Applied Quantitative Analysis, Vol. 4 No. 2 (2024) https://doi.org/10.31098/quant.2620

Research Paper

Board Performance of Fisheries Graduates: Logistic Regression Analysis for Curriculum Enhancement

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Received : July 15, 2024	Revised : October 30, 2024	Accepted : November 1, 2024	Online : November 5, 2024

Abstract

This study investigates the factors affecting the board performance of Bachelor of Science in Fisheries (BSFi) graduates in the fisheries technologists licensure exams in a specific region of the Philippines. The impetus for this research arose from observed variations in exam performance among graduates, prompting an examination of educational and institutional influences on success. The study used a purposive sampling technique to gather data from 138 respondents across State Universities and Colleges (SUCs) who took their first licensure exam from October 2018 to October 2023. A validated online survey questionnaire assessed academic performance, teaching methods, curriculum, faculty qualifications, library resources, laboratory facilities, and student characteristics. Logistic regression analysis was employed to analyze the relationship between these independent variables and licensure exam performance. The findings of this study are of profound importance, as they reveal strong correlations between faculty qualifications and exam outcomes, emphasizing the need for continuous professional development. Moreover, the study identifies improved laboratory facilities and a robust curriculum as critical factors contributing to student success. These insights have the potential to significantly impact stakeholders, informing them about essential areas for intervention and improvement. Ultimately, they aim to elevate the educational experience and licensure performance of BSFi graduates, thus supporting their professional trajectories in the fisheries sector.

Keywords *Fisheries Education, Licensure Exam Performance, Educational Factors, Curriculum Improvement, Philippines*

INTRODUCTION

The field of fisheries science and its associated academic programs are pivotal in addressing the multifaceted challenges and opportunities in the fisheries industry. Recent transformations, driven by technological advancements, increasing environmental concerns, and shifting market demands, underscore the need for graduates who are not only well-prepared but also capable of contributing meaningfully to sustainable practices within the sector (Thébaud et al., 2023; Chang et al., 2019). The study by Orofino et al. (2023) emphasizes that graduates' performance in licensure examinations serves as a critical indicator of both the quality of education they have received and their preparedness to navigate the professional landscape. Recognizing the importance of this issue, the present study investigates the factors affecting board examination performance among Bachelor of Science in Fisheries (BSFi) graduates. This investigation provides practical insights that can inform curriculum improvements, with immediate implications for enhancing individual graduate success and supporting the sustainability and growth of the fisheries industry as a whole.

Currently, the fisheries sector confronts numerous critical challenges, such as overfishing, habitat degradation, and climate change impacts, all of which jeopardize both ecological sustainability and economic stability. Addressing these pressing issues requires a workforce that is not only well-educated but also equipped with the specialized skills and knowledge essential for

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effective intervention and sustainable management. Graduates' performance in licensure examinations reflects their capabilities and has implications for the industry's ability to adapt and thrive amidst these challenges. For instance, well-prepared graduates can innovate sustainable practices, advocate for effective policies, and engage in responsible resource management, all of which are crucial for the long-term viability of fisheries (https://cfos.upv.edu.ph/).

Despite previous research highlighting various factors influencing licensure exam performance—such as academic achievement, teaching methodologies, and faculty qualifications—there remain significant gaps in understanding how these elements interact within the specific context of fisheries education. Many studies have focused primarily on general academic performance metrics without adequately addressing the unique challenges faced by fisheries students or the particular pedagogical approaches that may enhance their learning experiences (Nyboer et al., 2023). This study seeks to fill this gap by employing logistic regression analysis to explore the intricate relationships among factors like student characteristics, curriculum design, and faculty effectiveness. By systematically evaluating these variables, we aim to uncover actionable insights that can inform targeted curriculum enhancements.

The theoretical framework of this study not only delves into these complex interrelationships but also aims to contribute to the existing body of knowledge on educational strategies in fisheries science. By providing a nuanced understanding of the factors influencing licensure exam outcomes, this research aspires to enhance both the educational framework of fisheries programs and the preparedness of graduates for the demands of the industry. The findings will serve as a foundation for implementing evidence-based interventions to improve the educational experiences of BSFi students, ultimately fostering a generation of fisheries professionals equipped to tackle the sector's pressing issues.

In summary, this study seeks to predict the likelihood of BSFi graduates passing the licensure examination for fisheries technologists and aims to provide tailored recommendations for curriculum improvements. By addressing the specific challenges of the fisheries industry and enhancing the educational framework, we can contribute to the long-term success and sustainability of both graduates and the fisheries sector as a whole. Thus, in response to the present issue, this study seeks to forecast the likelihood of fishery students passing the licensure examination for fisheries professionals (LEFPs) by assessing various influential factors. To meet the study's objectives, specific research questions have been formulated, as outlined below:

1. What is the mean level of factors affecting the board performance of bachelor of science in fisheries graduates in the licensure examination for fisheries professionals concerning: (a) academic performance, (b) teaching methods and curriculum, (c) faculty qualifications and experience, (d) library resource and laboratory facilities, and (e) students' characteristics?
2. What is the percentage level of Performance in the Licensure Examination for Fisheries Professionals in One Region in the Philippines?
3. Do the identified factors significantly predict the chance of passing the Licensure Examination for Fisheries Professionals?
4. Based on the findings, what recommendations can a researcher make for curriculum improvements?

LITERATURE REVIEW

Theoretical Framework

The central theoretical framework of this study is Constructivism, which underscores the active role of learners in constructing knowledge through experience and interaction. This foundational theory provides a lens for understanding BSFi graduates' performance in the Licensure Examination for Fisheries Professionals, contrasting with traditional cognitive theories

by emphasizing active engagement in the learning process. Constructivism's focus on meaningful and authentic experiences aligns closely with curriculum enhancement objectives, suggesting that graduates' outcomes may improve through instructional strategies designed to promote deeper learning.

Additionally, this study utilized Hatcher et al.'s (1992) investment theory, which offers a complementary perspective by conceptualizing student achievement as a form of investment in educational outcomes. This theory emphasizes that students' efforts are not merely actions but represent strategic investments that contribute to their academic success. This theory adds a secondary evaluative dimension by considering students' motivations and expectations within the broader achievement framework. In conclusion, while Constructivism Theory remains the primary focus for examining student performance, the investment theory provides valuable additional context by addressing the perceived returns on students' educational efforts and experiences.

The Factor Affecting the Board Performance of BSFi Graduates in Licensure Examination for Fisheries Professionals

The academic performance of BSFi graduates, as measured by their scores on the Fisheries Technologist Licensure Examination, is influenced by a confluence of factors, including teaching methods, curriculum design, faculty experience, qualifications, library resources, laboratory facilities, and student characteristics. These elements are crucial in shaping students' knowledge and competencies, ultimately affecting their exam outcomes.

In the learning process, teaching methods serve as a critical influencing factor, as the various instructional strategies employed by educators can profoundly shape students' comprehension and retention of fisheries technology concepts. Active learning techniques, such as hands-on training and collaborative projects, enhance student engagement and comprehension. Research indicates that diverse teaching methods that cater to different learning styles foster a deeper grasp of the material, leading to improved performance on standardized assessments, including licensure exams. The learning process is facilitated through a thoughtfully designed curriculum, where aligning the curriculum closely with licensure exam content is essential to effectively prepare students. A well-structured curriculum serves as a foundational element, ensuring that the educational experience directly supports students in meeting the requirements and challenges of licensure exams. Curricula that integrate relevant theoretical knowledge with practical applications ensure that students are knowledgeable and capable of applying their learning in real-world scenarios. Studies suggest comprehensive curricula that reflect industry needs correlate with higher student success rates on licensure exams.

The subsequent facet, referred to as faculty experience and qualifications, plays a crucial role in shaping educational outcomes. Instructors with extensive industry involvement bring practical insights into the classroom, enhancing the relevance of the material taught. Moreover, faculty members with higher qualifications tend to employ advanced pedagogical techniques, which can positively influence student learning. Evidence suggests that students taught by experienced faculty perform better in licensure examinations, highlighting the importance of instructor expertise in fostering academic success.

Additionally, access to robust library and laboratory facilities is essential for comprehensive learning support. Access to robust library resources supports students' research and study needs, contributing to better academic preparation. Studies show that when students have access to comprehensive physical and electronic materials, their ability to engage with course content improves, leading to enhanced performance. Libraries that offer up-to-date resources and research support services facilitate a more effective learning environment, positively impacting students' readiness for licensure exams. Whereas for the laboratory facilities, the quality and

availability of laboratory facilities are critical for hands-on learning in fisheries technology. Well-equipped labs allow students to apply theoretical knowledge in practical settings, reinforcing their understanding and skill acquisition. Research indicates that students who benefit from modern laboratory facilities often achieve higher scores in licensure examinations, as they are better prepared to demonstrate their competencies in practical scenarios.

The aforementioned factors serve as supportive elements, representing external aspects that must be optimized to enhance the outcomes and performance of BSFi students. However, it is important to acknowledge that individual characteristics, including study habits, motivation, and preparedness, significantly influence students' academic performance. Research indicates that motivated students who engage in effective study practices and utilize available resources are likelier to succeed in licensure examinations. Additionally, characteristics such as resilience and time management skills contribute to students' ability to navigate the challenges of exam preparation, further impacting their overall performance.

In conclusion, the interplay between teaching methods, curriculum design, faculty experience and qualifications, library resources, laboratory facilities, and student characteristics creates a multifaceted educational environment. Each of these independent variables contributes to shaping the academic performance of BSFi graduates in the Licensure Examination for Fisheries Professionals. Understanding these relationships is crucial for educational institutions aiming to enhance their programs and improve student outcomes in this vital field. These external and internal facets have been shown to significantly influence the performance of BSFi from both practical and theoretical perspectives. As a result, the research framework outlined in Figure 1 below has been developed to reflect these findings. Additionally, this research hypothesizes that at least one of the identified factors predicts the likelihood of passing the Licensure Examination for Fisheries Professionals.

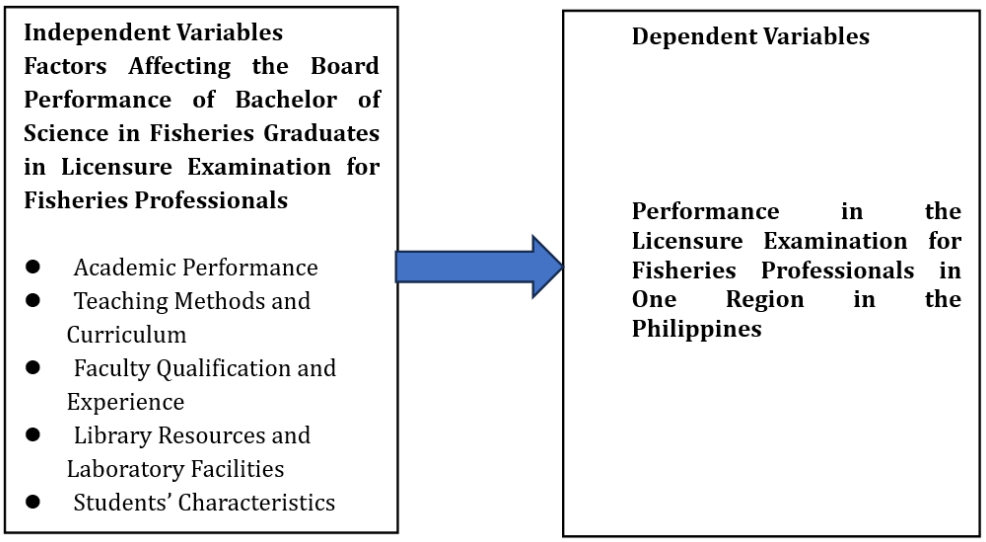

Figure 1. Conceptual Framework

By incorporating these theoretical perspectives, this study aimed to provide a comprehensive framework for understanding the achievement of Bachelor of Science in Fisheries graduates in the Licensure Examination for Fisheries Technologists. This framework guides the analysis of examination results, the identification of factors influencing performance, and the foundation for making evidence-based recommendations for enhancing and improving fisheries

education programs within the region.

RESEARCH METHOD

Research Development

As presented in the Figure 2, the Input, Process, and Output (IPO) Model describes a system's flow of information and materials. With its three distinct stages, this model plays a pivotal role in exploring the BSFi curriculum. The meticulously and comprehensively designed input stage included components such as Academic Performance, Teaching Method and Curriculum, Faculty Qualification and Experience, Library Resources, Laboratory Facilities, and Student Characteristics. The researcher chose these components, and the survey questionnaire carefully ensured accurate and relevant data collection, forming a robust foundation for the IPO Model. In the process stage, the questionnaire underwent a rigorous validation process. The author considered data from the PRC database to determine the total number of examinees from 2018 to 2023, sending letters to different SUCs and consent forms to respondents. Responses were also analyzed and interpreted. Meetings with the College of Fisheries stakeholders for curriculum enhancement were conducted, further ensuring the reliability of the data.

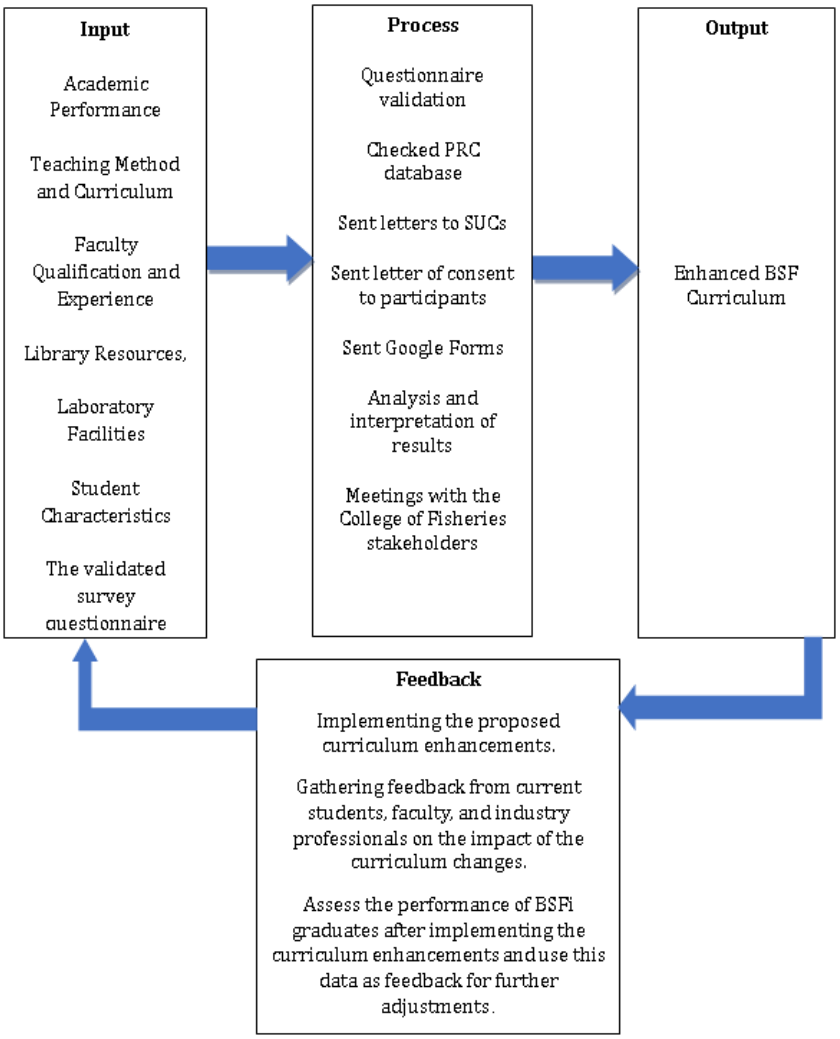

Figure 2. Curriculum Enhancement Process

The enhanced BSFi curriculum was crafted in the output stage, incorporating the insights

and data from the IPO Model. This tangible result, a testament to the model's effectiveness in enhancing the curriculum, inspires future curriculum development. Finally, implementing curriculum enhancements in a BSFi involves a multi-faceted approach encompassing stakeholder collaboration, gathering feedback, and assessing graduate performance. The author tailors the curriculum to meet the industry's and students' evolving needs by involving faculty, industry professionals, and current students in decision-making. Feedback from these stakeholders is crucial in evaluating the impact of the changes, as it provides valuable insights into the effectiveness of the enhancements and areas for further improvement. Assessing the performance of BS Fisheries graduates post-implementation is vital in determining the success of the curriculum changes. By tracking graduate outcomes, collecting employer feedback, and analyzing student success metrics, we can understand how well the curriculum prepares students for their careers. Continuous assessment and feedback loops are essential to ensure that the program remains relevant and practical, enabling graduates to thrive in the dynamic field of fisheries.

Data Collection and Data Analysis

The study analyzes the performance of BSFi graduates in fisheries technology licensure professionals in the Philippines. It utilized a quantitative research design and logistic regression analysis to examine the relationship between factors such as academic performance, teaching methods, curriculum, faculty qualifications, and students' characteristics and their impact on the graduates' performance in the board exam. The research provides valuable insights and recommendations for curriculum enhancement initiatives to better prepare BSFi graduates for success in their professional careers.

The Professional Regulation Commission (PRC) database recorded 848 BSFi graduates participating in the licensure examination from 2018 to 2023. Despite this substantial initial sample size, only 138 individuals responded to the survey, indicating a low response rate (16.27%). While the response rate of 16.27% may appear low, it highlights the challenge of engaging a diverse population of BSFi graduates. In addressing this, the researcher implemented several strategies to encourage participation. She utilized multiple communication channels to reach potential respondents, including email, social media platforms, and alums networks. By crafting clear and compelling messages emphasizing their input's importance, she aimed to foster a sense of relevance and urgency in the survey.

The researcher intends to elaborate on follow-up strategies within the methodology section to enhance participant engagement. These strategies will encompass sending reminder emails at strategically timed intervals and exploring alternative survey distribution methods, such as telephone interviews or in-person focus groups, to better reach individuals who may be less responsive to digital formats. Furthermore, the researcher acknowledges the significance of addressing the potential impact of a low response rate on the sample's representativeness and the generalizability of the findings. A thorough examination of the biases introduced by this low engagement was conducted, with particular attention to how varying levels of academic performance among graduates may influence their survey responses. By undertaking this analysis, the researcher aims to provide a more nuanced understanding of the study's limitations while also emphasizing successful initiatives to promote participation.

This study employed purposive sampling to select participants who met specific eligibility criteria: successful performance in licensure examinations, status as first-time takers, and representation from various educational institutions across the Philippines. By focusing on these criteria, purposive sampling allowed for the inclusion of individuals with the relevant experience and insights necessary to address the research questions effectively. Purposive sampling was chosen over other methods, such as random or stratified sampling, because it enables the

researcher to deliberately select individuals who are exceptionally knowledgeable or experienced in the subject matter. This approach is particularly beneficial in a specialized field like fisheries, where the nuances of board performance can vary significantly among graduates based on their educational background and examination experience.

The transparent nature of the purposive sampling process, along with thorough documentation of participant selection, enhanced the credibility of the findings and ensured that the data collected accurately reflected the perspectives of those most affected by the curriculum in question. This careful selection process strengthens the validity of the research, allowing for more meaningful and actionable insights into potential curriculum enhancements that could better prepare future fisheries graduates for licensure examinations and professional practice.

In this study, a researcher-designed questionnaire was the primary data collection tool. The questionnaire was structured to include sections addressing both independent and dependent variables. It employed a 5-point Likert scale to gauge responses effectively. A rigorous validation process was conducted to ensure the questionnaire's validity and reliability. This involved conducting pilot tests with a sample of fisheries graduates to identify any ambiguities or issues in the questions. Additionally, subject matter experts (SMEs) solicited feedback, focusing on the questionnaire items' clarity, accuracy, and comprehensiveness. The SMEs' insights were instrumental in refining the questionnaire, enhancing its relevance and alignment with the research objectives. Through this thorough validation process, the questionnaire's final version reflected improved clarity and bolstered the robustness and credibility of the research findings.

The researcher's comprehensive study involved obtaining permission from the College of Fisheries to conduct research off-campus and obtaining informed consent from participants. The data was collected using modern technology and verified for accuracy and relevance. The findings are coherently and interpreted using statistical tools, emphasizing scientific rigor. This approach contributes to a robust and insightful study outcome.

The study collected quantitative data and utilized various statistical techniques to analyze the data. It started in January, the second semester of school year 2023-2024, and ended in April. The study employed descriptive statistics to outline the demographic characteristics of the respondents and the variables under investigation. Inferential statistics, specifically logistic regression analysis, were utilized to explore relationships between these variables and board performance.

In the context of data analysis, logistic regression is selected as the appropriate method due to its robustness as a statistical technique that effectively models the probability of a binary outcome, such as pass/fail, based on one or more predictor variables. This method is particularly advantageous for analyzing dichotomous outcomes and estimating odds ratios, thereby offering valuable insights into the strength and direction of the association between variables (Hosmer et al., 2013). In this analysis, logistic regression was chosen due to its ability to handle binary outcomes and to accommodate multiple predictor variables, making it suitable for examining the factors influencing the board performance of BSFi graduates. While other techniques, such as linear regression, could be considered, they are inappropriate for binary outcomes as they may produce predictions outside the [0, 1] range. Additionally, methods such as decision trees or support vector machines, while applicable in specific contexts, do not provide the same interpretability regarding the influence of individual predictor variables on the outcome. The analysis was conducted using SPSS software, facilitating efficient computation and providing comprehensive outputs for interpreting logistic regression results.

Ethical Considerations

The discussion on ethical considerations encompasses several critical aspects, including

participant recruitment, informed consent, confidentiality, and data storage protocols. To initiate the recruitment process, the researcher drafted a formal letter requesting permission to conduct the study, ensuring transparency and respect for institutional guidelines. Participants were thoroughly informed about their involvement, emphasizing their right to informed consent and the voluntary nature of their participation.

Regarding data security, the researcher assured participants that all information provided would be securely stored in a password-protected digital drive. Access to this data is strictly limited to the researcher, reinforcing the commitment to maintaining confidentiality and protecting participants' privacy throughout the research process. These measures reflect a comprehensive approach to ethical research practices.

FINDINGS AND DISCUSSION

Following the data collection process, this section will present the analysis and results, which are crucial for identifying patterns, trends, and relationships relevant to the research questions. This comprehensive examination will facilitate a deeper understanding of the data and its implications for the study. This analysis lays the groundwork for drawing conclusions and deriving implications based on the empirical evidence gathered. The current study is significant as it aims to identify the key factors influencing the licensure examination performance of BSFi graduates as fisheries professionals at state universities and colleges in a specific region of the Philippines. Consequently, this research provides valuable insights for the Licensure Examination for Fisheries Professional (LEFP) Enhancement Program in the region.

Table 1. Academic Performance Agreement with Fishery Program

Indicative Statement	Mean	Verbal Description
A higher cumulative grade point average is a reliable indicator of a student's preparedness for the Licensure Examination for Fisheries Professionals.	4.07	Agree
A higher cumulative grade point average reflects a deep understanding of the fisheries curriculum.	4.10	Agree
The BS Fisheries program's academic rigor impacts students' cumulative grade point averages.	4.11	Agree
Good grades in my BSFi courses are crucial for preparing for the licensure exam.	4.13	Agree
I am confident that my course grades accurately reflect my understanding of the fisheries concepts tested in the licensure exam.	4.08	Agree
Composite Mean	**4.098**	**Agree**

Description: 1.00-1.49 (Strongly Disagree); 1.50-2.49 (Disagree); 2.50-3.49 (Moderately Agree); 3.50-4.49 (Agree); 4.50-5.00 (Strongly Agree)

The responses provided in Table 1, derived from a survey conducted among 138 students from different SUCs, showed nuanced perceptions about the role of academic performance in the BSFi program in preparing for the licensure exam. The indicative statement with the highest mean of 4.13, "Consistently earning good grades in my BSFi courses is crucial for my overall preparedness for the licensure exam," received the highest agreement score, indicating that students recognized the importance of consistently performing well to prepare for the licensure exam. The composite mean of all the indicative statements, standing at 4.098, reaffirms that students agree about the significant role their academic performance in the BSFi program plays in their preparedness for the

licensure exam.

This consensus underscores the importance of academic performance as a predictor of success in board examinations, emphasizing the need for graduates to prioritize their academic knowledge and understanding. The statement with the lowest mean of 4.07, "A high cumulative grade point average is a reliable indicator of a student's preparedness for the Licensure Examination for Fisheries Professionals," while still receiving a high agreement score, suggests that students not entirely convinced that a high GPA is the sole indicator of preparedness for the licensure exam. This nuanced view demonstrates their critical thinking about their education and their awareness that other factors can impact their performance in the licensure exam. Students in the BSFi program acknowledge the importance of academic performance in preparing for the licensure exam while also critically evaluating the various factors influencing their preparedness.

The results of this study align with prior research regarding the relationship between academic achievement and board examinations. Studies conducted by Micabalo and Cruspero Jr. (2022) and Amanonce and Maramag (2020) found a strong correlation between a graduate's academic performance and their performance in the board examination. Banluta's (2013) study also concluded that academic achievement significantly impacts the board examination rating of ECE students from Ateneo de Davao, Davao City, Philippines.

These findings have significant implications for students in the BSFi program. They suggest that students prioritize their academic performance to excel in the licensure exam and should not solely rely on their GPA to indicate their preparedness. Additionally, educators and policymakers should consider these findings when designing curricula and assessment methods to ensure students' preparation for the licensure exam.

Table 2. Perceived Extent of Agreement of Teaching Methods and Curriculum to Fishery Licensure Examination

Indicative Statement	Mean	Verbal Description
The teaching methods utilized in my program enhanced my understanding of key concepts required for the licensure examination.	4.05	Agree
The teaching methods employed in my program encouraged critical thinking and problem-solving skills relevant to the licensure examination.	4.20	Agree
The teaching methods employed in my program encouraged self-directed learning and independent study habits for the licensure examination.	4.14	Agree
Using multimedia resources and technology in teaching improved my learning experience in preparing for the licensure examination.	4.20	Agree
Integrating real-world case studies and examples in the curriculum helped me apply theoretical knowledge to practical situations tested in the licensure examination. -	4.20	Agree
The various assessment methods used in the program (e.g., quizzes, projects, and exams) helped me gauge my understanding of the licensure examination topics.	4.21	Agree
The program's opportunities for group work and collaborative projects enhanced my ability to work effectively with others, a skill necessary for the licensure examination.	4.21	Agree

Indicative Statement	Mean	Verbal Description
The program's practical training and internship opportunities contributed significantly to my preparation for the licensure examination.	4.27	Agree
The practical hands-on activities in my program enhanced my understanding of critical concepts tested in the licensure examination.	4.21	Agree
Incorporating field trips and site visits into the program enriched my understanding of practical applications related to the licensure examination content.	4.17	Agree
The flexibility in learning resources and materials (e.g., online resources, textbooks, simulations) provided in the program supported my varied learning styles in preparation for the licensure examination.	4.15	Agree
The BSFi curriculum program provided a good foundation for the topics covered in the licensure examination.	4.16	Agree
The curriculum content aligned well with the topics covered in the licensure examination.	4.08	Agree
The curriculum design of my program effectively incorporated practical skills and knowledge necessary for the licensure examination.	4.14	Agree
The curriculum design of my program allowed for sufficient hands-on experiences and practical applications of theoretical knowledge	4.06	Agree
The curriculum design of my program fostered a deep understanding of complex concepts and topics relevant to the licensure examination.	4.17	Agree
My program's curriculum design integrated real-world scenarios and case studies to enhance learning and preparation for the licensure examination.	4.18	Agree
My program's curriculum design was flexible and adaptable to accommodate licensure examination requirements and standards changes.	4.14	Agree
Composite Mean	**4.163**	Agree

As presented in Table 2, the survey results indicate that the practical training and internship opportunities in the BSFi program are highly effective in preparing students for the licensure examination, as evidenced by the highest mean score of 4.27. The program's emphasis on practical experience is yielding positive results. However, the lower mean score of 4.05 for the statement regarding the effectiveness of teaching methods in enhancing students' understanding of crucial concepts indicates a potential area for improvement. Despite this, the overall average composite mean score of 4.163 suggests that most respondents are satisfied with the program's teaching methods and curriculum organization.

In summary, while the students highly value the program's practical training and internship opportunities, the teaching methods could be improved to enhance students' understanding of key concepts required for the licensure examination. These findings indicate a positive overall satisfaction with the program while highlighting specific areas that could benefit from further attention and development. A study by Karami et al. (2012) found that collaborative

learning provides more opportunities for criticism in students' activities and various issues, facilitating a suitable context for students' critical thinking disposition. Therefore, teachers in educational systems should utilize this method to encourage critical thinking among students.

Additionally, the study conducted by Sanchez (2023) evaluated teaching strategies in an educational program. It found that teaching staff consistently motivates students to think critically and analytically. Foremost subject instructors were rated highly for promoting analytical and critical thinking. General education subject instructors also scored well, but there may be a need to enhance these skills further in general education subjects. The BSFi curriculum received an impressive mean score, indicating the importance of the significant subjects for comprehensive understanding and exam performance. The studies emphasize the importance of effective teaching methods and curriculum organization and recommend emphasizing collaborative learning and innovative teaching strategies.

Table 3. Perceived Extent of Agreement of Faculty Qualification and Experiences to Fishery Program

Indicative Statement	Mean	Verbal Description
Faculty with higher qualifications deliver relevant course content to BSFi students more effectively.	4.10	Agree
Faculty members actively participating in professional conferences and workshops bring valuable insights and best practices to the classroom, benefiting BSFi students.	4.19	Agree
Faculty members' continuous professional development and updating of knowledge positively impact the quality of education BSFi students receive.	4.15	Agree
Faculty members with diverse educational backgrounds bring various perspectives that enhance the learning experience of BSFi students.	4.25	Agree
The expertise and specialization of faculty members positively influence the academic success of BSFi students in preparing for the Licensure Examination for Fisheries Professionals.	4.22	Agree
Experienced faculty members are better equipped to provide practical insights and real-world examples to enhance the learning experience of BSFi students.	4.24	Agree
The mentorship and guidance experienced faculty members provide significantly contribute to the overall academic growth and success of BSFi students.	4.20	Agree
Faculty members' research experience contributes to developing critical thinking and analytical skills among BSFi students.	4.26	Agree
Faculty members collaborating on research projects with students create a more enriching and interactive learning environment.	4.17	Agree
Composite Mean	**4.197**	Agree

Furthermore, as presented in Table 3, it is essential to consider that teaching experience significantly impacts students' academic achievement. Experienced teachers can master the content and possess practical classroom management skills to address various classroom issues.

Additionally, experienced teachers can adapt their teaching styles to accommodate students with different abilities, prior knowledge, and backgrounds. Therefore, it is vital to recognize the role of teaching experience in enhancing the overall quality of education within the fishery program. Considering the significance of faculty qualifications, research experience, and teaching experience, it becomes evident that a well-rounded faculty with diverse expertise positively impacts the educational outcomes of BSFi students. The overall quality of education in the fishery program addresses areas of disagreement and strives for a more cohesive faculty perspective. This comprehensive approach will facilitate the development of critical thinking, analytical skills, and academic achievement among students, thereby shaping a more robust learning environment.

The positive influence of teachers is significant at four or five years of a teacher's career, as stated by Rivkin et al. (2005). However, the study also found that teaching experience affects students' achievement positively until years 5-8, after which the teachers' influence on students' achievement levels decreases. This could be due to burnout or the promotion of better teachers out of the classroom. The study emphasizes the importance of faculty qualifications, experiences, and teaching experience in delivering quality education and enhancing students' academic achievement.

Table 4. Perceived Extent of Agreement of Library Resources to Fishery Program

Indicative Statement	Mean	Verbal Description
The library's various books and materials helped me study for the licensure examination.	3.22	Moderately Agree
The library's online resources (e-books, databases) were helpful for my exam preparation.	3.28	Moderately Agree
I found it easy to access the materials I needed in the library for my exam preparation.	3.18	Moderately Agree
The library's collection of past licensure exam review materials was helpful for my studies.	3.28	Moderately Agree
The library's technology resources (computers, printers) were beneficial for my exam preparation	3.30	Moderately Agree
The library's operating hours met my needs for studying for the exam.	3.31	Moderately Agree
Composite Mean	**3.261**	Moderately Agree

The data presented in Table 4 provides valuable insights into how library users perceive the sufficiency and appropriateness of library resources to support a fishery program. The mean score of 3.18 suggests potential improvement in tailoring resources to support the program better. It is particularly evident in the ease of accessing materials, where the low score indicates the need for the library to address any obstacles users may face in accessing resources. However, the high score for the library's operating hours, with a mean of 3.31, indicates that this aspect is the most accommodating and satisfactory factor among the library's offerings for the fishery program. The Composite Mean of 3.261 further indicates that library resources provide moderate support for the program. This information is valuable for the library's strategic planning and resource management, as it gives insight into priority areas for investment and improvement. In summary, the data from Table 4 highlights areas of strength and areas for improvement in the library's resources and services relating to the fishery program. It serves as a valuable tool for decision-makers to understand user satisfaction and prioritize investments to enhance the quality and relevance of library resources. Additionally, it emphasizes the importance of continuous assessment and adaptation of library services to meet evolving academic curricula and research

demands.

This result is consistent with the findings of Thorpe et al. (2016), who investigated the relationship between students' utilization of academic library services, their grade point averages (GPAs), and retention rates. Thrope et al.'s (2016) study revealed a positive correlation between library use, higher GPAs, and retention rates. This research emphasizes the crucial role played by libraries in supporting student success. Libraries provide access to essential information and materials for academic achievement and a wide range of services and support to assist students in navigating the complex educational environment. For instance, many libraries offer workshops and training sessions on research skills, citation management, and other essential academic competencies. They also provide one-on-one consultations with librarians to help students with specific research queries or assignments to maximize the impact of university libraries on student achievement. Collaboration between faculty and librarians is crucial to identify opportunities for integrating library resources and services into course assignments and activities. For example, a research assignment might require using specific library resources or attending a workshop. By incorporating library services in this manner, students are more likely to recognize the value of these resources and use them to their full potential.

In conclusion, academic libraries are critical factors in student success. By providing access to information and resources and offering services and support, libraries can significantly contribute to students achieving higher GPAs and retention rates. To fully harness the potential of these resources, it is essential to integrate libraries into course curricula and for faculty and librarians to collaborate in supporting student success.

The Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP) has published a report recommending that a specific State University and College fulfill the criteria necessary to attain 2nd Level Survey Accreditation in Area 7, which pertains to the library. The report outlines several recommendations, including hiring a licensed librarian, obtaining professional books and journals, and ensuring that the library can accommodate 10% of the student population. The report also suggests updating the library's organizational structure and providing training for librarians and staff. In addition, the report calls for the acquisition of electronic resources and computer units for all campus libraries, as well as improvements to internet access, security, and library furniture. These recommendations are crucial for the SUC to uphold its mission and vision and meet AACCUP standards.

Table 5. Perceived Extent of Agreement of Laboratory Resources to Fishery Program

Indicative Statement	Mean	Verbal Description
The laboratory facilities provided by my university adequately support my learning in fisheries.	3.68	Agree
The laboratory equipment at my university is up-to-date and functional.	3.79	Agree
The laboratory facilities are conducive to conducting practical experiments and research.	3.86	Agree
Access to specialized laboratory equipment enhances my understanding of fisheries concepts.	3.85	Agree
The availability of laboratory resources positively impacts my performance in practical assessments.	3.86	Agree
Adequate laboratory space allows students to collaborate effectively during practical sessions.	3.84	Agree
The cleanliness and organization of the laboratory facilities contribute to a positive learning environment.	3.92	Agree

Indicative Statement	Mean	Verbal Description
The variety of laboratory equipment available caters to the diverse needs of fisheries students	3.84	Agree
The laboratory staff is knowledgeable and supportive in guiding students through practical experiments.	3.92	Agree
The availability of advanced technology in the laboratory enhances the quality of practical training.	3.97	Agree
I feel confident applying theoretical knowledge to practical tasks due to the laboratory facilities.	3.90	Agree
The laboratory facilities are crucial in preparing me for the Fisheries Professionals Licensure Examination	3.88	Agree
Composite Mean	**3.859**	**Agree**

The survey results from Table 5 indicated that students with access to well-equipped laboratories are better prepared for their future careers. Advanced laboratory technology enhances practical training quality and exposes them to the latest equipment and techniques. The high composite mean score of 3.859 supports this finding, indicating that students generally agree with the statement. Furthermore, students exposed to advanced laboratory equipment are more likely to develop critical thinking and problem-solving skills essential for success in their future careers. This hands-on experience allows them to apply theoretical knowledge in a practical setting, giving them a competitive edge in the job market.

However, a study by Gabisay et al. (n.d.) highlighted the negative impact of insufficient laboratory equipment on student performance. The researchers found that students with limited access to laboratory equipment had lower academic performance than those with adequate access. This emphasizes the importance of well-equipped laboratories in ensuring effective learning outcomes and preparing students for licensure exams.

Rebulanan and Samala (2021) studied the determinants of academic achievement among Science High School students in the Philippines. They discovered no notable correlation between the use of laboratory equipment and academic performance. Nonetheless, the research underscores the importance of improving the quality and quantity of laboratory facilities. The authors suggested using educational materials and enhancing teacher training and development to provide students with optimal resources for successful learning.

Overall, the results of these studies emphasize the importance of well-equipped laboratories in improving the caliber of education and equipping students for prospective vocations. Schools and universities should invest in upgrading and maintaining their laboratory facilities to ensure students can access the latest equipment and techniques. This will improve student performance and contribute to better board exam results.

Table 6. Respondents' Perceived Student Characteristics Harmonized with Fishery Licensure Examination Preparation

Indicative Statement	Mean	Verbal Description
I feel confident in my knowledge and skills related to fisheries science before taking the licensure exam.	4.03	Agree
My practical training and hands-on experience have positively influenced my readiness for the licensure exam.	4.09	Agree
My time management skills were sufficient to effectively prepare for the licensure exam.	4.05	Agree

Indicative Statement	Mean	Verbal Description
My level of motivation and dedication significantly impacted my performance on the licensure exam.	4.15	Agree
My communication skills helped me during the licensure exam preparation.	4.04	Agree
My ability to work well under pressure positively impacted my performance on the licensure exam.	4.15	Agree
My critical thinking and problem-solving skills were beneficial in answering exam questions.	4.06	Agree
My overall health and well-being influenced my performance on the licensure exam.	4.20	Agree
My learning style and study habits prepared me for the licensure exam.	4.19	Agree
Composite Mean	**4.107**	**Agree**

Table 6 analyzed the respondents' perceived student characteristics related to fishery licensure examination preparation. The respondents' positive outlook toward understanding fisheries science suggests they are confident in preparing for the licensure exam. Additionally, their belief that overall health and well-being influenced their performance on the exam emphasizes the importance of student welfare in academic success. The findings indicate that students' success in licensure exams depends on their knowledge and skills related to the subject and their overall health and well-being, highlighting the need for a holistic approach to student welfare to ensure their academic success.

The research conducted by Briones and Romero (2020) found that the participants showed exceptional self-motivation, which can inspire and motivate other education students. They also demonstrated effective use of resources such as study skills. However, the study also highlighted that health habits received the least attention among the participants. The participants had high time management skills for starting study routines but found it challenging to manage their time for less attractive tasks relevant to the professional examination. On the other hand, Chua et al. (n.d.) study focused on the readiness of education students for the LET exam. Although the study did not mention the specific characteristics, the findings highlighted the importance of preparing for the licensure exam. These studies show that personal preparedness is crucial for students preparing for the LET exam. Self-motivation, effective resource use, and time management skills are essential for success in this examination.

However, one must also pay attention to one's health habits to ensure one is in the best possible condition to achieve one's goals. These findings can provide valuable insights to educators and policymakers in designing effective programs to help students successfully prepare for licensure examinations.

Table 7. Respondent's Performance in Licensure Examination for Fishery Technologist

Examination Result	Frequency	Percent (%)
Failed	100	72.5
Passed	38	27.5
Total	138	100

Table 7 presents the licensure exam results, with a high failure rate of 72.5% and a low pass rate of 27.5%. This suggests a significant difference between the candidates' level of preparation and their actual performance. Therefore, reviewing the exam content and providing additional

support to help improve the candidates' outcomes is essential. This will ensure a fair assessment of their knowledge and skills.

Table 8. Matrix for Classification for Resulting Observed and Predicted Value

Observed	Predicted		Percentage Correct
	Failed	Passed	
Failed	98	2	98
Passed	32	6	15.8

As shown in Table 8, the logistic regression model was used to predict whether a first-time taker of an exam would pass or fail based on their performance in previous exams and other relevant factors. The model was highly accurate, correctly identifying 98 out of 100 failures, with only two being misclassified as passed. This level of accuracy could be a valuable tool for companies and institutions that need to make informed decisions based on performance evaluations, such as in the education sector or human resources departments. It is worth noting that the threshold for determining whether a person passes or fails is set at 50% by default. This means that if the estimated value by the model is higher than 50%, the person is assigned a "passed" status; if it is below 50%, they are assigned a "failed" status. However, this threshold can be adjusted depending on the organization's specific requirements or tasks, making the model more flexible and adaptable.

In conclusion, the logistic regression model is a powerful statistical tool that can provide critical insights and help organizations make informed decisions based on data analysis. Its flexibility, accuracy, and wide range of applications make it popular among data analysts and machine learning practitioners.

Table 9. Logistic Regression Estimates for the Influence of Factors on LEFT Performance

Variables	Coefficient (β)	SE	Odds Ratio	p-value
Academic Performance	.022	.418	1.022	.958
Teaching Method and Curriculum	-.658	.508	.518	.518
Faculty Qualification and Experience	.753	.453	2.124	.096
Library Resources	-.594	.275	.552	.031
Laboratory Facilities	.777	.447	2.174	.082
Student Characteristics	-.562	.428	.570	.189
Constant	-.333	1.058	.716	.753

$\chi^2 = 15.729$; $\rho = .046$; $n = 138$.
Nagelkerke $R^2 = .156$

The analysis examines factors such as academic performance, teaching method and curriculum, faculty qualification and experience, library resources, laboratory resources, and student characteristics to determine their influence on passing the exam. However, most coefficients have little impact, as the p-values are more significant than 0.05. Further research may be needed to confirm the statistical significance of these factors. Additionally, statistical significance only sometimes implies practical significance, so it is essential to interpret the results carefully.

For instance, the study of Juanatas and Juanatas (2019) used logistic regression to predict licensure examination performance based on academic grades. The researchers created a web-based application that offers students practice review materials and immediate feedback. The logistic regression model generated by the researchers identifies significant predictors, such as Differential Calculus, Structural Theory 1, and Earthquake Engineering courses, with an accuracy

of 93.33%. This study is particularly relevant for educators and institutions in the higher education sector seeking to enhance their students' performance in licensure examinations.

On the other hand, Hussain et al.'s (2021) study delves into the transformative potential of advanced learning for analyzing student academic performance. The researchers applied advanced learning and linear regression models to a dataset, with the deep learning model outperforming the linear regression model. The dataset recorded an average absolute score of 1.61 and a loss of 4.7, showcasing the power of advanced data analytics techniques. This study was particularly relevant for researchers and educators who want to implement these techniques to improve academic performance. These studies highlight the growing importance of data analytics in education and inspire excitement and curiosity about its potential to revolutionize teaching and learning.

Research Novelties

After conducting the research, this study reveals several compelling insights that address the objectives articulated at the outset. In addition to these insights, the current investigation also uncovers noteworthy novelties. Primarily, the research focuses on assessing the board performance of graduates from Bachelor of Science in Fisheries (BSFi) through logistic regression analysis. By narrowing the scope to a specific field of study, the research provides detailed insights and tailored recommendations relevant to the Fisheries discipline. Notably, logistic regression analysis serves as a distinctive statistical method for evaluating board performance, as it predicts outcomes using binary variables, thereby facilitating the analysis of factors influencing performance in board examinations.

The methodological approach, combined with a comprehensive research process, has resulted in findings presented in the preceding section, which offer valuable input for curriculum enhancement programs. By linking the analysis of board performance to potential curriculum improvements, this study presents practical implications for educational institutions and policymakers within the Fisheries sector. The analysis of board performance yields actionable insights for refining the curriculum, with the practical application of these findings having the potential to drive tangible improvements in the education and training provided to Fisheries graduates. In a broader context, this research can significantly influence educational practices and policies in the Fisheries field by advocating for curriculum enhancements based on board performance analysis. Implementing the recommendations derived from this study could ultimately lead to improved educational outcomes and better-prepared graduates in the Fisheries domain.

CONCLUSIONS

In conclusion, the analysis reveals that the identified coefficients do not demonstrate a significant influence, as evidenced by their p-values exceeding 0.05. Consequently, the researcher upholds the hypothesis that none of the examined factors effectively predict the likelihood of fisheries professionals passing the licensure examination. This outcome highlights the need for further investigation into alternative factors that may impact this result.

LIMITATION & FURTHER RESEARCH

The study focuses on one Region in the Philippines, and its findings may not directly apply to regions with diverse socioeconomic, cultural, or educational backgrounds. The study's conclusions on a specific group of BSFi graduates from one area and the sample size and selection methodology examine the relationship between BSFi graduates' performance and various independent variables. It heavily relied on self-reported data and the study's findings regarding its availability and reliability. The study outcomes offer valuable insights and practical

recommendations for enhancing the performance of BSFi graduates, caution in generalizing the results to other regions or countries. Acknowledging these scopes and limitations facilitates a balanced interpretation of the study's results.

In addition to the limitation of focusing on a specific case study in one region, several other aspects could be explored in future research. First, future studies could investigate the long-term performance of BSFi graduates over time, assessing how their skills and competencies evolve in the workforce and how they adapt to changing industry demands. Doing a comparative study by exploring the performance of BSFi graduates across multiple regions or countries with varying socioeconomic, cultural, and educational contexts could provide a broader understanding of the factors influencing graduate success.

The current study employs a quantitative research approach; however, integrating qualitative methods, such as interviews or focus groups, could provide richer insights into graduates' personal experiences and perceptions regarding curriculum relevance, job preparedness, and ongoing professional development. Future research could also explore the impact of practical training opportunities, internships, or industry collaborations on graduates' performance. Such investigations may reveal crucial curricular components that significantly enhance employability.

Moreover, implementing a graduate tracking system to monitor the career paths and job placements of BSFi graduates over time could yield valuable insights into employment trends and skill gaps within the fisheries sector. Future research should investigate the effects of technological advancements and digital tools on the fisheries industry, as well as the evolving skills required for graduates, which may necessitate adaptations in the curriculum. Furthermore, this study highlights the importance of considering the socioeconomic backgrounds of graduates and their influence on performance, as this can offer critical insights into how support systems or barriers affect career success. By addressing these areas, future studies could build upon the current findings, offering a more comprehensive understanding of the factors influencing the performance of BSFi graduates and effectively guiding curriculum enhancements.

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