Exploring the Main Factors Influencing the Quality of Learning Outcomes of Pedagogical Students from the Lecturers' Perspectives

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Abstract: *In the context of the information economy and the 4.0 revolution, higher education is experiencing significant changes to meet the requirements of society for high-quality human resources. In response to these demands, the institution has altered its curriculum, teaching techniques, and assessment of learning outcomes. However, there has been little interest in considering factors influencing learners' learning outcomes. The purpose of this research is to better understand the factors that influence the quality of students' learning outcomes from the perspective of lecturers at pedagogical schools. Google Form was used as a mean to construct the survey and distribute to participants. The exploratory factor analysis (EFA) was employed to discover the potential factors. The experimental results from 122 key teachers revealed that there were eight factors affecting students' learning outcomes, including assessment methods, assessment principles, facilitating conditions, peer assessment guidelines, test technique conformity, formative assessment, self-assessment guidelines, relationships with teaching elements. These findings contribute to the body of knowledge by enriching new factors so that interested researchers can consider them in subsequent studies. In the practical perspective, educators and policy makers can justify decision making based on the extracted factors.*

Keywords: exploratory factor analysis, learning outcomes, pedagogical, higher education, factors

1. Introduction

The information economy dominates all elements of social life in a worldwide society, and education is no exception [1, 2]. In this condition, each country's education is developing an overall strategy to adapt to the rapid changes of the times in order to prevent obsolescence [3, 4], while also promoting high-quality human resource training to satisfy labor market demands. As a result, the position and role of professors in universities has undergone fundamental and significant changes [5, 6]. Teachers are not only knowledge transmitters, but also learning technique instructors, designing learning activities in a flexible, proactive, and creative manner to assist learners in developing professional characteristics and competences. To do this, instructors and students must engage, collaborate, and experience [7] together using a range of methods and styles of teaching organization, including the evaluation of learning outcomes in the direction of a competency-based approach. Assessment of learning outcomes is seen as an activity that contributes to the quality of training provided by a higher education institution [8, 9] and is one of the fundamental tasks that must be completed appropriately [10]. Teachers assess learning outcomes by not only testing and evaluating the knowledge and skills of learners formed during the learning process, but also by considering the application of those knowledge and skills to practical situations; and motivating and encouraging learners to be excited and try to perform learning tasks on a regular basis. Learning outcomes have a significant impact on learners and the learning process [11] and are an important component for teachers to consider when reflecting on their educational products after a

duration of teaching [10, 12].

The quality of student learning outcomes has many correlations with the instructor, the learner, and the teaching process, according to educational practice [2, 6, 8]. The fundamental issue is determining which factors influence the quality of student learning results. Recognizing the aforementioned issue, we conduct this research from the perspective of lecturers, who have a direct influence on instructional goods in schools. Much prior research has been undertaken to address this topic; however, those studies were conducted in various nations, and the factors revealed are likely to apply solely to certain locations. As a result of the nature of societal changes, the current study is unique.

The rest of this paper is structured as follows: Section 2 offers an overview of previous research of this category. Section 3 then discusses the materials and analytical procedures. Section 4 reports on the findings and discusses issues. Section 5 presents the conclusions and research directions.

2. Literature Review

A variety of studies on academic accomplishment have been conducted, each addressing distinct approaches and strategies for assessing learning results [3]. Trigwell et al. [13] studied the elements influencing learning outcomes in the educational setting. The findings indicate that environments that promote deep methods are more likely to enable high-quality learning than ones that promote surface approaches. Lim et al. [14] explore the research challenge from a different angle. According to data analysis, the key

characteristics impacting learning results among student groups were age, prior distance learning experience, preferred method of teaching, and average study period. Pertaining to the relationship between students' university performance and the quality of school education they receive prior to entering university. Gabdrakhmanova et al. [15] discovered that there is no relationship between college students' academic performance and the type of high school they previously attended (rural or urban). Meanwhile, Somerville [16] discovered that knowledge/experience of school leaders, trust, opportunity for dialogue/collaboration, and leadership are all critical elements influencing the quality of learning outcomes. Leadership, faculty involvement and utilization of assessment data, a knowledge-rich working environment, an assessment plan, a communication strategy, and participation in the assessment by an administrator also played an important role. Yamarik [17] discovered that children who were taught through cooperative learning obtained greater academic accomplishment in the form of higher exam scores. The teacher-related component is the most essential in understanding learning outcomes, followed by student behaviours. Briones et al. [18] identified several factors that may impact student academic success at SKSU - Laboratory High School, including parental styles, student characteristics, internet effectiveness, instructor effectiveness, lack of motivation, and student choice. Among these characteristics, lack of motivation is seen as having the largest impact on academic achievement, followed by family status and teacher effectiveness. The research described above show that numerous issues are studied to varied degrees in different nations. A multitude of criteria are evaluated depending on the cultural, societal, and economic contexts. Each study makes a unique addition to the discipline. As a result, each researcher can select references that are appropriate for their individual study conditions, situations, and goals. Our study will add to the discipline by investigating the variables considered to impact the quality of academic performance of pedagogical students.

3. Materials and methods

3.1 Participants

A questionnaire was used to obtain primary data. Gender, education level, university where they teach, teaching experience, and teaching major are examples of information about responses. The survey was prepared using Google Form and sent to leacturers who teach Primary Education students at six universities: Thai Nguyen University of Education, Hue University of Education, Danang University of Education, Quang Nam University, Hung Vuong University, and Phu Yen University. The survey took place between December 18, 2020, and April 1, 2021. The anticipated number of survey participants is 150, and the response rate is 86.67% (130 replies), indicating that the sample size was acquired from individuals who volunteered for the survey. The research team excluded four respondents who did not finish the survey, as well as four faulty replies that were invalid owing to only picking one choice. The total

number of observations included in the study was 122 (93.85%).

The percentage of males accounted for 30.33% of the data obtained from the survey (see Table 1), while the proportion of women accounted for 69.67%. The survey subjects were all lecturers active in teaching topics to primary school children, with a master's degree accounting for 100 (81.97%) and a doctoral degree accounting for 22 (19.03%). The percentage of lecturers of the surveyed schools include Quang Nam University (51.64%), Da Nang National University of Education (16.39%), Hung Vuong University (11.48%), Phu Yen University (9.84%), Hue University of Education (6.56%) and Thai Nguyen University of education (4.1%). In terms of teaching experience, the number of lecturers with more than 15 years of experience participating in the survey was 67 (54.92%), followed by those with 11 to 15 years of experience with 33 (27.05%), those with 6 to 10 years of experience with 17 (13.93%), those with 2 to 5 years of experience with 4 (3.28%), and those with less than 2 years of experience with 1 (0.82%). The lecturers who took part in the survey were from a variety of majors, and they taught basic subjects (22.95%), basic for specialized subjects (18.03%), and specialized courses (59.02%) to pedagogical students.

Table 1: General information of the participants (N = 122)

Variable	Number	Percentage
Gender		
Male	37	30.33
Female	85	69.67
Degree		
Master	100	81.97
Doctor	22	19.03
University		
Quang Nam University	63	51.64
Da Nang National University of Education	20	16.39
Hung Vuong University	14	11.48
Phu Yen University	12	9.84
Hue University of Education	8	6.56
Thai Nguyen University of Education	5	4.1
Teaching experience		
More than 15 years	67	54.92
11 to 15 years	33	27.05
6 to 10 years	17	13,93
2 to 5 years	4	3.28
Under 2 years	1	0.82
Major		
Specialized subjects	72	59.02
Basic for specialized subjects	22	18.03
Basic subjects	28	22.95
Total	**122**	**100**

3.2 Instruments and measurements

The scale and questionnaire were created to examine respondents' perspectives on factors influencing student learning outcomes and were distributed to university lecturers via Google online survey form (see Table 2). The degree of agreement was measured using a five-point Likert scale (1 = Totally Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). The analytical model includes a

scale with 35 observable variables.

Table 2: Questionnaires used for survey participants (N=35)

Item No	Question
Q1	Assessment of learning outcomes has a strong relationship with goals
Q2	Assessment of learning outcomes has a close relationship with the teaching content
Q3	Assessment of learning outcomes has a close relationship with teaching methods and organizational forms
Q4	Assessment of learning outcomes has a close relationship with the means and conditions of teaching organization
Q5	Teachers need to conduct assessment of learning outcomes according to the principle of fairness
Q6	Teachers need to evaluate learning outcomes according to the principle of ensuring comprehensiveness
Q7	Teachers need to evaluate learning outcomes according to the principle of ensuring systematic
Q8	Teachers need to conduct assessment of learning results according to the principle of ensuring publicity
Q9	Teachers need to evaluate learning outcomes according to the principle of ensuring educational appropriateness
Q10	Teachers should evaluate learning outcomes from the very beginning of the teaching process
Q11	Teachers should evaluate learning outcomes in the teaching process
Q12	Teachers should evaluate learning outcomes at the time of summarizing the teaching process
Q13	Teachers should provide feedback on learning outcomes by commenting on students' answers in class
Q14	Teachers should provide feedback on learning by commenting on assignments, student or group performance
Q15	The teacher should talk privately after class with some students/groups
Q16	Teachers should write comments on students' assignments
Q17	Teachers should write comments on assessment sheets designed by teachers themselves
Q18	Teachers should comment in online class/group
Q19	Students want to be guided by teachers to process information about learning results by guiding students to summarize the knowledge and skills gained.
Q20	Guide students to identify strengths in learning: motivation, effort, results, etc.
Q21	Students want to be guided by teachers to process information about learning outcomes by guiding students to identify deficiencies in learning/exercises.
Q22	Students want to be guided by teachers to process information about learning results by guiding students to identify ways to overcome deficiencies in learning/exercises.
Q23	Students want to be guided by the teachers to process information about learning results by instructing students to report their results/products in front of the class.
Q24	Students want to be guided by teachers to process information about learning results by guiding students to comment on the results/exercises of friends/other groups.
Q25	Students expect to be guided by teachers to process information about learning outcomes by guiding students to respond to comments and assessments of teachers and classmates.
Q26	Students want to be guided by teachers to process information about learning results by guiding students to write summaries and draw necessary pedagogical conclusions.
Q27	Learning goals and interests affect students' learning outcomes
Q28	Teachers' expertise affects learning outcomes
Q29	Tools teachers use in testing and assessment affect students' learning outcomes
Q30	Conditions of facilities serving teaching and learning affect learning outcomes
Q31	Information technology environment for teaching and learning affects learning results
Q32	The degree of concordance between the forms of tests/exams to assess the learning outcomes compared to the specifics of the subject
Q33	The degree of compatibility between the content of the test/exam with the course objectives
Q34	Reasonableness of test/exam time
Q35	Teacher marks and returns the test in a timely manner

3.3 Data analysis

The present study employed Exploratory Factor Analysis (EFA) to examine the acquired data. EFA is a quantitative analysis approach that is used to condense a large set of interdependent measures into a smaller number of variables (called factors) while keeping the majority of the original set's information [19]. EFA may be used to determine the fundamental structure of a set of connected variables. Each index in the collection is supposed to be a linear function of one or more common factors. Common factors are unobservable variables that impact many indicators in a set. The unique factors are those latent variables that are thought to effect only one indication from a collection of indicators and do not take the indicator's correlation into consideration. The sole difference is that latent variables are claimed to effect only one indication from a group of indicators and do

not take indicator correlations into account [20]. Before conducting the EFA, descriptive statistics were employed to assess the measurement's applicability to the 35 survey items. For each entry in the descriptive statistics table, the research team calculated the mean of all replies and the standard deviation (SD). If a statement's mean was near to 1 or 5, the team eliminated it from the table since it may lower the quality of the connection between the remaining elements [21]. The next step is to compute the normal value of the confirmed distribution by checking the skewness and kurtosis to validate the distribution's normalcy. Finally, SPSS 26 software was used to conduct exploratory factor analysis (Statistical Package for Social Sciences).

4. Results and discussion

The process of exploratory factor analysis begins with the collecting of characteristic values for each item. The Kaiser-Meyer-Olkin (KMO) scale was then conducted to identify if the data were appropriate for factor analysis [22]. The KMO value ranges from 0 to 1, with levels greater than 0.5 indicating adequate EFA [21]. Bartlett's test [19] was used to determine whether the correlation between questions was strong enough for statistical significance analysis. Following analyses may only be performed if Bartlett's test is statistically significant (sig. 0.05).

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.823
Bartlett's Test of Sphericity	Approx. Chi-Square	2.496E3
	df	595
	Sig.	.000

EFA was conducted using Varimax rotation over 35 questions. The experimental results provided by SPSS software allowed researchers to investigate eigen values for each factor. Kaiser-Meyer-Olkin verified the adequacy of sampling with a value of 0.823 (shown in Table 3), which was higher than the recommended value of 0.6 by Kaiser [23] and 0.5 of Kim [24].

Bartlett's Test of Sphericity showed that $\chi 2$ (595) = 2.496E3 ρ <0,000, indicating that the correlations among questions are strong enough to conduct the exploratory factor analysis.

4.1 Exploratory Factor Analysis

Data from Table 4 shows that there are 8 main factors formed from 35 questions with eigenvalue greater than 1. In other words, these 35 questions contribute 67.971% of the importance of factors affecting quality. Quantitative learning outcomes from the perspective of teachers who teach students in Primary education, the rest is due to other factors. The percentages explained by each factor are factor 1 (28.916%), factor 2 (12.236%), factor 3 (6.538%), factor 4 (5.218%), factor 5 (4.651%), factor 6 (3.920%), factor 7 (3.286%) and factor 8 (3.205%).

Table 4: Eigenvalue, Total Variance Explained of factors

	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.121	28.916	28.916	10.121	28.916	28.916	4.584	13.096	13.096
2	4.283	12.236	41.152	4.283	12.236	41.152	4.365	12.473	25.569
3	2.288	6.538	47.691	2.288	6.538	47.691	3.09	8.828	34.397
4	1.826	5.218	52.908	1.826	5.218	52.908	2.942	8.405	42.803
5	1.628	4.651	57.559	1.628	4.651	57.559	2.869	8.198	51.001
6	1.372	3.92	61.479	1.372	3.92	61.479	2.052	5.863	56.863
7	1.15	3.286	64.766	1.15	3.286	64.766	2.006	5.733	62.596
8	1.122	3.205	67.971	1.122	3.205	67.971	1.881	5.375	67.971
9	0.932	2.662	70.633						
10	0.89	2.544	73.178						

Table 5 shows the load for each variable associated with a variable. Factor loading describes each factor and structure in a collection of variables. A factor loading of .30 or above would be regarded substantial for explanatory purposes [21]. All loads are reliable and meaningful when using this factor load criteria. Furthermore, the experimental results in Table 5 show that each variable has just one significant load. The first factor has 9 variables, the second factor includes 6 variables, the third factor contains 5 variables, the fourth factor has 3 variables, the fifth factor includes 4 variables, the sixth factor has 3 variables, the seventh factor contains 3 variables, and the eighth factor consists of 2 variables.

Table 5: Rotation Matrix

	Component							
	1	2	3	4	5	6	7	8
Q14	0.762							
Q17	0.761							
Q18	0.753							
Q16	0.732							
Q13	0.716							
Q15	0.681							
Q26	0.631							
Q32	0.449							
Q12	0.41							
Q05		0.831						
Q02		0.745						
Q08		0.725						
Q11		0.702						
Q09		0.657						
Q01		0.541						
Q29			0.753					

Q31			0.71				
Q28			0.68				
Q30			0.678				
Q27			0.512				
Q23				0.8			
Q24				0.784			
Q25				0.751			
Q35					0.754		
Q33					0.725		
Q34					0.697		
Q21					0.497		
Q10						0.696	
Q06						0.587	
Q07						0.586	
Q19							0.727
Q20							0.606
Q22							0.464
Q03								0.667
Q04								0.576

4.2 Naming the factors

Table 6 shows how each factor might be named based on variables with significant loading.

Table 6: Naming the factors

Item No	Question	
Factor 1. Assessment methods		
Q14	Teachers should provide feedback on learning by commenting on assignments, student or group performance	.762
Q17	Teachers should write comments on assessment sheets designed by teachers themselves	.761
Q18	Teachers should comment in online class/group	.753
Q16	Teachers should write comments on students' assignments	.732
Q13	Teachers should provide feedback on learning outcomes by commenting on students' answers in class	.716
Q15	The teacher should talk privately after class with some students/groups	.681
Q26	Students want to be guided by teachers to process information about learning results by guiding students to write summaries and draw necessary pedagogical conclusions.	.631
Q32	The degree of concordance between the forms of tests/exams to assess the learning outcomes compared to the specifics of the subject	.449
Q12	Teachers should evaluate learning outcomes at the time of summarizing the teaching process	.410
Factor 2. Assessment principles		
Q5	Teachers need to conduct assessment of learning outcomes according to the principle of fairness	.831
Q2	Assessment of learning outcomes has a close relationship with the teaching content	.745
Q8	Teachers need to conduct assessment of learning results according to the principle of ensuring publicity	.725
Q11	Teachers should evaluate learning outcomes in the teaching process	.702
Q9	Teachers need to evaluate learning outcomes according to the principle of ensuring educational appropriateness	.657
Q1	Assessment of learning outcomes has a strong relationship with goals	.541
Factor 3. Facilitating Conditions		
Q29	Tools teachers use in testing and assessment affect students' learning outcomes	.753
Q31	Information technology environment for teaching and learning affects learning results	.710
Q28	Teachers' expertise affects learning outcomes	.680
Q30	Conditions of facilities serving teaching and learning affect learning outcomes	.678
Q27	Learning goals and interests affect students' learning outcomes	.512
Factor 4. Peer assessment guidelines		
Q23	Students want to be guided by the teachers to process information about learning results by instructing students to report their results/products in front of the class.	.800
Q24	Students want to be guided by teachers to process information about learning results by guiding students to comment on the results/exercises of friends/other groups.	.784
Q25	Students expect to be guided by teachers to process information about learning outcomes by guiding students to respond to comments and assessments of teachers and classmates.	.751
Factor 5. Test technique conformity		
Q35	Teacher marks and returns the test in a timely manner	.754
Q33	The degree of compatibility between the content of the test/exam with the course objectives	.725
Q34	Reasonableness of test/exam time	.697
Q21	Students want to be guided by teachers to process information about learning outcomes by guiding students to identify deficiencies in learning/exercises.	.497

Factor 6. Formative assessment		
Q10	Teachers should evaluate learning outcomes from the very beginning of the teaching process	.696
Q6	Teachers need to evaluate learning outcomes according to the principle of ensuring comprehensiveness	.587
Q7	Teachers need to evaluate learning outcomes according to the principle of ensuring systematic	.586
Factor 7. Self- assessment guidelines		
Q19	Students want to be guided by teachers to process information about learning results by guiding students to summarize the knowledge and skills gained.	.727
Q20	Guide students to identify strengths in learning: motivation, effort, results, etc.	.606
Q22	Students want to be guided by teachers to process information about learning results by guiding students to identify ways to overcome deficiencies in learning/exercises.	.464
Factor 8. Relationships with teaching elements		
Q3	Assessment of learning outcomes has a close relationship with teaching methods and organizational forms	.667
Q4	Assessment of learning outcomes has a close relationship with the means and conditions of teaching organization	.576

4.3 Discussion and limitation

The investigation of many factors of the teaching process that influence the quality of learning outcomes of primary pedagogical students not only provides us with a larger picture of assessment activities in universities, but also helps guide the future design of successful teaching activities. The following recommendations can be made based on the factors that have been examined.

First, instructors' evaluation techniques should focus on generating positive feedback for individuals/groups of students, either orally or by commenting on the work based on the subject's features. Second, principles in the assessment process must be followed, such as guaranteeing fairness in assessment, assessment relevant to teaching objectives and content, disclosure of learning outcomes, and educational and procedural consistency. Third, testing settings such as testing equipment, physical facilities, and learners' interests must be considered. Fourth, for learners to have an impact on the quality of their learning outcomes, self-evaluation and peer assessment must be guided. Finally, assessment is taken into account throughout the educational process, from the beginnings to the end.

Perhaps the most important contribution of this study is the identification of eight factors based on 122 replies from lecturers from six institutions in Vietnam, including the north and south. These eight factors account for 67.971% of the effect on students' learning outcomes in Primary Education. The loadings of rotation matrix table contain information that is useful in both theoretical and practical perspectives. From theoretical standpoint, it adds to the corpus of knowledge by identifying eight factors. As a result, scientists might use it as a reference while researching comparable challenges in their field. Of course, these factors must also be carefully studied and re-examined, because each professional area has its unique peculiarities in terms of learner characteristics, training programs, school strategic goals, and societally organized human resource demands. Some criteria may apply to a wide range of fields, while others may not. In practice, educators can rely on the effect of variables to formulate suitable policies. The load factor is a critical measure that assists instructors in prioritizing required task.

The following are some drawbacks of this study: The first constraint concerns the analytical procedure. Exploratory factor analysis is a statistical tool for testing the structural plausibility and psychometric qualities of a collection of measurements. However, EFA is not a powerful enough instrument to examine the theoretical foundation, thus the Factory Confirmation Analysis method should be employed in future research to test the theoretical background (testing the theoretical background of eight factors). The bias in sampling is the study's second shortcoming. The study team only sampled teachers from some regions in Vietnam: three national universities and three provincial universities, which has a significant impact on the generalisation of the research findings. Scholars and managers should think carefully before transferring the findings of this study to their own research. The third drawback is that other factors are not taken into account throughout the study. Many important factors that directly impact the quality of students' learning outcomes may have gone unnoticed. Monitoring and measuring, such as cultural and social aspects, will influence our future expanded investigations.

5. Conclusion

The study was carried out to determine the factors influencing the quality of learning outcomes of primary school students by surveying teachers from six institutions in Vietnam. 35 questions were proposed and administered to participants via an online Google Form. The experimental results from exploratory factor analysis revealed that there are eight main factors affecting the quality of student learning outcomes from the perspective of university lecturers, including assessment methods, assessment principles, convenience conditions, peer assessment guidelines, formative assessment, self-assessment guidelines, and the relationship of assessment to elements of the teaching process, based on evidence from 122 valuable samples collected (relationships with teaching elements). The experimental results from 122 key teachers revealed eight factors influencing student learning outcomes, including assessment methods, assessment principles, facilitating conditions, peer assessment guidelines, test technique conformity, formative assessment, self-assessment guidelines, and relationships with teaching elements. These findings can be used as references for other research or as a challenge for future study by researchers interested in enhancing teaching quality in general and student learning outcomes in particular. At the same time, it may be used by

educators to develop successful pedagogical practices for Vietnamese higher education in the future.

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