

# Factors affecting the quality of graduates from pedagogical universities in vietnam



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**Abstract** Improving the quality of student graduates is paramount for enhancing the prestige and standing of universities. This study aims to identify the factors influencing the quality of student graduates from pedagogical universities in Vietnam. A questionnaire was used to survey 318 lecturers and alumni. Structural equation modeling analysis revealed that the support team factor exerted the strongest impact on students' pedagogical competency and professional awareness, followed by the enhanced services and faculty team factors. While the training program variable had a weak effect on students' professional awareness, the infrastructure factor also had a weak influence; however, the training program did not affect pedagogical competency. Notably, students' professional awareness positively correlated with pedagogical competency. Drawing from these results, this study proposes several solutions to improve the quality of knowledge among student graduates from pedagogical universities in Vietnam.

**Keywords:** quality of graduates, pedagogical universities, structural equation modeling, Vietnam

## 1. Introduction

Students represent invaluable assets to every educational institution (Alam & Islam 2022). Enhancing the quality of student graduates is pivotal in shaping the standard of education and the standing of universities. The performance of students in academic settings concerns not only administrators and educators but also employers in the job market (Ali et al 2009). Thus, increasing the quality of graduates has emerged as a critical determinant of students' future career success (Mappadang et al 2022). Higher education institutions are essential for fostering an environment conducive to learning and fostering the development of global competencies across various academic domains (Kassaw & Demareva 2023). Learning is a lifelong and arduous journey that does not guarantee the acquisition of knowledge, skills, or perspectives; it demands substantial effort and time (Logan et al 2021). To excel academically, students must demonstrate initiative, self-discipline, effective time management, focused attention, curiosity, and active class participation (Hiep et al 2020).

The efficacy of teaching and learning methodologies, alongside students' characteristics, aspirations, and abilities, significantly influences academic progress. Academic achievement is shaped by multiple factors, including financial circumstances, study habits, time allocation, health, and familial relationships, all of which bear considerable importance (Ozcan 2021). Poor academic performance has been correlated with various factors, such as irregular attendance, parental education levels, family instability, excessive social media use, and prolonged engagement in nonacademic activities (Shahjahan et al 2021).

However, the impact of these factors on the quality of student graduates varies across nations, institutions, and fields of study. Although numerous studies have explored the influence of factors on student outcomes, there remains a dearth of research evaluating these factors through the lens of service quality, particularly within pedagogical universities. Hence, this study aims to delineate the factors influencing the quality of student graduates at pedagogical universities in Vietnam. The data were collected through in-depth interviews with former students from such institutions, and a linear structural equation model was employed to assess the influencing factors.

## 2. Overview of Factors Influencing the Quality of Student Graduates

### 2.1. Training Program

The university training program (T\_P) encompasses various elements, including objectives, learning outcomes, content, methodologies, training activities, infrastructure, organizational structure, functions, responsibilities, and academic endeavors. Undoubtedly, training programs are one of the pivotal factors shaping the quality of student graduates. Quality training programs are characterized by their adaptability and are meticulously crafted by universities to



furnish students with a broad spectrum of knowledge and skills within their chosen field. These programs outline the array of knowledge, skills, competencies, and attributes students should possess upon graduation. The suitability, currency, and relevance of training programs significantly influence the outcomes of student graduates. A well-designed training program amplifies the endeavors of educators and learners, fostering motivation and laying the groundwork for program quality. Conversely, an obsolete or ill-suited training program leaves graduates ill-prepared to navigate real-world scenarios, thus hindering universities from meeting the demands of the labor market and the socioeconomic imperatives of local, national, and global contexts in an era of globalization. A training program that resonates with the expectations and aspirations of learners is paramount for ensuring the quality of student graduate outcomes. Weerasinghe and Fernando (2018) underscored that the quality of training programs correlates with student satisfaction and overall quality. Drawing upon the synthesis of the extant literature, this research endeavors to examine hypotheses H1-H2 as follows:

*H1: The training program positively influences professional awareness (P\_A).*

*H2: The training program positively influences academic proficiency (A\_P).*

## 2.2. Faculty member

The quality of the faculty member (F\_M) is considered one of the most influential factors affecting the quality of education (Akareem & Hossain 2016). Key indicators of faculty quality include extensive subject knowledge, effective communication skills, student support throughout the learning process, and proficient assessment methods, among others. According to Arnon and Reichel (2007), personal attributes and subject expertise are paramount in demonstrating faculty quality. Personal attributes encompass general traits, integrity, leadership capabilities, and professional demeanor, while subject expertise and pedagogical knowledge constitute professional qualities. Ingvarson et al (2007) identified several factors indicative of faculty teaching quality, including the ability to assess student learning, devise teaching plans, and receive constructive feedback. In many developing countries, faculty members may lack sufficient training for effective teaching and often rely on practical experience. Thus, addressing faculty training, both present and future, is critical and ultimately leads to enhanced educational standards (Akareem & Hossain 2016). Weerasinghe and Fernando (2018) noted that faculty team quality does not directly affect student satisfaction at state universities in Sri Lanka. Weerasinghe and Dedunu (2017) observed an indirect impact of faculty team quality on student satisfaction through the university's reputation in the Sri Lankan context. Alam and Islam (2022) highlighted the significant influence of faculty members' quality and conduct on student graduate outcomes. However, Martirosyan (2015) found a nonsignificant negative correlation between student satisfaction and faculty members' teaching styles and postgraduation teaching assistants. Conversely, the academic qualifications of faculty members, their attitudes toward students, classroom management strategies, curriculum relevance, teaching methodologies, and presentation skills, as well as the utilization of appropriate teaching aids, positively affect student achievement. Approachable faculty members encourage student participation and inquiry in class. Effective classroom management fosters student comprehension of faculty explanations. Proficient subject mastery ensures that students receive accurate disciplinary knowledge. Faculty readiness to deliver engaging presentations is crucial for effective knowledge transfer. Responsive faculty members who address student queries contribute to positive student perceptions. Additionally, the use of supportive tools such as focus, videos, and functional audio equipment enhances student engagement in class (Suhaily & Soelasih 2015).

Drawing upon the synthesis of existing research, this study proceeds to test hypotheses H3-H4 as follows:

*H3: The quality of the faculty team positively impacts professional awareness (P\_A).*

*H4: The quality of the faculty team positively impacts academic proficiency (A\_P).*

## 2.3. Infrastructure for Teaching and Learning

Infrastructure (I) is designed, constructed, and provided to facilitate the smooth operation of an organization (Kärnä & Julin 2015). The quality of university infrastructure in this study considered the availability and adequacy of classrooms, library facilities, computer laboratories, social areas, dormitories, and student dining halls. According to Mohamed et al (2018), facilities have a significant and positive impact on students' academic performance and learning outcomes. Weerasinghe and Fernando (2018) also suggest that infrastructure such as classrooms, libraries, computer labs, social areas, dormitories, and student dining halls are crucial determinants of the quality of higher education and student satisfaction at state universities in Sri Lanka. However, Douglas et al. (2006) found a statistically insignificant impact of university infrastructure on student satisfaction.

Based on the overview of existing studies, this research proceeds to test hypotheses H5-H6 as follows:

*H5: The infrastructure for teaching and learning at the university positively influences professional awareness (P\_A).*

*H6: The infrastructure for teaching and learning at the university positively influences academic proficiency (A\_P).*

## 2.4. Learner Support Services

Learner support services (L) play a vital role in shaping the quality of student graduates. Administrative services include offerings from the library, department offices, dormitories, sports facilities, and health care centers, among others. Nadiri et al (2009) noted that the quality of services provided by administrative units positively affects student satisfaction and overall quality. These services encompass those provided by service providers, libraries, department offices, dormitories, sports facilities, and student service centers. However, Weerasinghe and Fernando (2018) found no significant correlation between the quality of university support teams and student satisfaction. While some studies have demonstrated a positive link between the quality of administrative services and academic excellence, as well as student satisfaction, others have suggested otherwise (Weerasinghe & Fernando 2018). Drawing upon the literature review, this study proceeds to test hypotheses H7-H8:

*H7: Learner support services positively impact professional awareness (P\_A)*

*H8: Learner support services positively impact academic proficiency (A\_P).*

### 2.5. Additional services

Numerous studies have highlighted that the quality of additional services (A\_S) provided by universities influences the overall quality of higher education services, consequently affecting the outcomes and satisfaction levels of students. These services encompass a wide range of offerings, including medical and health services, banking facilities, student union activities, internships, practical experiences, academic counseling, career guidance, and extracurricular activities. Abdullah (2006) devised the higher education performance (HEdPERF) scale to gauge the quality of higher education services. Within this scale, additional services, such as academic counseling, career services, health services, financial assistance, and extracurricular engagements, are depicted as nonacademic activities that extend beyond direct teaching duties and are geared toward aiding students in meeting their academic obligations. Hanssen and Solvoll (2015) revealed that the location of a university within a city significantly influences overall student satisfaction. In essence, additional services contribute to bolstering student outcomes.

Building upon the analysis of existing research, this study proceeds to examine hypotheses H9-H10 as follows:

*H9: Additional services have a positive impact on professional awareness (P\_A)*

*H10: Additional services have a positive impact on academic proficiency (A\_P).*

### 2.6. Overview of studies on criteria for assessing the quality of student outcomes

Enhancing the quality of higher education holds significant importance within the national education systems of all countries. The quality of student outcomes encompasses the comprehensive knowledge, skills, and attitudes acquired through university education, which are tailored to meet the demands for human resource development necessary for the socioeconomic advancement of local communities and the nation as a whole, ensuring alignment with the expectations and requirements of relevant stakeholders and the broader social community regarding the intellectual, mental, and physical capabilities of university graduates. Numerous studies have investigated the quality or performance of graduating students. Baumert and Kunter (2013) highlighted that to enhance student outcome quality, possessing knowledge is a prerequisite that enables graduates to approach tasks assigned by employers postgraduation with confidence. Alongside fundamental knowledge acquisition, students must also be nurtured and developed in various "soft skills" pertinent to specific labor markets, thereby enhancing their postgraduate expertise. These soft skills include communication, presentation, independent and teamwork, writing, adaptability, technological proficiency, time management, conflict resolution, information processing, and leadership skills, among others. Consequently, educational institutions must not only focus on enhancing students' domain expertise but also prioritize equipping them with soft skills to ensure that they are well prepared to meet labor market demands after graduation. Baumert and Kunter (2013) introduced the COACTIV model for evaluating the professional competence of teachers, which delineates professional competence factors within specific teaching contexts. The COACTIV research group formulated a model of teachers' professional competence, theoretically derived from specialized studies on subject knowledge and further enriched by findings from professional competence research and analytical assessments. The COACTIV model integrates theories of professional attributes with competence studies, viewing professional competence as the outcome of an interplay of factors, including subject knowledge, values, beliefs, career aspirations, motivational orientation, and self-regulation skills.

## 3. Research methodology

### 3.1. Sample design and sampling method

In this study, the sample was selected using cluster sampling and convenience sampling methods at the final sample units. The survey subjects of the present study were faculty members and alumni of pedagogical universities in Vietnam. According to Hair et al (2019), for factor analysis to be conducted effectively, the sample size must be at least 5 times the total number of observed variables. With 52 observed variables in this research, the minimum required sample size is 52\*5

= 260. Therefore, the total sample size in the study was 318, fully meeting the set requirements and ensuring representativeness of the population.

### 3.2. Data Analysis

The study analyses factors influencing the quality of student outcomes through the following steps:

#### 3.2.1. Cronbach's alpha reliability test

The Cronbach's alpha reliability test reflects the level of consistency among observed variables within the same scale, indicating tightness and uniformity in responses. The study sequentially performed reliability tests for each factor group and gradually eliminated inappropriate variables based on the following principles. Each group was required to have a Cronbach's alpha  $\geq 0.60$  but not exceeding 0.95. The scale has good reliability when it varies within the range [0.75 - 0.95]. A Cronbach's alpha  $\geq 0.60$  indicated that the scale was acceptable in terms of reliability. If the Cronbach's alpha is too high ( $>0.95$ ), indicating the presence of many undifferentiated variables, reassessment is necessary. Variables with a total variance correlation coefficient less than 0.3 are considered redundant and are eliminated from the analysis (Nunnally & Bernstein 1994). If a measuring variable has a total variance correlation coefficient (adjusted)  $\geq 0.3$ , it meets the requirement. Variables whose elimination increased the Cronbach's alpha index could also be considered for removal.

#### 3.2.2. Exploratory Factor Analysis

After determining the scale's reliability, it is essential to evaluate the convergence and discriminant validity. The convergence value reflects the convergence level of a scale used to measure a factor group after multiple (repeated) iterations; observed variables converge into the same factor group. The discriminant value indicates that two measuring scales for different factor groups must differ; observed variables belong to this factor group and must differentiate from other factor groups. Exploratory factor analysis (EFA) is employed for this purpose. The suitability of factor analysis will be assessed using the Kaiser-Meyer-Olkin (KMO) coefficient, where a high KMO score indicates the appropriateness of factor analysis. Bartlett's test of sphericity with statistical significance (Sig.  $< 0.05$ ) will be used to examine the hypothesis of noncorrelation among variables in the population. If this test is statistically significant (sig.  $< 0.05$ ), the observed variables are correlated in the population. The percentage of total variance ( $> 50\%$ ) will be used to consider the variance percentage of the observed variables. Convergence will be examined in the pattern matrix table. The study will use a factor loading coefficient  $> 0.5$  because this is considered significant and practically meaningful (Gerbing & Anderson 1988). Variables with a factor loading below 0.5 will continue to be eliminated. Variables that load onto two or more factors and have a difference (measured by absolute difference) of less than 0.3 or variables that are only separated on one factor will also be removed.

#### 3.2.3. Confirmatory Factor Analysis

CFA aims to assess the fit of the existing model with the research data, with the following required indicators: the adjusted chi-square/degrees of freedom index measures the detailed fit of the entire model. Some researchers suggest  $1 < \text{chi-square/degrees of freedom} < 3$  (Hair et al 2019), while others propose that the smaller the index is, the better. Additionally, some practical studies differentiate between two cases:  $\text{Chi-square/degrees of freedom} < 5$  (with sample size  $N \geq 200$ ) or  $< 3$  (when the sample size  $N \leq 200$ ), indicating a good model fit. Other related indices, such as the comparative fit index (CFI), Tucker and Lewis index (TLI), goodness-of-fit index (GFI), and AGFI, will also be considered. Values above 0.9 are considered to indicate good model fit, but the CFI and GFI can even be below 0.9 (Hair et al. 2019). If these values are equal to 1, the model is perfect. The root mean square error of approximation (RMSEA) helps determine the model's fit compared to the population, requiring  $< 0.05$  for a good model fit, with a value of  $\leq 0.08$  being acceptable in some cases. Additionally, a deep CFA analysis will be conducted to assess the convergence, discriminant validity, and model reliability, ensuring that specific coefficients meet the set criteria.

#### 3.2.4. Impact Analysis

This study employs a linear structural model to determine the factors influencing and the degree of influence of these factors on the quality of student outcomes at pedagogical universities in Vietnam.

## 4. Analysis results of factors affecting the quality of graduates from pedagogical universities in Vietnam

### 4.1. Descriptive Statistical Analysis

This study surveyed lecturers and alumni from prominent pedagogical universities in Vietnam. Descriptive statistical analysis revealed that 167 lecturers (52.5%) and 151 alumni (47.5%) participated in the survey. Furthermore, 82.1% of the

surveyed lecturers and alumni had more than 5 years of teaching experience in educational institutions. Approximately 83.3% of the surveyed individuals held postgraduate qualifications.

#### 4.2. Reliability Testing Results of the Measurement Scales

Following the data collection, the study assessed the reliability of the measurement scales in the model using Cronbach's alpha coefficient. The remaining variables exhibited high reliability, with total variable correlation coefficients > 0.3 and Cronbach's alpha > 0.8, after excluding inappropriate variables such as F\_M6, F\_M4, I9, I5, A\_S9, A\_S2, A\_P8, and A\_P7.

#### 4.3. Exploratory Factor Analysis

After confirming the reliability of the measurement scales, the research model retained 7 factors with 44 observed variables. Principal component analysis with varimax rotation was employed in this study. The scales met the following acceptance criteria:  $0.5 \leq KMO \leq 1$ , Bartlett's test with a Sig. coefficient = 0.000 indicating significant correlations among observed variables, total variance extracted  $\geq 50\%$  (Gerbing and Anderson 1988), and factor loadings  $\geq 0.5$ , indicating appropriate reliability for factor analysis.

##### 4.3.1. Exploratory Factor Analysis for the Dependent Variables

Following Cronbach's alpha analysis, 2 factors (dependent variables) with 12 observed variables were chosen for exploratory factor analysis (EFA). The results in Table 1 show a KMO coefficient of  $0.872 < 1.0$ , indicating the suitability of the EFA model. The significance value of Bartlett's test (Sig. = 0.000) demonstrated correlations among the observed variables across the entire sample. The rotation matrix (iteration 2) in Table 2 indicates that all observed variables had factor loadings > 0.6. Noncompliant observed variables, including P\_A1, were excluded from the model. The EFA results indicated that 2 factors explained  $56.83\% > 50\%$  of the dataset's variation, thus confirming the convergence and discriminant validity of the dependent variables in the research model.

**Table 1** KMO and Bartlett's test for the dependent variables.

Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.872
Bartlett's Test of Sphericity	Approx. Chi-Square	1714.604
	df	55
	Sig.	.000

**Table 2** Pattern matrix<sup>a</sup> for the dependent variables.

Observed variables	Factor	
	1	2
A_P6	.813	
A_P3	.805	
A_P5	.761	
A_P4	.755	
A_P2	.753	
A_P1	.602	
P_A3		.840
P_A5		.768
P_A6		.762
P_A4		.730
P_A2		.662

Extraction Method: Principal Axis Factoring. Rotation Method: Promax with Kaiser Normalization.<sup>a</sup>

a. Rotation converged in 3 iterations.

##### 4.3.2. Exploratory Factor Analysis for the Independent Variables

Following the analysis of Cronbach's alpha, 5 factors (independent variables) comprising 32 observed variables were chosen for factor analysis. As shown in Table 3, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was computed to be 0.886, indicating that the sample size met the requisite conditions for factor analysis. Additionally, Bartlett's test yielded a significant result with Sig. = 0.000, underscoring the intercorrelations among the observed variables across the entire dataset.

**Table 3** KMO and Bartlett's Test for the Independent Variables (iteration 12).

Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.886



Bartlett's Test of Sphericity	Approx. Chi-Square	2968.214
	df	210
	Sig.	.000

To identify the primary factors, the study utilized factor extraction based on Eigenvalue. The results of the exploratory factor analysis (EFA) revealed that 5 factors explained 54.964% > 50% of the dataset variance. Table 4 demonstrates that all observed variables displayed factor loadings > 0.6, indicating convergence and discriminant validity of the independent variables in the research model. The excluded observed variables from the model were T\_P1, I1, I6, I7, I8, A\_S1, A\_S3, A\_S4, F\_M5, F\_M7, and F\_M8.

**Table 4** Pattern Matrix<sup>a</sup> for the Independent Variables (iteration 12).

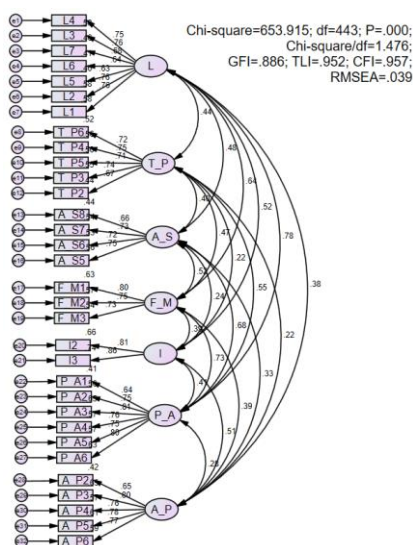
Biến quan sát	Factor				
	1	2	3	4	5
L5	.810				
L4	.720				
L8	.696				
L7	.693				
L6	.682				
L3	.668				
L2	.638				
T_P6		.758			
T_P4		.739			
T_P5		.732			
T_P3		.726			
T_P2		.633			
A_S8			.742		
A_S7			.727		
A_S6			.721		
A_S5			.643		
F_M1				.795	
F_M2				.743	
F_M3				.693	
I2					.961
I3					.699

Extraction Method: Principal Axis Factoring. Rotation Method: Promax with Kaiser Normalization.<sup>a</sup>

a. Rotation converged in 6 iterations.

4.4. Confirmatory factor analysis results

The results of the confirmatory factor analysis (CFA) depicted in Figure 1 demonstrate that the following specified criteria are satisfied: the chi-square/df ratio equals 1.476, which is ≤ 3 with a significance level of p ≤ 0.05; GFI = 0.886 > 0.8; TLI, CFI ≥ 0.9; and RMSEA = 0.039 ≤ 0.05, all of which fulfill the stipulated criteria. Consequently, the model is deemed to be well fitted.



**Figure 1** Confirmatory factor analysis results.



### 4.5. Linear Structural Model Results

The findings from Figure 2 indicate that the coefficients within the model meet the specified criteria. Specifically,  $CMIN/df = 1.476 \leq 2$ ,  $GFI = 0.886 > 0.8$ ,  $TLI \geq 0.9$ , and  $RMSEA = 0.039 \leq 0.05$ . Thus, the model is considered to be well suited.

The findings depicted in Figure 2 demonstrate that all observed variables in the model have weights exceeding 0.5, indicating convergent validity of the scales. Table 5 highlights that there are 04 factors significantly impacting the dependent variable P\_A at the 1% significance level, including L, T\_P, A\_S, and F\_M. As shown in Table 6, variable L has the strongest influence, followed by A\_S, F\_M, and T\_P. Furthermore, Table 5 also indicates that there are 5 factors influencing the dependent variable A\_P, namely, L (at the 10% significance level), A\_S (at the 1% significance level), F\_M (at the 5% significance level), and I (at the 1% significance level). In alignment with Table 6, variable L has the greatest influence on P\_A, followed by A\_S, F\_M, and T\_P. Additionally, the P\_A factor has a positive impact on A\_P (at the 1% significance level). The analysis results suggest that T\_P does not significantly affect A\_P.

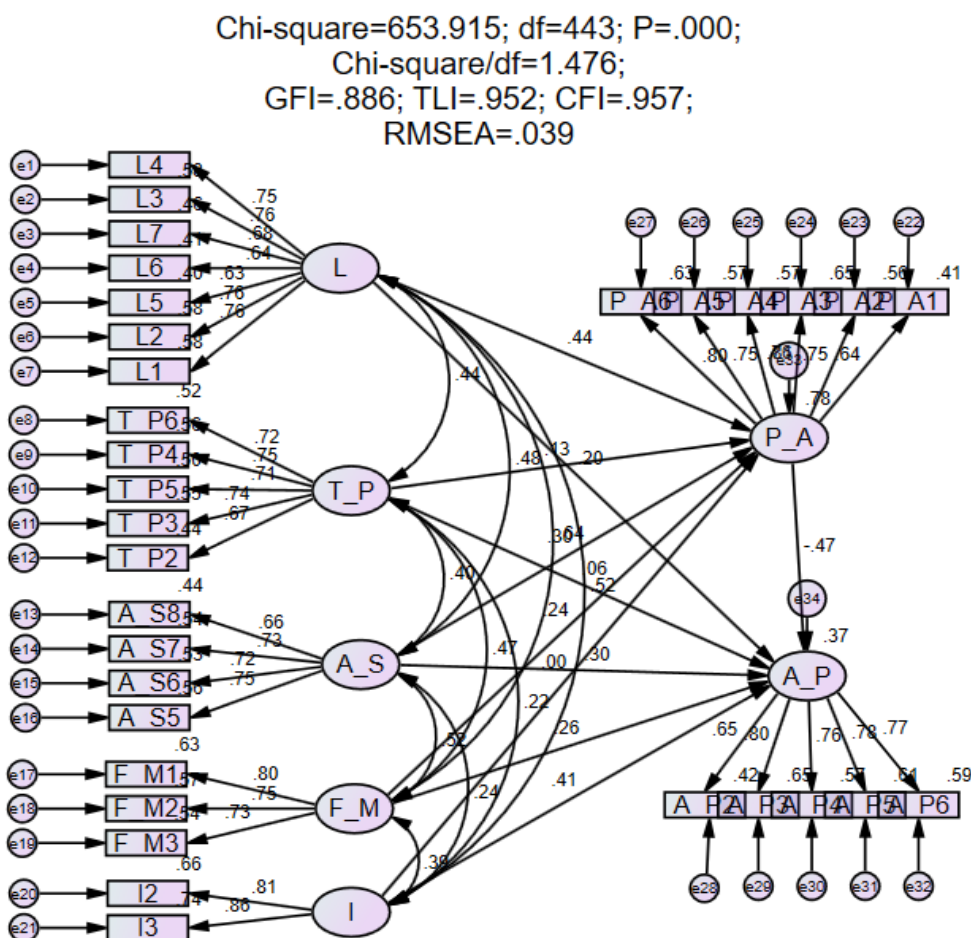


Figure 2 Results of factor analysis on the quality of graduates from pedagogical universities.

Table 5 Regression weights.

			Estimate	S.E.	C.R.	P
P_A	<---	L	.414	.068	6.076	***
P_A	<---	T_P	.135	.052	2.569	.010
P_A	<---	A_S	.367	.072	5.095	***
P_A	<---	F_M	.200	.056	3.571	***
P_A	<---	I	-.005	.046	-.102	.919
A_P	<---	L	.184	.108	1.693	.090
A_P	<---	A_S	.356	.115	3.098	.002
A_P	<---	F_M	.213	.086	2.493	.013
A_P	<---	I	.384	.074	5.214	***
A_P	<---	P_A	-.460	.158	-2.899	.004
A_P	<---	T_P	.066	.076	.871	.384



**Table 6** Standardized Regression Weights.

			Estimate
P_A	<---	L	.436
P_A	<---	T_P	.125
P_A	<---	A_S	.300
P_A	<---	F_M	.235
P_A	<---	I	-.005
A_P	<---	L	.199
A_P	<---	A_S	.299
A_P	<---	F_M	.258
A_P	<---	I	.414
A_P	<---	P_A	-.473
A_P	<---	T_P	.064

**5. Final consideration and policy implications**

This study examined the factors influencing the output quality of students at pedagogical universities in Vietnam. Hierarchical analysis was utilized to assess the priority levels of these influencing factors. The analysis revealed that factor L had the strongest impact on A\_P, followed by factors A\_S and F\_M. While factor T\_P has a weak impact on P\_A, factor I also has a weak impact on P\_A; however, factor T\_P does not significantly affect A\_P. Factor P\_A positively influences A\_P.

Based on the analysis findings, this study proposes several solutions to enhance student output quality. These include:

(i) Implementing measures to improve the quality of educational programs at pedagogical universities, ensuring alignment with learners' needs, labor market demands, and societal requirements. Additionally, information should be disseminated to students regarding training objectives, skill standards, knowledge, and graduation requirements.

(ii) Investing in facilities and learning resources such as laboratories, practical rooms, and equipment for teaching and scientific research for faculty and lecturers. Moreover, investing in facilities to support student activities such as auditoriums, sports fields, and sports stadiums is essential for creating a favorable environment for students to engage in extracurricular activities.

(iii) Enhancing the quality of the faculty, including providing opportunities and favorable conditions for faculty to study abroad to enhance their professional expertise and language skills and expand international relationships. Creating conditions for students to learn in a development-oriented educational environment is also essential. Encouraging faculty and students to participate in international networks, conferences, projects, research programs, and publications and establishing mechanisms and policies to incentivize and support individuals and units in scientific and technological activities.

(iv) Improving the service capability and attitude of staff and employees is necessary to enhance the quality of training services and student satisfaction. Additionally, enhancing the quality of medical services and student healthcare, as well as regularly organizing career orientation and entrepreneurship counseling activities for students and supporting them in participating in internship and practical activities at internship sites.

**Ethical considerations**

Not applicable

**Conflict of Interest**

The authors declare no conflicts of interest

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