

Predictors of LET Performance: A Basis for Admission Policy for COE Curricular Programs

Monetta C. Valencia, PhD

Instructor, College of Education, Philippines

Introduction

The practice of the teaching profession in the Philippines requires the passing of the Licensure Examination for Teachers (LET) as mandated in Republic Act No. 7836 or better known as the “Philippine Teachers Professionalization Act of 1994.” This is an act to strengthen the regulation and supervision of the practice of teaching in the Philippines and prescribing a Licensure Examination for Teachers and for other purposes. The state recognizes the vital role of teachers in nation-building and development through a responsible and literate citizenry. Towards this end the State shall ensure and promote quality education by proper supervision and regulation of the licensure examination and professionalization of the practice of the teaching profession.

Because of the K-12 implementation, the demand for quality teachers continues to rise. The LET serves as a means of maintaining the quality of teachers after they had been trained and schooled in their respective institution. Such an examination measures the competencies of a teacher who is believed to have acquired the necessary skills, knowledge and attitude necessary in the practice of the teaching profession. The Bicol State College of Applied Sciences and Technology (BISCAST) has as its mission to produce quality graduates who are highly competitive and socially responsive to the needs of the community along instruction, research, extension and entrepreneurial undertakings through excellent applied sciences and technology education.

In particular, the College of Education (COE) aims to produce graduates who are expected to practice the profession as licensed teachers, adherent to the professional and ethical standards worthy of emulation by the students and the community. Moreover, LET performance is an important factor that could affect SUC Levelling and the grant of PBB. Hence, it is important that we make sure that our graduates will perform well in the board exams. One way to do this is to make sure that the incoming COE freshmen have the potentials and abilities necessary to hurdle such challenges. Therefore, this research aims to determine the predictors of the LET performance and investigate its association with HS achievement and the College Entrance Test. If found significant, then a criteria may be set that can screen applicants prior to their admission to COE. This criteria aims to assure that only those freshmen applicants who will probably pass the LET Exam shall be granted admission to the College of Education.

IV. Objectives:

Main Objective: This study aims to develop a criterion-referenced admission policy for the BISCASST College of Education based on the predictors of LET performance.

Specific Objectives:

1. To identify the possible predictors that could affect the LET Performance.
2. To compare the LET Performance, HS Grades, IQ, DAT, and DAT components across programs.
3. To determine if there is a significant association between these predictors and the LET Performance
4. To develop a multiple regression model that could predict the LET Performance based on the HS Grades, IQ, and DAT Results
5. To recommend a criterion-referenced admission policy for applicants to the COE curricular programs.

V. Review of Related Literature:

Various studies on determining factors that affect LET Performance have been undertaken. These studies attempted to investigate the factors that contribute to the success of the graduates in their LET examination.

Ong, et al. (2012) in their study, determined the predictors of licensure examination performance of nursing graduates. Results revealed that College Entrance Examination performance on IQ test, nursing aptitude test, the composite score of science, math and English tests, college grade point average and pre-board examination performance significantly correlated with licensure examination performance but only two significantly predicted licensure performance, college grade point average and pre-board examination. The study concludes that students' academic performance in their baccalaureate program and their performance in the pre-board examination are significant bases in determining the success and failure of students' licensure examination performance

Foronda (2107) in her study on predictors of success in the Licensure Examinations for Teachers, found out that the effect of college entrance score to the LET performance is significant. She then recommended that college entrance score should be a basis for admission to the program.

Navarroza et al (2016) traced the graduates' College Admission Test (Otis-Lennon School Ability Test), Grade Point Average in General Education, Professional Education and Specialization / Content Areas against their actual performance in the LET. Of the variables considered, only the GPA in General and Professional Education were found significantly influential to the LET performance of the graduates.

Research Methodology

This is a quantitative research in which data on HS Average Grades, College Entrance Test Results and LET Ratings were retrieved from the records of the 2017 graduates of BISCASST College of Education.

Respondents This research started on the list of 2017 graduates of the College of Education. Their names were matched with the September 2017 Let Takers.

Data Gathering Procedure This research conducted data mining, where it involves the process of sorting through large datasets to identify patterns and establish relationships to solve problems through data analysis. Data mining tools allow organizations to predict future trends.

The first step on data gathering was to get a list of the 2017 College of Education graduates. The second step was to match their names with the September 2017 LET Results. The LET results were requested from the Professional Regulation Commission (PRC). The third step was to retrieve their HS Average Grade and College Entrance Test Result from the Guidance and Testing Center of BISCASAT. The College Entrance Test consists of two parts: the IQ part and the DAT part.

Data Analysis Since the possible predictors are of interval data type, the mean and standard deviation were utilized to compare the performance of the graduates by program. To determine the correlation between each possible predictor and the LET Rating, scatterplots were analysed and consequently the Pearson correlation coefficients were respectively computed. All correlation coefficients shall be tested using 0.05 significant level. Multiple regression was run to come up with a multiple regression equation that would predict LET Rating based on the significant predictors. And lastly, a simple linear regression was employed to predict the minimum value of each significant predictor that would yield a passing LET Rating. This set of minimum values of the predictors served as the criteria for admission.

Results and Discussion

Possible Predictors of LET Performance

The Guidance and Testing Center administers the College Entrance Test for incoming freshmen. This test consists of two major parts: the Otis-Lennon School Ability Test (IQ) and the Differential Aptitude Test (DAT). The DAT has the following components with its respective weight:

1. VR – Verbal Reasoning	20%
2. NA – Numerical Ability	15%
3. AR – Abstract Reasoning	10%
4. CS & A – Clerical Speed and Accuracy	15%
5. MR – Mechanical Reasoning	5%
6. SR – Space Relations	5%
7. S – Spelling	15%
8. LU – Language Usage	<u>15%</u>
	Total 100%

Finally, the college admission score is computed as follows:

85% of Average of IQ and DAT + 15% of HS Grades

After all the final admission scores are computed, they are ranked by program. The top 50 in each program are then granted admission. This system follows a norm-referenced selection procedure, in which there is no standard. The student's chance of being admitted depends on the performance of his co-examinees. As a result, there is a great possibility that in his later years in the College, the student will not be able to come up with the standards and requirements of the program. Since all the above-mentioned scores are components of the college admission score, then they were all considered as possible predictors of the LET Performance.

Level of Performance in the LET Examination, IQ, DAT, and HS Grades

Table 1 shows the average of the dependent variable (LET Rating) and the independent variables (HS Grades, IQ, and DAT) by program. It also shows the overall average of the indicators across programs. Since DAT is composed of scores under VR, NA, AR, CS & A, MR, SR, S, and LU, their corresponding averages were also shown.

Table 1. Average LET Rating, HS Grades, IQ, DAT, and DAT Composition by Program.

Variables	Overall	Program						
		BSED Math	BSED PhySci	BSED Eng	BSED TLE	BEED	BTTE FSM	BTTE GFDT
LET Rating	76	86	81	81	73	76	69	70
HS Grades	85	88	89	86	83	85	83	84
IQ	76	81	82	80	76	76	72	73
DAT	78	82	79	81	77	78	72	73
VR	67	71	63	75	65	66	63	62
NA	84	92	90	83	83	83	80	81
AR	83	92	89	84	78	85	76	82
CS & A	85	85	88	88	91	86	75	74
MR	73	79	76	76	73	74	66	71
SR	72	76	75	74	71	72	67	72
S	90	94	90	95	87	91	84	84
LU	66	69	67	71	65	66	64	64

Looking closely at Table 1, it can be noticed that the BSED Math had the highest average (86) in the LET Rating, followed by the BSED PhySci (81) and the BSED Eng (81). The BTTE GFDT (70) and the BTTE FSM (69) have the lowest average in the LET Rating.

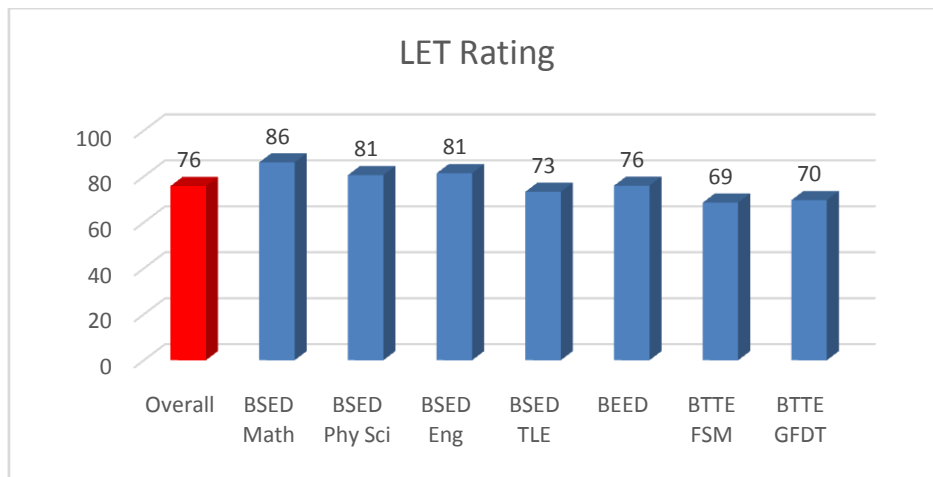


Figure 1. Comparison of Average LET Rating by Program

For the HS Grades, the BSED PhySci has the highest average (89), followed by the BSED Math (88). The BSED TLE (83), BTTE FSM (83), and the BTTE GFDT (84) have the lowest average in HS Grades.

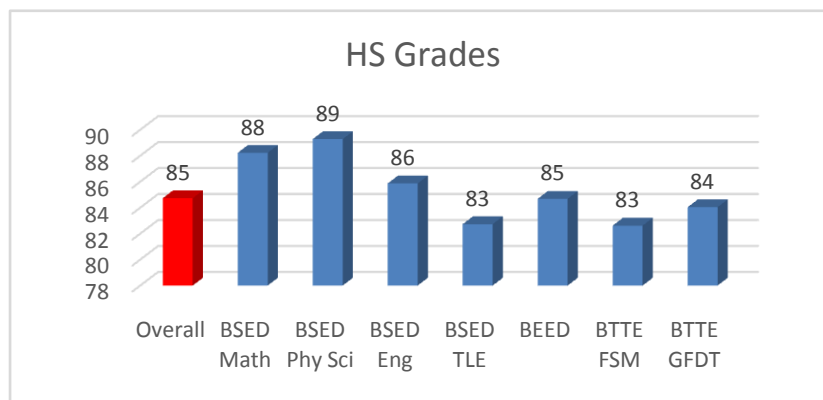


Figure 2. Comparison of Average HS Grades by Program

With regards to IQ, the BSED PhySci (82) was recorded with the highest average, followed by the BSED Math (81). On the other hand, the BTTE FSM (72) and the BTTE GFDT (73) had the lowest average in IQ.

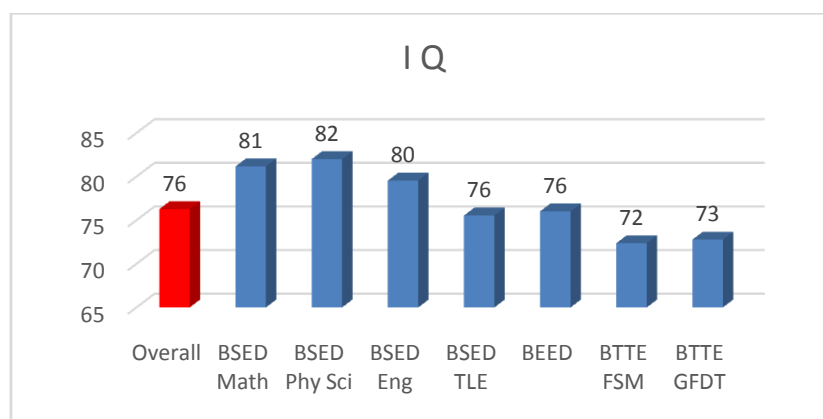


Figure 3. Comparison of Average IQ by Program

For the DAT, the BSED Math (82) was recorded with the highest average, followed by the BSED Eng (81). Again, the BTTE FSM (72) and the BTTE GFDT (73) had the lowest average.

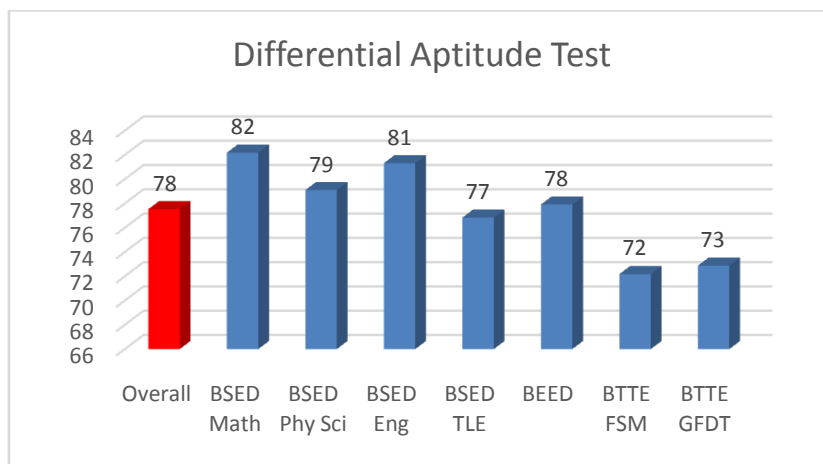


Figure 4. Comparison of Average DAT by Program

Looking into the detailed composition of the DAT, it can be observed that the BSED Math recorded the highest average in NA, AR, MR, and SR.

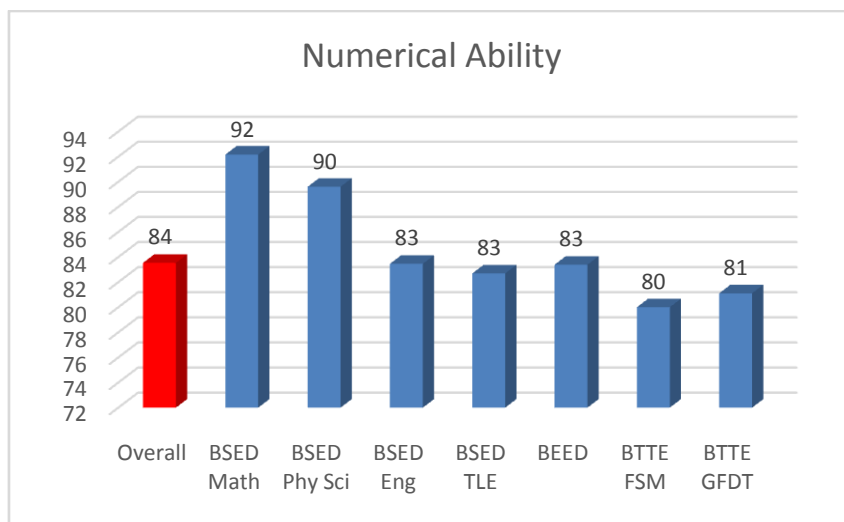


Figure 5. Comparison of Average NA by Program

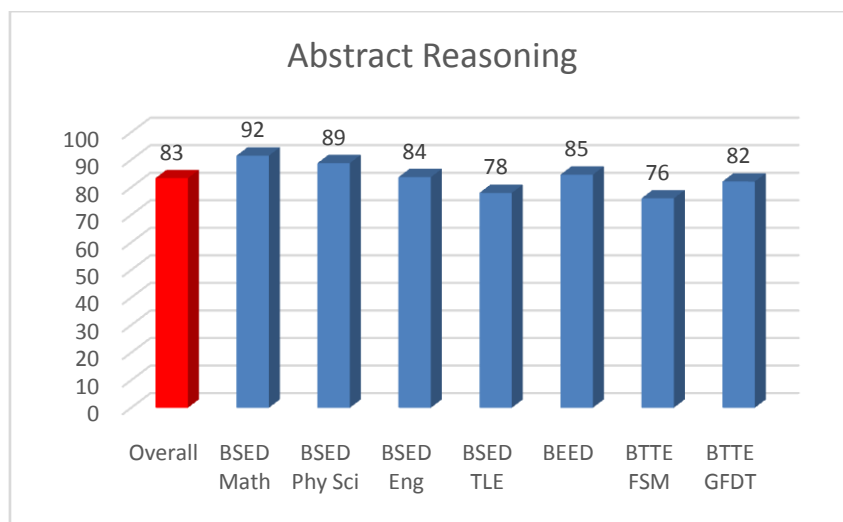


Figure 6. Comparison of Average AR by Program

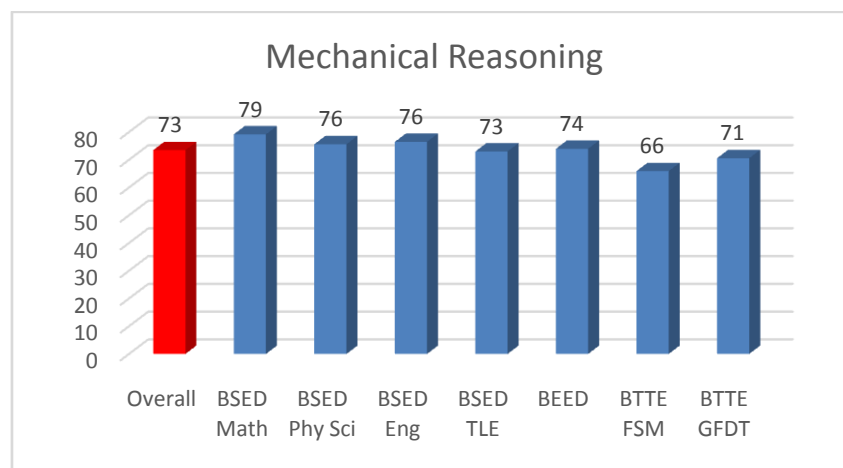


Figure 7. Comparison of Average MR by Program

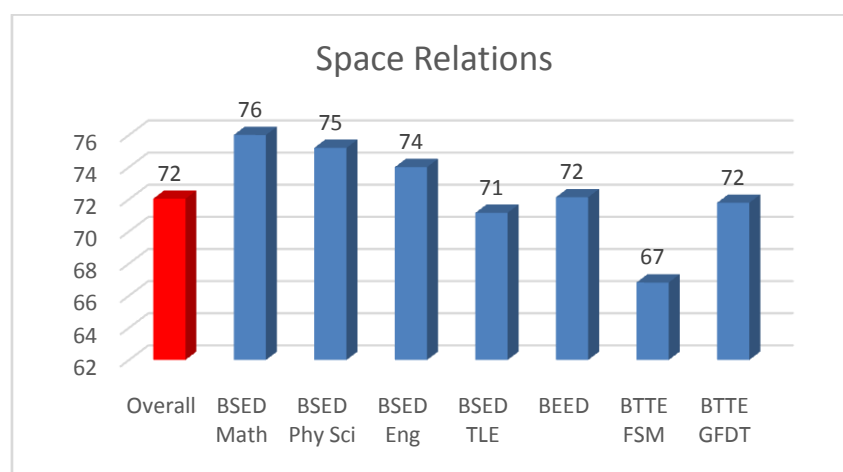


Figure 8. Comparison of Average SR by Program

Surprisingly, the BSED TLE got the highest average in CS & A. However, the BTTE FSM and the BTTE GFDT were consistently recorded having the lowest average scores in all components of DAT which are the VR, NA, AR, CS & A, MR, SR, S, and LU.

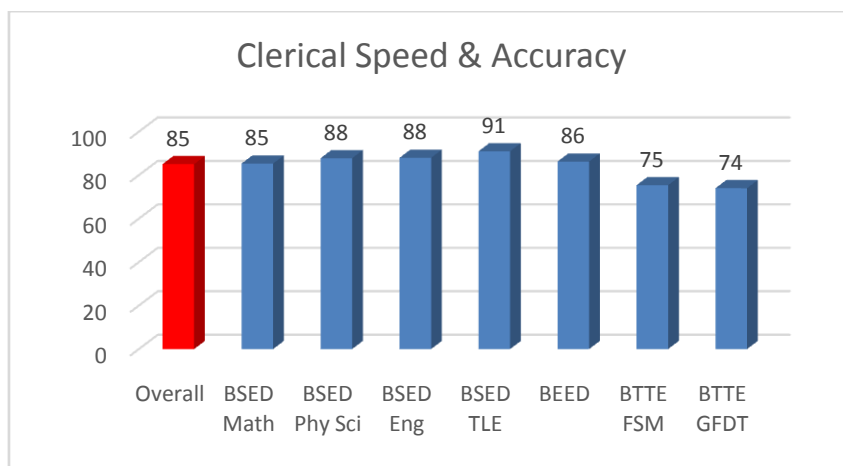


Figure 9. Comparison of Average CS & A by Program

The BSED English did well in the DAT particularly in the VR, S, and LU, having recorded with the highest average.

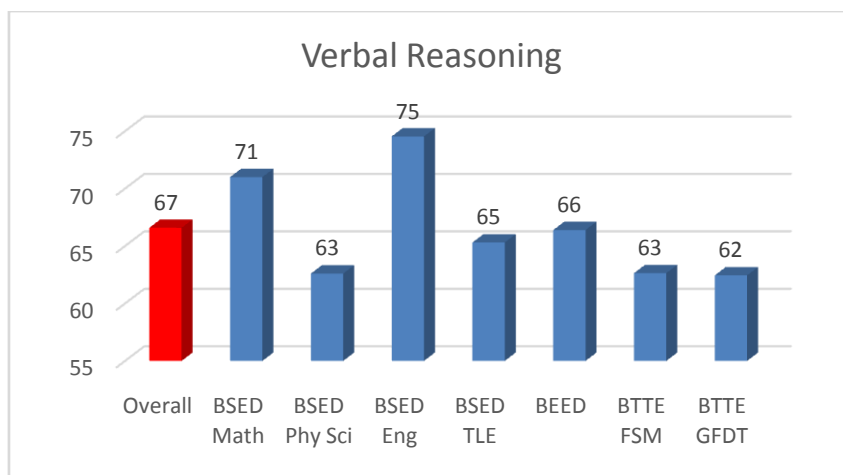


Figure 10. Comparison of Average VR Rating by Program

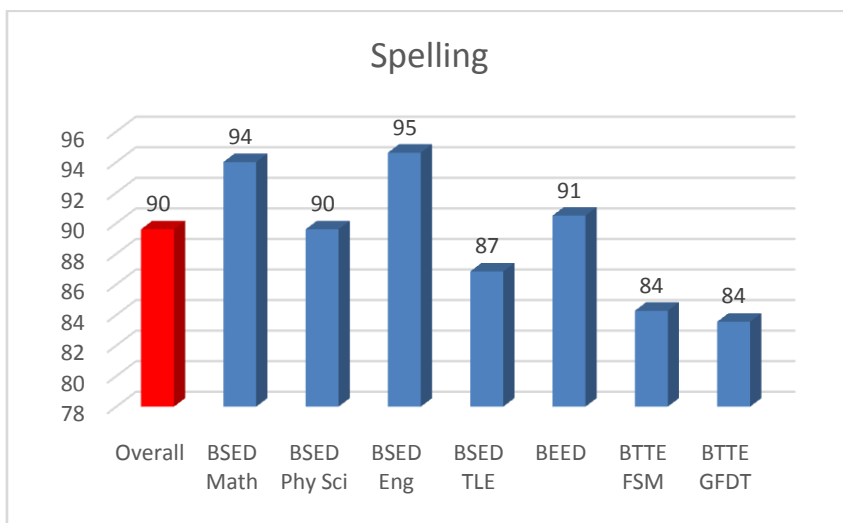


Figure 11. Comparison of Average S by Program

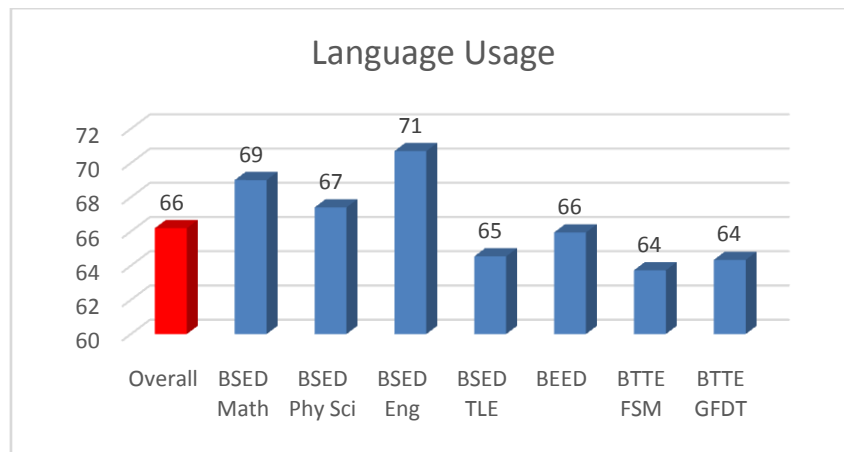


Figure 12. Comparison of Average LU Rating by Program

Correlation between the LET Board Exam Performance and the Predictors

Before going into correlation analysis, scatterplots must be inspected first. Scatter plots are used to show the relationship between two variables. Scatter plots are sometimes called correlation plots because they show how two variables are correlated. Figure 13 shows the relationship between LET Performance and HS Grades, it seems that LET Performance increases as HS Grades increases. The general trend is pretty strong and we can see that LET Performance is correlated with HS Grades.

Figure 14 shows the scatterplot of LET Performance and IQ. The trendline is rising to the right which indicates a positive correlation between LET Performance and IQ. Higher IQ would generally result to higher performance in the LET.

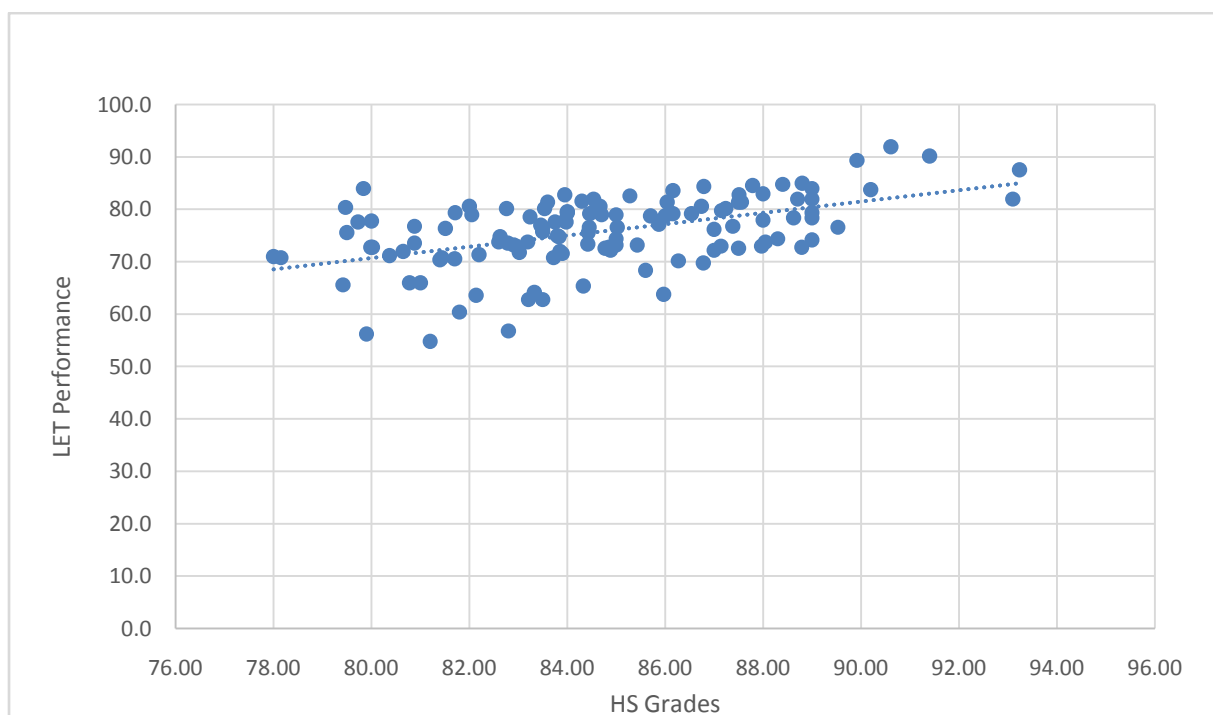


Figure 13. Scatterplot of LET Board Exam Performance and HS Grades

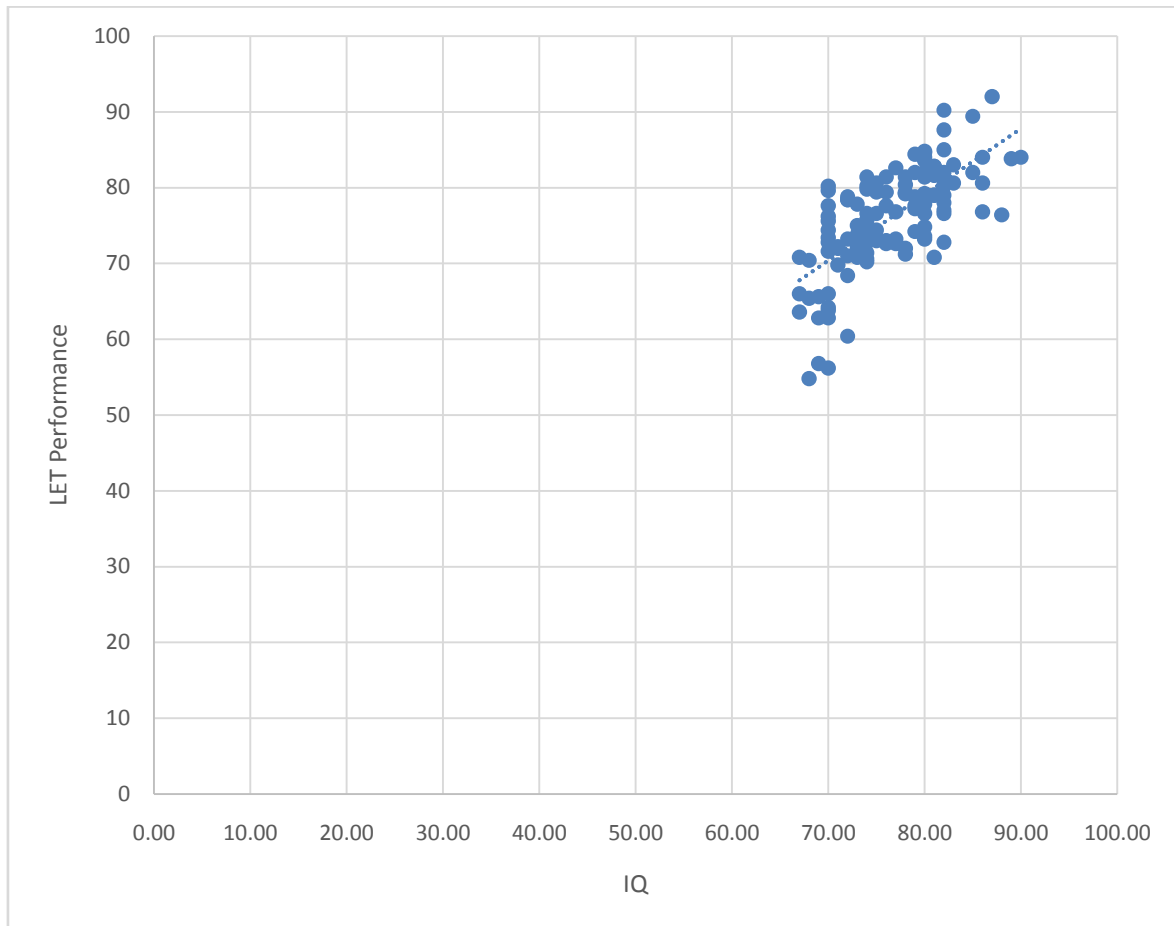


Figure 14. Scatterplot of LET Board Exam Performance and IQ

Figure 15 shows a scatterplot of the LET Performance and DAT. The points tend to rise to the right which is better shown by its trend line. It can be observed that as DAT increases, the performance in the LET also increases. This behavior in the scatterplot indicates a linear association between the two variables which further strengthens the justification for correlation analysis.

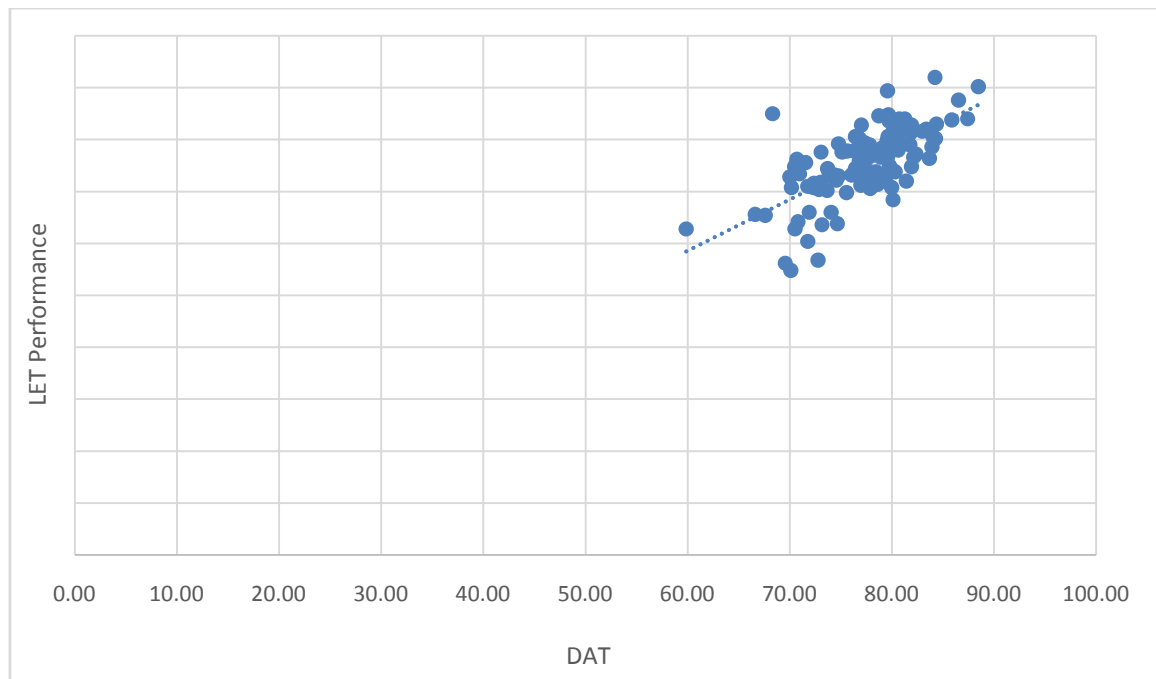


Figure 15. Scatterplot of LET Board Exam Performance and DAT

Table 2 shows the Pearson Correlation Coefficient between the predictors (HS Grades, IQ, and DAT) and the LET Board Exam Performance. It also shows the correlation coefficients between the components of DAT and the LET Board Exam Performance. The third column indicates whether the correlation is significant at $\alpha=0.05$ and $df=119$. Since all the computed r values are greater than the tabular value of 0.174, then all the Pearson correlation coefficients are significant. Therefore, there is a significant linear relationship between the LET Board Exam Performance and the identified predictors.

The strength of the association is shown in the fourth column. The IQ and DAT both proved to have the highest correlation of 0.69. HS Grades has only an r of 0.51. This may be attributed to the fact that the students came from different schools with different standards of grading system.

From the components of DAT, S showed the highest r of 0.58, followed by AR (0.56), MR (0.55), NA (0.53), and LU (0.45). All five components were found to be moderately correlated with the LET Board Exam Performance. However, SR (0.38), VR (0.33), and CS & A (0.30) all showed low correlation with LET Performance.

Table 2. Summary of Pearson Correlation Coefficients between the LET Board Exam Performance and the Predictors by Program.

Predictors	r	Significance	Verbal Interpretation
HS GRADES	0.51	significant	moderate correlation
IQ	0.69	significant	moderate correlation
DAT	0.69	significant	moderate correlation

VR	0.33	significant	low correlation
NA	0.53	significant	moderate correlation
AR	0.56	significant	moderate correlation
CS & A	0.30	significant	low correlation
MR	0.55	significant	moderate correlation
SR	0.38	significant	low correlation
S	0.58	significant	moderate correlation
LU	0.45	significant	moderate correlation

Multiple Regression Model for LET Performance

The Minitab Statistical Software was used to determine the multiple regression equation that would predict LET Performance. Based on the following results, as shown in Table 3, the p-values of the following predictors are less than 0.05, which indicates that the predictors HS Grade, MR, S and IQ+DAT are statistically significant. Furthermore, these four predictors accounted to 64% of the variation in the LET Rating. This implies that around 36% of the LET Rating may be attributed to other factors such as College grades, student’s stock knowledge, teacher’s competence, curriculum, and the like.

Table 3P-values of the Significant Predictors.

Predictor	P values
HS Grade	0.000
MR	0.017
S	0.039
IQ + DAT	0.000

The result of Stepwise Regression indicated that the HS grade, MR, S and IQ+DAT are the significant predictors of the LET Rating. Out of 12 possible predictors, it was trimmed down to only four predictors. The equation is given below:

$$\text{LET Rating} = -47.405 + 0.51(\text{HS Grade}) + 0.192(\text{MR}) + 0.167(\text{S}) + 0.661(\text{IQ+DAT})$$

Criterion-Referenced Admission Policy

Using the Simplified Statistics for Beginners (SSB) Ver. 1.0 statistical software, simple linear regression was run to obtain the minimum value of the significant predictors that would yield the minimum LET Rating of 75. The result are as follows:

	<u>Minimum Value to Pass LET</u>
HS Grade	84
MR	72
S	88
IQ+DAT	77

This implies that if the HS Grade is 84, it would yield a LET Rating of 75. Higher values of HS Grade would result to higher LET Rating. Therefore, the minimum acceptable value for HS Grade must be 84. Likewise, minimum acceptable values for MR, S, and IQ+DAT should be 72, 88, and 77, respectively. These minimum values may serve as basis for a criterion-referenced admission policy for incoming freshmen students who are interested to pursue a degree in the COE curricular programs.

Recommendations

To improve this study, it is recommended that future researchers may expand the data set to include:

1. Graduates of 2019, 2018, 2016, and 2015
2. Other possible predictors such as the GWA of their 12th Grade academic performance
3. LET Results from PRC starting with Sept 2015 to Sept 2019, and
4. College Admission Test Results from 2008-2012

To improve the BISCASST Performance in the LET Board Exams, the output of this study, specifically with regards to the minimum acceptable values of the predictors that would yield a passing LET Rating should be used as basis for a criterion-referenced admission policy to ensure that we accept only those freshmen applicants that will finish the program, will graduate on time, and will most likely pass the LET Exam.

References

- Ong, M.B., Palompon, D.R. & Bañico L. (2012). Predictors of Nurses' Licensure Examination Performance of Graduates in Cebu Normal University, Philippines. *Asian Journal of Health*. Vol. 2 · January 2012 · ISSN: 2094-9243 [doi: <http://dx.doi.org/10.7828/ajoh.v2i1.122>]
- Foronda, Marisol S. (2017). Predictors of Licensure Examination for Teachers (LET) Performance: A Mediation Analysis. *Proceedings of the International Conference on Digital Technology in Education*. Taipei, Taiwan — August 06 - 08, 2017. pp.74-78
- Navarroza, Alex H. et.al. (2016). Psychological and School-Related Variables: Their Predictive Influence on Students Performance in the Licensure Examination for Teachers (LET). *BISCASST Research Journal*. June 2016.

Annex 1

Stepwise Regression of LET with HS Grade, MR, S, and IQ+DAT as Predictors

Stepwise Regression: C1 versus C2, C3, ...

Alpha-to-Enter: 0.15 Alpha-to-Remove: 0.15

Response is C1 on 12 predictors, with N = 121

Step	1	2	3	4
Constant	-7.858	-43.422	-46.551	-47.405
C13	1.088	0.942	0.798	0.661
T-Value	12.15	10.35	7.15	5.15
P-Value	0.000	0.000	0.000	0.000
C2		0.55	0.57	0.51
T-Value		4.18	4.37	3.89
P-Value		0.000	0.000	0.000
C8			0.172	0.192
T-Value			2.15	2.42
P-Value			0.033	0.017
C10				0.167
T-Value				2.09
P-Value				0.039
S	4.49	4.21	4.15	4.09
R-Sq	55.36	61.12	62.60	63.95
R-Sq (adj)	54.99	60.46	61.64	62.71

Annex 2

Simple Linear Regression of LET Rating with HS Grade as Predictor

The screenshot displays a software window titled "Linear Regression" with the following components:

no.	code	x-test	y-test	x ²	xy	y [^]
1.	00001	87.51	82.8	7658.0001	7245.828	78.83
2.	00002	82.91	73.2	6874.0681	6069.012	73.87
3.	00003	83.72	70.8	7009.0384	5927.376	74.74
4.	00004	82.79	73.6	6854.1841	6093.344	73.74
5.	00005	83.95	77.8	7047.6025	6531.31	74.99
6.	00006	87	76.2	7569	6629.4	78.28
7.	00007	88.3	74.4	7796.89	6569.52	79.68
8.	00008	80.65	72	6504.4225	5806.8	71.43
9.	00009	81.71	79.4	6676.5241	6487.774	72.57
10.	00010	85	74.4	7225	6324	76.12
11.	00011	88.79	72.8	7883.6641	6463.912	80.21
12.	00012	84.46	79.2	7133.4916	6689.232	
Total		10,252.11	9,175.4	869,835.55	778,702.19	

Equation = -15.598 + 1.079 x

$$a = \frac{\sum y \sum x^2 - \sum x \sum xy}{n \sum x^2 - (\sum x)^2} = -15.598$$

$$b = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2} = 1.079$$

$$\hat{y} = a + b x$$

Projection: x = 84, y = 75.038

Annex 3

Simple Linear Regression of LET Rating with MR as Predictor

The screenshot shows a software window titled "Linear Regression" with a data table and calculation results.

no.	code	x-test	y-test	x ²	xy	y [^]
1.	00001	84	82.8	7056	6955.2	78.7
2.	00002	84	73.2	7056	6148.8	78.7
3.	00003	69	70.8	4761	4885.2	74.84
4.	00004	66	73.6	4356	4857.6	74.07
5.	00005	77	77.8	5929	5990.6	76.9
6.	00006	71	76.2	5041	5410.2	75.36
7.	00007	71	74.4	5041	5282.4	75.36
8.	00008	66	72	4356	4752	74.07
9.	00009	74	79.4	5476	5875.6	76.13
10.	00010	65	74.4	4225	4836	73.81
11.	00011	71	72.8	5041	5168.8	75.36
12.	00012	81	79.2	6561	6415.2	
Total		8,813.	9,175.4	652,639.	671,055.	

Equation = 57.074 + 0.258 x

$$a = \frac{\sum y \sum x^2 - \sum x \sum xy}{n \sum x^2 - (\sum x)^2} = 57.074$$

$$b = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2} = 0.258$$

$$\hat{y} = a + b x$$

Projection
 x = 72
 y = 75.65

Annex 4

Simple Linear Regression of LET Rating with S as Predictor

The screenshot shows a software window titled "Linear Regression" with a data table and various calculation options.

no.	code	x-test	y-test	x ²	xy	y [^]
1.	00001	91	82.8	8281	7534.8	76.31
2.	00002	81	73.2	6561	5929.2	74.0
3.	00003	89	70.8	7921	6301.2	75.85
4.	00004	91	73.6	8281	6697.6	76.31
5.	00005	95	77.8	9025	7391	77.23
6.	00006	91	76.2	8281	6934.2	76.31
7.	00007	89	74.4	7921	6621.6	75.85
8.	00008	91	72	8281	6552	76.31
9.	00009	91	79.4	8281	7225.4	76.31
10.	00010	89	74.4	7921	6621.6	75.85
11.	00011	91	72.8	8281	6624.8	76.31
12.	00012	90	79.2	8100	7128	
Total		10,759.	9,175.4	967,595.	818,375.6	

Equation
 = 55.308 + 0.231 x

new
 compute
 scatterplot
 export
 Close

Projection
 x = 88
 y = 75.636

$$a = \frac{\sum y \sum x^2 - \sum x \sum xy}{n \sum x^2 - (\sum x)^2} = 55.308$$

$$b = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2} = 0.231$$

$$\hat{y} = a + b x$$

$$n = 121$$

Annex 5

Simple Linear Regression of LET Rating with IQ + DAT as Predictor

The screenshot shows a software window titled "Linear Regression" with a data table and several calculation panels.

no.	code	x-test	y-test	x ²	xy	y [^]
1.	00001	79	82.8	6241	6541.2	78.11
2.	00002	75.45	73.2	5692.7025	5522.94	74.25
3.	00003	72.65	70.8	5278.0225	5143.62	71.2
4.	00004	73.43	73.6	5391.9649	5404.448	72.05
5.	00005	78.13	77.8	6104.2969	6078.514	77.17
6.	00006	70.35	76.2	4949.1225	5360.67	68.7
7.	00007	74.35	74.4	5527.9225	5531.64	73.05
8.	00008	74.28	72	5517.5184	5348.16	72.98
9.	00009	77.65	79.4	6029.5225	6165.41	76.64
10.	00010	73.2	74.4	5358.24	5446.08	71.8
11.	00011	75.88	72.8	5757.7744	5524.064	74.72
12.	00012	80.38	79.2	6460.9444	6366.096	
Total		9,305.2	9,175.4	718,108.16	708,346.96	

Equation = -7.822 + 1.088 x

$$a = \frac{\sum y \sum x^2 - \sum x \sum xy}{n \sum x^2 - (\sum x)^2} = -7.822$$

$$b = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2} = 1.088$$

$$\hat{y} = a + b x$$

Projection: x = 77, y = 75.954