

Predictors of Performance in the Licensure Examination for Agriculturists: Bases for a Proposed Plan of Action

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Abstract – *The present study utilized correlational method to examine the factors that influenced the performance of 45 Bachelor of Agricultural Technology (BAT) graduates in their Licensure Examination for Agriculturists (LEA). SPSS Descriptive statistics, Pearson's Correlation, and Coefficient of Determination were used to analyse the registration data on scores in LEA, academic, College Admission Test (CAT), and Course Audit. Findings showed that performances in CAT, academic, and course audit were good predictors of the graduates' achievement in the LEA. Their low performance in these areas, however, accounted for their low LEA scores. This suggests that strict admission policy, quality instruction, and comprehensive course audit are fundamental ways associated with high licensure exam performance. Hence, the agriculture department should benchmark from high performing schools in LEA, establish tests validity and reliability, consider the CAT results in admitting students, regularly assess the effectiveness of the course audit, implement promotion and retention policies, and choose the right faculty to teach a course.*

Keywords – *Licensure Examination for Agriculturists (LEA), Predictors, College Admission Test, Course Audit, Academic Performance*

INTRODUCTION

Licensure Examination for Agriculturists (LEA) is the gateway to become a licensed agriculturist. Graduates of Bachelor of Science for Agriculture (BSA) [1] and Bachelor of Science in Agricultural Engineering (BSAE) [2] are required to pass this examination to become part of the agricultural industry. On the other hand, graduates of Bachelor of Agricultural Technology (BAT) are not expected to have the license [3], but due to the demand of employment some take the examination.

Though passing the LEA is vital for BAT graduates, this situation creates a dilemma. BAT curriculum is focused on animal technology and plant technology [1] while the LEA areas include animal science, soil science, crop science, crop protection, agricultural economics and marketing, and agricultural extension. In some institutions, BAT program offers only one subject for soil science and very few subjects for most of the other areas. This incongruence of the BAT curriculum to the LEA can adversely affect the performance of BAT graduates in the examination who are bringing the name of their respective tertiary institutions in public upon the announcement of the LEA results. However, schools who are agents of change respond positively in a situation like this, as long as it is for the benefits of their clients. Thus, HEIs

in this state should treat the scenario a challenge and an opportunity to render quality instruction and services that can improve their passing rate in the examination.

The Isabela State University (ISU), San Mariano Campus is a producer of BAT graduates providing procedures and mechanisms for its graduates to pass in the LEA. It offers course audit courses and up-to-date learning experiences and ensures quality instruction by continuously sending faculty members to seminars and continuing professional education. As of 2017 records, the campus passing performance for LEA is above average and is ranked 69 out of 170 schools in the Philippines [4]. This status, however, does not yet satisfy the aims of the campus because the Professional Regulation Commission (PRC) reported that the campus passing rates from 2010 to 2013 were below the national passing rate, and although the campus rating was higher than the national passing rate in 2014, rating in 2015 again declined.

A lot of factors had influenced the graduates' licensure exam performance. College academic performance could be among them. Researchers reveal that this factor has a significant direct relationship with licensure performance [5]-[6]-[7]-[8]-[9]-[10]. This finding indicates that the quality of education graduates receive from their tertiary institution has a significant role in their licensure exam performance. On the other

hand, no significant finding implies that the school needs to improve areas of instruction and other student services such that the graduates' academic performance should be able to predict their scores in the licensure examination. Associating academic performance, therefore, is important in assessing the contribution of the campus instruction to the graduates' level of performance in the licensure examination.

Moreover, reviewing the relevance of campus admission policy is necessary. According to Pascua and Navalta [11] and Soriano [7], admission test scores can be associated with graduates' licensure performance. Thus, the campus should provide an admission test that has a well-established predictive validity with licensure exam to monitor and control its passing rate. The predictive validity of the questionnaire to licensure examination should be regularly checked and analyzed. The failure of graduates in the licensure examination also suggests the need to assess the efficacy of the licensure exam review offered by the campus. As Visco [12] poses, reviewing for licensure examination has a significant impact on licensure exam performance. However, for the course audit courses of the campus to be said effective, it should positively and largely influence the performance of the graduates in their licensure exam.

The assessment results of all these factors of licensure exam performance, in general, can facilitate the campus regarding the extents that it needs to improve for the betterment of the clientele in the examination as mentioned earlier. Analysing the factors that influenced the performance of the graduates in the licensure examination, therefore, is of high importance. Areas of the campus services impacting the performance of the graduates in the licensure exam must be traced and incorporated in policy-formulation to improve their performances and increase their chances of passing the examination.

Theoretical Framework

The classical conditioning theory explains how behavior is modified through the association of stimuli. It emphasizes that good learning performance can be shaped by designing a conducive environment for learning. For tertiary institutions, they can produce quality services for their students to ascertain a high licensure examination passing rate. On the other hand, the operant conditioning theory poses that behavior can be modified through contingencies of reinforcement. Hence, to reinforce learners to pass a licensure

examination, schools provide them with various forms of incentives or rewards.

Thorndike's laws of learning also illustrate one's performance in a licensure examination. The *law of readiness* states that individuals who are not ready to learn, find it difficult to instill learning. On the other hand, academically-prepared individuals obtain a satisfactory performance. Thus, graduates who are more prepared during their licensure examination can most likely get a more satisfying licensure rating. Moreover, the *law of exercise* situates that practice increases the efficiency of learning, which implies that individuals who learn more frequently can most likely master the learning and demonstrate better performance. About licensure examination, examinees with more involvement in licensure reviews can exhibit better performance than those who do not. Also, the *law of effect* confirms that satisfaction as a result of learning strengthens more learning. This clarifies that individuals who received more satisfactory remarks during the learning duration are more motivated to reach a higher level of performance in the licensure examination.

Theories and laws support that various factors might affect licensure examination performance. Some of these factors according to several research are college academic performance [12]-[17]-[11]-[6]-[9]-[8]-[10], college entrance examination performance [11]-[7] and attendance to licensure examination reviews [12]-[5]. These factors, according to *Shewart's Theory of Prediction*, can also become predictors of the licensure exam results and may be used to explain examinees' licensure examination score [18] partly. Found predictors can be traced and then managed by an institution to produce graduates that will at least perform positively in the said examination.

OBJECTIVES OF THE STUDY

The study aims to assess the factors that influence the licensure examination performance of BAT graduates. It gauges the impact of their performances in core subjects, college admission test, and course audit on their licensure examination performance, to formulate an action plan for the improvement of the delivery of program services relevant to preparing students for the LEA.

MATERIALS AND METHODS

Research Design

The descriptive-correlational research design was used. According to Fraenkel and Wallen [13], this

design describes the degree to which quantitative variables are related and can be used for prediction studies. In the current study, it was used to explore to what extent do examinees' performances in academic, college admission test, and course audit predicts their licensure examination scores.

Subjects

The subjects were 45 Bachelor of Agricultural Technology (BAT) graduates of Isabela State University-San Mariano Campus, Philippines within years 2010 to 2015, who took their licensure examination upon their year of graduation.

Data Gathering

Registration method was used to obtain the data on licensure exam scores, transcript of records (TOR), college admission test (CAT) scores, and course audit scores. Licensure exam scores were taken from PRC Manila, Philippines upon the approval of the University President and the chairperson of the PRC. The transcript of records (TOR), CAT scores, and course audit scores were obtained from the registrar's office, Office of Student Affairs and Services (OSAS), and Office of Academic and Related Affairs, respectively, upon the approval of the campus administrator and immediate supervisors.

Data Analysis

In gauging the graduates' licensure exam, only their scores during the first attempt were considered to measure only the impact of their stay in the campus since their succeeding attempts might be associated already to other factors and not to the attributes of the campus. Their mean performance in the licensure examination in this regard was interpreted using the PRC standard, that is, Passed if 75 and above, and Failed if 74 and below.

Also, only their GWA in their core subjects was considered since these are the only subjects relevant to the LEA. Before the computation of GWA, their grades were converted first into percentage and then interpreted using the institutional remarks as shown in the following:

Grade/GWA	Percentage	Remarks
1.25	96.00	Very Satisfactory
1.50	93.00	Satisfactory
1.75	90.00	Fairly Satisfactory
2.00	87.00	Good
2.25	84.00	Fairly Good
2.50	81.00	Fair
2.75	77.50	Below Fair
3.00	75.00	Passed

Frequency and Percent distribution table was presented after their CAT scores were categorized according to the following remarks.

CAT Score	Remarks
1 – 20	Unsatisfactory
21 – 30	Unsatisfactory
31 – 40	Slightly Satisfactory
41 – 50	Moderately Satisfactory
51 – 60	Moderately Satisfactory
61 – 70	Satisfactory
71 – 80	Satisfactory
81 – 90	Very Satisfactory

Mean CAT score was computed and interpreted using the same remarks.

Mean was used to gauge their course audit performance in each area. The mean values were interpreted using the same standard used in the Licensure Examination i. e. below 75 is failed, and 75 or above is passed.

Further, Pearson-r was employed to explore the association of their academic performance, college admission test performance, and course audit performance, on their licensure exam performance. To interpret the result of the correlation, the guidelines suggested by Cohen [14] was utilized as shown below:

r	Description	Interpretation
.10 -.29	Small	Weak
.30 - .49	Medium	Moderate
.50 – 1.0	Large	Strong

Coefficient of Determination (R²) was then computed to determine how much variances in their licensure examination scores are explained by the said factors.

RESULTS AND DISCUSSION

The subjects of the study were only those first takers who were fresh graduates. Table 1 shows the number of subjects who passed or failed when they first took the licensure examination.

Majority of them failed (73.33%). Find university.ph [4] revealed that the campus passing rate for first takers (but not necessarily fresh graduates) is only 28%. It confirms, however, that almost all the passers were the new graduate first takers which finding shows that the institution has higher chance to increase its licensure passing rate when the graduates immediately take their licensure examination upon their year of graduation.

Table 1. The Graduates' Remarks in Their Licensure Examination

Year	N	Passed		Failed	
		f	%	f	%
2010	2	0	0.00	2	100.0
2011	5	0	0.00	5	100.0
2012	5	2	40.00	3	60.00
2013	3	1	33.33	2	66.67
2014	5	3	60.00	2	40.00
2015	25	6	24.00	19	76.00
Overall	45	12	26.67	33	73.33

Table 2 shows that they had the highest licensure exam scores in Crop Science ($M = 69.24$; $SD = 9.39$), and Soil Science ($M = 68.20$; $SD = 12.63$); while least in Animal Science ($M = 64.33$; $SD = 12.80$).

Table 2. The Graduates' Licensure Examination Performance

Area	M	SD	Remarks	Rank
Crop Science	69.24	9.39	Failed	1
Soil Science	68.20	12.63	Failed	2
Crop Protection	66.00	13.14	Failed	4
Animal Science	64.33	12.80	Failed	6
Agri. Econ. & Mar.	66.56	9.92	Failed	3
Agri. Extension	65.04	14.06	Failed	5
GWA	66.57	10.43	Failed	

This is different from the findings of Simon and Quilang [15] that agriculture examinees performed best in Crop Protection and Animal Science, while least in Soil Science and Agricultural Economics and Marketing. On the other hand, similar results with them were obtained that the average LEA rating of the takers ($M = 66.57$; $SD = 10.43$) was below the passing score, 75.00. The current finding implies that the graduates' number of subjects in college does not affect much performance in the licensure examination. While they had only one subject in Soil Science, they were able to score higher in this area than in the other four areas except for Crop Science. This entails however that due to a limited number of subject in Soil Science, the examinees focused more their reviews or studies in this area. Hence, other more significant factors can influence licensure examination performance than the number of subjects taken during college.

Furthermore, the low scores of the examinees in the licensure examination suggest that there is much to improve in the academe relevant to the six areas to consequently enhance the graduates' performance in the said licensure examination.

Table 3 shows that they had a fairly good academic performance ($M = 83.59$; $SD = 3.51$). It was revealed that they consistently performed best in Agricultural Economics and Marketing while least in Crop Protection.

Table 3. The Graduates' Academic Performance

Area	M	SD	Remarks	Rank
Crop Science	83.78	3.47	FG	4
Soil Science	83.27	4.13	FG	5
Crop Protection	80.67	4.30	FG	6
Animal Science	84.80	2.56	FG	2
Agri. Econ. & Mar.	85.16	2.76	FG	1
Agri. Extension	83.84	3.86	FG	3
GWA	83.59	3.51	FG	

Note. FG means Fairly Good

Moreover, as can be gleaned in Table 4, a strong positive correlation exists between academic performance and LEA scores in Soil Science ($r = .50$; $p < .01$), Crop Protection ($r = .52$; $p < .01$), Agricultural Economics and Marketing ($r = .53$; $p < .01$), and Agricultural Extension ($r = .51$; $p < .01$). The amount of variances they share is around 25% to 28% for each area which only shows that graduates with better academic performance in one of the said subjects are more likely to have better LEA performance in that particular area.

Likewise, positive and moderate correlation is found between academic performance and LEA performance, in both Crop Science ($r = .42$; $p < .01$) and Animal Science ($r = .42$; $p < .01$). Respondents' academic performance in Crop Science and Animal Science shares 17.64% and 16.81% of the variances in their licensure examination scores in these areas, respectively. Hence, higher academic grades in Crop Science or Animal Science may also result to higher scores in these particular examination areas.

It can be confidently inferred that there is a high and positive correlation between licensure examination scores and academic performance ($r = .67$; $p < .001$). Academic performance, in this regard, helps to explain 44.89% of the variances in the respondents' scores in the licensure examination. Statistically speaking, graduates who perform well in their scholastic endeavors have a great chance to show well again in the licensure examination. On the other hand, graduates with poor academic records will also achieve unsatisfactory licensure examination ratings.

This result differs from the finding of Simon and Quilang [15] that the relationship between LEA rating and academic performance is high but inverse. Theirs

indicates that lower academic performance is associated with higher LEA scores which implicates that preparation after graduation is more impactful in taking a licensure examination than academic performance. This claim is similar to Pachejo and Allaga [16], in their study, that a good performance in college cannot guarantee a student to pass the licensure examination.

On the other hand, the result of the present study is parallel to the findings of Hena et al. [6], Rabanal [8], De Leon [10], Pascua and Navalta [11], and Quiambao et al. [17] that academic performance is a good predictor of licensure exam performance. The study suggests that academic performance is a critical factor of and has a substantial impact on licensure examination performance. Thus, there is a need to upgrade students' academic performance, especially in their core subjects to increase their chance of passing the LEA. Stakeholders should create a learning culture that can ascertain students' achievement of desired competencies to assist high licensure examination passing rate.

Table 4. Correlation between the Graduates' LEA Scores and Academic Performance

Area	<i>r</i>	<i>p</i>	Remarks
Crop Science	.42	.00	Medium
Soil Science	.50	.00	Large
Crop Prot.	.52	.00	Large
Animal Sci.	.41	.00	Medium
Agri. Econ. & Mar.	.53	.00	Large
Agricultural Extension	.51	.00	Large
General Average	.67		Large

Table 5 shows the performance of the graduates in a 100-item CAT. Although 30% of them had performed moderately satisfactory, 27.50% also had performed unsatisfactorily. This reflects that the program still admits a quite large percentage of enrolling students who do not even perform satisfactorily in the admission test.

Table 5. Graduates' CAT performance

Scores	Remarks	<i>f</i>	%
21 – 30	Unsatisfactory	11	27.50
31 – 40	Slightly Satisfactory	17	42.50
41 – 50	Moderately Satisfactory	8	20.00
51 – 60	Moderately Satisfactory	4	10.00
<i>M</i> = 37.38	Slightly Satisfactory	<i>N</i> = 40	100.00

It can be inferred in Table 6 that their CAT scores is strongly associated with their licensure examination scores in Crop Science ($r = .53; p < .001$), Soil Science ($r = .58; p < .001$), Crop Protection ($r = .59; p < .001$), Animal Science ($r = .57; p < .001$), Agricultural Economics and Marketing ($r = .61; p < .001$), and Agricultural Extension ($r = .58; p < .001$). In general, CAT scores and LEA scores have a positive and strong correlation ($r = .67; p < .001$) which implies that CAT score have explained 44.89% of their licensure examination scores. This is parallel to the studies of Pascua and Navalta [11] and Soriano [7] that college entrance examination performance is a good predictor of licensure examination performance.

Those who scored higher on the admission test also had scored higher in the said examination. It follows, however, that since the respondents scored low in the CAT, they also scored low in the licensure examination. This shows that the CAT questionnaire has a well-established predictive validity with the LEA hence it can be used to predict the licensure examination performance of the BAT graduates such that if the campus wanted high scorers in the LEA, it should admit top scorers in the CAT.

Table 6. Correlation between Graduates' CAT scores and LEA Scores

Areas of LEA	<i>r</i>	<i>P</i>	Remarks
Crop Science	.53	.00	Large
Soil Science	.58	.00	Large
Crop Protection	.59	.00	Large
Animal Science	.57	.00	Large
Agri. Econ. & Mar.	.61	.00	Large
Agri. Ext.	.58	.00	Large
General Average	.67	.00	Large

Moreover, the graduates' CAT performance and academic performance also have a strong relationship (see Table 7). About 46.24% of their academic performance is explained by CAT scores which show only that those who scored better in the CAT also performed better in their academic courses.

Table 7. Correlation between the Graduates' Performances in CAT and Academic

Academic Performance	<i>r</i>	<i>P</i>	Remarks
Crop Science	.64	.00	Large
Soil Science	.42	.00	Medium
Crop Protection	.55	.00	Large
Animal Science	.72	.00	Large
Agri. Econ. & Mar.	.57	.00	Large
Agricultural Extension	.56	.00	Large
GWA	.68	.00	Large

Table 8. Graduates' Course Audit Performance

Area	M	SD	Remarks
Crop Science	80.13	4.240	Passed
Soil Science	80.50	4.167	Passed
Animal Science	80.93	3.796	Passed
Crop Protection	80.87	4.133	Passed
Agri. Eco. & Mar.	80.87	3.381	Passed
Agricultural Extension	83.03	3.943	Passed
GWA	81.13	3.530	Passed

Since CAT performance can both predict academic performance and licensure examination performance, the campus should use the CAT questionnaire and impose effective admission policies that can assure students' success in their academic performance to facilitate their success in the licensure examination consequently. Hence, although the university adopts open admission policy, the result of the study suggests that the result of the test should be considered as a basis for admitting students to prevent low passing rate in the licensure examination. Table 8 shows that they had a passing remark in their course audit areas.

Table 9. Correlation between the Graduates' Course audit performance and LEA performance

Area	r	P	Remarks
Crop Science	.34	.07	Medium
Soil Science	.46	.01	Medium
Animal Science	.60	.001	Large
Crop Protection	.57	.001	Large
Agri. Eco. & Mar.	.63	.00	Large
Agri. Ext.	.51	.004	Large
GWA	.63	.00	Large

Table 9 shows that there was a strong correlation between the graduates' course audit scores and their LEA scores in Animal Science ($r = .60; p = .001$), Crop Protection ($r = .57; p = .001$), Agricultural Economics & Marketing ($r = .63; p < .001$), and Agricultural Extension ($r = .51; p = .004$). Meaning, those who performed well in one of these areas (e. g. Animal Science) were also those who performed well in the same licensure exam area.

In general, course audit performance had a significant and large association on their licensure performance ($r = .63; p < .001$). It could explain 40% of the variances in their licensure performance which entails that those who obtained higher scores in the LEA were those who got higher scores in the course

audit. This is similar to the finding of Visco [12], Nyangena, Getanda, and Ngugi [5] that attendance to licensure exam reviews has a significant impact on licensure exam performance.

The result implies that course audit as students' review for licensure exam can be a helpful means to increase the campus passing rate. However, the students need to do well in this course to increase the likelihood of getting a good score on the licensure examination.

Proposed Action Plan

Based on the results, the following strategies are proposed to improve the campus LEA performance (see Table 10): benchmarking from high performing schools in LEA, establishing tests content validity and predictive validity of the licensure examination, establishing the reliability of the CAT and then considering its results in admitting students, regularly assessing the effectiveness of the course audit, implementing promotion and retention policies, and choosing the right faculty to teach the subjects.

Table 10. Proposed Action Plan

Strategies	Brief Description
Benchmarking from high performing schools	The program should seek for effective strategy from top performing schools in the LEA.
Establishing tests' content validity and predictive validity with LEA	Training on how to establish validity may be done among teachers. As an initial move, teachers should prepare and submit their tests for experts' validation.
Establishing the reliability of the CAT and then considering its results for admitting students	The program should ensure the reliability of the test. If proven reliable, the program should admit high scorers.
Assessing regularly the effectiveness of the course audit using pretest-posttest design	The program should develop a valid and reliable pre- and post-course audit tests. Each teacher should, however, prepare their formative tests aligned to the target competencies.
Imposing promotion and retention policies	Teachers should promote students who can demonstrate the required outcomes but should retain students at their level when there is an outcome that has not been achieved.
Correct choice of Faculty to teach the course	The program chair should consider specialization and fashion to teach when assigning faculty on their teaching assignments.

CONCLUSION AND RECOMMENDATION

The study used a correlational method to explore the influence of graduates' performances in academic, college admission test, and course audit, on their licensure exam performance. Subjects were only fresh graduate first takers to establish the factors attributed to the school on the graduates' LEA scores.

Results revealed that most of the LEA passers were fresh graduates, which showed that the school could have higher passing rate when every graduate takes the LEA upon year of graduation. Further results showed the importance of academic performance, college admission test performance, and course audit performance as predictors of licensure examination performance which confirm that low performance in these areas are associated with low licensure exam performance. Thus, the school has a higher chance to control licensure exam rating if it holds sound practices on admission, academic, and course audit. With this, the researcher highly recommends that the BAT program should put into practice the proposed action plan in Table 10.

LIMITATIONS OF THE STUDY

The limited number of subjects limits the use of analysis of variance to determine the extent to which they performed well and poor. Moreover, the differences in year when data came from also led to some historical discrepancies such as differences in teachers, type of instruction received, course descriptions and number of courses taken per core area which might threaten the validity of the findings. Hence, future research should consider more observations or data which came from the same setting to minimize threats to internal validity.

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