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## Predictors of BSEd Mathematics Licensure Examination for Teachers (LET) Performance of One ASEAN State University

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### Abstract

Passing the board examination or Licensure Examination for Teachers (LET) is a mark of professional accomplishment for teachers. Determining factors that significantly predict LET performance is crucial in every higher education institution. The study investigated the relationship of the Bachelor of Secondary Education major in Mathematics (BSEd Math) graduates' academic performance (General Education, Professional Education, and Specialization) and LET performance. It also determined the significant predictors of their LET performance. The study employed the descriptive-correlational research design with 54 or 58.06% of the total BSEd Math graduates from 2014 to 2019 who were randomly selected as respondents. Data were gathered through interview method and document analysis. Findings disclosed that the academic performance of the graduates has a significant positive relationship with their LET performance across the areas of Specialization (Mathematics), Professional Education and General Education. Moreover, academic performance of the BSEd Math graduates in Professional Education is a significant predictor of LET performance. Those who would perform well in the Professional Education subjects in college would tend to have better performance in LET.

**Keywords:** academic performance, licensure examination for teachers, professional accomplishment, mathematics education, predictors.

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### 1. Introduction

Education at this present time must produce high-quality graduates who will play vital roles in economic development and nation building. In this fast-changing world and the advent of modern technologies, students are expected to acquire 21<sup>st</sup> century skills which are crucial for them in landing for jobs when they graduate and for global competitiveness. Hence, it is the principal responsibility of the education sector to make sure that they produce professionals who could meet the demands of the labor market.

One of the primary considerations in attaining quality education is the qualifications of teachers, especially in the Basic Education who build strong academic foundations for the students. Hence, it is very indispensable for teachers to pass the Licensure Examination for Teachers (LET) since it is the pre-requisite to being in the network of professional educators who shape the future of the youth. It is a mark of professional competence for teachers.

Republic Act 7836 of the Philippine Constitution, professionalized teaching by requiring teachers to have a license by passing the Licensure Examination for Teachers (LET) since it is an essential element to assure quality in the teaching workforce. The LET, formerly known as Professional Board Examination for Teachers (PBET) which is administered by the Professional Regulation Commission (PRC), measures the extent of the knowledge and competencies acquired by teacher education graduates.

One of the major concerns of the present education system in the Philippines and abroad is strengthening the Mathematics Education. Schleicher (2013), emphasized that mathematics is needed not only inside the classroom but also in our everyday life and tasks – ‘good numeracy is the best protection against unemployment, low wages, and poor health.’ With the new curriculum for Mathematics education in the country, it is expected that students will be more prepared for higher education and employment, and will be more equipped with 21<sup>st</sup> century skills for global competitiveness.

Cabrera (2012) reiterated that the Philippines ranked 8<sup>th</sup> in terms of quality education in science and mathematics based on the evaluation made by the World Economic Forum which was conducted on the eight countries who belong to the Association of Southeast Asian Nations (ASEAN). Moreover, the result of the 2018 Programme for International Student Assessment (PISA) shows that the Philippines ranked the lowest in the areas of mathematics, science and reading. It is therefore imperative to improve the qualifications of mathematics teachers by alleviating the deteriorating LET performance of the teacher education graduates in the country.

Several studies have shown that some Teacher Education Institutions (TEI) had poor LET performance over the years (Nool et al., 2017; Visco, 2015). They found out that teacher education graduates failed to attain the national passing rate in the Licensure Examination for Teachers. Furthermore, Nool et. al (2017) disclosed that there was a significant negative correlation between the number of overall takers and LET performance. This implies that the greater the number of examinees, specifically the repeaters, the greater the possibility of having a lower passing rate or percentage in the licensure examination. In contrast, the fewer the number of LET takers (particularly the repeaters), a better LET performance will be attained.

Further, academic achievements or accomplishments of teacher education graduates are significantly related to LET performance (Rabanal, 2016; Ferrer et al., 2015). Also, it was found out that the academic performances of graduates in the General Education, Professional Education, Specialization, and their overall performance in the three areas significantly predict LET performance (Ferrer et al., 2015; Visco, 2015). Hence, it is very crucial for teacher education graduates to have a higher academic achievement to have higher LET performance.

The study in general, determined the predictors of LET performance of BSEd Mathematics graduates in PSU-ACC. Specifically, the study assessed the academic performance of the BSEd Mathematics graduates in General Education, Professional Education, and Major/Specialization; the performance of the BSEd Mathematics graduates in the Licensure Examination for Teachers (LET) across the three areas ; the relationship between BSEd Mathematics graduates’ academic performance and LET performance across

the three areas; the significant predictors of BSEd Mathematics LET performance; and the areas of difficulties of BSEd Mathematics graduates in LET.

The Pangasinan State University Alaminos City Campus (PSU-ACC) has been offering Bachelor of Secondary Education major in Mathematics program (BSEd Mathematics) since 2010. However, no study about the predictors of LET performance was conducted yet. LET performance is a factor that can considerably affect the effectiveness of an academic institution especially in the context of quality and relevant curriculum. Thus, the result of this study will help identify areas for growth and development to sustain or improve not only the LET performance of the BSEd Math graduates but also the teacher education graduates' LET performance in general. All possible issues and concerns when it comes to the delivery of curriculum content will also be improved.

## **2. Materials and Methods**

### **2.1 Research Design**

A descriptive-correlational research design was used in this study. This was used since the objective of the study was to determine the LET performance of the BSEd Math graduates, the relationship between the graduates' academic performance and LET performance across the three areas (General Education, Professional Education, and Specialization) and the significant predictors of their LET performance.

### **2.2 Subjects, Respondents and Sampling**

The respondents of this study were the Bachelor of Secondary Education Major in Mathematics graduates of Pangasinan State University Alaminos City Campus. The respondents of the study consisted of 54 BSEd Math graduates who represent 58.06% of the total population of graduates from 2014 to 2019 of the Pangasinan State University Alaminos City Campus. Simple random sampling was used as sampling technique.

### **2.3 Data Collection**

The study employed structured interview method and document analysis for data collection. LET rating in the three areas (General Education, Professional Education, and Specialization) and areas of difficulties of the graduates in the licensure examination were asked. In order to acquire data for the academic performance, the Grade Point Average (GPA) of the graduates in the three areas were requested and retrieved from the office of the registrar with the permission and approval of the Campus Executive Director.

### **2.4 Data Analysis**

Descriptive statistics such as mean, standard deviation, skewness, and kurtosis were used to describe the academic and LET performances of the BSEd Math graduates across the three areas (General Education, Professional Education, and Specialization). In order to determine the relationship between BSEd Mathematics graduates' academic performance and LET performance across the three areas, Pearson's correlation coefficient was used. To determine the significant predictors of BSEd Math LET performance, Multiple Linear

Regression Analysis was applied. Lastly, to identify the areas of difficulties of the BSED Math graduates in LET, frequency and percentages were used.

### 3. Results

#### 3.1 Licensure Examination for Teachers (LET) Performance of BSED Mathematics Graduates

Table 1 shows the LET performance of the BSED Math graduates in the General Education, Professional Education, Specialization, and the overall LET performance.

It can be deduced from Table 1 that General Education has the highest mean which is 85.29, equivalent to a 'good' performance. The standard deviation 4.37 implies that most of the BSED Math graduates' ratings in the General Education lie between 81 and 90 (inclusive). The skewness -0.07 entails that a greater number of graduates have ratings which are slightly higher than 85.29 (Table 1) in General Education. The skewness and kurtosis indicate that distribution of BSED Math graduates' LET performance in General Education is approximately normal.

**Table 1. Licensure Examination for Teachers (LET) Performance of BSED Mathematics Graduates**

Areas	Min	Max	Mean	SD	Sk	Ku
General Education	77.00	93.00	85.29	4.37	-0.07	-0.70
Professional Education	72.00	85.00	79.26	3.49	-0.24	-0.57
Specialization (Mathematics)	71.00	92.00	80.97	4.28	0.23	0.57
Overall	75.00	88.00	81.15	3.50	0.11	-0.79

Note: Individual overall LET rating is obtained by considering the following weights of the three areas: 20% - General Education, 40% - Professional Education and 40% - Specialization.

On the other hand, Professional Education has the lowest mean rating of 79.26 which is equivalent to a 'fair' performance. Most of the graduates' ratings in Professional Education lie between 76 and 83 (inclusive) as signified by the standard deviation which is 3.49. The skewness -0.57 implies that a larger number of graduates have ratings higher than 79.26 (Table 1). The skewness and kurtosis indicate that the distribution of BSED Math graduates' LET performance in Professional Education is approximately normal.

In the major subjects or specialization, the mean is 80.97 which is equivalent to a 'good' performance. The standard deviation is 4.28, which tells us that most of the BSED Math graduates' ratings in the specialization lie between 77 and 85 (inclusive). The skewness 0.23 implies that a greater number of students have ratings which are slightly lower than 80.97 (Table 1). The skewness and kurtosis indicate that the distribution of BSED Math graduates' LET performance in specialization is approximately normal.

With regards to the overall performance of BSED Math graduates in LET, the mean is 81.15. This entails that the BSED Math graduates have a 'good' overall performance in LET. The standard deviation is 3.50, which means that most of the graduates' overall ratings in LET lie between 78 and 85 (inclusive). The overall skewness is 0.11 which implies that a

greater number of students have overall LET ratings which are slightly lower than 81.15 (Table 1). The skewness and kurtosis indicate that the distribution of BSED Math graduates' overall LET performance is approximately normal.

### 3.2 Academic Performance of BSED Mathematics Graduates

Table 2 reveals the academic performances of students in the General Education, Professional Education, Specialization, and overall academic performance.

**Table 2. Academic Performance of BSED Mathematics Graduates**

Areas	Min	Max	Mean	SD	Sk	Ku
General Education	1.63	2.35	2.06	0.20	-0.51	0.04
Professional Education	1.63	2.05	1.85	0.13	-0.26	-1.04
Specialization (Mathematics)	1.70	2.46	2.16	0.23	-0.89	0.09
Overall	1.66	2.28	2.03	0.18	-0.68	-0.17

Note: Pangasinan State University follows a grading system with 1.00 as excellent and 5.00 as failed.

In the General Education, the mean is 2.06 which is equivalent to a 'good' performance. It has a standard deviation of 0.20 which implies that most of the BSED Math graduates' grades in the General Education lie between 1.75 and 2.25 (inclusive). In addition, the skewness which is -0.51 tells us that a greater number of graduates have grades lower than 2.06 (Table 2). The skewness and kurtosis indicate that the distribution of BSED Math graduates' academic performance in General Education is approximately normal.

Professional Education has a mean grade of 1.85 which is equivalent to a 'good' performance. Most of the graduates' grades in Professional Education lie between 1.75 and 2.00 (inclusive) as signified by the standard deviation which is 0.13. This also means that their grades in Professional Education subjects are clustered closely around the mean. The skewness -0.26 implies that a greater number of students have grades lower than 1.85 (Table 2). The skewness and kurtosis indicate that the distribution of BSED Math graduates' academic performance in Professional Education is approximately normal.

In the major subjects or specialization, the mean is 2.16 which is equivalent to a 'good' performance. The standard deviation is 0.23, which tells us that most of the BSED Math graduates' grades in the specialization lie between 2.00 and 2.50 (inclusive). The skewness -0.89 implies that a greater number of students have grades which are lower than 2.16 (Table 2). The skewness and kurtosis indicate that the distribution of BSED Math graduates' academic performance in specialization subjects is approximately normal.

With regards to the overall performance of BSED Math graduates in LET, the mean is 2.03. This suggests that the BSED Math graduates have a 'good' overall performance in LET. The standard deviation is 0.18, which means that most of the graduates' GPAs lie between 1.75 and 2.25. The overall skewness is -0.68 which implies that a greater number of students have GPAs which are lower than 2.03 (Table 2). The skewness and kurtosis indicate that the distribution of BSED Math graduates' overall academic performance is approximately normal.

### 3.3 Relationship of Academic Performance and LET Performance

Table 3 presents the relationship between the academic performance and LET performance of the BSEd Math graduates across General Education, Professional Education, Specialization, and overall academic performance.

**Table 3. Relationship of Academic Performance and LET Performance**

Academic Performance	LET Performance		
	r-value	p-value	Remarks
General Education	-0.553*	0.021	Strong relationship
Professional Education	-0.749*	0.001	Strong relationship
Specialization (Mathematics)	-0.851*	0.00	Strong relationship
Overall	-0.856*	0.00	Strong relationship

\*significant at  $p < 0.05$

It can be observed from Table 3 that academic performance is significantly related to LET performance across the three areas as signified by the significance values of 0.021, 0.001, 0.00 and 0.00 respectively which are all less than the set 0.05 significance level. Also, the overall academic performance is significantly related to the overall LET performance of the BSEd Math graduates. Furthermore, academic performance is inversely related to LET performance across all areas (General Education, Professional Education, and Specialization). However, since a grade closer to 1.00 means a higher grade, it can be inferred that the higher the academic performance, the higher LET rating will be attained across all areas (General Education, Professional Education, and Specialization) and vice versa.

### 3.4 Predictors of the LET Performance of the BSEd Math Graduates

Table 4 displays the Multiple Regression Analysis results of the LET performance (response variable) and the academic performance of the graduates in General Education, Professional Education and Specialization (predictor variables).

**Table 4. Predictors of the LET Performance of the BSEd Math Graduates**

Academic Performance	LET Performance			Remarks
	Beta	t	p-value	
General Education	-7.938	-1.664	0.124	Insignificant
Professional Education	-18.402	-3.127	0.008	Significant
Specialization (Mathematics)	3.752	0.802	0.437	Insignificant

$$R^2 = 0.762$$

$$F = 18.114; \text{Sig } F: p < 0.05$$

It can be inferred that the influence of the combination of the three predictor variables is significant ( $F=18.114$ ,  $p < 0.05$ ). Further, the three predictor variables explain 76.2% of the variance on the LET performance of the BSEd Math graduates. Hence, about 23.8% can be accounted for other factors or variables not included in this study. Moreover, the coefficient of determination  $R^2 = 0.762$  implies that the model  $\hat{Y} = 124.087 - 18.402x$  ( $x$  is the



academic performance in Professional Education) which predicts LET performance fits the data well and is highly predictive. It has to be noted that we only consider the significant predictors in the fitted model and remove the insignificant predictor variables.

Notice that the beta coefficients for the General Education, Professional Education and Specialization are -7.938, -18.402, and 3.752, respectively. However, only the academic performance in the Professional Education was found to be a significant predictor as signified by the significance value 0.008 which is less than the set 0.05 significance level. Thus, LET performance of the BSEd Math graduates was influenced by this factor since 40% of the overall LET rating is accounted for the Professional Education area. Hence, the academic performance of BSEd Math graduates in Professional Education is a good predictor of their LET performance.

Results assert that those who would perform well in the Professional Education subjects during college would tend to perform better in the licensure examination. In contrast, those who would have poor performance in the Professional Education subjects during their college or undergraduate years are more likely to have lower LET performance.

### 3.5 Areas of Difficulties of BSEd Mathematics Graduates in LET

Table 5 shows the areas of difficulties of BSEd Math graduates in the Licensure Examination for Teachers.

It can be gleaned from Table 5 below that in General Education, only 12 or 22.2% of the respondents answered Physical Science as a particular area in the General Education that is difficult. In Professional Education, most of the respondents had difficulties in Social Dimensions with 27 or 50.0% of the total respondents to be followed by the Teaching Profession with 26 or 48.15%. In the Social Dimensions, the questions involved scenarios or situations in which they needed to apply what they learned about the four pillars of education.

**Table 5. Areas of Difficulties of BSEd Mathematics Graduates in LET**

Areas	Frequency	Percentage
<b>General Education</b>		
Physical Science	12	22.2%
<b>Professional Education</b>		
Special Topics in Education	10	18.5%
Principles of Teaching	11	20.4%
Curriculum Development	11	20.4%
Teaching Profession	26	48.2%
Social Dimensions	27	50.0%
All Areas	13	24.1%
<b>Specialization</b>		
Trigonometry	11	20.4%
Advanced Algebra	11	20.4%
History of Mathematics	31	57.4%

Note: Multiple responses are allowed.

Likewise, in the Teaching Profession, different scenarios were given which required applications of various philosophies in education, to be able to answer the questions based on the given situations. Few of them answered all areas in Professional Education with 13 or 24.1% of the total respondents and Special Topics in Education with 10 or 18.5% of the total respondents. Also, 11 or 20.4% answered the Principles of Teaching and Curriculum Development.

Lastly, the majority of the BSEd Math respondents found History of Mathematics as a difficult area in the Specialization. In particular, several questions about the contributions of different ancient mathematicians were included in the test items. In addition, 11 or 20.4% of the respondents considered Trigonometry and Advanced Algebra as difficult areas in the Specialization.

#### **4. Discussions**

The BSEd Math graduates had a 'good' LET performance in the General Education and Specialization areas, but their LET performance in Professional Education is 'fair.' The BSEd Math graduates performed 'good' in the academic subjects in General Education, Professional Education, and Major areas.

Results of the study revealed that the academic performance and LET performance of the BSEd Math graduates are significantly related. The higher the academic performance in all areas, the higher LET rating will also be attained in all areas. The academic performance of the BSEd Math graduates in Professional Education significantly predicts LET performance. BSEd Math graduates with higher academic achievement in Professional Education tend to perform better in LET. The findings of the present study confirms that of Rabanal (2016) and Ferrer et al. (2015) where the academic achievements or accomplishments of teacher education graduates are significantly related to LET performance. Likewise, the academic performances of graduates in the General Education, Professional Education, Specialization, and their overall performance in the three areas significantly predict LET performance (Ferrer et al., 2015; Visco, 2015).

Only a few respondents answered Physical Science as a specific area in General Education which is difficult in the licensure examination. Most of the respondents found Social Dimensions difficult in Professional Education to be followed by the Teaching Profession. In the Specialization, the majority found History of Mathematics as a problematic area in LET. It has to be noted that among the three areas, the BSEd Math graduates found Professional Education as the most difficult. This result is evident since on the average, the BSEd Math graduates obtained the lowest rating in Professional Education area. Professional Education is usually the most challenging part of the LET as it includes various disciplines in education which also requires intensive analysis.

#### **5. Conclusion and Implications**

Although the study was conducted in only one ASEAN State University, the results of the study can serve as guide to other universities offering teacher education in the other parts of the world, particularly in the ASEAN Region. The low passing rate of graduates taking the board examination for teachers is attributed to their low performance in the professional



education subjects during their course of study. Results suggest that schools offering teacher education must give great focus in the teaching of professional education subjects aside from the specialization subjects. Faculty members handling professional education subjects must ensure that the students are able to fully comprehend the different topics taught to the students as these are relevant for the students in becoming professional teachers.

## **6. Limitations**

The study is only limited to three predictor variables for the LET performance of the BSEd Math graduates, which include their academic performances along the areas of General Education, Professional Education and Specialization. To further improve the predictive model, other researchers might want to consider other possible predictor variables not included in the study such as students' demographic profile, attendance to board examination review and teacher-related variables.

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