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Sailing to success: A probabilistic analysis of factors influencing to pass the Licensure Examination for Fisheries Technologists

Ian S. Somosot[1*], John Rae V. Duran[1], and Bernandita T. Rodriguez[2]

[1] Institute of Teacher Education, Davao del Norte State College, Panabo City, Philippines
[2] Institute of Aquatic and Applied Sciences, Davao del Norte State College, Panabo City, Philippines

Abstract

The governing board like Professional Regulatory Commission conducts licensure examinations which serve as indicators of producing quality graduates. The results of licensure examination in all programs with board examination has been considered as evidence of the quality of instruction higher education institutions provide in their clienteles. However, from 2015 the national passing rate of the Licensure Examination for Fisheries Technologist is poor. This research was conducted to assess if admission test scores and high school grades were significant predictors of the Licensure Examination for Fisheries Technologists (LEFT). Employing a quantitative non-experimental design with the use of secondary data, the results of the study were investigated using frequency, spearman rho, and binary logistic regression. The study revealed that 33.87% of the LEFT takers had average admission test scores and 38.71% of the takers had good academic performance, and 35.50% of the takers successfully passed the LEFT. Further, the result of the study confirmed that there was a weak positive correlation between admission test scores and LEFT results ($r=0.357$, $p= 0.004$), and academic performance and LEFT results ($r=0.292$, $p=0.021$). It was concluded that admission test scores were the only variable with a significant likelihood of influencing LEFT outcomes. Statistically, it implied that, for every one-point increase in the admission test score, the likelihood of a corresponding increase in the LEFT average score by approximately 2. The study suggests that HEIs offering BSFT programs may consider admitting new students with at least average admission test scores. This study's findings can be a basis for future research utilizing other research designs. Additionally, researchers could investigate the mediating effect of review programs on licensure examination performance.

Keywords: *Admission Test Score; Binary Logistic Regression; High School Grade; Licensure Examination for Fisheries Technologists*

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1. Introduction

Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all were one of sustainable development goals. One indicator is there will be a proportion of the population in each age group who at least fixed the level of proficiency. The question is, are higher education institutions (HEIs) producing quality graduates? How do we measure quality graduates? The governing boards like Professional Regulatory Commission (PRC) conducts licensure examinations which serve as indicators of producing quality graduates [1]. The results of licensure examinations in all programs with board examinations have been considered as a positive measure of student outcomes and it is also considered as evidence of the quality of instruction HEIs provide in their clienteles [2].

To fulfill in producing quality graduates, HEIs need to prepare students for the licensure examination since this tells the quality of education and training the institutions provide. With the increasing number of HEIs in the Philippines, it entails that the access to

*Corresponding author; e-mail: ian.somosot@dnsc.edu.ph

college education and its quality has been an interested topic for many scholars specifically in terms of quality education [3]. The effectiveness and the efficiency of the schools depend on the licensure examination results [4]. Despite the effort of the institutions, the decrease of the passing rate in the licensure examinations is an indicator that the quality of education is deteriorating [5].

Taking licensure examinations including LEFT is one of the important factors in the curriculum and instructional implementation. The performance of the students during the licensure examinations is one of the indicators of efficiency of the schools and the intellectual capacity of graduates. Moreover, licensure examination results are also considered as one of the indicators to evaluate by the accreditation bodies particularly in the institutions quality assurance [1]. Moreover, many of the professions conduct licensure examinations to assess and evaluate qualified graduates in their respective fields [6].

In education, graduates in teacher education will take Licensure Examination for Teachers (LET). Many HEIs in the Philippines have already established their names in terms of producing quality teacher education graduates as seen in their LET performance. There are several studies that posited different factors that influence LET performance. These factors include the profile of the school, teachers' competence, school facilities, curriculum and instruction, and admission and retention policies. Furthermore, the academic achievement of the teacher education graduates is also attributed to the performance of LET takers. This implies that there is an effective implementation of instruction and sound evaluation procedures in the HIEs since the performance of the takers during their college education coincides with their LET performance [7].

Other professions such as nursing education considered licensure examination as the indicator of quality of the nursing program HEIs offered. There were also attempts to investigate factors that predict the chance of passing the nursing licensure examination (NLE). These factors include pre-entry qualifications including High School Grade, college admission test, nursing aptitude test, and academic performance. Further, identifying what factors that contribute to the success of graduates taking NLE may be useful in developing admission and retention policy in nursing courses. Tertiary schools offering nursing programs conduct standardized competency assessments on their students before graduation. This program ensures that their graduates are ready and assess their likelihood of passing the NLE [8].

There is also research conducted on the predictors for passing the licensure examination for agriculturists (LEA). The study confirmed that LEA passers who were fresh graduates showed a higher percentage of passing rate the exam. Furthermore, it is revealed that to successfully pass the LEA, graduates need to have good academic performance, better performance in the college admission test, and very good course audit performance. These indicators were considered predictors of licensure examination, particularly in LEA. The study posited low performance in these factors may result in low performance in licensure examination for agriculturist [9].

In line with the Philippine Fisheries Professional Act, the Professional Regulatory Board of Fisheries Resolution No. 06 series of 2022 discussed that the State should give priority attention and support to the professional development of fisheries professions in the Philippines. The aim of these actions is to maintain the country's food security and economic development, with a view to raising standards in fisheries education. At least once a year, the graduates of BS fisheries and their associated field shall undertake and pass written examinations organized by the Professional Regulatory Body in Fisheries. The coverage of the examination is Aquatic Resource and Ecology, Aquaculture,

Capture Fisheries, and the Post-harvest Fisheries.

In the Licensure Examination for Fisheries Technologist (LEFT) from 2015-2019, it is found out that the passing rate did not reach 50%. In October 2015 examination there were 366 (36.09%) who successfully passed the exam out of 1,014. Last October 2016 only 457 examinees passed out of 1,391 (32.85%). In 2017, only 479 out of 1,399 (34.24%) successfully passed the LEFT. During the 2018 LEFT only 502 out of 1,773 (28.31%) passed the exam. And last 2019 LEFT, 34.79% or 731 out of 2,101 had successfully passed the exam. During the pandemic, the 2020 examination was cancelled. In October 2021, 211 out 715 or 29.51% of the takers passed the licensure examination. In 2022, 36.42% or 716 out of 1,966 takers successfully passed the examination (Professional Regulatory Commission). Davao del Norte State College is one of the state universities and colleges in the Philippines offering Bachelor of Science in Fisheries who also participated in the LEFT. The College performance during the 2015 LEFT was 25%. In 2016 the College got a performance of 30.77%. In 2018, the result of college performance in the LEFT was 35%. During the 2018 LEFT the College got 18.03%. and in 2019 LEFT the College received a score of 35.48%. The above figure indicates that the College needs to improve its performance in order to become a Centre for Fisheries Technology Development. In addition, the performance of the graduates in the licensure examination is an indication of their capacities specifically on innovative sustainable practices, advocate for effective policies, and engage in responsible resource management which are vital aspects of fishery industry [26].

There are various studies conducted to find out what are the factors that will affect the likelihood of passing the LEFT. The results show that work experience, in depth assessment, the amount of time taken to reread and review familiarity with the examination played a decisive role in determining LEFT performance [1]. Another study posited to be ready in the licensure examination, practicing is the single most important step in the process [10]. A study on licensure examination for fisheries technologist failed to include high school academic grades and entrance exam results as predictors of the LEFT results [1]. Though there are studies investigating the high school grade and entrance exam results, these are used in investigating licensure examination results in teacher education [11], agriculturists [12], and nursing [13]. To add on the body of knowledge in what factors the best predict in the Licensure Examination for Fisheries Technologists, this investigation is deemed necessary to determine if the college entrance test score and high school GPA are predictors of successfully passed the LEFT. Further, the result of the study will serve as the basis for revision of the admission policy of HEIs offering courses with board examinations.

1.1 Research Objectives

The study sought to establish which factors had a significant influence on the probability of successful passing the fishing technologist certification exam. Specifically, it aimed to determine the admission test score and academic performance of LEFT takers, assess the number of passers in the LEFT, determine the significant relationship between the admission test score and LEFT result and academic performance and LEFT result and determine if the admission test score and academic performance significantly influence the chance to pass the LEFT.

1.2 Hypothesis

The following hypotheses were tested at 0.05 level of significance that there is no significant relationship between the admission test score and LEFT result, academic performance and LEFT results; and admission test scores and academic performance did not significantly influence the LEFT results.

1.3 Theoretical Framework

The study is anchored on the Attribution Theory of Achievement [14]. This theory posited that achievement of the individual can be affected by different factors such as ability, effort, task difficulty, and luck. Moreover, this theory includes the locus of control, stability, and controllability as the dimension of attribution of achievement. The attribution theory explains that success and failure can be affected by either internal or external attributes. In the context of the study, the success and failure in the licensure examination for fisheries technologists can be affected by internal factors such as their abilities, effort, or preparation. This factor further discussed that when one got the higher score or achieved victory this will result in greater positive effect. This positive effect might also relate to their intelligence in which in this study, admission test score and high school grades are indicators of student intelligence.

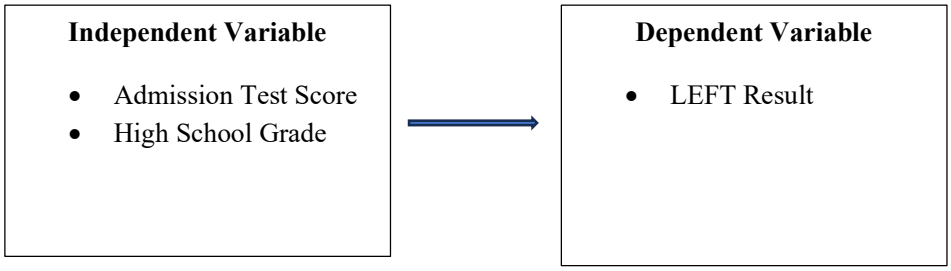

Figure 1. Conceptual framework of the study.

2. Methods

Quantitative non-experimental research design was employed to attain the objectives of study since this design is used when researcher gathers, analyzes, interprets, and writes the results of the study. Quantitative research is a systematic process comprising observing and describing phenomena which are used to identify relationships between independent variables and dependent variables [15]. The research utilized secondary quantitative research methods since the study used data, which includes Otis-Lennon School Ability Test (OLSAT) results, high school grade, and the LEFT performance of the graduates from 2015-2019. Moreover, this research employed a correlational research approach in which variables were tested to see if they were significantly related to each other. Correlation tells us that, whether it is positive or negative correlation, the change in the magnitude of 1 variable will be followed by a change in the magnitude of another variable [16]. The independent variables were OLSAT result, and high school grade and the dependent variable was the LEFT result.

To obtain the data to be used in this study, the researcher sought approval from the participants to use their admission test score, their high school grade, and their LEFT results. Through a direct message, the researcher sent a consent letter to the Bachelor of Science in Fisheries from 2015-2019. From 2015-2019, there were 62 graduates who took the LEFT. After their approval, the researcher wrote a letter to the Professional Regulatory Commission to retrieve the LEFT results from 2015-2019. The researcher also sent a letter to the College registrar to get the high school grade of the LEFT takers and at the same time a letter was sent to the Guidance and testing Office to retrieve the admission test score of the LEFT takers. The data were treated using the following statistical tool, frequency was used to determine the OLSAT result, high school grades, and LEFT results. Spearman's rho Correlation was used to determine if OLSAT and high school grade were significantly related to LEFT results. Binary logistic regression was used to determine if OLSAT and high school grades significantly predict the LEFT results.

In terms of the ethical consideration of the study, research adheres to the guidelines of

RA 10173 or also known as the Data Privacy Act of 2012. It is explained in this law that all the data retrieved in this study shall be treated confidentially, protected, and shall be used for the purpose only. The researcher has taken account of the confidentiality and integrity of the data collected. The data used by the researchers were from the college registrar, guidance and testing office, and the PRC and should be treated with utmost confidentiality and protection. The proper authority approved all the requests and made sure that the researcher secured consent from the LEFT takers. The researcher is responsible for ensuring that the gathered data is in a secure environment, which includes privacy and confidentiality of participant information. Researchers have a responsibility to protect participants' rights and welfare. To protect their integrity and confidentiality, the study participants signed an agreement not to disclose any information. The researchers have also noted that the study's objective was communicated to its participants. The signed consent was proof that research participants are voluntarily involved in the study, which allows researchers to obtain information specifically about LEFT results, admission test scores and grades.

3. Results and Discussion

One of the most important needs that any individual has for staying up to date with developments is obtaining a degree. It's one way for an individual to advance and develop his or her craft with the aim of becoming a human being [17]. After taking a degree, those graduates in programs with licensure examinations will take the board examination set by the Professional Regulatory Commission. Taking the board examination is one of the proofs of the quality of graduates Higher Education Institutions produced. Licensing examinations provide an opportunity to develop graduates into certified professionals with personal integrity and moral convictions, which allows them to compete globally. Graduates of the Bachelor Science of Fisheries and Technology or allied fields will take the Licensure Examination for Fisheries Technologists (LEFT) once a year. To determine which factors, predict the success of graduates to pass the LEFT, the study was conducted. Two factors were investigated admission test scores and high school grades.

For the students to enter Higher Education Institutions, they need to pass the admission requirements and one of these is taking admission test or entrance examinations [18]. Also, programs in higher degrees will also consider the high school grades of the student entrants [11]. Table 1 presents the results on the admission test score, high school grade, and LEFT result. The result of the study revealed that 21 or 33.87% of the LEFT takers got a Stanine 5 or Average, 14 or 22.58% of LEFT takers got Stanine 3 or below average, 13 or 20.97% of the LEFT takers got Stanine 4 or average, 5 or 8.06% of the LEFT Takers got Stanine 6 and Stanine 2 average and below average respectively. It is also shown in the result that 3 or 4.84% of the total number of LEFT Takers got Stanine 1 or below average and 1 or 1.61% of the LEFT takers got Stanine 7 or above average. It is important to note that looking at the entrance test score of the student entrants is the easiest way to determine the ability of the students and the chance of them to successfully finish their program [19]. In terms of high school grades, it is presented in this study that 24 or 38.71% LEFT Takers got a High School GPA of 89-91 Good, 14 or 22.58% of the LEFT Taker got a GPA of 80-82 Moderately Fair, 12 or 19.25% of the LEFT Takers had 86-88 Very Satisfactory GPA, 9 or 14.52% of the total number of LEFT Takers got 83-83 Satisfactory, and 3 or 4.84% of the LEFT Takers got a GPA of 77-79 Fair. As to the number of takers who passed and failed in the LEFT, the result revealed that LEFT Takers from 2015- 2019, 40 or 64.1% failed the exam and 22 or 35.5% successfully passed the licensure examination for fisheries technologists. The number of passers in the Licensure Examination for Fisheries Technologists sounds alarming especially since it is relatively low and does not even get 50%. The result implies that when the passing rate in the licensure examinations is decreasing it indicates that the quality of education is declining [5].

Table 1. Results on the admission test score, high school grade, and LEFT results.

Characteristics	Level	Frequency	%
Admission Test Score	Stanine 1	3	4.84
	Stanine 2	5	8.06
	Stanine 3	14	22.58
	Stanine 4	13	20.97
	Stanine 5	21	33.87
	Stanine 6	5	8.06
	Stanine 7	1	1.61
High School Grade	77-79	3	4.84
	80-82	14	22.58
	83-85	9	14.52
	86-88	12	19.35
	89-91	24	38.71
LEFT Result	Passed	22	35.50
	Failed	40	64.50

The important relationship between the score obtained on the admission test and the LEFT result, as well as academic performance and LEFT results is shown in Table 2. To determine the relationship between the variables in this study, a Spearman correlation was performed. This statistical tool is used since the data used are ordinal level (Admission Test Score and Academic Performance) and rank data (LEFT Result) [20]. The result confirmed that the admission test score of LEFT takers and LEFT results had a weak, positive monotonic correlation ($r= 0.357$, $n= 62$, $p <.004$). Statistically, it implies that the increase of the admission test score, LEFT score will also increase. The result of the study confirms that students who achieved a passing score in the admission test scores performed better in the licensure examinations [6, 11]. The result implies that since the college is using a standardized test for the admission exam, the BS Fisheries program should look on the result of all the college entrants and consider it as the admission requirement. It is important to remember that college examination is a standardized test used by the institutions for them to know the probability of students entering the program will finish their degree program [18].

Table 2. Significant relationship between the admission test score and LEFT result, academic performance and LEFT results.

Independent Variables	LEFT
Admission Test Score	0.357* 0.004
High School Grade	0.292* 0.021

In addition, to determine the relationship between the academic performance of LEFT takers, a Spearman correlation was also used. Moreover, result revealed that there is a weak, positive monotonic correlation between the academic performance of LEFT Takers and LEFT Results ($r=0.292$, $n=62$, $p<.021$). Statistically, this implies that the higher the grades of the students who will enter the BS Fisheries Program, the LEFT Result will increase. However, it is confirmed that high school grades are not significantly correlated with the licensure examination which is different from the result of this study. It is further explained that basic education is intended to develop basic skills while higher education is intended to give specialized skills in their chosen field [21].

Table 3. Logistic regression predicting the likelihood of passing the licensure examination for fisheries technologists.

							95% C.I. for Exp(B)	
		B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**Lower**	**Upper**
Step1[a]	Admission Test Score	.590	.266	4.931	1	.026	1.804	1.072	3.038
	High School Grade	.139	.098	2.022	1	.155	1.149	.949	1.391
	Constant	-15.049	8.290	3.296	1	.069	.000		

A logistic regression analysis is shown in Table 3 that estimates the likelihood of a successful Licensure Examination for Fisheries Technologists. To assess the impact of certain factors on whether or not a fisheries technologist passes an examination for license, binary logistic regression is performed. The model contained two independent variables (Admission Test Score and Academic Performance). The full model containing all predictors was statistically significant, $\chi 2$ (2, n=62) = 11.465 $p < .003$, indicating that the model was able to distinguish between which of the variables predicts the chance of passing the LEFT exam. The model, explained between 16.9% (Cox & Snell R Square) and 23.2% (Nagelkerke R Squared) of the two variables will influence the LEFT Result. Based on the Classification Table, it is revealed that the correctness of prediction is 69.4%. Based on the Model Data Fit, the insignificant result in the Hosmer and Lemeshow Test is $p > .656$, it implies that the model did not deviate from what is happening in the real world.

As shown in Table 3, only the Admission Test Score of LEFT Takers made a unique statistically significant contribution to the model and predictor of the likelihood to pass the LEFT, with a $p < .026$, recording an odds ratio of 1.804. Statistically, the likelihood that the LEFT average score will increase by approximately 2 points for each 1-point increase in the admission test score is approximately 2. The result of the study implies that colleges offering BS Fisheries program shall consider looking at the admission test score of the college entrants and make it as part of the admission requirement to get a higher admission test score. Through this, colleges will have a better chance that the students entering the program have a greater chance of passing the LEFT in the future. The result aligned with several studies that concluded that admission test as predictor to the board examination performance of takers [22, 9, 23, 24, 25].

In addition, the academic performances of LEFT takers during their high school did not significantly contribute to the LEFT performance. This result was a deviation of studies that high school grades are also predictors to board examination results [12, 9]. However, this result supports the study conclusions of studies that high school academic performance is not a predictor of licensure examination results [21, 22]. This implies that grading students is arbitrary and depends upon how the instructors/teachers exercise their academic freedom. This also tells that the basic education curriculum prepares students to become prepared in college not for licensure examination, and it is the responsibility of the higher education institutions to prepare college students for licensure examination and for work.

4. Conclusions

The results of the study have been used to draw these conclusions. Most LEFT students enter the program with an average score on the entrance exam. The average of the students who

entered the Bachelor of Science in fisheries was 89-91 in terms of their academic performance. From 2015-2019, there were 40 first time LEFT takers failed in the exam and 22 of them successfully passed the exam. This study posited that the admission test scores, and LEFT results are correlated with each other, and high school grade and LEFT results are significantly related to each other. Furthermore, the academic performance of LEFT takers significantly related to LEFT results. Finally, the research study concluded that only the admission test score had the likelihood to influence the LEFT results.

Based on the results and conclusion of this study, the researcher is suggesting that higher education institutions offering programs with board examination, particularly in the BS Fisheries program to consider accepting students with at least good, or better admission test scores since the result of the study confirmed that admission test score had the likelihood to influence the licensure examination result. It is also recommended for further investigation to use the result of the study and utilize other research designs. The study is only limited to admission test scores and high school grades; researchers may consider studying the mediating effect of review programs conducted by higher education institutions to the licensure examinations.

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