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FACTORS AFFECTING THE QUALITY OF ONLINE TRAINING IN THE CONTEXT OF THE COVID 19 PANDEMIC, RESEARCH AT UNIVERSITIES IN HANOI

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Abstract

The objective of this study is to analyze and measure the influence of factors affecting the quality of online training in the context of the Covid-19 pandemic of universities in Hanoi city. By means of exploratory factor analysis and multivariate regression analysis with 648 observations from students of 8 universities. The results indicate that there are 5 key factors that affect the quality of online training in descending order, including: Advanced technology; Teaching methods; Learners; Lecturers and Courses. Based on the research results, a number of recommendations are made to stakeholders to improve the quality of training of universities in the future.

Keywords: Training quality, online training, Covid-19 pandemic, Vietnam.

1. INTRODUCTION

The Covid-19 pandemic has deeply affected all countries in the world, all aspects of social life. In particular, education is considered to be one of the most impactful areas. According to statistics from the UNESCO Institute of Statistics (2020), as of April 18, 2020, more than 1,57 billion students in 191 countries and territories have had their education disrupted due to the impact of Covid-19, accounting for over 91% of the total number of learners worldwide.

In Vietnam, in that context, in order to prevent the spread of the Covid-19 epidemic, while maintaining the quality of teaching and completing the program on schedule, ensuring the learning of students, many universities have applied online teaching for most training systems and have gained many benefits for both teachers and learners, such as: saving time and costs because this form of learning helps to address the barriers of time and geography; lecturers can update the training content more often; can control the amount of knowledge that learners receive through the sessions by self-assessment system... and especially suitable when it is not possible to conduct direct exchanges between lecturers and students as during the Covid-19 pandemic. However, in addition to the advantages, online learning also has some main disadvantages, such as: there is no direct communication with teachers and other learners; learners easily lose motivation to study; reduced ability to communicate and work in groups; due to space constraints, the practice is more difficult... All this shows that there are limitations and inadequacies in the quality of online training. Many questions have been asked to find out, such as, which factors lead to unsecured quality of online training? Is the issue of controlling those factors in training implemented by universities and if so, how?

Studies on the quality of online training in both the world and Vietnam in recent years have been carried out to identify the factors that determine the quality of online training so that there are practical solutions, such as: research by Roca & partner (2006); Pham & partner (2019); Wang & partner (2020); Ameen &

partner (2020); Tran Thi Hang (2017)... However, most of these studies are mainly conducted in countries with developed education, such as the United States, South Korea, Spain... Meanwhile, experimental studies in Vietnam seem to be very limited. Therefore, this study was carried out as an attempt to fill the previous research gap, and thereby make recommendations to help universities in Hanoi have strategies to improve the quality of training in general and the quality of online training in particular.

2. Theoretical background and literature review

2.1. Theoretical basis

Online learning: According to Al-Said (2015), there are four forms of learning: in-person learning, distance learning, online learning, and telephone learning. In particular, D-Learning is the foundation for the formation of E-Learning and E-Learning is then the foundation of device learning or mobile platform (M-Learning). Online learning uses computers connected to the Internet and does not necessarily require learning at a specific location (Charmonman & Chorpothong, 2005; Laouris & Eteokleous, 2005). The Internet has a decisive role in the success of online learning (Kaymak & Horzum, 2013). According to Welsh & partner (2003), online learning uses computer networking technology on the internet environment to provide information and guidance to individuals in need. In addition, Morrison's (2003) research indicates that online learning can be defined as the acquisition of knowledge and skills through synchronous and asynchronous applications such as writing, communication, operations, support and management of Internet use. As such, the definition of online learning may vary but all revolve around the fundamental issues of learning, technology, and connectivity.

Quality of training: According to Cheng & Tam (1997), the quality of training is a rather vague and controversial concept, they argue that different people may have different conceptions, some emphasize the quality of input to educational systems, others prioritize the quality of process or the quality of output, currently there is no general consensus on the concept of quality of training although its importance has been emphasized. In addition, Harvey & Green (1993) argue that the quality of training is defined very differently depending on the time and among those interested, such as: students, lecturers, employers, sponsoring organizations and accrediting bodies. According to Cheng & Tam (1997), the quality of training is characteristic of all the inputs, processes and outputs of the education and training system that it provides services that satisfy the needs of learners and the needs of society in terms of training. Thus, the training process can be considered as the process of providing services between the school and the learners. Within the scope of this study, from the learner-centred point of view, learners are "final customers". The quality of online training means the satisfaction of the expectations and needs of learners. So, the quality of online training is determined by learners when it meets their satisfaction.

Satisfaction with training services: Kotler & Clarke (1987) define satisfaction as the state perceived by an individual's experience results or results that meet his or her expectations. Meanwhile, according to Zeithaml (2000) customer satisfaction is a consideration whether a service or a product satisfies their needs and expectations. Parasuraman & partner (1988) argue that customer satisfaction for service quality is measured by the difference between expected quality and achieved quality. As can be seen, satisfaction refers to the comparison between perception and expectations (Alves & Raposo, 2009).

In recent years, the concept of satisfaction has also been studied in the context of university training. Some studies believe that student satisfaction is related to their perceptions and experiences with learning at school (Alves & Raposo, 2009; Nell & Cant, 2014). Student satisfaction can be considered as a comprehensive assessment of the training provided by the school, meeting the expectations of students. Thus, it is possible to understand that student satisfaction with the

quality of online education is the level of student satisfaction with the online learning experience at the university.

The relationship between training quality and satisfaction: According to Zeithaml & Bitner

(2000), service quality and customer satisfaction are two distinguishing concepts. Customer satisfaction is a holistic concept that speaks to their satisfaction when consuming a service. Meanwhile, service quality focuses only on specific components of the service. If the supplier provides its customers with quality products and services that satisfy the requirements of customers, the beginning of the business has made customers satisfied. Thus, to improve the satisfaction of customers, the service providers to improve the quality of service. Thus, it can be understood that in the context of university training, the quality of online training and student satisfaction are closely related, in which the quality of online training is what is created first and then determines student satisfaction.

2.2. Literature review

Domestic and foreign researches have confirmed the direct or indirect influence of factors on the quality of online training, specifically as follows:

Lecturer

According to Snipes & Thomson (1999), the knowledge, skills and interest of trainers in learners are the most important factors for training quality. The study by Musa & Othman (2012) was conducted on 450 undergraduate students at Teknologi University Malaysia. The results also show that the role of lecturers in promoting interaction, discussion and the timely distribution of learning resources on the system network has an important influence on the quality of online training. Meanwhile, research by (Nguyen Thanh Long, 2006) has shown that lecturers are the most important factor of training quality, impacting on student satisfaction.

Teaching methods

According to Jacqueline Douglas & partner (2006), important aspects of training services relate to core services, such as: lectures, including knowledge capture, classroom notes. Moreover, the training programs of universities should be referenced and compared with the training programs of universities in the world and prestigious professional organizations in the world. According to Tran Thi Hang (2017), it is necessary to innovate teaching methods and develop online training as the main direction of training. In addition, Yunwei (1997) believes that the development of curriculum and teaching methods are important factors that create the quality of online training.

Technology

Numerous studies have been carried out to assess the role of technology in online learning, Rosenberg (2000) affirms that online learning is based on the use of Internet technologies to provide a range of solutions that improve knowledge and training performance. Research by Siritongthaworn & partner (2006) on factors affecting the quality of online training conducted in Thai universities, in-depth interview results indicate that advanced technology has a significant influence on the quality of online training. In addition, research by Musa & Othman (2012) suggests that the most important factor for success in online training is the technology factor, specifically the study emphasizes the importance of Internet speed for online training.

Learner

Ali & partner research (2018) conducted an in-depth review of the literature related to factors affecting the quality of online training. Data was extracted from reputable peer-reviewed journals between 1990 and 2016. By qualitative analysis, the results show that there are 4 groups of factors that affect the quality of online training, of which the group of factors belonging to "learners" is considered to have an important influence.

Research by Jun (2005) and Cereijo (2006) also showed that the characteristics of learners, such

as gender, motivation, attitude, work schedule have a significant and decisive influence on the effectiveness of online learning.

Course

Some studies deal with the content of the course, the activities carried out in the course, the support functions offered and the mode of delivery of the course that influences the quality of online learning. Patton's (2000) study states that course content is important and refers to what is actually taught or learned. Some discuss whether the content is interesting and relevant, accurate, up-to-date, and relevant to the needs of future employers (Lentell & O'Rourke, 2004). Meanwhile, Rahman's (2006) study refers to the varying flexibility of the course and the degree of personalization required for students to pass a course, which is related to whether students are allowed to study at their own pace and take exams when they want to, which is important to determine the effectiveness of online learning.

3. Research Method

3.1. Research models and hypotheses

Based on the theoretical basis and the research overview, on the basis of succession of predecessor research models, the theoretical model is proposed as follows:

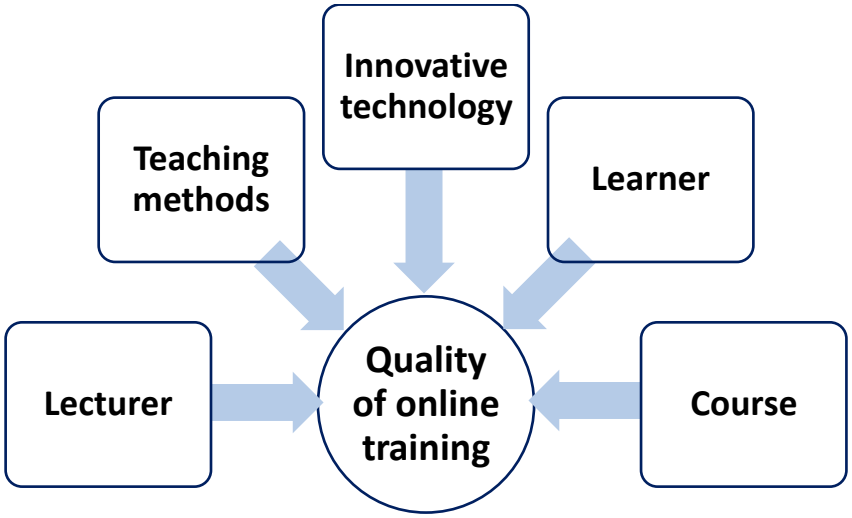

Figure 1. *Research model on the quality of online training*

Source: Author of the proposal

Accordingly, the research hypotheses are expressed:

H1: There is a favorable relationship between the teaching factor and the quality of online training.

H2: There is a favorable relationship between the factors of teaching methods and the quality of online training.

H3: There is a favorable relationship between the advanced technology factor and the quality of online training.

H4: There is a favorable relationship between the learner factor and the quality of online training.

H5: There is a favorable relationship between course factors and the quality of online training.

3.2. Data collection and processing

The author collects data using questionnaires to collect the opinions of students from 8 universities, including: National Economics University (NEU); University of Foreign Trade (FTU); University of Commerce (VCU); Hanoi University of Natural Resources and Environment (HUNRE); Academy of Finance (AOF); Institute of Banking (BA); University of Trade Union (TUU) and University of Labor and Social Affairs (ULSA) on the impact of

factors on the quality of online training in the context of Covid-19 pandemic.

Through the review of previous studies, to assess the quality of online training (dependent variable), the author uses the Likert scale of 5 levels of agreement, from: (1) Strongly disagree to (5) Strongly agree. Evaluating independent variable factors, the author uses the Likert scale with 5 levels of influence, from: (1). Very low to high (5). Very. The number of scales for measuring variables is presented in Appendix 1.

The questionnaire is checked and calibrated by sending to 05 people (01 is a senior lecturer, Faculty of Accounting, Academy of Finance; 02 are students of Institute of Banking – Finance, National Economics University; 02 are students of Marketing, Commercial University) to assess the relevance to the research objectives. In addition, to ensure the study sample size, based on the minimum sample size requirements for EFA analysis and regression Bollen (1989), the sample size is calculated according to the formula n = 5*i (i is the number of variables observed in the model).

The author uses a convenient sampling method and 648 valid samples obtained through sending and receiving questionnaires through the Google form tool and email to students of 8 universities in Hanoi city, from November 2021 to February 2022. Based on the collected data, the author uses quantitative techniques such as testing the reliability of the scale, exploratory factor analysis... with the use of SPSS software.22 to summarize and present the basic results of the study.

4. Results and discussion

Of the 648 valid replies, 86 were from NEU, accounting for (13,26%); 73 were from FTU, accounting for (11,26%); 72 were from VCU, accounting for (11,11%); 92 were from HUNRE, accounting for (14,2%); 66 were from AOF, accounting for (10,19%); 85 were from BA, accounting for (13,12%); 78 were from TUU, accounting for (12,04%); and 96 were from ULSA, accounting for (14,82%).

Regarding the number of students by faculty: Accounting - Auditing 122 students, accounting (18,83%); Business Administration 117 students, accounting (18,06%); Marketing 96 students, accounting (14,81%); Banking - Finance 88 students, accounting (13,58%); Law 76 students, accounting (11,73%) and in other faculties 149 students, accounting (22,99%).

The sample surveyed belongs to many universities, with a fairly uniform distribution. Thus, it is possible to ensure that the answers are reliable and of quality.

Statistical results describing the scale showed that most of the variables observed had mean values around the expected mean (3,0) and there was no significant difference between the variables observed in the same group. This shows that the surveyed subjects have similar opinions and all agree with the scale of variables.

4.1. Results of testing the quality of the scale

Cronbachs Alpha test results for the online training quality scale (6 scales with 25 observation variables) are shown in Table 1.

Table 1. *Results of testing the reliability of the scale of factors in the model*

No.	Factor	Symbol	Cronbachs Alpha
1	Lecturer	GV	0,815
2	Teaching methods	PPGD	0,863
3	Innovative technology	CNTT	0,885
4	Learner	NH	0,836
5	Course	KH	0,762
6	*Quality of online training*	HL	0,804

Source: Analysis results from SPSS 22.0

Thus, the model retains 6 factors to ensure good quality, with 25 characteristic variables (Cronbachs Alpha coefficient) of the whole greater than 0,6; The coefficient of correlation of variables - the sum of the observed variables is greater than 0,3.

Explore factor analysis EFA

The EFA exploratory factor analysis was performed separately for 02 groups of independent variables and dependent variables by the full-angle rotation method (Varimax). The results obtained after the first rotation are as follows:

Table 2. *Table of KMO and Bartlett test results for independent variables*

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure ò Sampling Adequacy.	0,825	
Bartlett's Test of Sphericity	Approx. Chi-Square	3048,736
	df	310
	Sig.	0,000

Source: Results of data analysis on SPSS 22

EFA analysis results for the independent variable:

Looking at the results of EFA analysis for independent variables, it can be seen that the results were divided into 5 groups. The criteria are evaluated as follows:

- KMO = 0,825 so the EFA analysis is consistent with the study data.

Sig. (Bartlett's Test) = 0,000 < 0,05 shows that the observed variables in the whole are correlated with each other and the data used in the EFA analysis are appropriate.

- There are 5 factors quoted at Eigenvalues = 1,184 > 1 representing the variation explained by each factor.

- Total variance explained by factor analysis is 74,267% > 50% satisfactory. This means that these 5 factors explain 74,267% change of the data.

The post-rotation factor matrix table will be reviewed to see which observation variables these 5 factor groups include.

Table 3. *Factor Rotation Results*

Rotated Component Matrixa

	Component				
	1	2	3	4	5
GV1	,824				
GV2	,760				
GV4	,727				
GV3	,709				
PPGD2		,874			
PPGD1		,826			
PPGD4		,804			
PPGD3		,712			
IT1			,873		
IT3			,840		
IT4			,785		
IT2			,775		
IT5			,745		
NH1				,872	
NH4				,871	
NH3				,738	
NH2				,720	
KH2					,789
KH3					,740
KH1					,736

Source: Results of data analysis on SPSS 22

The analysis results show that the observed variables have been assembled into 05 groups of variables with the order of the observed variables kept the same compared to the original independent variables.

EFA analysis results for dependent variables:

The indicators show the coefficients

- KMO = 0,764 satisfies the condition of 0,5 < KMO < 1, so the exploratory factor analysis is suitable for actual data.

- The quantity Sig. = 0,000 satisfies the condition Sig. ≤ 0,05 so this test is statistically significant and the observed variables are correlated with each other in the whole, proving that the data used in the analysis is suitable.

- The analysis of the total variance extracted for the dependent variable shows that the percentage of variance of the whole percentage of variance = 83,743% > 50%, the value of Eigenvalue = 2,164 > 1, so the model qualifies for exploratory factor analysis and the load factor of the observation variable is greater than 0,5 so the observation variable has practical significance. So the dependent variable is kept between the original independent variable and the observed variable.

4.3. Results of regression analysis

Pearson Correlation Analysis

This step is performed before the regression analysis to check the correlation between the independent variable and the dependent variable, when the independent variable does not correlate with the dependent variable will be excluded from the model (if Sig. > 0,05).

Pearson correlation analysis results showed a close correlation between the dependent and independent variables in the model because the Sig. value was less than 0,05. Meanwhile, among the independent variables there was a correlation with each other at a level of incoherence due to Sig.<0,05 and r < 0,6.

In addition, the Pearson correlation coefficient of the independent variables with the dependent variable on the quality of online training has a positive value, so these independent variables are proportional to the dependent variable, meaning that the factors under consideration are increased, the quality of online training is higher and the correlation coefficient of the dependent variable with the independent variable ranges from 0,461 to 0,829.

Regression analysis

Based on the results of EFA analysis, we have a multiple regression model as follows:

$CLĐTTT = \beta0 + \beta1*CNTT + \beta2*PPGD + \beta3*GV + \beta4*NH + \beta5*KH + \varepsilon$

In which: β1, β2… is the regression coefficient, β0 is the intercept coefficient, ε is the residual

Table 4. *Summary table of modelb*

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	,865[a]	,746	,737	1,935

a. Predictors: (Constant), CNTT, PPGD, GV, NH, KH.

b. Dependent Variable: CLĐTTT

Source: Results of data analysis on SPSS 22

Table 5. *ANOVAa Model Analysis Sheet*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17,125	5	3,425	86,351	0,000[b]
	Residual	5,235	134	0,04		
	Total	22,360	139			

a. Dependent Variable: CLĐTTT

b. Predictors: (Constant), CNTT, PPGD, GV, NH, KH.

Source: Results of data analysis on SPSS 22

Table 6. *Linear regression results*

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1		,010	,137		,070	**,945**		
	CNTT	,371	,079	**,363**	4,665	**,000**	,291	**3,440**
	PPGD	,276	,076	**,281**	3,611	**,000**	,295	**3,391**
	GV	,154	,062	**,162**	2,498	**,014**	,426	**2,346**
	KH	,061	,0,62	**,069**	1,993	**,022**	,380	**2,630**
	NH	,133	,034	**,184**	3,944	**,000**	,854	**1,171**

a. Dependent Variable: CLĐTTT

Source: Results of data analysis on SPSS 22

Test the relevance of the model

Multicollinearity test: The error magnification factor (VIF) of all independent variables is less than 10, so the multicollinearity in the model is assessed as not serious.

The Durbin - Watson coefficient used to test the correlation of the residuals shows that the model does not violate when using multiple regression, since the Durbin - Watson value obtained is 1,935 (range 1 to 3). In other words, the model has no correlation of the residuals.

The assessment of model suitability is based on the Analysis of Variance (ANOVA) table. ANOVA test results with a significance level of Sig. = 0,000 shows that the multiple linear regression model has been constructed in accordance with the data set and used, or in other words that this model is significant to derive broadly for the whole.

Evaluate the level of interpretation by the independent variables in the model

The coefficient of R2 correction = 0,737 > 0,5 means that the independent variables explain 73,7% of the change of the dependent variable "CLDTT", while 26,3% is due to random error or other factors outside the model.

Independent variables IT, PPGD, T, NH, KH all have a statistically significant impact (due to Sig.<0.05) on information management.

The independent variables IT, PPGD, teachers, banks, customers with β>0 proved to have a reversible effect with the dependent variable "CLĐTTT". Therefore, accepting the initial hypothesis (H1, H2, H3, H4, H5), are independent variables that are linearly related to the dependent variable and perfectly fit the model. From there, we have the regression equation with normalized beta coefficient as follows:

CLĐTTT = 0,363*CNTT + 0,281*PPGD + 0,162*GV + 0,069*KH + 0,184*NH

5. Conclusion and Recommendation

5.1. Conclusion

An analysis of 648 survey samples from students of 8 universities in Hanoi. The regression results show that the factors that positively affect the quality of online training in descending order are: Advanced technology; Teaching methods; Learners; Lecturers and Courses. This is quite similar to the results of previous studies and is explained as follows:

Firstly, the advanced technology factor is considered to have the most important influence on the quality of online training, which can be explained because the application of digital technology will help to have a diverse source of teaching and learning materials thanks to the progress of the Internet connection system and huge data, lecturers and learners can access many materials at home and abroad, serving the construction of lessons

well. Lecturers and students can explore the subject in depth with a variety of perceptions that enrich their view of the subject. In addition, lecturers can use modern teaching methods, means and techniques applied to their teaching activities. With advanced teaching software, lecturers will have the opportunity to choose the appropriate technical means for the content and curriculum.

The second is the teaching method factor, which is considered to be an important factor affecting the quality of online training, this is explained when lecturers have teaching methods suitable to online learning methods, good communication methods, easy to understand, create interest for learners, especially with the encouragement of learners to participate in interaction, which will help learners understand more, thereby increasing the quality of online training.

Thirdly, the learner is considered to be an important factor affecting the quality of online training, because when learners define their goals and have a serious attitude to learning, the quality of learning will be improved, especially in online learning conditions, teachers and learners interact with each other through the virtual environment, the initiative needs to be promoted.

Next, the factor belonging to the lecturer is rated as a significant factor affecting the quality of online training, which is completely reasonable, because the lecturer is the stimulator, guiding students in the discussion, research, learning the lesson content, assigning responsibility to learners instead of focusing on teaching, thereby contributing to improving the quality of online training (Eom & Ashill, 2006).

And finally, the course factor assessed by students has the least impact on the quality of online training.

5.2. Recommendations

The findings from the experimental study are the basis for the author to make some specific recommendations, such as:

Application of advanced technology: In the context of the 4.0 technology revolution and the Covid-19 pandemic, in order to contribute to improving the quality of online training, universities need to devote funds to complete the system of specialized software, Internet transmission lines with higher speed to serve the process of teaching and learning online. At the same time, investing, building virtual practice rooms for students to help learners adapt to the use of information technology in their careers. In addition, it is necessary to improve the skills of using information technology in teaching to lecturers by organizing training and learning courses in the topic of information technology.

Innovating teaching methods: Innovating modern teaching methods is making an urgent requirement for universities especially in the current context. Teaching methods at universities should be applied on the basis of modern information technology, guiding students to learn new knowledge, expanding understanding by accessing and providing information from lecturers. Modern teaching methods are learner-centered, asking questions, asking students to work more at home, increasing research more than before. Online sessions should enhance group discussions and discussions between faculty and students. In addition, it is necessary to diversify the methods of testing and evaluating students such as group exercises, case interviews, etc. In order to be highly effective, besides students having to be well prepared, lecturers must be good at organizing, carefully studying discussion issues, preparing content students will ask more, suggest, guide students to feel excited, arouse passion, creativity and initiative in students' learning.

For learners: Due to the limitation in the interaction between students and lecturers, in order to improve the quality of online training, students must first be able to work independently with a high level of self-awareness. At the same time, students also need to know how to plan appropriately with themselves, orient themselves in learning, and implement the study plan set out. In addition, students also need good skills in using

electronic, computer, telecommunications equipment related to information technology, digital... for learning. It is necessary to move from learning a lot of memory to mastering the essence of the problem, forming the capacity to apply and create in solving situations. Being active in learning, not only learning in books, through materials but also learning through various forms, such as: through games, interactive contacts, project-based learning...

Role of lecturers: Lecturers participating in online training methods need to understand properly and fully the nature of this training method, need to make good use of means; electronic equipment; computers; digital... for teaching, need to switch from knowledge transmission methods to quality formation and capacity development for students towards organizing an open education; internship; career practice. In addition, faculties should strengthen the organization of training courses on digital pedagogical methods, including integrating online teaching aids, integrating games in lectures to consolidate knowledge, increase interaction and increase student interest in lessons. Direct online lecturers should provide course syllabi, study plans and test forms, assess learning outcomes clearly and fully on the online system before starting the teaching process. Lecturers in specialized departments and schools need to regularly discuss difficulties and problems as well as overcome difficulties in the process of teaching and learning by online methods in order to increase the quality of training in the process of online learning. Faculties should emphasize the roles and responsibilities of organic teachers, respond quickly and thoroughly to students' queries.

For the course: In fact, the quality of online training depends on the content of teaching. It is noticeable that not all of the content of the training subject is suitable for use in the online platform. Therefore, universities need to select subjects that suit this mode of learning. In addition, the content of online training needs to be updated more frequently and effectively through interactive activities such as allowing students to debate actively with the lecture content through assignments instead of giving only one-sided information. According to the development trend of education, learners will register for courses because they really have a need to learn new knowledge, from which education needs to associate "learning" with "practice", that is, theoretical training needs to be associated with practice.

5.3. Limitations of the study and subsequent research directions

The article contributes to expanding the research knowledge on the influence of factors on the quality of online training in the context of the Covid-19 pandemic. However, the study still has some limitations, such as: Firstly, the model only explains 73.7% of online training quality of universities in Hanoi. Thus, there are still other factors that have not been studied affecting 26.3% that further studies may explore. Secondly, research has only stopped at EFA analysis. Therefore, further studies should aim to explore new factors, implement deeper analysis techniques. At the same time, it is necessary to increase the sample size and expand the scope of the survey to have a more comprehensive view of the quality of online training of universities.

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