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The Factors Affecting Licensure Passing Rates of Philippine State Universities and Colleges – A Panel Regression Analysis

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***Abstract*: The Philippines currently suffers from an inadequate education system, which results in students performing below the expected level of competency. Thus, the research aimed to measure state universities' and colleges' quality of education by using the percentage of licensure examination passers. This study explored possible factors influencing the licensure passing rates of the country's state university and college (SUC) graduates and found that three of the four predetermined factors were statistically significant. Data used and analyzed in this paper was mainly gathered through government agencies such as the Commission on Higher Education (CHED) and the Development Academy of the Philippines (DAP). Using a panel regression analysis, the researchers determined the proportion of Ph.D. holder faculty, government-allocated budget for SUCs, and accreditation status of SUC programs as some of the acceptable predictors of the licensure passing rate. They found that the faculty-student ratio was statistically insignificant in the ability of students to pass the licensure examinations. Finally, evaluating the effective distribution of financial resources to state universities and colleges nationwide is recommended to enhance the licensure passing rate of state universities and colleges. More effective resource allocation tactics would allow for faculty's professional growth and enhancement of programs to meet industry standards.**

***Keywords*: accreditation, budget allocation, faculty-student ratio, licensure passing rate, Ph.D. faculty, state universities and colleges.**

1. Introduction

The Philippines' longstanding education crisis may be rooted in decades of ineptitude and inadequate education investment (Palatino, 2023). Data presented by the World Bank in 2021 indicate that more than 80% of students enrolled in secondary education are performing below the expected level of competency. These findings are indicative of the existence of issues within the education system. Furthermore, it is worth noting that these concerns continue to persist and expand to encompass higher education, as evidenced by the persistently subpar percentages of licensure examination passing rates across multiple professional domains.

The licensure examination passing rate, as disclosed by the Professional Regulation Commission (PRC), is a reliable indicator for assessing the caliber of higher education (Manasan, 2012). In addition, the ability of graduates to possess the necessary knowledge and skills for employment can also serve as a benchmark for assessing the level of performance excellence in State Universities and Colleges (SUCs) (Orlanda-Ventayen, 2020). Based on statistics from the PRC, the aggregate passing rate for licensure examinations across 36 distinct professions from 2017 to 2022 was roughly 40% of exam takers, indicating a relatively low level of success. The respective passing rates were recorded at 24.36% for Accountancy, 33.18% for Fishery Technology, and 36.92% for Agriculture.

Separate research conducted by the Philippine Business for Education (2023) regarding the Licensure Examination for Teachers (LET) discovered that inadequate teacher qualifications had harmed academic achievement and student performance. Results also identified the correlation between dismal passing rates in the LET and the substandard quality of education provided by educational institutions. LET takers consistently fared poorly since 2010, exhibiting significantly unfavorable results compared to licensure examinations from other academic disciplines. The importance of faculty competency in influencing students' educational performance and success has been acknowledged in the study and further discussed how faculty proficiency should be held in high regard to strengthen education quality further.

Furthermore, it is essential to highlight that the Certified Public Accountant Licensure Examination (CPALE) in the Philippines is widely recognized for its rigorous nature, making it one of the most challenging licensure examinations. This is apparent based on the persistently low annual passing rates reported by the PRC. Laguador & Refozar (2020) conducted a study examining the passing rates of the CPALE. The results indicate a decrease in the success rates of first-time takers in both public and private universities and colleges during the period spanning from 2015 to 2019. It has revealed that only three out of ten universities evaluated in the study produced institutional passing rates that exceed the national average, often used as a benchmark to assess the educational quality of many universities. As a result, it was observed that over 70% of universities attained passing rates that were below the national average.

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In addition to the passing rates observed in licensure examinations, the PRC has recently reported the 2023 Veterinarians Licensure Examination results. The March cohort exhibited a success rate of 32.2%, with 220 out of 681 examinees clearing the test, while the October cohort demonstrated a success rate of 9.3%, with 92 takers succeeding out of 985 participants. Citing Sawey-Ognayon & Afalla (2022), there is a downward trend in the passing rates of various licensure examinations, as indicated by the results released by the PRC.

This study examines the capacity of the 114 SUCs in the Philippines to produce graduates who demonstrate proficiency and successfully pass licensure examinations. The researchers utilize regression analysis to explore the SUCs concerning the academic variables under observation in the study: the faculty-student ratio, the number of Ph.D. holders faculty, budget, and accreditation status. The researchers probe the regression model results and generate hypotheses on the role of SUCs in enhancing student performance in licensure examinations.

Furthermore, the present research paper is in line with the theory of educational economics, investigating the optimal distribution of limited educational resources, such as budgetary allocation and faculty competence, to foster the acquisition of knowledge and skills and achieve the highest possible educational objectives within the context of formal education (Lovenheim & Turner, 2017). The research also incorporates the human capital theory, which contends that education is a form of investment that enhances individuals' economic productivity (Carneiro et al., 2010). The significance of doing such a study must be supported, particularly in light of the increasing number of students opting to pursue higher education at SUCs instead of private universities. The increasing favorability towards SUCs necessitates prioritizing upholding high education standards and fostering global competitiveness within these academic institutions. Hence, this study and its outcomes serve as supplementary research to advance, augment, and refine career development services at SUCs to ensure that public universities can effectively cultivate adaptable, proficient, and valuable graduates who can contribute to the country's economic prosperity.

Researchers measure the quality of education of SUCs in terms of their licensure passing rate across different fields. This paper determines the impact and influence of the following factors on the SUC licensure passing rate: faculty-student ratios, number of PhD-holder faculty, education budget, and Commission on Higher Education (CHED) accreditation.

This study focuses on the tertiary education of all SUCs in the Philippines and collected data on its graduates, specifically, the total number of graduates per academic year and the total number of licensure examination passers. It only considers data from the academic years 2015 up to 2019. The academic year 2020 to 2021 was excluded due to the COVID-19 pandemic that has affected the education system and the economy. Moreover, the researchers only used and collected data from first-time exam takers and utilized aggregate data from licensure examination takers. By focusing on the results of first-time takers only, their performance is more clearly attributed to the SUC than those who retook the exam and have had more experience and knowledge about the exam than first-time takers (Nagle et al., 2018). Lastly, the study only collected data from the 114 SUCs located in the 17 regions of the Philippines.

2. Review of Related Literature

A. Quality Education

Quality education and literacy are assets in every nation, especially in the Philippines. Many Filipinos strive for quality education for themselves and their families, as education is believed to solve poverty (Bañez & Pardo, 2016). Numerous studies established licensure examinations as an indicator or measure of quality education in HEIs, including Teacher Education Institutions (TEIs). Findings stated that it is through these licensure examinations that graduates' competencies and skills developed from quality HEIs can be measured (Barrera et al., 2013). This is also supported by domestic and international accrediting agencies that consider the passing rate of licensure examinations as a criterion of quality education (Silvestri et al., 2013; Amanonce & Maramag, 2020). The success rate of licensure examination takers from different fields such as Medicine, Accountancy, Engineering, Criminology, Agriculturists, and more are believed to be one of the best gauges of quality education from HEIs (Chan-Rabanal, 2016; Minoza, 2016; Banua, 2017; Chisholm-Burns et al., 2017; Oducado et al., 2019; Llego et al., 2020; Nicholas et al., 2020).

A study by Banua (2017) focused on the factors that influenced the Nurses' Licensure Examination (NLE) of the Bicol University College of Nursing graduates. The researchers have stated that the performance of the graduates on the NLE shows the quality of education of an educational institution. To conclude, Banua (2017) utilized several statistical methods: percentages and frequency, Pearson product-moment correlation coefficient, and a stepwise regression analysis. Additionally, Bautista et al. (2019) stated that a few indicators measure the quality of nursing education, yet results from the NLE still draw the most attention. Government institutions such as the CHED, the PRC, and the Board of Nursing (BON) use the NLE results or the passing rate as the basis to monitor and evaluate the quality of nursing education provided by the HEIs. Those who can pass the NLE are expected to be equipped with the proper knowledge and practical skills needed to serve the public.

Furthermore, a study by Nicholas et al. (2020) investigated the performance of Bulacan Agricultural State College graduates in the Agriculturist Licensure Examination (ALE) from 2014 to 2017. In the study by Nicholas et al. (2020), specific laws supporting the ALE were presented. This shows that the State has recognized licensure examinations as a valid and essential measure of quality education given by HEIs.

On the other hand, Perez (2015) focused on the CPALE, which stated that numerous critics have deemed the CPALE to be one of the most challenging licensure examinations in the Philippines. Graduates' performance on the licensure examination reflected the graduate's intellect and the quality of instruction the faculty gave. Hence, an institution's success in

the CPALE is one of the most highly regarded measurements of an institution's quality of education.

Furthermore, studies conducted by Nool & Ladia (2017) and Dagdag et al. (2017) suggested that the performance of first-time LET takers directly reflects the quality of education provided by their respective institutions. Hence, licensure examination passers are expected to possess adequate knowledge and skills, enabling them to teach effectively. Esmeralda and Perez-Espinosa's (2015) research demonstrated a positive correlation between the passing rate of LET and the competence of graduates from teacher education programs. Of the aforementioned studies, the latter's research highlighted LET as the only national assessment tool that effectively measures the quality of education provided by TEIs. Worldwide, several ongoing studies examine various predictors and factors influencing the LET passing rate, aiming to increase the percentage of successful examinees.

Generalao et al. (2022) conducted a study exploring the relationship between program performance predictors and quality education, explicitly using the LET passing rate to measure quality education. The LET passing rate has been widely accepted as a valid and reliable measure of the quality of education provided by a program. However, there is a potential for correlated independent variables to result in an exaggerated relationship between the LET passing rate and the independent variables. To address this issue, the researchers utilized multiple regression analysis to isolate the relationship of the same covariate variables with the LET passing rates. Through this approach, the researchers were able to establish significant relationships between different variables and provide relevant policy recommendations. Overall, the study by Generalao et al. (2022) offers valuable insights into the predictors of program performance and their impact on quality education as measured by licensure examinations.

B. Faculty-Student Ratio

The faculty-to-student ratio relates to the teaching environment and learning outcomes. For faculty to deliver individualized guidance when needed, the proportion of students per teacher should ideally be kept as low as reasonably practicable (Volchik et al., 2018). Factors that are responsible for the shortage of faculty in HEIs include the severe shortage in the supply of graduates with advanced degrees, the low number of people who would be interested in pursuing a teaching career in higher education, and the issues arising from inadequate recruitment and faculty retention (Aragon, 2016; Yee et al., 2022).

In recent years, research has highlighted the significant challenges that academic institutions face due to inadequate recruitment and faculty retention. Aragon (2016) and Yee et al. (2022) have identified these issues as critical concerns for universities, as they can impact the quality of education, research, and other essential activities. Recruiting new faculty members is vital for maintaining the expertise and diversity of perspectives necessary for a vibrant academic environment. At the same time, retaining existing faculty members is crucial for promoting institutional stability and ensuring a long-term commitment to academic excellence. However, inadequate recruitment and retention can lead to high turnover rates, disrupting research and teaching programs and hindering institutional progress. As such, universities must prioritize recruitment and retention efforts to attract and retain the best talent and promote long-term success. Moreover, there was a ratio of just 1.10 Ph.D. faculty members for every 100 students nationwide in the education program for the academic year 2016 - 2017.

Given the significance of HEIs as establishments for fostering knowledge and innovation, these academic institutions must be able to recruit and retain instructors who can cultivate and promote academic excellence, influencing student performance (Wu et al., 2012). According to a study by Kim and Lundberg (2016), a significant correlation was found between faculty-student interactions and the development of students' cognitive abilities, particularly during their last year of higher education. The influence of highly regarded faculty was particularly evident in demanding and competitive academic disciplines, such as in Science, Technology, Engineering, and Math (STEM) (Micari & Pazos, 2012). The presence and availability of faculty members play a significant role in the academic growth of students, as well as in shaping educational objectives and achieving those goals. Moreover, it influences their attitude and inclination toward pursuing scholarly professions (Hoffman, 2014).

Bautista et al. (2019) also found a favorable teacher-student ratio linked to higher licensing exam pass rates and overall education quality. Theoretical models suggest that a higher ratio of professors to students increases the likelihood of engagement and interaction, leading to higher levels of integration, which is associated with higher rates of retention and learning outcomes (Hunsaker & Thomas, 2013; Yu et al., 2016; Bordean & Sonea, 2018). Therefore, to improve the learning experience and performance of the student body, it is recommended to increase the faculty-to-student ratio or decrease the class size to enhance the time an educational instructor can spend on each student (Koc & Celik, 2015).

Nonetheless, efforts to boost and apportion the volume of students per instructor remain to be a challenge. With the educational sector experiencing teacher shortages, the Center for Analysis of Longitudinal Data in Education Research (2016) sought to determine long-term trends in teacher production. Findings have shown that students are more inclined to pursue majors with relatively better employment opportunities and can generate higher wages. Therefore, students shy away from pursuing professions in teaching in favor of other financially rewarding career fields.

As the constant production of competent faculty has been challenging to uphold, institutions have been looking into alternative ways in which the faculty-student ratio can still be altered or manipulated. If institutions find it hard to employ additional faculty, decreasing the class size is another way to tweak the faculty-student ratio. However, reducing class size to improve the faculty-student ratio may increase per-student expenditures because teacher salaries account for most ongoing education spending (Altinok & Kingdon, 2012). The benefits of

reducing class size were hardly noticeable, suggesting that reducing class size was a costly way of generating only minimal increases in students' learning gains. In contrast, increasing the number of students in each class can distribute the cost of teacher salaries throughout the entire student body. Although some educators may not be willing to accommodate additional students, income-motivated instructors may be open to the prospect (Hansen, 2014). American surveys regarding teacher compensation concluded that teachers prefer higher wages over smaller class sizes (Goldhaber et al., 2010, as cited in Hansen, 2014; Farkas & Duffett, 2012, as cited in Hansen, 2014).

Furthermore, research in the Philippines has likewise determined that the faculty-student ratio is not as significant in deciding institutional gains. In Casas' (2013) study, it was discovered that the faculty-student ratio ranked second lowest among the factors contributing to institutional productivity and produced statistically insignificant results. Another study has determined that the assessment of HEI performance should rely more on Institutional Research Performance rather than the faculty-student ratio (Aithal & Kumar, 2016, as cited by Capulso, 2020).

While the relationship between the faculty-student ratio and licensure passing rates remains uncertain, most existing literature indicates a direct connection between the faculty-student ratio and academic performance. It suggests that HEIs with higher faculty-student ratios tend to have higher performance on licensure exams. Nevertheless, decreasing class size to enhance the faculty-student ratio might not be cost-effective in generating noticeable increases in learning gains. Increasing the number of students in each class may be a viable alternative to distributing the cost of teacher salaries.

H1: SUC faculty-to-student ratios do not affect licensure passing rates

C. Faculty Credentials

The importance of curriculum and instruction in producing quality outcomes in the educational process has been emphasized in several studies. Delos Angeles (2019) noted that these elements are crucial for faculty to embody to achieve excellence. Ruben (2014) found a significant correlation between curriculum, instruction, and faculty competence and the LET performance of graduates. Delos Angeles (2019) and Ruben (2014) utilized both qualitative and quantitative approaches to examine this relationship in TEIs, also taking into account the type of school (private or public). This highlights the need for quality educators to produce quality graduates.

To improve LET passing rates, faculty members can pursue Master's and Doctorate degrees, as Visco (2015) recommended. Using multiple regression analysis, Visco (2015) found a positive relationship between faculty academic achievement and LET passing rates at a 0.05 significance level. Similarly, Maratas (2018) found that the number of faculty with MS and Ph.D. degrees was related to licensure exam performance in SUCs in Mindanao. Although Maratas' (2018) scope was broader, the same results emerged regarding the importance of Ph.D. holders in improving passing rates. This is consistent with Manasan's (2012) results that revealed how the number of Ph.D. faculty holders positively relates to passing licensure examinations.

As previously mentioned, the quality of education universities and institutions deliver depends highly on the faculty. According to Okolie et al. (2020), pedagogical training can enhance a teacher's knowledge and competency in addition to acquiring a Ph.D. qualification. They found that additional pedagogical training facilitated teaching more effectively than without. Moreover, an international study by Kowalczuk-Walędziak et al. (2017) revealed that teachers are motivated to pursue Doctorate degrees because they believe this positively affects their students' learning outcomes and enhances their professional growth and working environment.

All in all, the reviewed studies by Delos Angeles (2019), Ruben (2014), Visco (2015), Maratas (2018), Okolie et al. (2020), and Kowalczuk-Waledsiak et al. (2017) share the common goal of identifying the factors that contribute to improved educational outcomes, particularly in terms of LET and licensure exam passing rates. The aforementioned studies also focus on the importance of faculty competence, curriculum, and instruction in achieving this goal.

However, the studies differ in their specific methodologies and scopes. For instance, Ruben (2014) used qualitative and quantitative methods to examine the relationship between admission and retention policy, curriculum, instruction, and faculty competence to the LET passing rates in TEIs. Using both descriptive and correlational research design, the study revealed that the aforementioned factors are all significantly correlated with successful licensure examination performance.

On the other hand, both Visco (2015) and Maratas (2018) used multiple regression analysis to examine the relationship between advanced degrees and exam passing rates—however, the former focused explicitly on the LET, while the latter included various licensure exams. Maratas (2018) focused on the relationship of licensure examination performance to the number of faculty with Master's and Ph.D. degrees in SUCs in Mindanao. Visco (2015) studies the LET precisely and how the number of faculty with Master's and Doctorate degrees influences LET performance.

Okolie et al. (2020) also examined the impact of pedagogical training on teaching efficacy using quantitative and qualitative approaches. The study's results implicated that teachers with additional pedagogical training are more effective educators than those without. This finding can be associated with higher educational attainment, such as Master's and Doctorate degrees. In comparison, Kowalczuk-Walędziak et al. (2017) explored teachers' motivations for pursuing Doctorate degrees. Teachers' motivations included career promotions, professional and personal development, an improved work environment, and more. These are only a few of the notable motivations of teachers for pursuing Doctorate degrees.

Despite these differences, the studies consistently highlight the importance of faculty competence, curriculum, and instruction in achieving improved educational outcomes and the potential benefits of advanced degrees and pedagogical training. These findings emphasize educators' critical role in ensuring high-quality education and suggest that investing in

faculty development can significantly improve student performance.

H2: SUC number of faculty members with PhDs does not affect licensure passing rates.

D. Budget

The importance of investing in the education system has been recognized by many governments worldwide (Amanonce & Maramag, 2020). Conchada & Zamudio's (2013) study found that government funding is crucial in improving the quality of education institutions provide, as measured by annual licensure passing rates. Delfin's (2015) study showed that decreasing budgetary allocations for SUCs is a pressing issue surrounding government funding. SUCs, as well as public schools, heavily rely on government allocations for their operations.

The need for more sufficient funding for SUCs is a common problem in many countries, particularly in developing ones. Since funding is limited, specific solutions were generated to address the insufficient budget allocated to SUCs. To address this issue, Manasan & Revilla (2015) proposed adopting a socialized tuition fee scheme based on a family's income. Students' financial situations were considered when creating possible solutions, hence, the socialized tuition fee program. This system could improve resources for quality education while maintaining students' ability to enroll in SUCs.

International studies also suggested that spending on higher education influences licensure passing rates. Cordis & Muzatko's (2021) study on spending on HEIs and the licensure examination rates of accounting students found a positive relationship between government spending on education and CPALE passing rates. It was also discovered that a significant disparity between the budget allocation across states was present. This disparity was thought to be attributed to differences in (1) political factors, (2) competing state budgetary demands, (3) income inequality, (4) general budgetary tradeoffs, (5) business cycle effects, and (6) higher education governance structures (Tandberg & Griffith, 2013, as cited in Cordis & Muzatko, 2021). This shows the different factors the government considers before allocating funds for state universities.

Similarly, a study conducted in Bangladesh by Sarkar et al. (2014) found challenges with allocating higher education budgets. The paper compared the higher education in Bangladesh to South Asian countries' higher education. There is also a disparity between the distribution of funds among the different subheads and the need for compliance with the guidelines for adequately implementing higher education budgeting. These findings present challenges in the budget allocation for higher education and, at the same time, hinder the improvement of quality education in some parts of the world.

However, Manasan's (2012) study found that the cost per student is insignificant to the licensure examination passing rate. This means that altering the cost per student has little effect on the quality of education provided by SUCs, which contrasts with other researchers' findings. Future studies may delve more into variables that affected the data and focus on differences between these studies to determine which ones yielded more accurate results.

In summary, government funding significantly improves the quality of education institutions provide, particularly SUCs. The need for sufficient funding and proper implementation for SUCs is a common problem in many countries, and alternative solutions, such as a socialized tuition fee scheme, have been proposed. Spending on higher education has been found to increase licensure passing rates. However, further research is needed to establish the relationship between cost per student and the quality of education provided by SUCs.

H3: SUC budget allocation does not affect licensure passing rates

E. Accreditation

The accreditation of higher education programs has become widely recognized to ensure that a higher percentage of graduates pass licensure examinations (Callena et al., 2019). The accreditation process enables HEIs to demonstrate compliance with the curricular standards accreditation boards and organizations set. This verification assures that these institutions can produce graduates with the necessary knowledge and skills to pass licensure examinations successfully. Educational institutions that aspire to attain globally recognized certificates may also endeavor to establish themselves as Centers of Excellence (COEs) or Centers of Development (CODs). Consequently, HEIs must enhance their assessment and feedback mechanisms in developing instructional materials, students' test-taking abilities, and various other teaching and learning endeavors.

A study conducted by Baylan (2018) successfully established that the ongoing and rigorous practice of institutional program accreditation significantly enhances educational quality. Hence, the quality assurance process through voluntary and self-evaluation is crucial for achieving favorable institutional outcomes in terms of quality. In addition, CHED is responsible for accrediting academic disciplines within educational institutions to promote, enhance, and nurture educational excellence. According to CHED (2016), academic disciplines and departments that demonstrate exceptional performance in instruction, research, and linkages may be categorized as either a COE or a COD.

The designation of SUCs as COEs or CODs might indicate the institution's dedication to upholding and sustaining its exemplary performance levels. Sawey-Ognayon & Afalla (2022) argue that the ultimate measure of success for an educational program is in the accreditation as a COE or COD. Hence, HEIs are obligated and motivated to achieve this title by demonstrating superior performance in various mandatory areas, such as in licensure examinations. SUCs that voluntarily submit their programs for accreditation ought to address areas of concern to ensure that state-funded educational institutions deliver quality service.

According to Calingacion (2015) and Orlanda-Ventayen (2020), universities recognized as COEs and CODs demonstrate a greater propensity for achieving elevated success rates in licensure examinations. According to a study conducted by Jay-cen (2020), it was found that individuals who graduated

from TEIs with a higher accreditation status demonstrated notably superior performance on the LET compared to their counterparts who were enrolled in TEIs with lower accreditation status. However, a study by Ladia et al. (2012) discovered that less than 50% of the candidates who participated in the 2010 LET successfully passed the examination. Furthermore, the study revealed that the successful candidates were primarily from eight out of 31 COEs and four out of nine CODs. According to Balagtas and Gerundio (2014), there is a need for improvement in the many components of teacher education, including general, specialization, and professional education courses.

A comparative analysis conducted on medical licensing passing rates in Mexico and the Philippines revealed that those who attended reputable and accredited institutions in both countries experienced an improvement in their initial success rates for the countries' respective Physician Licensure Examination (PLE). The results of this study provide evidence that accreditation has a significant role in enhancing student outcomes, highlighting its importance and practicality (van Zanten et al., 2012). The relationship between accreditation status and excellent success rates on the United States Medical Licensing Examination (USMLE) has been acknowledged in worldwide research studies (Zanten, 2015; Amaral & Norcini, 2022).

The significance of using the independent variable of accreditation status in explaining changes in the dependent variable of licensure passing rates is clear. Accreditation serves as a measure of quality in the education provided by HEIs. Thus, institutions with higher accreditation status are expected to have better performance outcomes, such as higher licensure passing rates.

The methodology and findings of the reviewed papers varied. Callena et al. (2019) and Orlanda-Ventayen (2020) found that COEs and CODs are more likely to generate higher licensure passing rates. On the other hand, Ladia et al. (2012) found that many COEs and CODs still need to fulfill their obligation to produce competent teachers. Balagtas and Gerundio (2014) suggested that the aspects of the program that make up the education of teachers, such as general education, specialization, and professional education, should be improved. Zanten et al. (2012) and Amaral & Norcini (2022) found that accreditation status aids PLE takers to pass on their first attempt. Malaluan (2017) discussed the three basic patterns observed in university quality management: accreditation, assessment, and quality assurance. Altogether, the reviewed studies offer a comprehensive understanding of the importance of accreditation in the realm of higher education and its influence on the production of high-caliber graduates.

H4: SUC accreditation does not affect licensure passing rates

F. Synthesis

The bulk of the research focused on how specific SUC attributes, such as (1) faculty-to-student ratio, (2) faculty credentials, (3) budget allocation, and (4) accreditation, influence SUC graduates' performance on licensure examinations. The four aforementioned SUC characteristics directly correlate with the licensure examination passing rate. Therefore, SUCs with higher faculty-to-student ratio, more faculty members with PhDs, higher budget allocations, and higher accreditation status all yield higher licensure examination passing rates for first-time examination takers.

3. Method

A. Simulacrum

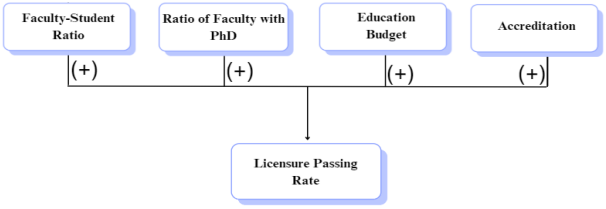

Fig. 1. Conceptual framework

Figure 1 presents the overall framework of the study, wherein it shows how the different variables influence the licensure passing rate. These factors included the faculty-student ratio, the ratio of faculty Ph.D. holders, the education budget, and accreditation status.

The first factor of this study explored whether the faculty-student ratio is positively related to the licensure passing rate. Second, the research determined if the faculty ratio with Ph.D's positively affected the licensure passing rate. Third, the relationship between the education budget and the licensure passing rate was studied to determine whether they are positively related. Lastly, the study explored the relationship between accreditation and the licensure passing rate and whether they are positively related.

B. Research Method

$$LPR_{ij} = \alpha + \beta_1\ FCST_{ij} + \beta_2\ PHD_{ij} + \beta_3\ BUDGET_{ij} \\ \beta_4\ AACCRED_{ij} + \epsilon \quad (1)$$

where:

- LPR = overall licensure exam passing rate for graduates of the SUC;
- FCST = faculty-student ratio of the SUC;
- PHD = percentage of Ph.D. faculty holders of the SUC;
- BUDGET = budget allocation for the SUC;
- ACCRED = 1 if the SUC has a program with a COE/COD accreditation, 0 if none;
- i = year
- j = SUC
- ϵ = error term

In equation 1, the researchers used the licensure examination passing rate as the dependent variable to expound on the study conducted. Furthermore, on the other side of the equation are the explanatory variables that helped predict the outcome of the dependent variable. The first explanatory variable was the faculty-student ratio, denoted by FCST, which measured the

influence of the number of students handled by one teacher in a class on the licensure passing rate. Next is the number of faculty that hold a Ph.D. degree, wherein it measured the influence of having a teacher with high educational attainment on the success of first-time takers of the licensure examinations. Third was the BUDGET, which measured the influence of the funds allotted to the college on the SUC's licensure passing rate. Lastly, ACCRED, as a dummy variable, was used to determine whether the SUC has programs accredited as a COE/COD by CHED and influences the licensure passing rate. The resulting coefficients in the regression model provided the percentage point changes in the dependent variable, which is the licensure examination passing rate. Coefficients resulted in a positive coefficient (increase) or a negative coefficient (decrease) relative to the explanatory variable, holding all else constant (Generelao et al., 2022), giving a close estimate of how these factors influence the licensure passing rate.

A panel data analysis is used when the data includes multiple cross-sections over many points in time. Since this research studied 114 different SUCs and five different variables for five years, a Panel Regression analysis was utilized to determine the influence of the independent variables on the dependent variable to establish the quality of education given by SUCs in the Philippines.

The researchers checked for a trend using the graph and then corrected the data following the steps to run a panel regression model. The researchers applied the Breusch-Pagan test and then used the random effects model as the p-value was less than 0.05. Next, the researchers tested for cross-section dependence using PCSE as the cross-sections exceeded the time period. Then, the researchers used a histogram to test the normality of the data in determining the strength of the relationship between the licensure passing rate and the four explanatory variables, namely, faculty-student ratio, percentage of faculty Ph.D. holders, percentage of the budget allotted, and lastly, the accreditation of the SUC. When the data was presented to be normally distributed, the researchers tested whether the variables were significant using a p-value of 0.05. This study utilized the Eviews 12 software to run the regression and the tests needed.

This paper utilizes aggregate data for all five variables. The data for the licensure examinations passers from 2015 to 2019 was mainly collected from three government agencies: the Development Academy of the Philippines (DAP), the Department of Budget and Management (DBM), and the Commission on Audit (COA). On the other hand, the data for the faculty credentials, faculty-student ratios, budget, and accreditation status for each SUC was gathered from CHED's official website. The data collected included all 114 SUCs found in the 17 regions of the Philippines. Data missing from the aforementioned sites were then collected from the SUCs' annual reports published on their website. However, it was discovered that there were still missing values for the licensure examination passers; hence, the researchers estimated these values using mean imputation.

4. Results and Discussion

This section presents the descriptive statistics and the analysis of the performance of Philippine SUCs in licensure examinations. The regression analysis results were utilized to assess the potential impact of preset variables on the performance of SUCs in licensure examinations.

Table 1
Statistics of variables

	LPR	FS	PHD	BUDGET	ACCRED
Mean	0.544420	0.045392	0.170336	0.008772	0.375439
Median	0.540500	0.039700	0.144950	0.005130	0.000000
Maximum	0.974600	0.683500	0.908300	0.310869	1.000000
Minimum	0.000000	0.004100	0.000000	0.000777	0.000000
Std. Dev.	0.156700	0.046886	0.118450	0.024705	0.484661

Table 1 presents the descriptive statistics for the variables examined in the study. The data revealed that, on average, the licensure passing rate among the 114 SUCs was roughly 54.44% between 2015 and 2019. Within the same time frame, 50% of SUCs achieved a passing percentage of 54.05% or less, while the remaining 50% of SUCs had passing rates that surpassed this threshold. The standard deviation of the licensure passing rate is 15.67%, indicating a significant variation in the performance of the examination takers. This suggests that certain institutions or individuals perform above or below the average passing rate.

Upon analyzing the licensure passing rates of the SUCs from 2015 to 2019, it was discovered that the University of the Philippines stands out as the sole institution to excel consistently. The university achieved licensure passing rates of 97.46%, 95.77%, 93.98%, 95%, and 96% for the specified years. In 2015 and 2017, the Philippine State Normal University also achieved outstanding passing rates of 91.87% and 90.19%, respectively. Conversely, data has also revealed that the Adiong Memorial State College has regularly performed poorly from 2015 to 2019, with licensure passing rates consistently below 30%.

The descriptive statistics indicate that the faculty-student ratio in Philippine SUCs is, on average, 4.54 students per faculty member. This suggests a conducive environment for personalized attention and interaction between students and faculty. The median result suggests that half of SUCs' faculty members are responsible for handling four percent of the student body or fewer, while the remaining half of SUCs' faculty are responsible for teaching more than four students. Additionally, the standard deviation of 4.69 indicates a greater variation in the faculty-student ratio among SUCs. This suggests that some SUCs may have much higher or lower faculty-student ratios than the average of 4.54 percent of students per professor. The variation in institutional size and resources may account for this observation.

Moreover, the results also indicate that SUCs have an average of 17.03% of their faculty staff holding PhD degrees. With the relatively low mean proportion, institutions should contemplate the most effective methods for incorporating research initiatives and endeavors into the academic culture. Consequently, the median figure shows that half of these public institutions have a proportion of faculty members with Ph.D.

degrees equal to or lower than 14.50%. In comparison, the remaining half of SUCs have a higher proportion of PhD faculty than 14.50%. The standard deviation indicates that the percentage of Ph.D. faculty in certain institutions varies by around 11.85% from the average percentage. This suggests notable variations among institutions regarding the percentages of faculty members holding doctoral degrees. Institutions should contemplate strategies for recruiting, retaining, and supporting faculty members with Ph.D. degrees.

SUCs with a significant percentage of faculty members holding a Ph.D. degree can attain better success rates in licensure examinations. In contrast, SUCs with a lower ratio of faculty members are nonetheless able to achieve a relatively high level of performance, although not on the same level as SUCs with a higher proportion of faculty with doctoral degrees.

Furthermore, Table 1 reveals that an SUC receives an average of 0.87% of the national budget allocated for SUCs in the country for the years 2015-2019. Despite each SUC's relatively low percentage, considering the number of state schools in the country, an average of 0.87% could be regarded as high. With a total of 114 schools to divide the already limited government education budget, it is expected that only a few institutions would receive a more than 1% educational budget, which may depend on the number of students. Specifically, most of the educational funding is centered in Luzon, with an average of 1%, while Visayas and Mindanao only receive 0.06% each. Another notable observation is that being the country's national university for five consecutive years, the University of the Philippines received the most significant percentage of the educational budget with 23.01%, 24.91%, 26.01%, 26.28%, and 31.09%, respectively.

Lastly, the descriptive statistics for accreditation indicate that only 37% of the Philippines' SUCs have at least one program or course accredited as Centers for Excellence or Centers for Development. It shows that more than half of the country's SUCs have failed to have a program receive an accreditation status for 2015 to 2019 and become COE or COD. These SUCs require further improvement in specific areas such as research and publication, instruction, and specific academic qualifications evaluated by CHED. In contrast, it was shown that the University of the Philippines garnered the highest number of Centers of Excellence and Development among other higher education institutions in the Philippines. No other notable observations were seen for accreditation in the Philippines.

A. Philippine SUCs' Performance on Licensure Examinations

The balanced panel regression in Table 2 produced statistically significant findings for all independent variables except for the faculty-student ratio. Nevertheless, the low r-squared value of 0.144442 suggests that the independent variables in the regression model have limited explanatory power for the observed variance in SUC licensure passing rates. This implies that there are more factors not accounted for in the model. The results also show a Durbin-Watson statistic of 0.807307, which means the presence of positive autocorrelation. The results show a highly significant set of independent variables yet low values for the r-squared and Durbin-Watson statistic, signaling the need for further refinement of the model. Hence, the researchers performed corrective measures for a more accurate estimation.

Table 2
Balanced panel regression of Philippine SUCs' Licensure Passing Rate
Panel Least Squares, dependent variable: LPR

Variable	Coefficient	Std. Error	t-Statistic	Prob
FS	0.162171	0.130989	1.238049	0.2162
PHD	0.194308	0.052629	3.692036	0.0002
BUDGET	1.612642	0.252197	6.394382	0.0000
ACCRED	0.04786	0.013284	3.602714	0.0003
C	0.470787	0.012706	37.0522	0.0000
R-squared	0.144442	Mean Dependent var		0.544420
Adjusted R-Squared	0.138151	S.D dependent var		0.156737
F-statistic	22.96064	Durbin-Watson Stat		0.807307
Prob (F-statistic)	0.000000			

Table 2 demonstrates that when equation 1 was utilized, the results showed the existence of autocorrelation. Therefore, the researchers decided to use a dynamic panel regression as a corrective measure to remove the autocorrelation from the variables. This type of panel regression involved adding a lagged dependent variable as denoted by LPR(-1). Therefore, the corrected model is presented by equation 2.

$$LPR_{ij} = \alpha + \beta_1 FCST_{ij} + \beta_2 PHD_{ij} + \beta_3 BUDGET_{ij} \beta_4 AACCRED_{ij} + LPR(-1) + \epsilon \quad (2)$$

The findings of the Panel Estimated Generalized Least Squares of the Philippine SUCs and five regressors — faculty-student ratio, ratio of Ph.D.-holding faculty, budget allocation, CHED accreditation, and the lagged licensure passing rate — are depicted in Table 3.

The analysis in Table 3 showed that the faculty-student ratio had no statistically significant effect among all the explanatory variables. The p-value of 0.9645 is greater than the significance level of 0.05. Hence, the study's findings fail to provide evidence against the null hypothesis, which states that no significant relationship exists between faculty-student ratios at SUCS and licensure passing rates.

The existing body of scholarly literature pertaining to the faculty-student ratio predominantly focused on its relevance to success rates in licensure examinations. Nevertheless, the research yielded statistically insignificant results, similar to those of Casas (2013) and Hansen (2014). This suggests that no conclusive evidence supports that lower class sizes and more

favorable faculty-student ratios directly result in enhanced performance in licensure examinations. The lack of statistical significance in the faculty-student ratio may emphasize the importance of other indirect factors, such as the quality of teaching, curriculum, pedagogical approach, or socioeconomic circumstances, in influencing graduates' educational experience and achievement.

Table 3
Dynamic panel regression of Philippine SUCs' Licensure Passing Rate

Variable	Coefficient	Std. Error	t-Statistic	Prob
FS	-0.003576	0.080316	-0.044530	0.9645
PHD	0.119092	0.048400	2.460591	0.0143
BUDGET	0.610610	0.297569	2.051994	0.0408
ACCRED	0.019335	0.009436	2.048982	0.0411
LPR(-1)	0.609867	0.169148	3.605530	0.0003
C	0.182999	0.083518	2.191134	0.0290
Weighted Statistics				
R-squared	0.465659	Mean Dependent var		0.546444
Adjusted R-Squared	0.459460	S.D dependent var		0.157243
F-statistic	75.120220	Durbin-Watson Stat		2.434921
Prob (F-statistic)	0.000000			

The regression analysis results indicated statistically significant findings concerning the faculty ratio of Ph.D. holders at Philippine SUCs. The obtained p-value of 0.0143 was statistically significant at the chosen significance level of 0.05. Based on the empirical evidence, this research refutes the null hypothesis, which asserts the absence of any association between the number of faculty members holding doctoral degrees and the rates of successful licensure attainment at SUCs. Hence, a statistically significant and positive relationship exists between the passing rate of licensure examinations and the ratio of faculty members possessing a Ph.D. degree, as denoted by a coefficient of 0.119092. The results of this study suggest that a one percent increase in the ratio of faculty members with Ph.D. degrees is associated with a 0.119092% rise in the passing rate for licensure exams.

The findings of this study are consistent with the research conducted by Visco (2015) and Maratas (2018), who employed regression analyses to investigate the relationship between faculty credentials and the success rate of Philippine SUCs in licensure examinations. A higher proportion of faculty with doctoral degrees is likely to contribute to the enhanced performance of graduates in licensure examinations. Faculty members with postgraduate degrees generally possess extensive knowledge and competence in their specific areas of study. This advanced level of education and qualification has the potential to significantly enhance the quality of instruction, hence resulting in the production of better-prepared and more knowledgeable graduates. Consistent with the findings of Okolie et al. (2020), this study suggests that doctoral programs place significant emphasis on practical teaching methodologies. As a result, faculty members with postgraduate degrees are better prepared to enhance the learning experience and promote academic achievement. The significance of doctoral faculty in SUCs is further reinforced based on the DBM's criteria for appointing faculty members as full Professors. Following these criteria, academic faculty are required to have at least obtained a pertinent doctoral degree and possess the capacity to shape public policy by making substantial contributions to human resources development initiatives through research recommendations.

Furthermore, the SUC budget produced statistically significant results, as indicated by a p-value of 0.0408, which is significant at the 0.05 level. Hence, the null hypothesis, which suggests that the SUC budget does not affect the rate of passing licensure exams, is refuted based on the research conducted. Significantly, the coefficient associated with the Philippines' SUC budget is the highest among all explanatory variables. This finding indicates that it substantially impacts the probability of passing licensure examinations compared to all other independent variables examined in the study. As interpreted, there is a positive relationship between the overall licensure passing rates in the country and the allocated budget for SUCs. Specifically, for every percent share of the national budget allocated to SUCs, the overall licensure passing rates are expected to increase by 0.610610%.

The extent of financial assistance the government provides significantly influences the performance of SUC graduates in licensure examinations. This underscores the pivotal role of adequate financial resources in creating a favorable educational setting that fosters efficient pedagogy, improves student cognition, and enables comprehensive scholastic success. However, the issue of efficient budget allocation has been identified as a challenge in the studies conducted by Sarkar et al. (2014) and Cordis & Muzatko (2021). Therefore, it is advisable to prioritize resource allocation to establish level playing fields in education. Financial support can mitigate disparities in academic accomplishment across different educational institutions by serving as a means to overcome gaps in available resources. The imminent prospect of budget cuts provides clear proof of the influence that financial resources can have on public universities, as demonstrated by the diminished ability to raise salaries and construct and maintain facilities for the student population, particularly in SUCs, which serve as the sole free-tuition institution of their respective island. In addition, the CHED has acknowledged that providing adequate funding to SUCs as mandated by the Universal Access to Quality Tertiary Education Act in 2017 has facilitated the first-generation graduate phenomenon, enabling numerous families to celebrate their first member completing a college education.

Moreover, the accreditation of SUCs produced statistically significant results, as indicated by a p-value of 0.0411, below the established significance level of 0.05. Based on the abovementioned findings, the research will continue challenging the null hypothesis, which posits that SUC

accreditation does not affect SUC performance in licensure examinations. The research findings suggest that accredited SUCs have a much better rate of passing licensure exams, at around 0.019335% than their non-accredited counterparts. Nevertheless, the coefficient linked to CHED accreditation yielded the lowest value, suggesting that compared to other independent variables influencing licensure passing rates, the magnitude of impact CHED accreditation holds may be less significant.

The statistical significance in the relationship between CHED accreditation and SUC licensure passing rates underscores factors such as quality standards, targeted investment, faculty proficiency, research environment, student support, and institutional standing in promoting favorable educational results. In line with the research conducted by Baylan (2018) and Callena et al. (2019), the outcomes of this study suggest that institutional recognition through accreditation serves as evidence that institutions adhere to rigorous standards in various aspects, including faculty facilities, curriculum, and research. This finding implies that educational institutions with COE or COD titles yield graduates with superior performance in licensure examinations. This can be attributed to the institutions' dedication to high academic excellence and quality standards. Moreover, the University of the Philippines and the Mindanao State University - Iligan Institute of Technology have 29 and 17 programs accredited as COEs and CODs, respectively. These universities are considered high-performing institutions regarding the success rating in licensure exams, as their institutional passing rates exceed the national passing rates.

Table 3 also presents the r-squared and adjusted r-squared values. The study will focus mainly on the adjusted r-squared, a modified version of the r-squared that considers the number of predictors included in the regression model. The adjusted coefficient of determination offers a more dependable assessment of the model's ability to explain the observed variability since it considers the inclusion of predictors that have a minor impact on the model. The research model's adjusted r-squared value is 0.459460, suggesting that the independent variables investigated in the study can account for approximately 45.95% of the variation in the licensure passing rate. The research study aimed to analyze SUC-centered factors contributing to its licensure performance. With this, the study intentionally excluded other variables typically associated with performance determinants, such as student characteristics and other academic support services and systems. By including omitted variables in the model, the researchers believe that the adjusted r-squared value will rise, as it will now account for other relevant variables that impact the licensure passing rate. The researchers acknowledge the potential influence of unobserved factors that were not accounted for in the model, which may be significant in explaining the variances found in the outcome and further enhancing the robustness of the research model.

Lastly, Table 3 displays the Durbin-Watson statistic, a diagnostic tool for detecting autocorrelation inside the regression model. Autocorrelation arises when the observations within a regression model exhibit correlation with preceding observations, hence violating the concept of the independence of errors that is crucial for precise statistical inference. The Durbin-Watson diagnostic test is based on a null hypothesis that asserts no serial correlation is present in the residuals. Alternatively, the alternative hypothesis posits that there is a serial correlation. In the context of the study, it is imperative to ascertain the presence of autocorrelation since it significantly impacts the validity of the regression model's outcomes. Based on the Durbin-Watson statistic, which has a value of 2.434921, it can be inferred that the research does not provide sufficient evidence to reject the null hypothesis at the significance level of 0.05. This observation indicates no autocorrelation in the residuals of the regression model.

5. Conclusion

A. Summary

Education is highly regarded in the Philippines and is widely considered an integral part of solving socioeconomic problems in the country. It has become the dream of every Filipino household to acquire quality education for their children to ensure long-term economic stability and the chance at a better future and a higher quality of life. Furthermore, a solid educational foundation equips individuals with skills that aid them to become globally competitive and foster economic growth and development. It is essential to explore the situation of the educational institutions in the country to determine the areas that are currently lacking or are substandard so that possible solutions can be proposed and implemented.

For this reason, this study focused on the country's SUCs since they are particularly accessible to most Filipino citizens, providing opportunities to less privileged Filipinos. This study examined some factors that influence the quality of the education supplied by SUCs to understand the standard of education offered by these institutions. Among the numerous possible factors that impact quality education, this paper explored the following variables: faculty-student ratio, faculty credentials, budget, and accreditation status. Meanwhile, the percentage of licensure examination passers was the quantitative measurement of quality education in this research.

A panel regression analysis found that three out of the four chosen explanatory variables were statistically significant, while the faculty-student ratio was insignificant. This shows that employing faculty with PhDs, having sufficient financial support from the government, and having a high accreditation level influence the performance of licensure takers in licensure examinations.

This research, having a moderate r-squared result in the statistical analysis, implies that there are still other possible factors that influence the performance of licensure takers that need to be explored. Moreover, this study was accomplished with limited data available, using aggregate data. This may have distorted the results as it covered the entire SUC and was not merely focused on the aspects that involved licensure examinations/takers. Therefore, this study can still be enhanced further by requesting and incorporating more specific data sets

that will improve the depth and accuracy of the analysis.

B. Policy Implications

This research yielded results that support the belief that the financial assistance given by the government significantly impacts the quality of education provided by these public educational institutions. Concerning this, having sufficient funds ensures or increases the possibility of equitable distribution of these resources across the numerous SUCs in the country. Doing so decreases the disparities in educational outcomes in the different parts of the Philippines in different socio-economic statuses. This paper was pursued to direct attention to the public educational sector and emphasize the importance of government support in producing globally competitive graduates.

A strategic deployment of government funds towards enhancing educational quality and overall institutional efficacy can be a viable approach to improving the licensure passing rates of SUCs. Policies and investments should be geared towards improving the performance of SUC graduates in licensure examinations. Subsequently, more efficient resource allocation would allow SUCs to have a greater capacity to engage in enhanced investments in faculty development, specifically for continual professional development. Furthermore, adequate financial resources could enable SUCs to evaluate and improve their courses consistently, ensuring correspondence with industry benchmarks and licensure examination qualifications. Investments may supplement faculty training programs, attract and retain highly skilled educators through competitive salaries and benefits, provide students with access to necessary tools and resources, and improve upon infrastructure and facilities to create a conducive environment that promotes effective teaching and learning. A comprehensive and relevant curriculum has the potential to supplement the competitiveness of SUC graduates. Regular curriculum evaluations guarantee that academic programs remain adaptable to shifts in industry demands and global trends.

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