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Predictive validity of a simulated licensure examination for physical and health education pre-service teachers

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Abstract

This study determined the predictive validity of the CHK-Simulated LET Examination in determining success in the actual Licensure Examination for Teachers (LET). Focusing on graduates from the College of Human Kinetics at Cagayan State University, this quantitative research examined the relationship between scores obtained in the simulated LET and the actual LET. Through Pearson product-moment correlation and multiple linear regression analyses, the study found that while the simulated LET has some predictive ability, it accounts for only 44.5% of the variance in actual LET performance. Notably, a significant positive correlation was observed among scores in General Education, Professional Education, and Major Subjects in both the simulated and actual LET. Furthermore, scores in the major subjects in the actual LET emerged as the most significant predictor of actual LET performance, while scores in General Education in the simulated LET were the most significant predictor of performance in the actual LET. These findings imply that while the simulated LET is a useful tool for preparation, it does not fully encapsulate all factors influencing success in the actual LET. The study recommends the continuous refinement of the simulated LET, a strategic emphasis on major subjects and professional education in curriculum development, and further research to explore additional factors influencing LET success.

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Introduction

The educational landscape is continually evolving, with licensure examinations such as the Board Licensure Examination for Professional Teachers (BLEPT) or most known as LET, playing a crucial role in defining the standards for teacher competence and readiness (Amanonce and Maramag, 2020; Dagdag, 2017). In fact, the Table of Specifications of the LET was recently revised in March 2023 as noted by Quendangan *et al.* (2023) considering the major paradigm shifts in teacher education such as the new general education (GE) courses. On top of the new GE courses, most subjects have also changed as a result of the implementation of improved policies, standards, and guidelines recommended by the Commission on Higher Education (Cortes *et al.*, 2022).

These examinations are not just assessments but also benchmarks that reflect the effectiveness of teacher education programs. The College of Human Kinetics (CHK) at Cagayan State University acknowledges this reality and has implemented a stricter observance of course audit activities.

An innovation introduced was the development of a Simulated LET Examination in order to potentially identify the preparedness of its graduate in the actual LET.

In several educational institutions, the administration of simulated or pre-board examinations is a common practice, employed as a strategy to gauge students' preparedness for actual licensure examinations like the LET (Cant and Cooper, 2017; Ziv *et al.*, 2013). This approach serves multiple purposes. For instance, Levine *et al.* (2012) explains that it familiarizes students with the format and rigor of the licensure exams and provides a diagnostic tool for educators to identify areas of student weakness. Additionally, Feinberg (2012) also argued that simulated exams offer a chance for students to experience exam conditions, reducing anxiety and improving performance in the actual test.

However, the implications of this program extend beyond mere exam preparation. These simulated exams can significantly influence curricular design, teaching methodologies, and academic support systems (Dagdag *et al.*, 2017). Schools often use the results of these exams to refine their instructional strategies, ensuring that their teaching aligns more closely with the requirements of the licensure exams. Moreover, the outcomes of these simulated tests can inform institutional policies on student advancement and readiness, potentially affecting decisions regarding additional support or intervention for students struggling to meet the standards (Aquino *et al.*, 2015). Thus, while simulated examinations primarily aim to prepare students for licensure tests, their impact is far-reaching, affecting educational practices, curriculum development, and policy-making within schools.

While simulated or pre-board examinations are widely used as a preparatory tool for licensure exams, they face challenges concerning their validity and reliability (Ryall *et al.*, 2016; Selim *et al.*, 2012). The central issue is their ability to accurately predict actual performance in licensure examinations. If these simulated tests do not closely mirror the content, format, and difficulty level of the actual licensure exams, their effectiveness as a predictive tool is compromised.

Moreover, if they do not account for the comprehensive range of skills and knowledge required for professional practice, they may provide a false sense of preparedness among students.

Furthermore, the reliability of these examinations can be questioned if there is inconsistency in how they are administered or graded. This raises concerns about the fairness and effectiveness of using simulated exam results to make high-stakes decisions about students' readiness for licensure exams. Therefore, it's crucial to ensure that these simulated tests are meticulously designed and rigorously evaluated to serve as accurate predictors of licensure exam performance.

Existing literature underscores the significance of predictive assessments in teacher education. Amanonce and Maramag (2020) highlight the correlation between academic preparedness and licensure exam outcomes. Another study by Nool *et al.* (2017) revealed that simulated exams could significantly improve the readiness of teacher education students for LET.

Building on these findings, the current study extends the discourse by examining the specific context of the College of Human Kinetics. It aims to ascertain whether the CHK-Simulated LET serves as an accurate predictor of success in the actual LET. Furthermore, the results could potentially inform curricular innovations at CHK, leading to a more targeted approach in preparing students for the LET. Furthermore, the study could influence policy discussions within the educational community, particularly concerning the design and implementation of predictive assessments in teacher education.

Materials and methods

Research design

In this study, a quantitative research design was employed. Specifically, it utilized a correlational design to examine the relationship between scores obtained in a simulated Licensure Examination for Teachers (LET) and the actual LET. This research design is particularly suited for exploring and quantifying the strength and direction of relationships between variables — in this case, the test scores across different subject areas. Through correlational analysis, the study sought to determine the degree to which variables are related, providing a statistical basis for identifying patterns or trends. Subsequently, predictive analysis using multiple linear regression was utilized to ascertain the extent to which scores from the simulated LET could serve as a reliable indicator of actual LET performance.

Sampling and locale of the study

This study was conducted at the College of Human Kinetics at Cagayan State University, specifically focusing on graduates from the Bachelor of Physical Education program for the School Year 2021-2022. The initial cohort consisted of all 105 students who had completed the comprehensive review and participated in the simulated LET as a final assessment. However, the final sample was comprised of the 97 graduates who subsequently took the actual LET in March 2023.

The data on the scores from the simulated examination were obtained from the course audit coordinator, while the actual LET performance data were requested from the Professional Regulation Commission. This selection process naturally led to a purposive sample of individuals who both completed the simulated examination and sat for the actual licensure exam, thereby providing a specific participant group for analyzing the predictive validity of simulated examinations.

Development of the simulated LET and validation

Initially, an in-depth review of the Table of Specifications (TOS) utilized by the Board of Professional Teachers for the actual LET was undertaken. This step was critical in aligning the simulated exam's content with the real exam, thereby establishing content validity. Subsequently, faculty members of the College of Human Kinetics participated in a test-construction workshop with the goal of producing 150 multiple-choice questions for each of the three areas, drawing upon both their expertise and soliciting input from seasoned professionals in the field to ensure a comprehensive and representative question set.

To further refine the instrument, the preliminary version of the simulated exam underwent scrutiny through a workshop designed for expert review. This session was attended by three distinguished experts specializing in measurement and evaluation. Their collective recommended modifications were integrated into the instrument.

Additionally, item analysis was conducted. This includes the computation of discrimination and

difficulty indexes for each question. This involved piloting the instrument with the graduating students from a different institution offering the same program. The responses were analyzed to identify items that effectively discriminated between high and low performers (discrimination index) and to determine the proportion of students who correctly answered each question (difficulty index). Items that were too easy or too difficult, as well as those that failed to discriminate effectively between different levels of student ability, were flagged for revision or rejection. Finally, with all necessary amendments and improvements in place, the instrument was deemed suitable for full-scale deployment, which commenced in 2022.

Data analysis

This study tested the following null hypotheses: (1) There is no significant relationship among the scores of the students in General Education, Professional Education, and Major Subjects in the simulated and actual licensure examinations; (2) The scores of the students in the three areas of the actual licensure examination do not significantly predict their overall rating; and, (3) The scores of the students in the LET-simulated examination do not significantly predict their performance in the actual licensure examination.

Prior to conducting the correlation and predictive analyses, the normality of the data was tested using Kolmogorov-Smirnov test. The test showed that all p-values are greater than the level of significance of 0.05 which suggests that all data are normal. Hence, the use of parametric tests in testing the hypotheses is valid for the study. Specifically, Pearson product-moment correlation was used to determine if there is a significant relationship among the scores of the students in General Education, Professional Education, and Major Subjects (MAPEH) in the simulated and actual licensure examinations. Meanwhile, the second and third hypotheses were tested using multiple linear regression analysis. Statistical tests were conducted using SPSS v.20 at 0.05 level of significance.

Ethical considerations

All data collection processes adhered to ethical guidelines, ensuring confidentiality and anonymity of the graduates' scores. Permissions were obtained from both the College of Human Kinetics and the Professional Regulation Commission to access and use the data for research purposes.

Results and discussion

In order to carry out the main objectives of this study, the scores of the examinees during the simulated LET and Actual LET were gathered. The descriptive statistics of those scores are provided in Table 1. It can be observed from the table that the mean scores in the actual LET are higher than the mean scores in the simulated LET. This must be a result of the review classes the examinees attended as their preparation for the actual licensure exam. It is also worth noting that in both the simulated and actual LET, the highest mean score is accounted for general education. Several studies have observed the same result and explained that examinees found the general education area as the easiest among the three areas (Antiojo, 2017). Some researchers argued that the test items in the general education are at the knowledge or recall level (Pascua and Navalta, 2011) and that they are specified to high school subjects; hence, the examinees are generally familiar with the items. Furthermore, the professional education area and major subjects (MAPEH in this case) are consistently harder items to answer correctly. Although, in the simulated exam, the mean score in the major subjects is slightly higher than the professional education area, the result in the actual LET further suggests that the examinees had a difficult time answering the items in the major subjects correctly. In a study of licensure exam results of examinees of diverse field of specializations, Solis-Nool *et al.* (2017) explained that the items in the field of specialization are purposely constructed with a higher degree of difficulty because since there are higher number of units for the field of specialization in the curriculum.

Table 1. Descriptive statistics of the scores of the students in the simulated LET and Actual LET

Area	Simulated LET (N=97)				LET (N=97)			
	Min	Max	Mean	sd	Min	Max	Mean	sd
General education	67.67	84.67	75.96	3.45	54.00	92.00	82.93	5.62
Professional education	62.00	77.33	70.19	3.12	59.00	85.00	76.67	5.45
Major subjects	65.00	78.33	71.52	2.81	50.00	87.00	74.97	7.23
Average rating	66.67	78.07	71.87	2.47	59.00	86.00	77.11	5.68

Furthermore, during the interview with the examinees after the actual LET, they remarked that MAPEH is indeed a difficult field of specialization as there are four subjects to review and they observed that the released table of specifications was not complied at all.

Table 2. Cross tabulation of Performance in simulated LET and Actual LET

		LET		Total
		Failed	Passed	
Simulated LET	Failed	21	16	37
	Passed	4	56	60
Total		25	72	97

The performance of the examinees in the simulated LET vis-a-vis the actual LET is shown in Table 2. There was a total of 97 examinees, and it is apparent that there are more examinees who passed the actual LET than the simulate LET with a 12 count difference. This gap may be attributed to the additional preparation by the examinees for the actual licensure exam. In a study conducted by Binayao and Dales (2020) enrolling in a review center have shown significant improvement to the test performance of the examinees. The author further explained that the structured and intensive learning environment provided by review centers could be a key factor contributing to this improvement. They posited that such environments offer a focused and comprehensive review of the content, coupled with test-taking strategies and time management skills, which are crucial for success in examinations like the LET.

One objective of the study was to determine whether the scores are the simulated LET significantly relates to the scores in the actual LET. Table 3 presents the results of the Pearson-r correlation analysis. All pairwise p-values are less than 0.05 level of significance which suggests that the first null hypothesis is rejected. It means therefore that there is a significant relationship among the scores of the students in General Education, Professional Education, and Major Subjects in the simulated and actual licensure examinations. Moreover, it can be observed that all correlation coefficients are positive which suggest that the relationship among the ratings are direct. This means that as the scores in the simulated LET increase, the scores in the actual LET also increases.

Specifically, using the interpretation of Selvanathan *et al.* (2020) of correlation coefficients, the scores in the general education (simulated LET) are highly correlated to the scores in the actual LET with the exemption of the major subjects being moderately correlated. Furthermore, although significant, the correlation between professional education (simulated LET) and to the areas of the actual LET can only be described as low correlation. Meanwhile, the scores in the major subjects of the simulated LET exhibited moderate correlation to the scores in the actual LET. Taken the three areas together as expressed as average rating, it can be inferred from table 3 that there is a high correlation between the simulated LET performance and the actual LET performance.

Interestingly, the high correlation of the general education to the average rating in the actual LET can speak of the importance of acquiring basic knowledge on general information. In this case, those that was part of the new general education courses like Science, Technology, and Society, and Mathematics in the Modern World. It implies that mastering the ability to recall information is indeed very fundamental for more complex cognitive tasks needed in objective tests like analysis and evaluation.

Table 3. Correlation of ratings in different areas between simulated LET and Actual LET

		General education (LET)	Professional Education (LET)	Major subjects (LET)	Average rating (LET)
General education (Simulated LET)	Pearson correlation	.604**	.632**	.584**	.648**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
Professional education (Simulated LET)	Pearson correlation	.296**	.316**	.356**	.345**
	Sig. (2-tailed)	0.003	0.002	0.000	0.001
Major subjects (Simulated LET)	Pearson correlation	.419**	.505**	.553**	.544**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
Average rating (Simulated LET)	Pearson correlation	.510**	.567**	.595**	.603**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
** Correlation is significant at the 0.01 level (2-tailed).					

Table 4. Regression parameters on the predictors of LET Performance (vs. actual component areas in the LET)

Model	R	R Square	Adjusted R Square	Std. Error of the estimate	Durbin-Watson
1	.925[a]	.856	.854	2.16830	
2	.971[b]	.943	.941	1.37638	
3	.976[c]	.953	.951	1.25778	1.982
a. Predictors: (Constant), Major Subjects (LET)					
b. Predictors: (Constant), Major Subjects (LET), Professional Education (LET)					
c. Predictors: (Constant), Major Subjects (LET), Professional Education (LET), General Education (LET)					
d. Dependent Variable: Average Rating (LET)					

The low correlation of the professional education to the average rating in the actual LET may be a result of the relatively poor performance of the examinees in the professional education area of the exam. It can also be argued that the skillset needed to answer the items in the professional education area are relatively less effective or needed for the entire licensure exam. In fact, Puertos (2015) agree that although the items in the major subjects are relatively more difficult, they are mostly at the knowledge and comprehension level of the taxonomy of cognitive domain. On the other hand, items in professional education are at the analysis to evaluation level.

Table 4 presents the regression parameters of the scores of the examinees in all three areas of the actual LET as predictors of their average rating in the actual LET. The stepwise multiple linear regression analysis indicates that the most dominant predictor is the performance of the examinees in the major subjects with a coefficient of determination of 85.6%. The inclusion of professional education model increased the explanatory power to 94.3%. Lastly, a meager 0.01 was added to the coefficient of determination when the performance in general education is added. Nevertheless, it can be concluded that the actual LET performance is very largely attributed to the performance of the examinees to the three areas and only 4.7% can be accounted for other factors.

The results showed an entirely different perspective about the licensure examination. In contrast with the correlation analysis where it showed that general education seems to have the highest correlation, table 4 suggests otherwise. The score in the major subjects was the most significant predictor of actual LET performance followed by professional education. These findings imply significant considerations in curriculum development in physical education undergraduate programs and in the development of course audit strategies. Specifically, the findings could mean a strategic shift in physical education curriculum development and course auditing, emphasizing the areas of major and professional education.

Interestingly, from the descriptive statistics table, the examinees are least performing in the major subjects

which is the most significant predictor apparently. This irony must be addressed as failing the major subjects can also imply failing the entire examinations. As such, the college must give particular attention to improving the performance of its students in the major subjects.

In a similar vein, Table 5 presents that all three are significant predictors of the actual LET performance. All p-values are less than 0.05 which means that the null hypothesis is rejected. Hence, the scores of the examinees in the three areas of the actual licensure examination significantly predict their overall rating. From the results, the regression equation can be formulated as follows: Average Rating in the Actual LET = 1.543 + 0.455 (Major Subjects) + 0.384 (Professional Education) + 0.145 (General Education).

Table 5. Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.595	2.306		9.800	.000
	Major subjects (LET)	.727	.031	.925	23.755	.000
2	(Constant)	6.538	1.990		3.285	.001
	Major subjects (LET)	.521	.026	.662	19.986	.000
	Professional education (LET)	.411	.035	.395	11.907	.000
3	(Constant)	1.543	2.141		.721	.473
	Major subjects (LET)	.455	.028	.579	16.262	.000
	Professional education (LET)	.384	.032	.368	11.933	.000
	General education (LET)	.145	.033	.143	4.423	.000

[a]. Dependent Variable: Average rating (LET)

Table 6. Regression parameters on the predictors of LET Performance (vs. areas in the simulated LET)

Model	R	R Square	Adjusted R Square	Std. Error of the estimate	Durbin-Watson
1	.648[a]	.420	.414	4.35031	
2	.667[b]	.445	.433	4.27952	2.056

[a]. Predictors: (Constant), General Education (Simulated LET)

[b]. Predictors: (Constant), General Education (Simulated LET), Major Subjects (Simulated LET)

[c]. Dependent variable: Average Rating (LET)

Moving on, the main objective of this study is to examine the predictive validity of the simulated examination to the performance of the examinees in the actual LET. The results of the stepwise multiple linear regression analysis are shown in Table 6. Two significant models emerged from the analysis. It is apparent that the most significant predictor among the areas of the simulated LET is general education with a coefficient of determination of 42%. The addition of the major subject slightly increases the coefficient of determination to 44.5%. The results suggest that the other 55.5% of the variance can be accounted to other factors.

It is interesting to note that the regression analysis eliminated professional education as a predictor variable. This is complementary to the results of the correlation analysis where it showed that professional education has a low correlation to the performance of the examinees in the actual LET.

Moving on, Table 7 offers a detailed look at the regression analysis conducted to understand the influence of various factors on the average rating of the LET. The table presents the relative impact of General Education and Major Subjects on the examinees' performance. In both models, General Education (Simulated LET) emerges as a significant predictor at 0.000 p-value, reflecting its substantial role in determining the average rating in the actual LET. This reaffirms the findings from previous tables where General Education consistently showed a strong correlation with the average rating in the actual LET. Moreover, in Model 2, the introduction of

Major Subjects (Simulated LET) as an additional predictor demonstrates a significant p-value at 0.044 which is lower than level of significance of 0.05. This addition underscores the importance of subject-specific knowledge in determining the overall performance, albeit to a lesser extent than General Education.

By considering the values presented in Table 7, the regression equation can be drawn as follows: Average Rating in the actual LET = 0.841 (General Education Score in Simulated LET) + 0.421 (Major Subjects Score in the Simulated Exam) – 16.927.

In a nutshell, looking at the results of the regression analysis, the achievement of the examinees in the simulated LET examination does not wholly guarantee the likelihood to achieve the same achievement in actual LET examination. While the simulated LET demonstrates some predictive ability regarding performance in the actual LET, its extent is relatively limited, accounting for only 44.5% of the variance. This finding implies that while the simulated exam is a useful tool, it does not capture the full spectrum of factors influencing success in the actual LET. Other elements, possibly including psychological preparedness, test-taking strategies, or even the nature of the actual exam environment, contribute to the remaining 55.5% of the variance. Therefore, reliance solely on simulated exam performance as a predictor of actual success may be misguided.

Table 7. Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.868	9.774		-.396	.693
	General education (Simulated LET)	1.066	.129	.648	8.294	.000
2	(Constant)	-16.927	11.548		-1.466	.146
	General education (Simulated LET)	.841	.168	.511	5.018	.000
	Major subjects (Simulated LET)	.421	.206	.208	2.042	.044

[a]. Dependent variable: Average rating (LET)

To enhance the predictive validity of the simulated LET, it's recommended to continuously update and refine the test items based on the latest table of specifications and the performance trends observed in the actual LET. Incorporating feedback mechanisms from past examinees could provide insights for improvement. Additionally, supplementing simulated exams with workshops or sessions focusing on test-taking strategies and psychological preparedness might offer a more holistic approach to preparing examinees for the actual LET.

Conclusion

This study evaluated the predictive validity of the CHK-Simulated LET Examination in determining success in the actual Licensure Examination for Teachers (LET). The findings reveal that while the simulated LET has some predictive ability, it accounts for only 44.5% of the variance in actual LET performance, indicating that it is a useful tool but not a definitive predictor of success. Notably, the correlation analysis indicated a significant relationship among the scores in General Education, Professional Education, and Major Subjects in both the simulated and actual LET, with all correlation coefficients being positive. This suggests that as scores in the simulated LET increase, so do the scores in the actual LET. Moreover, the study further identified that scores in the major subjects in the actual LET emerged as the most significant predictor of actual LET performance. On the other hand, within the context of the simulated LET, the scores in General Education were found to be the most significant predictor of performance in the actual LET. This point to the foundational role of general knowledge and the ability to recall and apply this knowledge effectively.

Recommendation(s)

Based on the findings of the study, the following are recommended:

a. Continuously update and refine the simulated LET based on the latest table of specifications and performance trends observed in the actual LET.
b. Conduct regular item analyses to ensure each question effectively discriminates between different levels of student ability and accurately reflects the difficulty level of the actual LET.
c. Curriculum developers should place greater emphasis on the major subjects and professional education areas, as these have shown to be significant predictors of LET success.
d. Incorporate findings from the simulated LET into curriculum reviews to ensure alignment with the actual LET's requirements.
e. Strategies should be developed to address the identified weaknesses, possibly through targeted review sessions or additional instructional materials.
f. Encourage students to engage in a comprehensive review that goes beyond the simulated LET, including strategies for managing time and stress during the exam.
g. The college may consider forming partnerships with review centers to provide students with structured and comprehensive review programs.
h. Further studies should explore the additional factors that influence success in the actual LET to provide a more holistic view of exam preparation. Research into the psychological aspects of exam preparation, such as anxiety reduction techniques and confidence-building strategies, would be beneficial.

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