# Factors Influencing Freshmen's Acceptance of Online Learning: A Study at Hanoi University of Industry

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## ABSTRACT

The sudden outbreak of Covid-19 has challenged Vietnamese educational systems, forcing educational institutions across the nation, especially universities and colleges, to shift to an online mode of teaching and learning. What has concerned Vietnamese educators and policymakers is the quality of these online teaching and learning activities. Blayone (2018), Cigdem and Ozturk (2016) as well as Wei and Chou (2020) shared the belief that the acceptance of students decided the success of online teaching and learning. However, only a little research has been done so far on Vietnamese students' acceptance of online learning. Therefore, this quantitative study focuses on determining factors influencing freshmen's acceptance of online learning at Hanoi University of Industry, thus identifying their acceptance level of online learning. Data was collected by a survey with the use of random sampling and the participation of language-majored students from the Hanoi University of Industry. The collected data was quantitatively processed with the employment of SPSS. The results indicate that freshmen's acceptance of online learning is affected by four main factors, including performance expectancy, effort expectancy, attitude, and technological competencies. With respect to the research findings, several implications are suggested for effective online learning and teaching in Vietnam.

**Keywords**: online learning, higher education, measurement, students' acceptance

## Introduction

Online learning has become popular in Vietnam recently in the context of the Covid-19 pandemic. Teachers and students have switched to online teaching and learning for nearly two years, but online education appears to remain many challenges and problems. For example, it is easy for online students to feel isolated from their teachers if their teachers overuse multiple-choice tests instead of collaborative learning tasks, leading to considerable barriers to maintaining the students' study to the end of coursework (Gillett-Swan, 2017). Besides teacher-related problems, students are likely to suffer from anxiety about interrupted

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interactions with their peers for group-assigned presentations (Fabriz, Mendzheritskaya, & Stehle, 2021). Therefore, there has been an enormous urge for teachers and researchers to research students' acceptance of online learning to identify whether students are ready for the new form of education so that teachers can provide support if necessary. However, it seems impractical to diagnose students' acceptance level of online learning without identifying elements of this acceptance. In Vietnam, there has been a great deal of research conducted about online learning; however, the majority of the papers are on the effectiveness of online learning or recommendations for better virtual teaching and learning. Although some researchers did focus on the topics related to Vietnamese students' readiness for only learning, their works were conducted in Central and Southern Vietnam. As a result of the lack of relevant research on this topic in Vietnam, this paper is conducted to determine factors affecting the acceptance of language-majored students at the Hanoi University of Industry of online learning, thus identifying their acceptance level for virtual learning.

## Literature review

### *Online learning*

As more and more researchers become interested in studying online learning, a myriad of definitions of online learning have been provided, most of which are based on technological platforms. Mosa, Mahrin and Ibrrahim (2016) defined online learning as a learning method to create an interactive learning environment with the assistance of computers and the Internet. Sharing the same idea, Yacob, Kadir and Zainudin (2012) gave a more general definition by pointing out that online learning consisted of all forms of teaching and learning requiring technological devices' help. Therefore, online learning can be described as a method of learning based on the employment of technological platforms on different devices that had an Internet connection such as computers, laptops, or smartphones.

To assure the quality of online learning, it is necessary to "further build assessment and evaluation techniques" (Dumford & Miller, 2018, p.453). The reason could result from the practice that the established assessment tools for traditional classrooms might not work well in online learning (Dumford & Miller, 2018). In their research, Bhuasiri et al. (2012) stated that the success of online learning was attributed to four different factors, including technological expertise, recognition of its actual effectiveness, attitudes towards the learning method, and the efficiency of digital devices used for the learning process.

### *Students' acceptance of online learning*

With the growing importance and popularity of online learning, a great deal of research has been conducted to assess students' acceptance of online learning. One of the first studies belonged to Mattice and Dixon (1999). This paper highlighted that students' acceptance of online learning was influenced by students' access to technological platforms, their interest in virtual learning, and other demographical features (Mattice & Dixon, 1999). Zimmerman and Kulikowich (2016) proposed that technology skills were among the significant factors in students' acceptance of online learning. However, some studies in Vietnam pointed out that the limitations of the technological infrastructure in Vietnam exerted a considerable impact on virtual research. The lack of digital devices and stable Internet connections, especially in rural and remote areas, hindered students' online learning (Pham & Ho, 2020). Nguyen and Doan (2021) also agreed that the availability of technological tools played an essential part in

students' acceptance of online learning. In short, students' acceptance of online learning is influenced by numerous elements such as students' attitudes towards online learning, the quality of the technological infrastructure, or demographical features. However, in this study, only four aspects are analyzed, including (1) efficiency expectations for online learning, (2) efforts expectations for online learning, (3) learners' attitudes toward online learning, and (4) students' technology skills.

### *Efficiency expectations for online learning*

Efficiency expectations are concerned with the learners' assumptions. From their perspective, the technology used for online education can foster their academic achievement. Efficiency expectations originate from the Technology Acceptance Model which mentions the perceived usefulness of technology usage (Ngampornchai & Adams, 2016). Students could accept online learning when it helped target their educational and personal goals (Teo, 2013). There is a positive relationship between the learner's expectations and perceived usefulness (Liu, Teng, & Han, 2020). When the students' expectations for online education reach a high level, they are likely to realize the advantages of the online learning platform quickly and then foster their perceived usefulness of online learning. Furthermore, online education can bring about the advancement of computer skills necessary for the student's graduate jobs due to quickly seeking more updated Internet news (Kew et al., 2018).

### *Efforts expectations for online learning*

Efforts expectations refer to the learners' belief of ease in employing technology. In other words, effort expectations are associated with perceived ease of technology usage (Ngampornchai & Adams, 2016). The majority of studies in Asia indicate that the perceived ease of use that emerges from the Technology Acceptance Model is a key factor in approving the users' different technologies (Murillo, Novoa-Hernández, & Rodríguez, 2021). In this research, we also adopted this element in the Technology Acceptance Model as a factor influencing students' acceptance of online learning. It can be inferred that the students could expect to save time from online learning because of the ease of online software applications. They can hope to become skillful in using technological applications without support from other members such as lecturers or friends.

### *Learners' attitudes towards online learning*

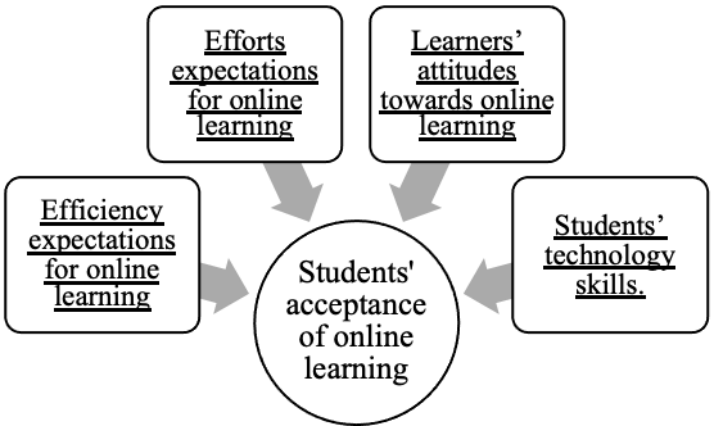
Attitude is identified to have a positive association with human behavior towards the surrounding environment (Liu et al., 2020). In terms of online learning, students' attitude was shown to have a direct impact on their learning participation (Ali, 2020). The previous study indicated that the student's attitudes brought about significant effects on their behavioral intention to accept language learners' mobile technology (García Botero et al., 2018). The students who had a positive attitude towards online education tended to encounter the lowest barrier. In contrast, the students who were pessimistic about learning online appeared to have the highest barrier ratings (Muilenburg & Berge, 2005)

### *Technology skills for online learning*

Online learning also requires students to proficiently use multimedia applications, computer software, email, and video-based social interactions (Baytiyeh, 2018). It is undeniable that technology skills can affect the students' capacities in fulfilling their personal learning tasks and student-and-instructor interactions (Agyeiwaah et al., 2021). The readiness for online learning is partially constituted by "computer skills, internet self-efficacy, self-direction" (Tang et al., 2021, p.4). Digital readiness for online education as stated by Blayone et al.

(2018) was impacted by "four-human-computer-interaction types: computational, informational, communicational and technical" (Blayone et al., 2018, p.3). The first three categories originated directly from key capacities of computer hardware for processing, storing, and transmitting computer data. The technical competencies which belong to the learners' operational skills could be developed through working with devices, managing online accounts, and performing procedural tasks.

*Figure 1: Conceptual framework of the research*




### *Research hypotheses*

After reviewing some themes in online learning and considering the present context at Hanoi University of Industry, we focused on four following hypotheses:

H1: Students' effectiveness expectations have a positive influence on their acceptance of online learning.

H2: Students' efforts and expectations have a positive effect on their acceptance of online learning.

H3: Students' attitude toward online learning has a positive influence on their acceptance.

H4: Students' technology skills have a positive effect on their acceptance of online learning.

## Methods

For this research analysis, we employed a case study of the Hanoi University of Industry, an educational institution with a history of 124 years. Hanoi University of Industry was well known as a technical vocational school and has become a higher education institution since 2005. At Hanoi University of Industry, online and face-to-face education was implemented for foreign-languages students more than five years ago. Online learning has merged into the electronic university administration system, so teaching and learning activities can be systematically managed and inspected.

The participants in the study were first-year students who had just finished general education and attended higher education in two weeks. The freshmen spent online learning time when they were in grade 12. Therefore, they seemed familiar with meeting their teachers and friends through internet-based applications such as Zoom, Google Meet, or Microsoft Teams.

The online survey questionnaire was utilized to collect data in this study because it saved costs, sorted data electronically, and helped receive feedback from participants in remote

locations (Teo, 2013). The questionnaire consists of 5 parts with 40 questions which require the participants to rate their response on the five-point Likert scale. The five first parts of 35 questions are related to five independent variables and one dependent variable. Five independent variables include the participants' efficiency expectations, efforts expectations, attitudes, and technology skills towards online learning. They were supposed to impact the participants' acceptance of online learning positively. The last part is five questions about the respondents' demographic information, including the participants' gender, living place, online learning equipment, and their training major at Hanoi University of Industry. It was designed in Vietnamese because it was the participants' mother tongue, although they pursued different training majors of languages, including English, Korean, Japanese, and Chinese.

After being piloted with the participation of 31 students, the official questionnaire was sent to the whole population of the research, which was 361 freshmen of the Faculty of Foreign Languages at Hanoi University of Industry and excluded the number of participants for the survey pilot. After three days, 239 students responded and agreed to participate in the research, which made the confidence interval of the sample size more than 95%.

To analyze the study data, SPSS software version 26 was employed. Firstly, the article depicts the demographic information of the participants by using the descriptive statistic method. Afterward, the scales' reliability needed to be analyzed before executing dimension reduction to discover principal components. Lastly, correlation and multiple linear regression were performed to develop a model of relationships between the newly explored factors and the acceptance of online learning.

## Results

### *Quality of the scale*

#### *Reliability of the scale (Cronbach's alpha coefficients)*

Prior to further analysis into exploratory factors, correlation, and regression, the reliability and validity of the scale are verified. As can be seen from Table 1, Cronbach's alpha coefficients of all items are higher than 0.80, which indicates a very good level of reliability of the scale (Peterson, 1994). The corrected item-total correlation of all indicators is more than 0.30, pointing out that all of the indicators are qualified (Nunnally, 1978). In terms of Cronbach's alpha coefficients, if an item is deleted, almost every indicator has a coefficient lower than the coefficient of the item, except for the two indicators E8 and P2. However, since Cronbach's alpha coefficients of the two items are high (more than 0.80), the coefficients of these two indicators, if items are deleted, are acceptable. Therefore, it can be claimed that the test is reliable, thus being qualified for further analysis.

Table 1. Test of reliability

| No | Items | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|
| **1. Effectiveness Expectations (E) – 0.86** | | | |
| **1** | E1 | 0.73 | 0.82 |
| **2** | E2 | 0.63 | 0.83 |
| **3** | E3 | 0.54 | 0.85 |
| **4** | E4 | 0.65 | 0.83 |
| **5** | E5 | 0.54 | 0.85 |
| **6** | E6 | 0.72 | 0.82 |
| **7** | E7 | 0.61 | 0.84 |
| **8** | E8 | 0.39 | 0.86 |
| **2. Efforts Expectations (P) – 0.83** | | | |
| **9** | P1 | 0.55 | 0.81 |
| **10** | P2 | 0.51 | 0.83 |
| **11** | P3 | 0.73 | 0.76 |
| **12** | P4 | 0.69 | 0.77 |
| **13** | P5 | 0.67 | 0.78 |
| **3. Attitudes (A) – 0.86** | | | |
| **14** | A1 | 0.46 | 0.86 |
| **15** | A2 | 0.66 | 0.83 |
| **16** | A3 | 0.56 | 0.85 |
| **17** | A4 | 0.69 | 0.83 |
| **18** | A5 | 0.63 | 0.84 |
| **19** | A6 | 0.66 | 0.83 |
| **20** | A7 | 0.71 | 0.83 |
| **4. Technology Skills (T) – 0.93** | | | |
| **21** | T1 | 0.65 | 0.92 |
| **22** | T2 | 0.72 | 0.92 |
| **23** | T3 | 0.75 | 0.92 |
| **24** | T4 | 0.78 | 0.91 |
| **25** | T5 | 0.71 | 0.92 |
| **26** | T6 | 0.74 | 0.92 |
| **27** | T7 | 0.78 | 0.92 |
| **28** | T8 | 0.74 | 0.92 |
| **29** | T9 | 0.72 | 0.92 |
| **5. Students' Acceptance (D) – 0.90** | | | |
| **30** | D1 | 0.76 | 0.88 |
| **31** | D2 | 0.80 | 0.87 |
| **32** | D3 | 0.69 | 0.89 |
| **33** | D4 | 0.81 | 0.87 |
| **34** | D5 | 0.65 | 0.89 |
| **35** | D6 | 0.67 | 0.89 |

### *Validity of the scale (Exploratory factor analysis)*

After confirming that the scales are reliable based on the results of the reliability assessment by Cronbach's alpha, a total of 35 items, including 29 items of the independent variables and 6 items of the dependent variables are utilized for the exploratory factor analysis (EFA). The method of extraction used in this analysis is principal component analysis. The statistics in Table 2 show that the scale acquires adequate internal consistency. The results of assessing scale validity indicate that KMO is 0.90 and Sig. of Bartlett's Test is 0.000 < 0.005. As the

KMO value and the result of Bartlett's Test are qualified, the factor analysis is allowed to proceed (Hair et al., 1998).

As indicated in Table 2, the Eigenvalues of all four explored factors, which represent the total amount of variance that all the components explain, are greater than 1. In addition, the cumulative percentage of justified variance is 62.88%, which means that these four factors can account for 62.88% of the total variance (Anderson & Gerbing, 1988). These indexes indicate that the results of exploratory factor analysis of independent variables in this research are valid. Regarding the rotated component matrix from EFA, 4 factors are generated from 25 items. There are 9 items in Factor 1 named technology skills (T) while Factor 2 known as students' attitudes (A) includes 6 items. Factor 3 with 5 different items is called effectiveness expectations (E) and the last factor is Factor 4, named efforts expectations (P), which comprises 5 different items. Interestingly, one item of Factor 3 (E8) in the original questionnaire, after exploratory factor analysis, has been moved to Factor 4. Several items, including A1, P2, E5, and E7 have been eliminated because they are categorized into 4 other factors after the analysis. Each of these factors consists of 1 item only, making them invalid.

Table 2. Results of exploratory factor analysis for independent variables

| **Items** | **Components** | | | |
|---|---|---|---|---|
| | **1** | **2** | **3** | **4** |
| **T4** | 0.82 | | | |
| **T3** | 0.80 | | | |
| **T6** | 0.79 | | | |
| **T7** | 0.78 | | | |
| **T5** | 0.77 | | | |
| **T2** | 0.77 | | | |
| **T9** | 0.76 | | | |
| **T8** | 0.76 | | | |
| **T1** | 0.69 | | | |
| **A5** | | 0.80 | | |
| **A6** | | 0.75 | | |
| **A7** | | 0.75 | | |
| **A2** | | 0.73 | | |
| **A4** | | 0.71 | | |
| **A3** | | 0.70 | | |
| **E4** | | | 0.73 | |
| **E3** | | | 0.73 | |
| **E1** | | | 0.73 | |
| **E2** | | | 0.67 | |
| **E6** | | | 0.63 | |
| **P3** | | | | 0.80 |
| **P5** | | | | 0.71 |
| **P1** | | | | 0.70 |
| **P4** | | | | 0.59 |
| **E8** | | | | 0.56 |
| **Eigenvalues** | 8.09 | 3.99 | 2.25 | 1.38 |
| **Cumulative (%)** | 32.34% | 48.34% | 57.35% | 62.88% |
| **Kaiser-Meyer-Olkin Measure of Sampling Adequacy** | | | 0.90 | |
| **Bartlett's Test of Sphericity** | Approx. Chi-Square | | 3434.56 | |
| | Df | | 300 | |
| | Sig. | | 0.000 | |

Table 3 illustrates the results of exploratory analysis for the dependent variable, which is

students' acceptance of online learning. As can be seen from the table, the indexes of the KMO coefficient and the Sig. of Bartlett's Test are 0.88 and 0.00 respectively, that there are enough conditions for factors analysis to be conducted with the dependent variable (Hair et al., 1998). There are 6 different items in this factor named students' acceptance of online learning. The Eigenvalues of this factor is 4.03, much greater than 1, with the accumulated percentage of explained variance being 67.19%. Based on these statistics, it can be concluded that there is a factor named students' acceptance of online learning generated from 6 items, which accounts for 67.19% of the variability of data.

Table 3. Results of exploratory factor analysis for the dependent variable

| **Items** | **Components** | |
|---|---|---|
| **D5** | 0.76 | |
| **D4** | 0.75 | |
| **D6** | 0.73 | |
| **D2** | 0.70 | |
| **D1** | 0.64 | |
| **D3** | 0.55 | |
| **Eigenvalues** | 4.03 | |
| **Cumulative (%)** | 67.19 | |
| **Kaiser-Meyer-Olkin Measure of Sampling Adequacy** | 0.88 | |
| **Bartlett's Test of Sphericity** | Approx. Chi-Square | 847.91 |
| | Df | 15 |
| | Sig. | 0.000 |

## *Correlation*

The correlation was conducted to assess the relationships between variables, including both independent and dependent ones. As shown in Table 4, all independent variables are correlated to dependent variables and this correlation has significant meaning since the Sig. of the test is all smaller than 0.01. While technology skills (T), effectiveness expectations (E), and efforts expectations (P) have a positive correlation with students' acceptance of online learning (D), the factor named attitudes (A) possesses a negative correlation ($r$ = -0.48, $p$ < 0.01). In general, all these four dependent variables just have a fair correlation with the dependent variable when the absolute value of correlation coefficients ranges from 0.39 to 0.66 ($p$ < 0.01). The relationship between effective expectations (E) and students' acceptance (D) is the strongest while the relationship between technology skills (T) ($r$ = 0.66, $p$ < 0.01) and students' acceptance (D) is the weakest ($r$ = 0.39, $p$ < 0.01).

In addition to the correlation between independent variables and dependent variables, among independent variables exist correlations as well since the Sig. of correlation coefficients between most independent variables is smaller than 0.01, except for the relationship between attitudes and technology skills. Interestingly, both effectiveness expectations (E) and efforts expectations (P) have a negative relationship with attitudes toward online learning (A), with coefficients of -0.36 and -0.22 respectively ($p$ < 0.01). However, these negative relationships are quite weak. Nevertheless, in order to confirm the correlation between variables, there is a need to conduct multiple linear regression to identify whether students' acceptance of online learning is attributed to these four explored factors. Therefore, multiple linear regression is carried out after the correlation test with a view to testifying these hypotheses.

Table 4. Pearson correlations between key variables

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **1. Students' Acceptance (D)** | 1 | | | | |
| **2. Technology Skills (T)** | 0.39** | 1 | | | |
| **3. Attitudes (A)** | -0.48** | -0.09 | 1 | | |
| **4. Effectiveness Expectations (E)** | 0.66** | 0.32** | -0.36** | 1 | |
| **5. Efforts Expectations (P)** | 0.55** | 0.50** | -0.22** | 0.55** | 1 |

* *significance at the level p < 0.01 level (2-tailed)

### *Multiple linear regression*

Table 5 describes the results of multiple linear regression among one dependent variable, which is students' acceptance of online learning, and four independent variables including technological skills (T), students' attitudes (A), effectiveness expectations (E), and efforts expectations (P). The technique selected for data analysis was multiple regression because the relationships in this model are multivariate. As can be seen from Table 5, the Sig. of the test is 0.000 and the Sig. of all independent variables are lower than 0.05, which means that the results of the regression are significant, and thus reliable. The R square value is 0.56, illustrating that all the explored factors including students' attitudes (A), effectiveness expectation (E), efforts expectations (P), and technology skills (T) can explain 55.70% of the student's acceptance of online learning while 45.30% of this acceptance is attributed to other factors which are not included in the regression model.

Table 5. The models' regression results

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B Std. Error Beta | B Std. Error Beta | B Std. Error Beta | | | Tolerance VIF | Tolerance VIF |
| 1 | **(Constant)** | 1.09 | 0.28 | | 4.11 | 0.000 | | |
| | **T** | 0.15 | 0.05 | 0.14 | 2.74 | 0.005 | 0.75 | 1.33 |
| | **A** | -0.27 | 0.04 | -0.28 | -6.08 | 0.000 | 0.87 | 1.15 |
| | **E** | 0.39 | 0.05 | 0.41 | 7.55 | 0.000 | 0.64 | 1.56 |
| | **P** | 0.22 | 0.06 | 0.20 | 3.55 | 0.000 | 0.59 | 1.70 |
| **a. Dependent Variable: D** | | | | | | | | |
| **Adjusted R Square = 0.56** | | | | F (ANOVA) = 76.51 | | | Sig. = 0.000 | |

## Discussion

From the data analysis of this article, it can be concluded that students' acceptance of online learning is attributed to four different factors, including students' effectiveness expectations, students' efforts expectations, their attitudes towards online learning, and their technological skills. In addition, although three hypotheses about students' effectiveness expectations, students' efforts expectations, and students' technological skills are supported, the other about students' attitudes is rejected. While students' effectiveness expectations, students' efforts expectations, and students' technology skills exert a positive influence on their acceptance of online learning, students' attitudes are negatively influential, which contradicts the hypotheses of this research. The study also identifies the weakest relationship between students' technology skills and their acceptance of online learning. This finding helps to clarify the

results of the questionnaire – why students are confident about their technical skills but still feel skeptical about online learning.

Although there have been numerous studies about students' acceptance of online learning, this paper has identified several noteworthy points which contradict the previous study. While all four factors named performance expectancy, effort expectancy, attitudes, and technology skills were claimed to exert positive influences on students' acceptance and readiness for e-learning in many studies (Ngambonchai & Adams, 2016), students' attitudes have been identified to have a negative relationship with students' acceptance in this paper.

In addition, the findings in this research also point out that students' technological skills have little impact on students' acceptance of online learning. Besides, the statistics collected from participants also indicate that while the majority felt confident about their technological skills, they were still uncertain or skeptical about online learning. This finding about students' acceptance of online learning is quite contradictory to relevant research conducted in the Vietnamese context. The study of Nguyen and Chu (2021) implied that students' confidence in their technological abilities would improve their likelihood to accept the use of technological tools for learning. However, this study indicated students' confidence in using technology does not help them to be more positive about online learning.

The discovery of relationship between attitudes and students' acceptance of online learning also overlaps with what has been discovered in the study of Ngo (2021). He believed that opportunities to interact, and students' feelings and emotions strongly affect their engagement in online learning (Ngo, 2021). This finding bears a resemblance to the analysis of this research which indicates the relationship between students' attitudes and their acceptance of online learning. However, while Ngo (2021) discovered a positive impact of students' emotions on their online learning, this study on students' acceptance of online learning represents a negative relationship between the two factors.

## Conclusion

In conclusion, the acceptance of online learning among language-majored freshmen at Hanoi University of Industry was attributed to four different factors, including students' effectiveness expectations, their efforts expectations, their attitudes towards online learning, and their technological skills. While the three factors obtain a positive influence on students' level of acceptance, the last factor, which is students' technology skills, negatively affects students' acceptance of online learning. Based on the results of the research, it can also be concluded that while students were fairly confident about their technological skills, they were still uncertain about their acceptance of online learning and did not want to lengthen the period of studying virtually. Therefore, in order to increase students' acceptance of online learning, lecturers and counselors need to help students recognize the efficiency of online learning before assisting them to develop their technology skills. There should be more studies in the future about how to boost students' acceptance of online learning, thus making their virtual learning more effective. However, this study was conducted at Hanoi University of Industry with freshmen only, so the scale of the research is quite small, which is a limitation of this study. Therefore, there should be more research on a larger scale to identify which factors affect Vietnamese students' acceptance of online learning.

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