

Determinants Of learner satisfaction in short-term training programs: Evidence from the school of economics, Hanoi University of industry

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World Journal of Advanced Research and Reviews, 2026, 30(03), 2167-2179

Publication history: Received on 22 May 2026; revised on 28 June 2026; accepted on 30 June 2026

Article DOI: <https://doi.org/10.30574/wjarr.2026.30.3.1800>

Abstract

This study aims to identify and evaluate the factors affecting learner satisfaction with short-term training programs at the School of Economics, Hanoi University of Industry. Based on the literature on educational service quality and learner satisfaction, a research model was developed comprising five determinants, namely training program quality, instructor quality, facilities and learning infrastructure, support services, and perceived value. Data were collected from 380 learners who had participated in short-term training programs and were analyzed using descriptive statistics, Cronbach's Alpha reliability testing, exploratory factor analysis (EFA), Pearson correlation analysis, and multiple linear regression. The results indicate that all proposed factors have positive and statistically significant effects on learner satisfaction. Among them, training program quality exerts the strongest influence ($\beta = 0.290$), followed by facilities and learning infrastructure ($\beta = 0.231$), instructor quality ($\beta = 0.144$), perceived value ($\beta = 0.114$), and support services ($\beta = 0.046$). The regression model explains 72.78% of the variance in learner satisfaction, demonstrating a strong explanatory power. These findings suggest that enhancing program content, improving learning facilities, strengthening instructor capabilities, increasing perceived value, and providing effective support services are critical to improving learner satisfaction. The study contributes empirical evidence to the literature on short-term training programs and provides practical implications for educational institutions seeking to improve training quality, learner experiences, and the sustainable development of continuing education activities.

Keywords: Learner satisfaction; Short-term training programs; Training program quality; Instructor quality; Facilities and learning infrastructure; Perceived value

1. Introduction

In the context of digital transformation, globalization, and the rapid evolution of labor market demands, the need for lifelong learning and continuous professional development has become increasingly critical. Alongside formal education programs, short-term training and professional development courses have emerged as an important mechanism for enabling learners to update their knowledge, enhance professional competencies, and meet the increasingly sophisticated requirements of employers. This trend also reflects a significant shift in higher education, where institutions are expanding beyond their traditional role of delivering degree programs to provide continuing education, lifelong learning opportunities, and short-term training services that address the evolving needs of society.

Within the context of short-term training, learner satisfaction is widely recognized as a key indicator of training service quality and organizational effectiveness. Satisfied learners are more likely to evaluate training programs positively, recommend courses to others, participate in additional training activities, and contribute to strengthening the reputation and competitiveness of the training provider. Conversely, when training quality fails to meet learners'

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expectations, institutions may encounter challenges in attracting and retaining participants, thereby undermining their long-term sustainability in an increasingly competitive educational market.

At the School of Economics, Hanoi University of Industry, a wide range of short-term training and professional development programs have been implemented in areas such as accounting, finance, business administration, professional skills, digital competencies, and other specialized fields. These programs not only contribute to enhancing learners' professional capabilities but also generate additional revenue streams and strengthen the institution's position in the continuing education sector. However, as an increasing number of educational institutions, enterprises, and organizations enter the short-term training market, improving learner satisfaction has become a strategic imperative for maintaining competitive advantage and attracting prospective learners.

Previous studies have demonstrated that learner satisfaction is influenced by various factors, including training program quality, instructor quality, learning facilities, support services, and perceived value. Nevertheless, most existing research has focused on formal higher education settings, while empirical studies examining learner satisfaction in short-term training programs offered by higher education institutions in Vietnam remain relatively limited. Furthermore, little research has been conducted in the specific context of short-term training and professional development programs at the School of Economics, Hanoi University of Industry.

Against this backdrop, the present study aims to identify and evaluate the factors influencing learner satisfaction with short-term training programs at the School of Economics, Hanoi University of Industry. The findings are expected not only to enrich the theoretical understanding of educational service quality and learner satisfaction but also to provide practical managerial implications for improving program quality, enhancing learning experiences, and strengthening the institution's ability to attract and retain learners in the future.

2. Literature review and hypotheses development

2.1. Learner satisfaction in short-term training programs

Satisfaction is widely recognized as one of the most important indicators reflecting service quality and organizational performance. According to Oliver (1980), satisfaction is a psychological state resulting from a comparison between customers' initial expectations and the actual outcomes they receive after experiencing a service. When perceived performance meets or exceeds expectations, customers tend to be satisfied; conversely, dissatisfaction arises when perceived performance falls short of expectations.

In the educational context, learner satisfaction refers to learners' overall evaluation of their educational experiences throughout their participation in a training program (Elliott & Healy, 2001). Unlike students enrolled in formal degree programs, participants in short-term training courses typically have clearly defined learning objectives, such as enhancing professional knowledge, developing specific competencies, or meeting immediate job-related requirements within a relatively short period. Consequently, their satisfaction is influenced not only by the content and quality of the training program but also by various other factors, including instructor quality, learning facilities, support services, and the value derived from the training experience.

Previous studies have consistently demonstrated that learner satisfaction is closely associated with institutional image, loyalty, continued participation intentions, and positive word-of-mouth recommendations (Hennig-Thurau et al., 2001; Brown & Mazzarol, 2009). Satisfied learners are more likely to recommend training programs to others, enroll in additional courses offered by the same institution, and contribute to enhancing the institution's reputation and competitiveness. Therefore, understanding the determinants of learner satisfaction is of considerable importance for educational institutions seeking to improve training quality, strengthen learner engagement, and achieve sustainable growth in an increasingly competitive educational environment.

2.2. Hypothesis development

2.2.1. Training Program Quality and Learner Satisfaction

Within educational institutions, the training program is regarded as the core product delivered to learners. Training program quality reflects the relevance, currency, practical applicability, and overall ability of the curriculum to meet learners' educational needs. Douglas et al. (2006) identified course content as one of the most influential determinants of student satisfaction. Similarly, Navarro et al. (2005) argued that learners tend to evaluate courses more positively when the training content aligns with their expectations and learning objectives.

In the context of short-term training programs, participants typically seek knowledge and skills that can be applied directly to their professional activities. Therefore, a well-designed curriculum that incorporates current trends, industry developments, and practical applications is expected to enhance learners' educational experiences and increase their level of satisfaction.

Based on the above arguments, the following hypothesis is proposed:

H1: Training program quality positively influences learner satisfaction.

2.2.2. Instructor Quality and Learner Satisfaction

Instructors play a central role in the teaching and learning process by facilitating knowledge transfer and shaping learners' overall educational experiences. Instructor quality is commonly assessed through professional expertise, pedagogical competence, practical experience, and the ability to interact effectively with learners.

Elliott and Healy (2001) found that teaching quality is one of the key determinants of learner satisfaction in higher education. Likewise, Abdullah (2006) emphasized that teaching-related factors constitute a critical component of educational service quality. In short-term training programs, learners often expect not only theoretical knowledge but also practical insights and professional experiences from instructors. Consequently, instructors' competencies and teaching approaches are likely to have a direct impact on learners' evaluations of training programs.

Therefore, the following hypothesis is proposed:

H2: Instructor quality positively influences learner satisfaction.

2.2.3. Facilities and Learning Infrastructure and Learner Satisfaction

Facilities and learning infrastructure encompass classrooms, instructional equipment, learning technologies, and other physical resources that support the training process. According to Owlia and Aspinwall (1996), physical facilities represent one of the fundamental dimensions of educational quality. Hanssen and Solvoll (2015) further demonstrated that learning environments and educational infrastructure significantly affect learners' perceptions of service quality.

In the era of digital transformation and blended learning, learners increasingly expect modern, convenient, and technology-enabled learning environments that facilitate knowledge acquisition and engagement. Consequently, investment in appropriate facilities and learning infrastructure is expected to contribute positively to learner satisfaction.

Accordingly, the following hypothesis is proposed:

H3: Facilities and learning infrastructure positively influence learner satisfaction.

2.2.4. Support Services and Learner Satisfaction

In addition to instructional activities, support services play an essential role in shaping learners' overall experiences. These services include course advising, registration procedures, information provision, learning support, and the resolution of issues that may arise during participation in training programs.

According to the SERVQUAL framework developed by Parasuraman et al. (1988), service quality is reflected through dimensions such as reliability, responsiveness, and customer care. Within the educational context, Ali et al. (2016) found that support services significantly affect learner satisfaction. When administrative procedures are efficient, information is communicated effectively, and learners' concerns are addressed promptly, learners are more likely to form positive evaluations of educational services.

Therefore, the following hypothesis is proposed:

H4: Support services positively influence learner satisfaction.

2.2.5. Perceived Value and Learner Satisfaction

Perceived value refers to learners' overall assessment of the benefits obtained relative to the costs incurred in participating in a training program. According to Zeithaml (1988), perceived value results from a comparison between the benefits received and the sacrifices made by customers when consuming a service.

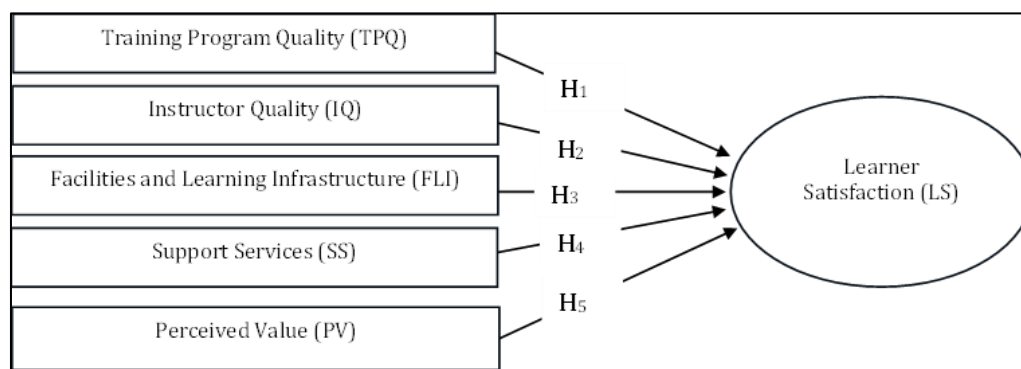
In educational settings, learners often evaluate a program's value based on the knowledge acquired, skills developed, career opportunities created, and other benefits gained relative to tuition fees, time commitments, and personal effort. Alves and Raposo (2007) argued that perceived value plays a critical role in shaping learner satisfaction. In short-term training programs, where participants generally pursue specific professional objectives, perceiving substantial practical value from a course can significantly enhance satisfaction levels.

Based on these considerations, the following hypothesis is proposed:

H5: Perceived value positively influences learner satisfaction.

2.3. Proposed research model

Based on the literature review and the hypotheses developed above, this study proposes a research model consisting of five independent variables, namely Training Program Quality (TPQ), Instructor Quality (IQ), Facilities and Learning Infrastructure (FLI), Support Services (SS), and Perceived Value (PV). These factors are expected to have direct and positive effects on Learner Satisfaction (LS) in the context of short-term training programs.



Source: Authors' compilation based on previous studies

Figure 1 Conceptual research framework

The proposed model is grounded in the educational service quality and customer satisfaction literature, which suggests that learner satisfaction is influenced by both academic and non-academic aspects of the learning experience. Specifically, training program quality and instructor quality represent the core academic dimensions of educational services, while facilities and learning infrastructure, support services, and perceived value reflect the broader learning environment and learners' overall evaluation of the benefits obtained from participating in a training program.

Drawing upon previous empirical studies and the theoretical arguments presented in the preceding sections, five research hypotheses (H1–H5) are proposed to examine the relationships between the independent variables and learner satisfaction. The conceptual framework of the study is illustrated in Figure 1.

3. Research methodology

3.1. Research design

This study adopts a quantitative research approach to examine the factors influencing learner satisfaction with short-term training programs at the School of Economics, Hanoi University of Industry. Based on the literature review and the proposed conceptual framework, the research model includes five independent variables, namely Training Program Quality (TPQ), Instructor Quality (IQ), Facilities and Learning Infrastructure (FLI), Support Services (SS), and Perceived Value (PV), with Learner Satisfaction (LS) serving as the dependent variable.

Data were collected through a structured questionnaire administered to learners who had participated in or were currently enrolled in short-term training programs offered by the School of Economics. To ensure diversity in the sample, respondents were drawn from different occupational backgrounds, age groups, and professional fields. Convenience sampling combined with snowball sampling was employed because a comprehensive sampling frame for the target population was not readily available. According to Hair et al. (2022), a sample size of at least 200 observations is considered adequate for studies employing factor analysis and multiple regression techniques. Therefore, this study targeted a minimum of 250 valid responses for subsequent statistical analyses.

3.2. Measurement scale and research variables

All constructs were measured using a five-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The measurement items were adapted from established scales in previous studies and modified to fit the context of short-term training programs in Vietnam.

Training Program Quality was adapted from Douglas et al. (2006) and Navarro et al. (2005). Instructor Quality was measured using items derived from Abdullah (2006) and Ali et al. (2016). Facilities and Learning Infrastructure were adapted from Owlia and Aspinwall (1996) and Hanssen and Solvoll (2015). Support Services were developed based on Parasuraman et al. (1988) and Ali et al. (2016). Perceived Value was measured using scales adapted from Zeithaml (1988) and Alves and Raposo (2007). Learner Satisfaction was assessed using items derived from Elliott and Healy (2001) and Hennig-Thurau et al. (2001).

Prior to the main survey, the questionnaire was reviewed by experts in educational management and training to assess content validity. A pilot survey was subsequently conducted with a small group of learners to refine the wording and improve the clarity of the measurement items.

3.3. Data collection

Data collection was conducted between January and April 2026 through both online and face-to-face survey methods. Questionnaires were distributed to learners who had participated in or were currently attending short-term training programs organized by the School of Economics, Hanoi University of Industry.

Following data screening procedures, incomplete responses and questionnaires exhibiting response patterns indicative of low-quality or inattentive answering were removed. Only valid responses were retained for subsequent analyses.

3.4. Data analysis

The collected data were analyzed using Stata software. Descriptive statistics were first employed to summarize the characteristics of the sample and the main study variables. The reliability of the measurement scales was then assessed using Cronbach's Alpha coefficients. Subsequently, Exploratory Factor Analysis (EFA) was performed to examine the underlying factor structure and evaluate the convergent validity of the measurement items.

After confirming the adequacy of the measurement scales, Pearson correlation analysis and multiple linear regression were conducted to test the proposed hypotheses. Standardized regression coefficients (β), t-values, p-values, the coefficient of determination (R^2), and the F-statistic were used to evaluate the relationships between the independent variables and learner satisfaction. In addition, multicollinearity was assessed using the Variance Inflation Factor (VIF) to ensure the robustness and reliability of the regression model.

4. Research results

4.1. Sample Characteristics and Descriptive Statistics

A total of 380 valid questionnaires were collected from learners who had participated in or were currently enrolled in short-term training programs offered by the School of Economics, Hanoi University of Industry. Descriptive statistics for the study variables are presented in Table 1. The mean scores ranged from 3.89 to 4.17 on a five-point Likert scale, indicating that respondents generally held favorable perceptions of the quality of the training programs and related services.

Among the investigated constructs, Support Services (SS) received the highest mean score ($M = 4.17$), suggesting that learners were generally satisfied with the administrative support, consultation services, and learning assistance provided throughout the training process. Training Program Quality (TPQ) and Facilities and Learning Infrastructure

(FLI) were also evaluated positively, with mean scores of 4.09 and 4.03, respectively. Instructor Quality (IQ) and Perceived Value (PV) obtained mean scores of 3.98 and 3.99, indicating relatively favorable evaluations from participants.

Table 1 Descriptive Statistics of the Research Variables (N = 380)

Variable	Obs	Mean	Std. dev.	Min	Max
TPQ	380	4.087368	0.4833354	3	5
IQ	380	3.981579	0.5260272	3	5
FLI	380	4.033684	0.4547284	3	4.8
SS	380	4.173684	0.4793819	3	5
PV	380	3.985263	0.3911875	3	4.8
LS	380	3.890526	0.4070808	3	5

Source: Author's analysis results

Learner Satisfaction (LS), the dependent variable, recorded a mean score of 3.89, reflecting an overall positive level of satisfaction among respondents regarding their learning experiences and training outcomes. Furthermore, the standard deviations of the study variables ranged from 0.39 to 0.53, suggesting a relatively low level of dispersion and a high degree of consistency in respondents' evaluations.

Overall, the descriptive statistics indicate that learners generally perceived the short-term training programs positively across all dimensions. These findings provide an appropriate basis for subsequent reliability, validity, and regression analyses.

4.2. Reliability analysis

The reliability of the measurement scales was assessed using Cronbach's Alpha coefficients. As shown in Table 2, the Cronbach's Alpha values ranged from 0.785 to 0.845, exceeding the recommended threshold of 0.70 suggested by Hair et al. (2022). Among the constructs, Instructor Quality (IQ) demonstrated the highest reliability ($\alpha = 0.845$), followed by Facilities and Learning Infrastructure (FLI) ($\alpha = 0.833$), Training Program Quality (TPQ) ($\alpha = 0.823$), and Support Services (SS) ($\alpha = 0.823$). Perceived Value (PV) and Learner Satisfaction (LS) also exhibited satisfactory reliability levels, with Cronbach's Alpha coefficients of 0.785 and 0.786, respectively.

The results indicate a high degree of internal consistency among the measurement items within each construct. Since all scales satisfied the recommended reliability criterion, all 30 observed variables were retained for subsequent Exploratory Factor Analysis (EFA).

Table 2 Reliability Analysis Results

Item	Number of Items	Cronbach's Alpha	Conclusion
TPQ	5	0.8234	Accepted
IQ	5	0.8445	Accepted
FLI	5	0.8329	Accepted
SS	5	0.8230	Accepted
PV	5	0.7853	Accepted
LS	5	0.7857	Accepted

Source: Author's analysis results

4.3. Exploratory Factor Analysis (EFA)

Following the reliability analysis, Exploratory Factor Analysis (EFA) was conducted to assess the construct validity of the measurement scales and examine the underlying factor structure of the observed variables. Prior to factor

extraction, the suitability of the data for factor analysis was evaluated using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity.

As reported in Table 3, the KMO value was 0.710, exceeding the recommended threshold of 0.50, indicating that the sample was adequate for factor analysis. In addition, Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 1,917.976$; $p < 0.001$), suggesting that the correlation matrix was not an identity matrix and that sufficient correlations existed among the observed variables. These results confirm the appropriateness of applying EFA to the dataset.

Table 3 KMO and Bartlett's Test Results

Measure	Value
KMO	0,710
Bartlett's Test (χ^2)	1.917,976
Sig.	0,000

Source: Author's analysis results

Table 4 Exploratory Factor Analysis Results

Variable	Item	Factor Loading
Training Program Quality (TPQ)	TPQ1	0.821
	TPQ2	0.843
	TPQ3	0.807
	TPQ4	0.826
	TPQ5	0.751
Instructor Quality (IQ)	IQ1	0.885
	IQ2	0.841
	IQ3	0.822
	IQ4	0.836
	IQ5	0.764
Facilities and Learning Infrastructure (FLI)	FLI1	0.778
	FLI2	0.735
	FLI3	0.702
	FLI4	0.728
	FLI5	0.711
Support Services (SS)	SS1	0.812
	SS2	0.839
	SS3	0.851
	SS4	0.798
	SS5	0.721
Perceived Value (PV)	PV1	0.736
	PV2	0.811
	PV3	0.745
	PV4	0.704
	PV5	0.712
Learner Satisfaction (LS)	LS1	0.748
	LS2	0.802

	LS3	0.733
	LS4	0.708
	LS5	0.719

Source: Author's analysis results

The EFA results identified six factors corresponding to the proposed research model, namely Training Program Quality (TPQ), Instructor Quality (IQ), Facilities and Learning Infrastructure (FLI), Support Services (SS), Perceived Value (PV), and Learner Satisfaction (LS). As presented in Table 4, all measurement items loaded strongly on their respective constructs, with factor loadings ranging from 0.702 to 0.885, exceeding the recommended threshold of 0.50. These findings indicate satisfactory convergent validity of the measurement scales.

Among the extracted constructs, Instructor Quality (IQ) exhibited the highest factor loadings, ranging from 0.764 to 0.885. The remaining constructs also demonstrated substantial factor loadings, including Training Program Quality (0.751–0.843), Support Services (0.721–0.851), Facilities and Learning Infrastructure (0.702–0.778), Perceived Value (0.704–0.811), and Learner Satisfaction (0.708–0.802). Furthermore, no substantial cross-loadings were observed among the extracted factors, suggesting adequate discriminant validity between the constructs.

Overall, the EFA results support the proposed measurement structure and confirm the construct validity of the scales. Therefore, all 30 observed variables were retained for subsequent correlation and multiple regression analyses.

4.4. Correlation analysis

Prior to conducting the regression analysis, Pearson correlation analysis was performed to examine the linear relationships among the study variables. The results presented in Table 5 indicate that all independent variables were positively and significantly correlated with Learner Satisfaction (LS) at the 1% significance level ($p < 0.01$).

Specifically, Training Program Quality (TPQ) exhibited the strongest correlation with Learner Satisfaction ($r = 0.807$), followed by Facilities and Learning Infrastructure (FLI) ($r = 0.798$), Support Services (SS) ($r = 0.740$), Instructor Quality (IQ) ($r = 0.703$), and Perceived Value (PV) ($r = 0.696$). These findings suggest that learners who perceive higher levels of training quality tend to report greater satisfaction with short-term training programs.

Furthermore, the independent variables were also positively correlated with one another, with correlation coefficients ranging from 0.558 to 0.859. The highest correlation was observed between Facilities and Learning Infrastructure (FLI) and Support Services (SS) ($r = 0.859$). Although several correlations were relatively high, particularly between FLI and SS, all coefficients remained below the threshold of 0.90, suggesting that severe multicollinearity was unlikely to be present. Nevertheless, multicollinearity was further assessed using the Variance Inflation Factor (VIF) in the subsequent regression analysis.

Overall, the correlation analysis provides preliminary evidence supporting the proposed research hypotheses and indicates that the independent variables are closely associated with learner satisfaction in the context of short-term training programs at the School of Economics, Hanoi University of Industry.

Table 5 Pearson correlation matrix of research variables

Variable	TPQ	IQ	FLI	SS	PV	LS
TPQ	1					
IQ	0.731***	1				
FLI	0.817***	0.672***	1			
SS	0.776***	0.571***	0.859***	1		
PV	0.674***	0.558***	0.794***	0.828***	1	
LS	0.807***	0.703***	0.798***	0.740***	0.696***	1

Source: Author's analysis results

The results show that career development opportunities explain 42.9% of the variance in organizational commitment ($R^2 = 0.429$). In addition, organizational commitment explains 37.0% of the variance in quiet quitting behavior ($R^2 =$

0.370). These findings indicate that the proposed model possesses moderate explanatory power and provides meaningful insights into the factors influencing organizational commitment and quiet quitting behavior among Generation Z employees.

Overall, the results suggest that career development opportunities and organizational commitment play important roles in explaining employees' attitudes and behavioral responses in the workplace.

4.5. Multiple Regression Analysis and Hypothesis Testing

Following the reliability and correlation analyses, multiple linear regression analysis was conducted to test the proposed hypotheses regarding the effects of the independent variables on learner satisfaction with short-term training programs. The regression results are presented in Table 6.

The findings indicate that the regression model is statistically significant, with an F-value of 203.67 and a significance level of $p < 0.001$. The coefficient of determination (R^2) is 0.7314, while the adjusted R^2 is 0.7278, indicating that the five independent variables explain approximately 72.78% of the variance in Learner Satisfaction (LS). This result suggests that the proposed model demonstrates a high level of explanatory power and provides a good fit to the data.

The regression results further reveal that all five research hypotheses are supported at the 5% significance level. Among the examined factors, Training Program Quality (TPQ) exerts the strongest positive effect on Learner Satisfaction ($\beta = 0.290$, $p < 0.001$). This finding suggests that improvements in curriculum relevance, content quality, and practical applicability are likely to enhance learners' overall satisfaction with short-term training programs. Facilities and Learning Infrastructure (FLI) represent the second most influential factor ($\beta = 0.231$, $p < 0.001$), highlighting the importance of a supportive and well-equipped learning environment in shaping learners' experiences.

Instructor Quality (IQ) also demonstrates a positive and statistically significant effect on learner satisfaction ($\beta = 0.144$, $p < 0.001$). This result underscores the critical role of instructors' professional expertise, practical experience, and pedagogical effectiveness in enhancing the perceived quality of training programs.

Regarding Perceived Value (PV), the regression coefficient is 0.114 ($p = 0.029$), indicating that learners are more satisfied when they perceive the benefits gained from the program to be commensurate with the time, effort, and financial resources invested. Support Services (SS) also have a positive and statistically significant impact on learner satisfaction, although the effect is the weakest among the investigated factors ($\beta = 0.046$, $p = 0.030$). This finding suggests that administrative assistance, consultation services, and learner support activities contribute to the overall learning experience, albeit to a lesser extent than the core educational dimensions.

Overall, the results indicate that Training Program Quality, Facilities and Learning Infrastructure, and Instructor Quality are the three most influential determinants of learner satisfaction. Therefore, training providers should prioritize investments in these areas to improve training quality, enhance learner experiences, and strengthen their ability to attract and retain learners in an increasingly competitive educational environment.

Table 6 Results of Hypothesis Testing

Hypothesis	Relationship	β	p-value	Result
H1	TPQ $\rightarrow$ LS	0,290	0,000	Supported
H2	IQ $\rightarrow$ LS	0,144	0,000	Supported
H3	FLI $\rightarrow$ LS	0,231	0,000	Supported
H4	SS $\rightarrow$ LS	0,046	0,030	Supported
H5	PV $\rightarrow$ LS	0,114	0,029	Supported

Source: Author's analysis results

To assess the potential presence of multicollinearity in the regression model, the Variance Inflation Factor (VIF) was examined. As reported in Table 7, the VIF values of the independent variables ranged from 2.30 to 4.49, with a mean VIF of 4.13.

Among the predictors, Facilities and Learning Infrastructure (FLI) and Support Services (SS) exhibited the highest VIF values, at 4.49 and 4.34, respectively. The remaining variables showed VIF values ranging from 2.30 to 4.03. Since all VIF values were below the commonly accepted threshold of 5, the results indicate that multicollinearity is not a serious concern in the regression model.

Therefore, the estimated regression coefficients can be considered reliable, and the relationships between the independent variables and learner satisfaction can be interpreted with confidence.

Table 7 Results of Multicollinearity Diagnostics

Variable	VIF	1/VIF
FLI	4.49	0.22272
SS	4.34	0.23041
TPQ	4.03	0.24814
PV	3.51	0.28490
IQ	2.3	0.43478
Mean VIF	4.13	

Source: Author's analysis results

These findings provide further evidence of the robustness of the regression model, indicating that the estimated coefficients are reliable and can be meaningfully interpreted to explain the relationships between the proposed determinants and learner satisfaction.

5. Discussion and managerial implications

The findings of this study indicate that all five factors—Training Program Quality, Instructor Quality, Facilities and Learning Infrastructure, Support Services, and Perceived Value—have positive and statistically significant effects on learner satisfaction with short-term training programs at the School of Economics, Hanoi University of Industry. These findings are consistent with previous studies on educational service quality and learner satisfaction, confirming that learner satisfaction is shaped by a combination of factors associated with the delivery of educational services.

Among the investigated factors, Training Program Quality emerged as the most influential determinant of learner satisfaction ($\beta = 0.290$, $p < 0.001$). This finding suggests that participants in short-term training programs place particular emphasis on course content, the relevance and currency of knowledge, and the practical applicability of acquired skills. Unlike learners in formal degree programs, participants in short-term courses are typically motivated by the need to enhance professional competencies within a relatively short period. Consequently, they tend to value training programs that are well designed, aligned with industry requirements, and responsive to labor market demands.

Facilities and Learning Infrastructure were identified as the second most influential factor affecting learner satisfaction ($\beta = 0.231$, $p < 0.001$). This result highlights the importance of learning environments, instructional equipment, educational resources, and technology-enabled learning platforms in enhancing learners' overall experiences. In the era of digital transformation and flexible learning, investment in modern facilities not only improves training effectiveness but also contributes to strengthening the professional image of the training institution.

Instructor Quality was also found to have a positive and significant impact on learner satisfaction ($\beta = 0.144$, $p < 0.001$). This finding underscores the importance of instructors' professional expertise, practical experience, and teaching effectiveness in creating educational value for learners. In the context of short-term training, learners often expect not only theoretical knowledge but also practical insights, professional experiences, and real-world applications shared by instructors.

Furthermore, Perceived Value positively influences learner satisfaction ($\beta = 0.114$, $p = 0.029$). This result suggests that learners are more satisfied when they perceive the benefits gained from a training program to be commensurate with the time, effort, and financial resources invested. The finding is consistent with the view that perceived value represents an important antecedent of customer satisfaction in service-related contexts.

Support Services exhibit the weakest, yet still statistically significant, effect on learner satisfaction ($\beta = 0.046$, $p = 0.030$). This finding indicates that although administrative support, consultation services, and learner assistance are not the primary determinants of training quality, effective support services contribute positively to learners' overall experiences and perceptions of the training institution.

Based on the empirical findings, several managerial implications can be proposed for the School of Economics, Hanoi University of Industry to enhance learner satisfaction with its short-term training programs.

First, priority should be given to improving training program quality through the continuous review and updating of course content in response to industry needs and labor market trends. Greater involvement of industry experts and employers in curriculum development can help ensure the relevance, practicality, and currency of training programs.

Second, the institution should continue investing in and upgrading learning facilities, instructional equipment, and technological infrastructure. The development of online learning platforms, digital learning resources, and modern learning support systems can significantly enhance learner experiences while meeting the growing demand for flexible learning opportunities.

Third, greater attention should be devoted to faculty development through professional training, continuous knowledge updating, and pedagogical enhancement programs. In addition to full-time instructors, collaboration with industry practitioners, managers, and experienced professionals can enrich course content and increase the practical value of short-term training programs.

Fourth, efforts should be made to enhance learners' perceived value by ensuring that training programs generate tangible benefits for career advancement and professional development. Providing recognized certificates, facilitating industry connections, and offering pathways for continued learning may further increase the value perceived by learners.

Fifth, the quality of support services should be continuously improved through the simplification of registration procedures, greater adoption of information technology in learner management, and the enhancement of advisory and support services before, during, and after course completion. Such initiatives can contribute to creating positive learning experiences and strengthening the institution's reputation in the field of continuing education.

Overall, the findings suggest that improving learner satisfaction requires a comprehensive approach, with particular emphasis on Training Program Quality, Facilities and Learning Infrastructure, and Instructor Quality. Continuous improvement in these areas will contribute to enhancing training quality, increasing learner attraction and retention, and supporting the sustainable development of short-term training programs at the School of Economics, Hanoi University of Industry.

6. Conclusion and Future Research Directions

This study was conducted to identify the factors influencing learner satisfaction with short-term training programs at the School of Economics, Hanoi University of Industry. Based on a review of relevant theories and previous studies, a research model comprising five determinants—Training Program Quality, Instructor Quality, Facilities and Learning Infrastructure, Support Services, and Perceived Value—was developed. Data were collected from 380 learners participating in short-term training programs and analyzed using descriptive statistics, reliability analysis, Exploratory Factor Analysis (EFA), and multiple linear regression.

The findings indicate that all factors included in the proposed model have positive and statistically significant effects on learner satisfaction. Among these factors, Training Program Quality exerts the strongest influence, followed by Facilities and Learning Infrastructure, Instructor Quality, Perceived Value, and Support Services. These results confirm that learner satisfaction is determined not only by the content of training programs but also by the learning environment, instructional quality, support services, and the value that learners perceive from their educational experiences.

From a theoretical perspective, this study contributes empirical evidence to the growing body of literature on learner satisfaction in the context of short-term training programs offered by higher education institutions in Vietnam. The findings also support the applicability of educational service quality and customer satisfaction theories in the context of continuing education and professional development programs.

From a practical perspective, the study provides a scientific basis for training providers to develop and implement strategies aimed at improving program quality, strengthening instructor competencies, upgrading learning facilities, enhancing support services, and increasing learners' perceived value. These factors are essential for attracting and retaining learners and for ensuring the sustainable development of short-term training programs in an increasingly competitive educational environment.

Despite its contributions, this study has several limitations. First, the survey was conducted exclusively at the School of Economics, Hanoi University of Industry, which may limit the generalizability of the findings to other educational institutions. Second, the use of convenience sampling may not fully represent the characteristics of the target population. Third, the proposed model focuses on five direct determinants of learner satisfaction, whereas other potentially influential factors, such as institutional image, perceived learning outcomes, learning motivation, program flexibility, and future enrollment intentions, were not considered.

Based on these limitations, future studies may expand the scope of investigation to include multiple educational institutions and training providers in order to enhance the generalizability of the findings. Future research may also incorporate additional constructs, such as institutional image, learner loyalty, re-enrollment intention, and positive word-of-mouth, to develop a more comprehensive research framework. Furthermore, the application of advanced analytical techniques, such as Structural Equation Modeling (SEM) or Partial Least Squares Structural Equation Modeling (PLS-SEM), may provide deeper insights into the relationships among the research variables and improve the robustness of the findings.

Compliance with ethical standards

Acknowledgments

The authors gratefully acknowledge the support of Hanoi University of Industry, Vietnam in funding this study. Additionally, the author expresses sincere gratitude to the reviewers for their insightful comments and constructive feedback, which greatly contributed to enhancing the quality and clarity of the paper.

Disclosure of conflict of interest

The authors declare no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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