highlighting the importance of a well-aligned curriculum and educational strategies. However, further research is needed to explore causative factors and

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provide a more comprehensive understanding of the dynamics influencing CELE performance.

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