

# **What Shapes Undergraduate Students' Satisfaction in Unstable Learning Contexts?**

**Anh Nguyen-Thi-Phuong**  
VNU University of Economics and Business

**Duy Vu**  
VNU University of Economics and Business

**Nguyen To-The**  
VNU University of Economics and Business  
TIMAS Thang Long University

**Vuong Vu-Tien**  
Vietnam National University of Agriculture

**Nhu Dao-Anh**  
VNU University of Economics and Business

**Nhung Nguyen-Thi**  
Hanoi Pedagogical University 2

**Tuan Nguyen-Anh**  
VNU University of Economics and Business

*This paper investigates what determinants, and to what extent, they influence students' satisfaction in unstable learning contexts. Using a national-scaled sample of Vietnamese HEIs with a sound theoretical background, we find that regardless of instabilities from external shocks, the key factors that shape students' satisfaction are fixed by traditional norms (self-efficacy, infrastructure, lecturer) rather than occasional factors occurring from each event. We find in particular that self-efficacy is the most influential factor for students' satisfaction and friendship is the most prominent element that enhances students' self-efficacy. Overall, this paper enriched the literature on student satisfaction, especially during unstable contexts. Thus, it has important implications for educators and HEIs stakeholders in management planning in the time to come.*

*Keywords: university students, satisfaction, unstable context, crisis*

## INTRODUCTION

Enhancing students' learning satisfaction is the key priority of higher education institutions (HEIs) to ensure enrollment capacity and competitive advantages (Wright, 2011, Hsieh, 2014). However, this task is considered more challenging for HEIs nowadays for two main reasons. First, HEIs' new generation of learners shows unique characteristics that distinguish them from their predecessors in terms of values, societal trends, and anxious control (Milliron, 2008, Shatto and Erwin, 2017, Darawong and Sandmaung, 2019, Schlee et al., 2020). It makes the conventional pedagogy approach becomes less effective for this generation (Milliron, 2008). Second, the frequent adjustments of HEIs to adapt to unexpected events (e.g., natural disasters or epidemics) significantly affect students' psychological elements (Holzweiss et al., 2020, Adarkwah, 2021). It makes the efforts to improve students' satisfaction more difficult to achieve. As a result, an insight into the psychological upheavals of HEIs' new generation of learners during unstable contexts becomes urgent.

Most of the existing research on students' satisfaction in the unstable context was implemented during the outbreak of the COVID-19 pandemic with limited samples in each study (Baber, 2021, Basuony et al., 2020). Meanwhile, the COVID-19 pandemic is only viewed as a once-in-many crisis that has happened in the world, and students' perspectives can vastly vary based on specific context as well as their' background (So and Brush, 2008). Thus, focusing on a single event with a small number of observations may create an unequal chance of every student being included and may produce biased results for policy-makers in giving strategies in the time to come. To the best of our knowledge, no empirical works have examined students' responses to general unstable contexts compared with those in the normal conditions. Given the research gap, this paper examines whether and to what extent determinants of undergraduate students' satisfaction under unstable contexts are different from those in normal conditions.

Our study chose Vietnam to be the observed country for illustrative purposes and conducted a national-scaled survey with 1680 Vietnamese HE students. Vietnam is an ideal sample because the country itself belongs to the developing economy, but many aspects, including higher education, have integrated with the developed world (Pham et al., 2019). As a result, the empirical study in Vietnam can make major contributions to various countries to prepare management plans within HEIs under different circumstances. In addition, Vietnam HEIs promote multidisciplinary training and has a relatively close female to male ratio in the HE systems (Economy, 2021). These features perfectly suit our research goals of applying gender and majors as moderators.

Theoretically, we expected the impacts of external shocks and the shift to alternative learning methods (online or hybrid) would have the most substantial power to influence students' self-efficacy and satisfaction, respectively (Adarkwah, 2021, Yilmaz, 2017, Mishra et al., 2020). However, after testing by the PLS structural equation model (PLS-SEM), these two variables were not the most important factors but friendship and students' self-efficacy. Our research results have proved that regardless of instabilities from external shocks, the key factors that shape students' satisfaction are fixed by traditional norms rather than occasional factors occurring from each event.

These findings make important contributions to the literature in three main ways. First, we provide a broad context for HEIs educators and policy-makers to understand students' concerns during unstable learning contexts so that they can deal with possible future crises. Second, we exhibit different cleavage layers of determinants, e.g. factors to students' self-efficacy and factors to students' satisfaction, then verify all of their relationships. The final contribution is assisting students aware of what drivers affect their' learning satisfaction to proactively adjust themselves and achieve optimal learning outcomes.

The remainder of this paper is organized as follows. Section 2 reviews the background literature and proposes the hypothesis. Section 3 presents model specifications, data and sample selection. Section 4 reveals empirical results and hypothesis testing. Section 6 discusses the main results and presents the hypothesis tests. Section 6 concludes the paper.

## LITERATURE REVIEW

### External Shocks and Self-Efficacy

“Self-efficacy” is the beliefs that people hold about their capabilities and the outcomes of their efforts (Bandura, 1977). These self-efficacy beliefs can help individuals to be more persistent and perseverant when they display in the face of shocks (Bandura et al., 1999). Prior studies have broadly emphasized the adverse impacts of external shocks on modifying ones’ self-efficacy (Wuepper and Lybbert, 2017, Turner et al., 2012, Peltier et al., 2021). However, the results remain controversial.

On the one hand, excessive stress from external shocks can cause anxiety and other types of stresses for students, thus, lowering their learning engagement and achievement (Hordacre et al., 2016, Yang et al., 2021). In a study of Peltier et al. (2021), the author found that anxiety had negative influences on the class preparation of students. However, the author could not prove the connection between anxiety to learning performance. On the other hand, an appropriate level of anxiety can increase students’ brain reaction speed and attentiveness (Elmer et al., 2020). At this point, students tend to proactively adjust themselves to improve self-learning efficacy (Bandura et al., 2006). When an external fluctuation occurs, it has the power to break a traditional persistence of an individual or even erase the old and low self-efficacy (Beaman et al., 2012, Banerjee et al., 2015).

Based on the discussion, our study supports the first viewpoint as an external shock is more likely to create high anxiety for students and bring potential risks to their’ self-efficacy. Accordingly, we deduce the following hypotheses.

***Hypothesis 1:** Under unstable contexts, external shock itself is the most influential determinant to students’ self-efficacy and influences negatively.*

### Friendship and Self-Efficacy

Existing literature also focused on the interrelation between friendship and students’ self-efficacy, especially when they are in a difficult time (Hamilton et al., 2017, Wang et al., 2018, Stürmer et al., 2018). A good-quality friendship is believed to create added value for students’ performance. Meanwhile, a weak-tie friendship appears to link to negative learning achievements, including self-efficacy (Nelson and DeBacker, 2008).

When an unexpected event occurs, students’ self-efficacy becomes less effective due to they face uncertain learning issues (Almaiah et al., 2020). In that context, small-group assistance or other friends’ integration types can directly enhance their self-efficacy and thus, help them achieve target outcomes (Stürmer et al., 2018; Brouwer et al., 2016). In a study of Stürmer et al. (2018), the author found that even virtual friendship can significantly foster the self-learning effectiveness of students. As a result, the role of friendship in students’ self-efficacy becomes evident under every circumstance (Qazi et al., 2020).

Prior studies have pointed out the role of friendship on both students’ self-efficacy and students’ satisfaction. Nevertheless, since our study is conducted when students are restricted from interacting with each other in person, we hypothesized that friendship would directly influence students’ self-efficacy rather than their satisfaction. Accordingly, the hypothesis is proposed as follows.

***Hypothesis 2:** Under unstable contexts, friendship positively influence the self-efficacy of students.*

### Self-Efficacy and Satisfaction

Students’ satisfaction is a short-term attitude from evaluating students’ experience, services, and facilities during the learning process (Weerasinghe and Fernando, 2017). The role of self-efficacy in enhancing student satisfaction in a given task has been investigated broadly since the 70s (Bandura, 1977, Ferla et al., 2009, Domenech-Betoret et al., 2017).

Specifically, students without sufficient self- efficacy have little reason to invest tremendous effort or attempt new things. Likewise, students with higher self-efficacy tend to set more ambitious goals, try harder, persist more diligently, therefore, gaining higher satisfaction in life (Wuepper and Lybbert, 2017).

Satisfaction and self-efficacy are viewed as layered phenomena, with self-efficacy serving as a premise to build satisfaction (Zimmerman, 2008). During the fluctuation in learning conditions, prior studies proved that students fail in achieving satisfaction because they are not able to manage themselves to follow class disciplinary (Yilmaz, 2017, Ferla et al., 2009). Hence, in this study, we expect higher self-efficacy students can obtain higher satisfaction toward their learning in the unstable context with the following hypothesis.

**Hypothesis 3:** *Under unstable contexts, the satisfaction of students is significantly contributed by self-efficacy.*

### **Environmental Factors and Satisfaction**

“Environmental factors” are defined as elements related to the physical (e.g. infrastructure), society (e.g. the assistance), and other surrounding contexts (e.g. nature) that affect one individual (Fink, 2016, Stürmer et al., 2018). The importance of environmental factors on an individual’s satisfaction has been indicated across aspects from daily life (Kim et al., 2014) to the retail sector (Marques et al., 2013) or tourism industry (Jarvis et al., 2016). Regarding education, environmental factors such as infrastructure, learning method, activities, and lecturers are popularly considered applicable to students’ satisfaction (Piccoli et al., 2001, Sun et al., 2008, Stürmer et al., 2018, Wood and Bandura, 1989, Whiteneck et al., 2004).

Under normal conditions, lecturers are often considered the most influential factor among variables in supporting students’ satisfaction (Neumann and Neumann, 1981, Butt and Ur Rehman, 2010, Yilmaz, 2017). Highly adequate lecturers tend to display better instruction skills and offer more activities to maintain students on task to create lively learning environment (Yilmaz, 2017, Butt and Ur Rehman, 2010). If students believe that their lecturers care about them and create diversified activities, it may promote emotional satisfaction and support them to address challenges (Xiao and Wilkins, 2015).

Another factor indicated as a determinant that influences students’ satisfaction is the availability of classroom infrastructure (Sun et al., 2008). Infrastructure is often in the form of furniture, stationaries, books and other learning equipment (Wiranto and Slameto, 2021). Should HEIs provide a sufficient infrastructure, learning activities will be effective and satisfy students (Gibson, 2010). Meanwhile, if students have to deal with infrastructure shortages, they generally give contrary feedbacks, which fails to satisfy them from participating in class (Stürmer et al., 2018).

However, when an external shock occurs, specific changes may occur, which reorders the influence power of determinants on students’ psychology (Adarkwah, 2021). For instance, in the context of the unprecedented COVID-19 pandemic, all HEIs have been forced to shift their systems to online and strongly made students feel uncertain about learning performance (Adarkwah, 2021, Yilmaz, 2017, Mishra et al., 2020). Along with social concerns, students’ satisfaction becomes highly uncertain (Mishra et al., 2020). Based on evidence from the latest unstable context, this study predicts that the learning method will affect students’ satisfaction the most under fluctuation, instead of conventional factors. Hence, the hypotheses are formatted as follows.

**Hypothesis 4a:** *Under unstable contexts, all environmental factors containing lecturer, infrastructure, activity, and learning method still positively influence student satisfaction.*

**Hypothesis 4a:** *Under unstable contexts, learning method is the most influential factor toward students’ satisfaction.*

### **Genders and Majors as Moderator Variables**

Socio-demographic constructs such as gender generally play the role of moderating variables in measuring students’ satisfaction (Moro-Egido and Panades, 2010, de Jager and Gbadamosi, 2013). Several theories such as of Cross and Madson (1997), Bem (1981), Davidson and Freudenburg (1996) has presented different results from one’s perception based on gender. They contend that males and females behave

differently, and this difference is because of the different socialization processes that males and females undergo (Davidson and Freudenburg, 1996). According to these theories, females and males will perceive common conditions with different viewpoints so that it may lead to different psychological feedbacks (Bem, 1981). Hence, we propose a hypothesis.

**Hypothesis 5a:** *Under unstable contexts, there is a significant gender difference in all constructs toward learning satisfaction.*

Additionally, prior studies investigating the preference of social science students and natural science students reveal different results. In comparison, social science students, such as accounting or business administration majors, show a higher satisfaction when they frequently interact with instructors (Cloete, 2018, Endres et al., 2009). On the other hand, natural science students, such as medical or math majors, often present the priority to the in-class activities or small-group works (Kilgour et al., 2016, Hyun et al., 2017). Based on existing literature, our study formulates the following hypothesis.

**Hypothesis 5b:** *Under unstable contexts, social science students and natural science students have different priority factors in satisfying their learning process.*

## DATA AND METHODOLOGY

### Data Collection

The data were collected with the help of an online questionnaire survey approach using the simple random sampling method regardless of age or geographic educational background. A survey can be defined as a series of questions that help to get self-reported characteristics of a population (Baxter and Babbie, 2003). In our study, every graduate student has an equal chance of being included in the sample. Our study can obtain fair results by applying the random sampling method since they do not favour certain members.

In order to determine student satisfaction from the course and other dependent factors, we followed the scale developed by Eryilmaz (2012), Gruber et al. (2010) with the five-point Likert scale (where 1= completely disagree; 2= disagree; 3= neutral; 4= agree; 5= completely agree).

At first, a pilot study was conducted for a certain number of students to check the understandability and validity of the questionnaire before data collection. Considering the suggestion from the pilot survey, some wordings were refined in the questionnaire to make it more understandable from the students' perspective. We have collected totally 1680 questionnaires from our online survey across country. Kline (2015) who was followed the work of Barclay et al. (1995) has advocated for ten samples per item regarding the sample size. Our study consists of 39 items and meets the priori condition which are described in table 6. The demographic composition of the respondents is mentioned in Table 1. Our respondents are first-year students only accounts for 24.52 % of total respondents. More than 80 % of the surveyed students prefers to dedicate themselves in studying. They tend to spend more time on their major courses with more than 50 % of the students spend more than 15 studying hours per week. 62.56 % of the respondents do a part-time job.

**TABLE 1**  
**DESCRIPTION OF THE STUDENTS' CHARACTERISTICS**

Variables	Scale	Count	Percentage
Gender	Male	805	47.92
	Female	875	52.08
First-generation college student	Yes	412	24.52
	No	1268	75.48
Majors	Social science	670	39.88
	Natural science	1010	60.12
Dedication to class preparation	Yes	1360	80.95

Weekly study hours spent on major courses	No	320	19.05
	<5	154	9.17
	5 to 10	290	17.26
	10 to 15	314	18.69
	15 to 20	521	31.01
Part-time job	>20	401	23.87
	Yes	1051	62.56
	No	629	37.44

### Analytical Methods

Since our paper obtains latent variables with many constructs, indicator variables, and structural paths, we apply the PLS-SEM model and is run by STATA 16 software to measure the relationship between dependent variables and independent variables. Prior studies to measure students' satisfaction and motivation regularly apply either SEM or PLS-SEM to measure their constructs because these are ideal models to handle reflective and formative models (Al-Marouf and Al-Emran, 2018, Farooq et al., 2018, Ghasemy et al., 2020). Moreover, the choice of PLS-SEM was made based on its natural ability to estimate causal relationships among all latent constructs while simultaneously dealing with measurement errors in the structural model (Hair Jr et al., 2014). Therefore, PLS-SEM is the best fit for this study. Considering the guidelines suggested by Hair et al. (2019), measurement models were evaluated separately before the evaluation of the structural model. To ascertain the data quality and consistency of structural model, several tests (presented in the following parts) were performed along with other validity and reliability checks before performing PLS-SEM analysis.

## DATA SCREENING AND HYPOTHESIS TESTING

### Data Screening

#### *Reliability and Validity*

Cronbach's Alpha reliability coefficient was used to test the scale in the study. This tool assists in determining if the observed variables of the parent factors are reliable and indicates which observed variables of a factor have contributed to the measurement of the notion of factors. To evaluate this scale, the observed variables with low variable total correlation coefficients (less than 0.3) must be removed, which is the condition for selecting the scale when alpha reliability is larger than 0.6. (Hair Jr et al., 2014). The greater the alpha, the greater the inherent consistency (Considine et al., 2005).

Next, to provide acceptable item reliability, factor loading scores are calculated for each measure of each construct. Measures with factor scores of less than 0.5 are removed from the model because they cannot indicate more than 50 per cent of the indicator's variance (Joseph et al., 2010). In our structure, all measures of infrastructure, lecturer, and activity are kept. A few variables of self-efficacy, external shocks, friends, and learning method are removed. The measures are kept represented in Table 2

**TABLE 2**  
**ROTATION LOADINGS MATRIX**

Variables	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Uniqueness
Self-efficacy <sub>2</sub>	0.685							0.285
Self-efficacy <sub>3</sub>	0.664							0.274
Self-efficacy <sub>4</sub>	0.673							0.259
Self-efficacy <sub>5</sub>	0.667							0.253
Self-efficacy <sub>6</sub>	0.790							0.189
Infrastructure <sub>1</sub>		0.682						0.277
Infrastructure <sub>2</sub>		0.805						0.178

Infrastructure 3	0.814		0.167
Infrastructure 4	0.749		0.192
Infrastructure 5	0.696		0.287
Infrastructure 6	0.707		0.276
Infrastructure 7	0.566		0.405
Lecturer 1		0.749	0.233
Lecturer 2		0.729	0.235
Lecturer 3		0.760	0.216
Lecturer 4		0.785	0.223
Lecturer 5		0.722	0.257
Lecturer 6		0.709	0.282
Activity 1		0.631	0.232
Activity 2		0.693	0.199
Activity 3		0.773	0.145
Activity 4		0.729	0.184
Activity 5		0.751	0.194
Activity 6		0.656	0.226
Shock 1		0.837	0.228
Shock 2		0.855	0.202
Shock 3		0.849	0.187
Shock 4		0.826	0.213
Friendship 2			0.816
Friendship 4			0.853
Friendship 5			0.772
Method 1			0.892
Method 2			0.917
Method 3			0.867

Convergence value occurs when observed variables of the same type converge on a factor, whereas discriminant value occurs when observed variables converge on this factor must be distinguished from observed variables convergent on that factor. As a result, EFA analyses the relationship between variables in all factor groups to find observed variables that load too many factors or observed variables that are not factored out in the first place. In the following section, examination EFA is used to do regression model analysis in this approach.

According to Meyers et al. (2016), extracting Principal Components in conjunction with varimax rotation is the most often used method in factor analysis. The principle of selecting a variable belonging to a factor includes the variable having a factor reliability coefficient greater than 0.5 in that factor and not having a convergent validity parameter increases greater than 0.35 in other factors (Igbaria et al., 1995) or the distance between two load weights of the same variable in two factors being greater than 0.3. The value of KMO is 0.974 which is more than 0.5, indicating that factor analysis is appropriate for statistical data (Hair Jr et al., 2014). Furthermore, the sig value is 0.00, less than 0.05, indicating that the Barlett test is statistically significant with a 95 per cent confidence level, and the initial eigenvalues ( $1.05 > 1$ ) are appropriate.

We continue assess reflective indicators to make sure a representative set of all possible items within the conceptual domain of a construct (Diamantopoulos and Winklhofer, 2001), most often using Fornell and Larcker (1981) composite reliability (CR) and average variance extracted (AVE). According to Hair Jr et al. (2014), the CR evaluates the construct measures' internal consistency reliability and AVE assesses the validity of indicators. Higher values generally indicate higher levels of reliability. The CR values are

higher than 0.7, and the AVE value is higher than 0.5 are considered acceptable in exploratory research. In our research, the CR and AVE of all measures are from 0.6 to 0.9, which support the measures. Table 2 also provides the detail of convergent validity. On the whole, all of the constructs show relatively good validity and reliability.

*Structural Equation Modeling Analysis*

A variety of regression equations are used to obtain structural model coefficients for interactions between structures. According to Hair et al. (2019), when examining structural relationships, alignment must be examined to ensure that it does not cause bias in the regression findings. The variance inflation factor (VIF) is frequently used to assess the integrity of exogenous structures and its score should be close to 3 and lower. Our VIF values vary from 1.1 to 1.5, which is satisfied the ideal range of VIF.

Next, we apply the structural modeling to investigate the underlying links between structures. In this investigation, the bootstrap technique (resampling = 500) was used to determine the statistical significance of the path coefficient (Hair et al., 2019). The link between endogenous and exogenous factors was studied at a significance level of 0.05 ( $p < 0.05$ ).

Table 3 shows that, with the exception of the activity variable, all independent factors have a positive and statistically significant connection with the dependent variable, as expected.

**TABLE 3  
RESULT OF STRUCTURAL EQUATION MODEL**

<b>Variables</b>	<b>Satisfaction</b>	<b>Self</b>
Infrastructure	0.162 ***	
Lecturer	0.039 **	
Activity	0.050	
Method	0.116 ***	
Self-efficacy	0.174 ***	
Friendship		0.455 ***
Shock		0.203 ***

Note: \*, \*\* and \*\*\* mean for significance at 10%, 5% and 1% level, respectively.

The results of the multi-group analysis for the model with male and female groups are shown in Table 4 and Table 5. Based on these results, it can be seen that there is a significant difference between the male and female groups.

**TABLE 4  
THE DIFFERENCE IN LATENT FACTORS BETWEEN MAJOR OF THE  
SURVEYED STUDENTS**

<b>Variables</b>	<b>Global</b>	<b>Male</b>	<b>Female</b>	<b>Abs.Diff</b>	<b>Statistic</b>
Infrastructure -> Satisfaction	0.162	0.256	0.075	0.182	2.717 **
Lecturer -> Satisfaction	0.093	0.039	0.139	0.100	1.728 *
Activity -> Satisfaction	0.050	0.037	0.051	0.014	0.170
Method -> Satisfaction	0.116	0.105	0.124	0.020	0.352
Self-efficacy -> Satisfaction	0.174	0.196	0.165	0.031	0.501
Friendship -> Self-efficacy	0.445	0.486	0.422	0.064	1.378
Shock -> Self-efficacy	0.1203	0.186	0.216	0.030	0.688

Note: \*, \*\* and \*\*\* mean for significance at 10%, 5% and 1% level, respectively.



**TABLE 5**  
**THE DIFFERENCE IN LATENT FACTORS BETWEEN GENDER OF THE SURVEYED STUDENTS**

Variables	Global	Male	Female	Abs.Diff	Statistic
Infrastructure -> Satisfaction	0.162	0.172	0.159	0.013	0.050
Lecturer -> Satisfaction	0.093	0.105	0.080	0.025	0.603
Activity -> Satisfaction	0.050	0.015	0.087	0.073	0.990
Method -> Satisfaction	0.116	0.142	0.099	0.043	0.096
Self-efficacy -> Satisfaction	0.174	0.197	0.151	0.047	0.713
Friendship -> Self-efficacy	0.455	0.418	0.483	0.065	1.804*
Shock -> Self-efficacy	0.203	0.245	0.194	0.051	1.260

Note: \*, \*\* and \*\*\* mean for significance at 10%, 5% and 1% level, respectively.

### Hypothesis Testing

When all measurement model assessment is satisfactory, we evaluate the structural results to test the hypothesis. We focus on the coefficient of determinants and the statistical significance. Table 3 outlines the hypothesis testing. All of our hypotheses were found to impact their outcome significantly. The regression path of Friendship (0.455) and COVID (0.203) to self-efficacy were significantly positive, however the beta-coefficient of friendship is higher than that of external shocks, supporting hypothesis H<sub>1a</sub>, H<sub>2</sub>, and H<sub>3</sub> but not hypothesis H<sub>1b</sub>.

The hypotheses H<sub>4</sub> is also supported. Although we could not find a significant relationship between activity and students' satisfaction, it overall does not affect the verify of H<sub>4</sub> as self-efficacy, online, infrastructure, and lecturer positively influenced students' satisfaction.

The hypothesis, H<sub>5</sub> is not supported as learning method is not the most influential factor toward students' satisfaction amid the unstable learning contexts but students' self-efficacy.

The moderation effect of major and gender are tested using multi-group analysis and found to be significantly different between comprising groups. The first comparison is between major comprised of 805 students in natural science and 875 students in social science. For comparison indicators among the two majors, the p-value remains significant with lecturers to satisfaction and infrastructure to satisfaction. Under unstable contexts, while the lecturer factor more affects nature science students, infrastructure was found to have more influence on social science students.

The second comparison is between gender. While we found significant differences in the influence of friendship on self-efficacy between two genders in which female students are positively affected by their friends more than male students.

### DISCUSSION

The main objective of this research is to offer a broad view for educators and policy-makers in issuing effective managing plans to maintain and foster student satisfaction even in a time of crisis. We assessed what factors shaped undergraduate students' satisfaction during unstable contexts with variances in psychology, learning method, infrastructure, class activities and instruction from lecturers.

We hypothesized that the external shocks would directly affect students' self-efficacy the most, and the change in learning method would be the most influential factor to students' satisfaction. However, after using the PLS-SEM model to examine structures, the findings surprisingly show that external shock, which brings anxiety to students, is not the most potent factor to motivate students' self-efficacy but friendship. Moreover, the sudden transition in new learning methods (e.g. online or hybrid) is not the key in affecting students' satisfaction, but the students themselves are the decisive factors, followed by infrastructure. It can be seen that determinants of students' self-efficacy and satisfaction are fixed norms and not affected much by external contexts.

Primarily, our study confirmed a correlation between external shocks and friendship to students' self-efficacy, with both variables having statistically positive impacts. However, compared to pressure from external shocks, friendship have more power to stimulate students' self-efficacy (Elmer et al., 2020). These findings are in line with the study of Bandura et al. (2006), Lauder et al. (2008), Stürmer et al. (2018), Brouwer et al. (2016) implementing in normal conditions when rating support from friendship has the highest impact on students' self-efficacy that means friendship is an undeniably substantial factor at any context. At this point, HEIs educators need to be aware of teamwork among classes and can encourage their students to learn by groups. Besides that, students should well maintain a group of friends so that they may assist each other to catch up with the learning process even in the crisis (Allo, 2020). By doing that, it will positively students deal with psychological issues created by external shocks and support them to overcome difficulties together (Qazi et al., 2020). This finding again emphasizes the substantial role of friendship in the students' self-efficacy, especially under unstable learning context (Allo, 2020).

Among determinants of satisfaction, self-efficacy is the most substantial factor. This finding is in line with that of Hamdan et al., 2021 and again persuades us that students who reported higher levels of self-efficacy would have higher levels of satisfaction regardless of the external instabilities. Accordingly, students should be aware of their self-efficacy power and proactively enhance it in learning in all circumstances and learning platforms (Prifti, 2020, Alqurashi et al., 2016). The next substantial factor of students' satisfaction is infrastructure. This is in line with previous studies by Stürmer et al. (2018), Sun et al. (2008), Yilmaz (2017) which were implemented under normal conditions. It reaffirms the necessity of improving the enablers to implementing learning infrastructure regardless of normal or abnormal context, online or onsite platform.

Learning method is another significant factor that impacts students' satisfaction. However, it only ranks third after self-efficacy and infrastructure. It can be seen that our observed students still consider conventional factors more critical than those sudden changes, such as novel learning methods. Surprisingly, the most humble influential factor in students' satisfaction is the lecturers' role. It can be translated that students' self-learning ability has been more enhanced than those of previous learner generations. It seems that lecturers do not always play a critical role in students even when they face uncertainty from external (Yilmaz, 2017).

It also may reflect the limited interactions in student-teacher nowadays. As a result, educators should be more active in communicating, giving feedback and constantly innovating their teaching methods with various tools (Talbert, 2012). Under unstable contexts, they can additionally consult for students regarding psychological issues so that their students can be more encouraged to learn.

Unfortunately, our study could not find the statistically mean of activity to students' satisfaction. Although the university and the lecturers attempted to redesign their teaching activities which align with pandemic situation, these alterations did not significantly change students' satisfaction. This result can be also explained based on our descriptive table, which shows that most students have part-time jobs out of school time. Consequently, a part-time job may interfere with collaborative activities and become insignificant in satisfying students (Fahmalatif et al., 2021). Nevertheless, educators should not ignore this element but actively enrich extracurricular activities to diversify learning methods Liu et al. (2018), Richardson (2001), Swan et al. (2006).

Last but not least, each major and gender have different preferences in terms of determinants. Infrastructure is more important for natural science major than social science major because the natural science students are assigned to do more experimental units and subjects that requires investment in facilities and infrastructure. Meanwhile, the pedagogical qualification, enthusiasm of the lectures is significantly important for social science students. The contents and of each lecture and the way lecturers deliver the knowledge play key roles in promoting social students' participation. Therefore, universities administrators and educators should flexibly equip them with proper learning conditions to optimise their learning outcomes.

## CONCLUSION

Hackman and Walker (1990) said that understanding the level of satisfaction of the students towards a learning course was paramount for efficient course design and for understanding its efficiency. Our study has successfully documented a set of structural relations of students' satisfaction under unstable contexts and compared them with those in normal conditions. We conducted a national-scale survey of students throughout Vietnam and collected 1680 surveys with local universities' students. The participants were asked about their engagement with learning through different factor groups. We have confirmed the positive influence of self-efficacy, infrastructure, lecturers, and learning methods on students' satisfaction by using the PLS-SEM model. We also confirmed the different preferences among majors (natural and social science) and genders for different constructs toward learning satisfaction.

Nevertheless, our study faces unavoidable drawbacks as we cannot investigate the relation between activity and students' satisfaction. We also acknowledge that the students' answers may not be entirely objective, which leads to some errors during the analysis of the semi-structured model. However, the model is still valid for reference.

Accordingly, the first contribution of our study is building a diversified source of literature, accordingly enhancing the knowledge of how factors influence students from different learning contexts (stable and unstable) satisfied with learning. The second contribution is providing evidence for policy implications for countries to sustain the quality of learning and satisfy their learners. As self-efficacy is the most vital factor, educators and policy-makers should have proper assistance and support for their students to learn effectively. Students also need to proactively improve their existing barriers to confront possible future changes. Overall, our findings demonstrate the importance of comprehensive synchronization of all aspects around individuals in order for them to acquire academic satisfaction for learning under different contexts and with diversified platform.

As other fluctuations may occur in the future, we should well turn challenges into advantages by creating a flexible condition of learning, such as making blended learning into a popular learning method. Moreover, it is necessary to join hands among stakeholders from government and academia to discuss multiple aspects. There should be no border between nations to share information on specific challenges, benefits, and industry experience in building resilience in the world.

## REFERENCES

- Adarkwah, M.A. (2021). "I'm not against online teaching, but what about us?": ICT in Ghana post Covid-19. *Education and Information Technologies*, 26, 1665–1685.
- Al-Marouf, R.A.S., & Al-Emran, M. (2018). Students Acceptance of Google Classroom: An Exploratory Study using PLS-SEM Approach. *International Journal of Emerging Technologies in Learning (iJET)*, 13(06), 112–123.
- Allo, M.D.G. (2020). Is the online learning good in the midst of Covid-19 Pandemic? The case of EFL learners. *Jurnal Sinestesia*, 10, 1–10.
- Almaiah, M.A., Al-Khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. *Education and Information Technologies*, 25, 5261–5280.
- Baber, H. (2021). Modelling the acceptance of e-learning during the pandemic of COVID-19-A study of South Korea. *The International Journal of Management Education*, 19, 100503.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191.
- Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares, & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (Vol. 5, pp. 307–337).
- Bandura, A., Freeman, W.H., & Lightsey, R. (1999). Self-efficacy: The exercise of control. *Journal of Cognitive Psychotherapy*, 13, 158–166.

- Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Pariente, W., . . . Udry, C. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. *Science*, *348*, 1260799.
- Barclay, D., Higgins, C., & Thompson, R. (1995). *The partial least squares (PLS) approach to casual modeling: Personal computer adoption and use as an Illustration*.
- Basuony, M.A., EmadEldeen, R., Farghaly, M., El-Bassiouny, N., & Mohamed, E.K. (2020). The factors affecting student satisfaction with online education during the COVID-19 pandemic: An empirical study of an emerging Muslim country. *Journal of Islamic Marketing*, *12*, 631–648.
- Baxter, L.A., & Babbie, E.R. (2003) *The Basics of Communication Research*. Cengage Learning.
- Beaman, L., Duflo, E., Pande, R., & Topalova, P. (2012). Female leadership raises aspirations and educational attainment for girls: A policy experiment in India. *Science*, *335*, 582–586.
- Bem, S.L. (1981). Gender schema theory: A cognitive account of sex typing. *Psychological Review*, *88*, 354.
- Brouwer, J., Jansen, E., Flache, A., & Hofman, A. (2016). The impact of social capital on self-efficacy and study success among first-year university students. *Learning and Individual Differences*, *52*, 109–118.
- Butt, B.Z., & Ur Rehman, K. (2010). A study examining the students' satisfaction in higher education. *Procedia-Social and Behavioral Sciences*, *2*, 5446–5450.
- Cloete, M. (2018). The impact of an integrated assessment on the critical thinking skills of first-year university students. *Accounting Education*, *27*, 479–494.
- Considine, J., Botti, M., & Thomas, S. (2005). Design, format, validity and reliability of multiple choice questions for use in nursing research and education. *Collegian*, *12*, 19–24.
- Cross, S.E., & Madson, L. (1997). Models of the self: Self-construal's and gender. *Psychological Bulletin*, *122*, 5.
- Darawong, C., & Sandmaung, M. (2019). Service quality enhancing student satisfaction in international programs of higher education institutions: A local student perspective. *Journal of Marketing for Higher Education*, *29*, 268–283.
- Davidson, D.J., & Freudenburg, W.R. (1996). Gender and environmental risk concerns: A review and analysis of available research. *Environment and Behavior*, *28*, 302–339.
- Diamantopoulos, A., & Winklhofer, H.M. (2001). Index construction with formative indicators: An alternative to scale development. *Journal of Marketing Research*, *38*, 269–277.
- Domenech-Betoret, F., Abellan-Rosello, L., & Gomez-Artiga, A. (2017). Self-efficacy, satisfaction, and academic achievement: The mediator role of students' expectancy-value beliefs. *Frontiers in Psychology*, *8*, 1193.
- Economy, T.G. (2021). Vietnam: Female to male ratio, students at tertiary level education. *The Global Economy*.
- Elmer, T., Mephram, K., & Stadtfeld, C. (2020). Students under lockdown: Comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. *Plos One*, *15*, e0236337.
- Endres, M.L., Chowdhury, S., Frye, C., & Hurtubis, C.A. (2009). The multifaceted nature of online MBA student satisfaction and impacts on behavioral intentions. *Journal of Education for Business*, *84*, 304–312.
- Eryılmaz, A. (2012). A model of subjective well-being for adolescents in high school. *Journal of Happiness Studies*, *13*, 275–289.
- Fahmalatif, F., Purwanto, A., Siswanto, E., & Ardiyanto, J. (2021). Exploring barriers and solutions of online learning during the Covid-19 Pandemic by vocational school teachers. *Journal of Industrial Engineering & Management Research*, *2*, 53–63.
- Farooq, M.S., Salam, M., Fayolle, A., Jaafar, N., & Ayupp, K. (2018). Impact of service quality on customer satisfaction in Malaysia airlines: A PLSSEM approach. *Journal of Air Transport Management*, *67*, 169–180.

- Ferla, J., Valcke, M., & Cai, Y. (2009). Academic self-efficacy and academic self-concept: Reconsidering structural relationships. *Learning and Individual Differences, 19*, 499–505.
- Fink, G. (2016). *Stress: Concepts, Cognition, Emotion, and Behavior: Handbook of Stress Series* (Volume 1). Academic Press.
- Fornell, C., & Larcker, D.F. (1981). *Structural equation models with unobservable variables and measurement error: Algebra and statistics*.
- Fraenkel, J.R., Wallen, N.E., & Hyun, H.H. (2012). *How to design and evaluate research in education*.
- Ghasemy, M., Teeroovengadum, V., Becker, J.M., & Ringle, C.M. (2020). This fast car can move faster: A review of PLS-SEM application in higher education research. *Higher Education, 80*(6), 1121–1152.
- Gibson, A. (2010). Measuring business student satisfaction: A review and summary of the major predictors. *Journal of higher education policy and management, 32*(3), 251–259.
- Gruber, T., Fuß, S., Voss, R., & Glaser-Zikuda, M. (2010). Examining student satisfaction with higher education services: Using a new measurement tool. *International Journal of Public Sector Management, 23*, 105–123.
- Hackman, M.Z., & Walker, K.B. (1990). Instructional communication in the televised classroom: The effects of system design and teacher immediacy on student learning and satisfaction. *Communication Education, 39*, 196–206.
- Hair Jr, J.F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V.G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review, 26*, 106–121.
- Hair, J.F., Risher, J.J., Sarstedt, M., & Ringle, C.M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*, 2–24.
- Hamdan, K.M., Al-Bashaireh, A.M., Zahran, Z., Al-Daghestani, A., Samira, A.H., & Shaheen, A.M. (2021). University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management, 35*(3), 713–725
- Hamilton, K., Warner, L.M., & Schwarzer, R. (2017). The role of self-efficacy and friend support on adolescent vigorous physical activity. *Health Education & Behavior, 44*, 175–181.
- Holzweiss, P.C., Walker, D.W., Chisum, R., & Sosebee, T. (2020). Crisis planning for online students: Lessons learned from a major disruption. *Online Learning, 24*, 22–37.
- Hordacre, B., Immink, M.A., Ridding, M.C., & Hillier, S. (2016). Perceptual-motor learning benefits from increased stress and anxiety. *Human Movement Science, 49*, 36–46.
- Hsieh, T.-L. (2014). Motivation matters? The relationship among different types of learning motivation, engagement behaviors and learning outcomes of undergraduate students in Taiwan. *Higher Education, 68*, 417–433.
- Hyun, J., Ediger, R., & Lee, D. (2017). Students' satisfaction on their learning process in active learning and traditional classrooms. *International Journal of Teaching and Learning in Higher Education, 29*, 108–118.
- Igbaria, M., Guimaraes, T., & Davis, G.B. (1995). Testing the determinants of microcomputer usage via a structural equation model. *Journal of Management Information Systems, 11*, 87–114.
- Jarvis, D., Stoeckl, N., & Liu, H.B. (2016). The impact of economic, social and environmental factors on trip satisfaction and the likelihood of visitors returning. *Tourism Management, 52*, 1–18.
- Joseph, F., Barry, J.B., Rolph, E.A., & Rolph, E.A. (2010). *Multivariate Data Analysis*. Pearson Prentice Hall.
- Kilgour, J.M., Grundy, L., & Monrouxe, L.V. (2016). A rapid review of the factors affecting healthcare students' satisfaction with small-group, active learning methods. *Teaching and Learning in Medicine, 28*, 15–25.
- Kim, S., Park, S., & Lee, J.S. (2014). Meso-or micro-scale? Environmental factors influencing pedestrian satisfaction. *Transportation Research Part D: Transport and Environment, 30*, 10–20.
- Kline, R.B. (2015). *Principles and Practice of Structural Equation Modeling*. Guilford Publications.

- Lauder, W., Watson, R., Topping, K., Holland, K., Johnson, M., Porter, M., . . . Behr, A. (2008). An evaluation of fitness for practice curricula: Self-efficacy, support and self-reported competence in preregistration student nurses and midwives. *Journal of Clinical Nursing*, *17*, 1858–1867.
- Liu, S., Xu, X., & Stronge, J. (2018). The influences of teachers' perceptions of using student achievement data in evaluation and their self-efficacy on job satisfaction: Evidence from China. *Asia Pacific Education Review*, *19*(4), 493–509.
- Marques, S.H., Cardoso, M.M., & Palma, A.P. (2013). Environmental factors and satisfaction in a specialty store. *The International Review of Retail, Distribution and Consumer Research*, *23*(4), 456–474.
- Meyers, L.S., Gamst, G., & Guarino, A.J. (2016) *Applied multivariate research: Design and interpretation*. Sage publications.
- Milliron, V.C. (2008). Exploring millennial student values and societal trends: Accounting course selection preferences. *Issues in Accounting Education*, *23*, 405–419.
- Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, *1*, 100012.
- Moro-Egido, A.I., & Panades, J. (2010). An analysis of student satisfaction: Full-time vs. part-time students. *Social Indicators Research*, *96*, 363–378.
- Nelson, R.M., & DeBacker, T.K. (2008). Achievement motivation in adolescents: The role of peer climate and best friends. *The Journal of Experimental Education*, *76*, 170–189.
- Neumann, Y., & Neumann, L. (1981). Determinants of students' satisfaction with course work: An international comparison between two universities. *Research in Higher Education*, *14*, 321–333.
- Peltier, J.W., Chennamaneni, P.R., & Barber, K.N. (2021). Student anxiety, preparation, and learning framework for responding to external crises: The moderating role of self-efficacy as a coping mechanism. *Journal of Marketing Education*, pp. 1–17.
- Pham, L., Limbu, Y.B., Bui, T.K., Nguyen, H.T., & Pham, H.T. (2019). Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam. *International Journal of Educational Technology in Higher Education*, *16*, 1–26.
- Piccoli, G., Ahmad, R., & Ives, B. (2001). Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic IT skills training. *MIS Quarterly*, pp. 401–426.
- Prifti, R. (2022). Self-efficacy and student satisfaction in the context of blended learning courses. *Open Learning: The Journal of Open, Distance and e-Learning*, *37*(2), 111–125.
- Qazi, A., Naseer, K., Qazi, J., AlSalman, H., Naseem, U., Yang, S., . . . Gumaei, A. (2020). Conventional to online education during COVID-19 pandemic: Do develop and underdeveloped nations cope alike. *Children and Youth Services Review*, *119*, 105582.
- Richardson, J.C. (2001). *Examining social presence in online courses in relation to students' perceived learning and satisfaction*. State University of New York at Albany.
- Schlee, R.P., Eveland, V.B., & Harich, K.R. (2020). From Millennials to Gen Z: Changes in student attitudes about group projects. *Journal of Education for Business*, *95*(3), 139–147.
- So, H.-J., & Brush, T.A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, *51*, 318–336.
- Sturmer, S., Ihme, T.A., Fisseler, B., Sonnenberg, K., & Bar-barino, M.-L. (2018). Promises of structured relationship building for higher distance education: Evaluating the effects of a virtual fast-friendship procedure. *Computers & Education*, *124*, 51–61.
- Sun, P.-C., Tsai, R.J., Finger, G., Chen, Y.-Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, *50*, 1183–1202.
- Swan, K., Shen, J., & Hiltz, S.R. (2006). Assessment and collaboration in online learning. *Journal of Asynchronous Learning Networks*, *10*, 45–62.
- Talbert, R. (2012). Inverted classroom. *Colleagues*, *9*, 1–2.

- Turner, J.E., Goodin, J.B., & Lokey, C. (2012). Exploring the roles of emotions, motivations, self-efficacy, and secondary control following critical unexpected life events. *Journal of Adult Development, 19*, 215–227.
- Wang, L., Tao, H., Bowers, B.J., Brown, R., & Zhang, Y. (2018). Influence of social support and self-efficacy on resilience of early career registered nurses. *Western Journal of Nursing Research, 40*, 648–664.
- Weerasinghe, I.S., & Fernando, R.L. (2017). Students' satisfaction in higher education. *American Journal of Educational Research, 5*(5), 533–539.
- Whiteneck, G., Meade, M.A., Dijkers, M., Tate, D.G., Bushnik, T., & Forchheimer, M.B. (2004). Environmental factors and their role in participation and life satisfaction after spinal cord injury. *Archives of physical medicine and rehabilitation, 85*(11), 1793–1803.
- Wiranto, R., & Slameto, S. (2021). Alumni satisfaction in terms of classroom infrastructure, lecturer professionalism, and curriculum. *Heliyon, 7*(6), e06679.
- Wood, R., & Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review, 14*, 361–384.
- Wright, G.B. (2011). Student-centered learning in higher education. *International Journal of Teaching and Learning in Higher Education, 23*, 92–97.
- Wuepper, D., & Lybbert, T.J. (2017). Perceived self-efficacy, poverty, and economic development. *Annual Review of Resource Economics, 9*, 383–404.
- Xiao, J., & Wilkins, S. (2015). The effects of lecturer commitment on student perceptions of teaching quality and student satisfaction in Chinese higher education. *Journal of Higher Education Policy and Management, 37*, 98–110.
- Yang, X., Zhang, M., Kong, L., Wang, Q., & Hong, J.-C. (2021). The effects of scientific self-efficacy and cognitive anxiety on science engagement with the “question-observation-doing-explanation” model during school disruption in COVID-19 pandemic. *Journal of Science Education and Technology, 30*, 380–393.
- Yilmaz, R. (2017). Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom. *Computers in Human Behavior, 70*, 251–260.
- Zimmerman, B.J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*, 166–183.07.

## APPENDIX

**TABLE 6**  
**DESCRIPTIVE STATISTICS OF THE STUDY**

<b>Variables</b>	<b>Mean</b>	<b>Std. Div.</b>	<b>Min</b>	<b>Max</b>
Self-efficacy <sub>2</sub>	3.948	0.793	1	5
Self-efficacy <sub>3</sub>	3.845	0.812	1	5
Self-efficacy <sub>4</sub>	3.816	0.821	1	5
Self-efficacy <sub>5</sub>	3.811	0.844	1	5
Self-efficacy <sub>6</sub>	3.909	0.819	1	5
Lecturer <sub>1</sub>	4.103	0.748	1	5
Lecturer <sub>2</sub>	3.916	0.768	1	5
Lecturer <sub>3</sub>	4.103	0.744	1	5
Lecturer <sub>4</sub>	4.041	0.748	1	5
Lecturer <sub>5</sub>	3.923	0.806	1	5
Lecturer <sub>6</sub>	4.306	0.734	1	5
Infrastructure <sub>1</sub>	3.819	0.862	1	5

Infrastructure 2	3.775	0.907	1	5
Infrastructure 3	3.775	0.895	1	5
Infrastructure 4	3.781	0.841	1	5
Infrastructure 5	3.881	0.842	1	5
Infrastructure 6	3.786	0.923	1	5
Infrastructure 7	3.708	0.934	1	5
Activity 1	3.773	0.814	1	5
Activity 2	3.821	0.793	1	5
Activity 3	3.789	0.835	1	5
Activity 4	3.921	0.795	1	5
Activity 5	3.781	0.824	1	5
Activity 6	3.854	0.804	1	5
Friendship 2	3.354	1.195	1	5
Friendship 4	3.341	1.243	1	5
Friendship 5	3.611	1.091	1	5
Method 1	3.567	1.113	1	5
Method 2	3.716	1.125	1	5
Method 3	3.964	1.007	1	5
Shock 1	3.824	1.031	1	5
Shock 2	3.632	1.063	1	5
Shock 3	3.603	1.062	1	5
Shock 4	3.729	1.018	1	5

---