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Innovative Teaching, Delivering Materials and the Student's Satisfaction in Online Learning: Evidence from a Sharp Shift due to Covid-19 Pandemic in Vietnam

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***Abstract*—Online learning is one of the trend in modern education today. In the context of the complicated Covid-19 epidemic, the role of online learning in teaching and research activities is even more critical. Innovative teaching methodologies and providing materials are two decisive factors in online education, so improving those two factors will help increase the quality of online learning. The research explores the influence of innovative teaching approach and the effectiveness of delivery materials on student satisfaction at higher education institutions in Vietnam. The research collected data through survey questionnaires with 527 responses. The study tested the measurement quality and examined hypotheses through multivariate regression analysis. The findings confirmed a positive effect of innovative teaching approaches and the effectiveness of delivering materials on student satisfaction in online courses. Based on the findings, the research proposed some recommendations to improve innovative teaching methodologies and provide materials in e-learning to enhance the quality of online learning.**

***Index Terms*—Innovative teaching approach, delivery materials, online learning, student satisfaction.**

I. Introduction

Online learning (e-learning) is controversial, with many different concepts receiving more attention from researchers and practitioners (Oblinger & Hawkins, 2005). Zemsky and Massy (2004) suggest three different understandings of e-learning: a method of distance education, learning management software to support network communication activities, and learning through electronic means. Due to the impact of the Covid-19 pandemic, e-learning has become a common and normal activity around the world (Elshami et al., 2021). E-learning contributes to the innovation of Vietnamese education. Higher education institutions (HEIs) in Vietnam have quickly switched to online learning or blended learning as of 2020, particularly in light of the complex evolution of the Covid-19 outbreak. Higher self-study competency is needed for online learning to replace face-to-face instruction, which implies students need self-efficacy to self-regulate their behavior in online courses. Students with low self-efficacy cause the procrastination and isolation in online learning (Klassen, Krawchuk, & Rajani, 2008). It is crucial to employ an innovative teaching approach and deliver materials effectively in online courses that engage students in the online environment and satisfy them (Giap, Vu, Tran, & Nguyen, 2022).

Many authors and prestigious universities in the global have studies that bring great value to education. Student satisfaction is one of the most popular criteria to evaluate the program quality and investigate factors influencing student satisfaction pay attention from researchers. Student satisfaction has a positive correlation with the quality of learning outcomes (Palmer & Holt, 2009). Improving learner satisfaction can lead to a higher quality of learning outcomes for students. Innovative teaching attracts the student's attention, stimulates their interest in the subject, and helps them easily grasp the concepts (Baskaran & Rajarathinam, 2018), so teachers' innovative teaching approaches or behaviors can increase learner satisfaction. While providing materials contributes a vital part to the success of education that makes a difference in learner satisfaction between online learning and traditional learning (McFarland & Hamilton, 2005). However, the previous studies pay less attention to delivering materials in online learning and its effect on learner satisfaction. Some of the earlier studies had a limitation in sample size that was relatively small (Cao, Shang, & Meng, 2020) or focused on graduate students. From 2020 to 2021, the HEIs in Vietnam switched to online learning due to the impact of the Covid-19 pandemic and the social distancing policies of the Vietnamese Government, there are few domestic studies on the effect of innovative teaching and delivery materials in online courses on student satisfaction.

This study aims to answer the following questions: (1) The reality of student satisfaction at HEIs during the sharp transition to online learning due to the Covid-19 pandemic? (2) How do an innovative teaching approach and delivering materials in online learning influence student satisfaction? The study significantly contributes to research and practice by identifying key elements to boost student satisfaction with online learning. The findings also have theoretical contributions to research models, and implications for HEIs to implement innovative teaching methodologies to meet the user needs in the context of the fourth industrial revolution as well as widely implement e-learning and blended learning after the Covid-19 pandemic.

II. Conceptual Framework

Online learning or e-learning is a common and familiar term used to refer to the transmission of learning or training activities based on information technology software and social networking sites such as websites and the internet. Online learning is known as distance learning or virtual learning (Holsapple & Lee-Post, 2006). Online learning is a method of distance learning based on modern electronic platforms and devices such as desktop computers, laptops, tablets, and smartphones via an internet connection (Urdan, Weggen, & Cornelia, 2000). From the perspective of learners, e-learning is defined as learning supported by information and communication technology (ICT), and e-learning is not only limited to digital literacy but also combines many forms and methods (CEDEFOP, 2001). Learning materials and lectures are updated on the learning management system (LMS) and other information technology devices. However, there is a lack of interactions between teachers and students, resulting in isolation in online classes (Bolliger & Martin, 2018).

One of the key elements HEIs believe determines the quality of online learning is student satisfaction. Satisfaction is an emotion or attitude formed based on comparing what they expect with what they receive from a particular product or service. Satisfaction is defined as a mindset when people achieve a goal (Plouffe, Vandenbosch, & Hulland, 2001) that shows people's psychological comfort and emotional state. Various levels of management consider proper feedback as the key to user satisfaction. Some researchers show that quality has an effect on satisfaction, while others argue that better service gives consumers a comfortable consumption experience (Lee, Lin, & Kang, 2016). Student satisfaction with learning is the subjective feelings of students about the evaluation of teaching and learning support services provided by the school based on knowledge and experience from using the training service (Harvey, Parahoo, & Santally, 2017).

Innovative behavior refers to the intentional development, introduction, and implementation of new ideas inside a work role, group, or organization to enhance the performance of the role, the group, or the organization (Janssen, 2000). Innovative teaching approach as comparative advantage and learning satisfaction as satisfaction from Technology Acceptance Model (Lee et al., 2016). The level of innovative teaching behavior or innovative teaching approach positively affects learner satisfaction (Baskaran & Rajarathinam, 2018; Lee et al., 2016). Based on the above literature, this research proposes the following hypothesis:

Hypothesis H1: Innovative teaching approach has a positive effect on student satisfaction in online learning.

Online learning has distinct characteristics from face-to-face teaching, which emphasizes the openness of learning resources(Hu & Li, 2017). Delivering materials in online learning is not simply providing lessons and learning materials, but it is related to the strategy of building infrastructure, learning platforms, the connection between applications, and curriculum to be able to bring about the effectiveness of providing materials and effective use of learning materials in student learning (Schmidt & Winterhalter, 2004). In the connectivism theory, Siemens (2004) highlighted how changes in access to information in the digital age affect learning and the development of online learning connections. In particular, the element of learning resources needs to be provided and distributed through multiple channels and must be adequate to optimize for learners (Ally, 2004; Ally, Lin, McGreal, Woo, & Li, 2005). There is a difference in student satisfaction and performance between traditional and online course delivery (McFarland & Hamilton, 2005). New educational delivery methods like online learning are diverse resources for students, and delivering materials in these courses is a critical factor in student satisfaction (AlHamad, Al Qawasmi, & AlHamad, 2014). The research postulates the following hypothesis:

Hypothesis H2: The effectiveness of delivering materials has a positive effect on student satisfaction in online learning.

III. Methodology

A. Instruments measurement

The research adopted measures from previous studies to reduce the common method variance phenomenon (Chang, Van Witteloostuijn, & Eden, 2010). Student satisfaction and innovative teaching approach were adopted from Lee et al. (2016) with seven and six indicators, respectively. The study adopted the scale of the effectiveness of delivering materials developed by the Center for Innovation in Teaching & Learning with seven items. In the pretest phase, the interview result with a professor revealed that the item "*do not invite elderly local people to have a lecture as a formal curriculum*" was not common in the training programs in Vietnam. Thus, this item was eliminated from the original scale of the innovative teaching approach. The study used a 5-point Likert scale to assess student satisfaction in online learning courses on an increasing scale from (1) Totally disagree to (5) Totally agree. The summary of the measures is presented in Table 1.

B. Data gathering and analysis

This research focused on undergraduate students at the HEIs. The questionnaire included two parts: part I focused on the demographic of the respondent, and part II evaluated the level of three variables. The minimum sample was determined to align with exploratory factor analysis (EFA) (Nguyễn Đình Thọ, 2013). With 20 items measuring vari-

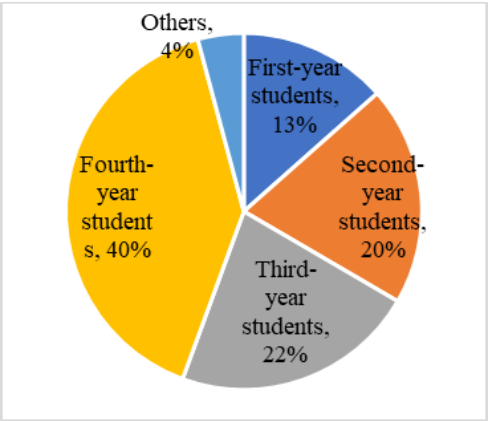

Fig. 1 Demographic of respondents

ables, the minimum sample is 100. The survey link was sent via the online student groups and through lecturers at the HEIS to transfer to the Zalo group of online courses.

The demographic of respondents in the survey is shown in Fig. 1. The total number of valid responses was 527. The respondents came from diverse HEIs in Vietnam, i.e., National Economics University, Hanoi University of Industry, Academy of Finance, Hanoi University, Thuongmai University, Hanoi University of Science and Technology, Hanoi University of Civil Engineering, etc. Regarding the major, 87% of respondents came from economic and social major, and the rest, 13% of respondents, was technical and natural major. The respondents covered all the academic years; however, the fourth-year student accounted for the highest percentage, with 40%.

IV. Results and Discussion

A. Measurement model test results

The descriptive results are presented in Table 1, which shows the mean value of variable measures. The 5-point scale is used to evaluate the agreement to items of the measures. The results reveal that all items, except ITA2- *Editing local culture material is a new teaching method*, are greater than 4. Students at HEIs highly appreciate the innovative teaching approach, the effectiveness of delivering materials, and satisfaction with online courses.

The research test constructs reliability and validity. The reliability estimator is examined by using Cronbach Alpha. Cronbach Alpha coefficient greater than 0.6 ensures the scale's reliability (Hair, Black, Babin, & Anderson, 2014; Nguyen, 2013; Nunnally & Bernstein, 1994). The results of the reliability analysis are summarized in Table 1. The results of Cronbach Alpha coefficients are greater than 0.6, showing that all constructs for the variables ensure reliability.

Then, the research tests the validity of constructs by employing exploratory factor analysis (EFA) for dependent and independent variables, respectively, with principal component analysis and Varimax rotation. The criteria for EFA include KMO being greater than 0.5 with 95% confidence. The items will be removed if the difference between the factor loading coefficient on the variable groups is less than 0.3 (Kaiser, 1974; Tabachnick & Fidell, 2007). The KMO value of dependent variable is 0.909 (sig. = 0.000) and the KMO value of independent variables is 0.921 (sig. = 0.000). These results show that the data are completely consistent with the proposed model. For the dependent variable, all items load a single group of factors, which are computed and named SAT. For the independent variables, the total variance extracted is 57.993% > 50%, and the varimax rotation loads up two groups of factors. Factor 1- Effectiveness of delivering materials (EDM) includes seven items: EDM5, EDM1, EDM4, EDM7, EDM2, EDM3, and EDM6. Factor 2 - Inno-

TABLE 1
SUMMARY OF MEASUREMENT TEST RESULTS

	Items	Mean	Corrected Item-Total Correlation	Cronbach Alpha if Item Deleted
Innovative teaching approach (Lee et al., 2016) Cronbach alpha = 0.789				
ITA1	Using mobile technology is a new teaching method	4.45	0.476	0.771
ITA2	Editing local cultural material is a new teaching method	3.98	0.590	0.745
ITA3	Inviting experts to share their experiences	4.21	0.585	0.746
ITA4	Using QR-CODE as a teaching aid is a new teaching method	4.50	0.446	0.778
ITA5	Field trip is a new teaching method	4.21	0.604	0.740
ITA6	Video lecturing is a new teaching method	4.40	0.550	0.757
Effectiveness of delivering materials (Center for Innovation in Teaching & Learning) Cronbach alpha = 0.904				
EDM1	The lectures are organized logically	4.48	0.734	0.888
EDM2	The lecturers make the content engaging by intertwining interesting anecdotes, videos, and examples into the lectures.	4.30	0.713	0.890
EDM3	The content in materials is delivered consistently.	4.42	0.667	0.895
EDM4	The delivered materials are concise	4.46	0.766	0.884
EDM5	The delivered materials stay focused.	4.47	0.751	0.886
EDM6	The delivered materials are brief.	4.21	0.656	0.898
EDM7	The content of course materials is presented visually whenever possible.	4.44	0.745	0.886
E-learning satisfaction (Lee et al., 2016) Cronbach alpha = 0.925				
SAT1	Online learning makes learning become much more interesting	4.32	0.737	0.916
SAT2	Online learning gives me the ability to observation	4.21	0.768	0.913
SAT3	Online learning makes my thoughts sharp	4.18	0.768	0.913
SAT4	I like the online courses	4.13	0.789	0.911
SAT5	I hope online learning can promote other subjects	4.34	0.800	0.910
SAT6	I hope I still have opportunities to learn in the online courses	4.31	0.764	0.913
SAT7	I will recommend the online courses to other classmates	4.27	0.722	0.918

vative teaching approach (ITA) includes six items: ITA3, ITA5, ITA2, ITA1, ITA4, and ITA6.

B. Hypotheses test results

The results of the correlation analysis of three variables are presented in Table 2. The results of correlation analysis from 2-tailed shows a close correlation between the independent and dependent variables if the correlation is greater than 0.05 with 95% confidence. The results in Table 2 show that the independent variables (ITA and EDM) and dependent variables (SAT) are significantly correlated with each other.

TABLE 2
CORRELATION ANALYSIS RESULTS

Correlations

		ITA	EDM	SAT
ITA	Pearson Correlation	1	.667**	.609**
	Sig. (2-tailed)		.000	.000
	N	527	527	527
EDM	Pearson Correlation	.667**	1	.690**
	Sig. (2-tailed)	.000		.000
	N	527	527	527
SAT	Pearson Correlation	.609**	.690**	1
	Sig. (2-tailed)	.000	.000	
	N	527	527	527

**. Correlation is significant at the 0.01 level (2-tailed).

The regression analysis results are summarized in Table 3.

TABLE 3
SUMMARY OF REGRESSION RESULTS

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.377	.166		2.280	.023		
	ITA	.294	.045	.268	6.559	.000	.555	1.802
	EDM	.593	.047	.512	12.547	.000	.555	1.802
a. Dependent Variable: SAT								
R Square	.516	Adjusted R Square		.514	F	279.481	Sig.	.000[b]

The regression results show that the R-square value is 0.514, which indicates two independent variables, the innovative teaching approach and the effectiveness of delivering materials, explaining 51.4% of the variance of the dependent variable, online student satisfaction. When the independent variables change, it will explain more than 51.4% of the dependent variable (adjusted R-square = 0.514). The ANOVA analysis results using the F test to examine the proposed model have a significance value of 0.000. Thus, the proposed model is completely suitable for analysis and generalization.

The model regression results are presented in the Coefficients table. The innovative teaching approach and the effectiveness of delivering materials have a significance value of 0.000. For a 95% confidence level, these two variables influence student satisfaction in online learning. The B value shows that these two variables positively affect student satisfaction. These results indicate that both hypothesis H1 and hypothesis H2 are accepted.

C. Discussion

From the regression model, the results accept both research hypotheses and confirm the positive influence of the innovative teaching approach and the effectiveness of delivering materials on student satisfaction in online learning courses. The beta (β) value indicates the degree of influence of the independent variables on the dependent variable. The value of βEDM is 0.512, indicating the most significant effect of the effectiveness of delivering materials on the dependent variable, satisfaction. And the value of βITA is 0.268, which shows a positive effect of the innovative teaching approach on student satisfaction in online courses. The VIF value is less than 2 showing no multicollinearity in the research model.

The findings show that the effectiveness of delivering materials during online learning has a great influence on student satisfaction. Providing materials such as documents, lecturer notes, and videos through supporting software can help students reduce the cost of printing documents, which are easy to manage and easy to find. Giving students the materials before class will enable them to prepare for class by studying the topic beforehand, which may boost their self-discipline and confidence. Additionally, providing materials after the lessons is also very important because it helps students consolidate their knowledge after class and serves as a basis for students to research when practicing and applying knowledge to reality. The research findings reveal that the innovative teaching approach positively affects student satisfaction. Students will feel more satisfied when teachers use various teaching methods, combining traditional learning with discussion topics, working in groups, and studying through specialized platforms and websites. For online learning, teachers employ quiz sections or games in the lessons, which will stimulate students. Moreover, using innovative teaching will engage students in learning activities in the class and enable them to reduce pressure.

The results also show that students at HEIs are quite satisfied with the innovative teaching and delivery of materials in online learning. This finding also brings positivity to schools and teachers because this new teaching method is likely to be widely used in the future when information technology is more and more developed and better supported for online learning. However, there are still some troubles that cause ineffective online learning. For example, the low quality of the internet results in a lag in accessing sources of materials and online classes. Other troubles come from the software, which has not been fully designed, or the security is not good. For example, there is some disorder in participating in online classes. In addition, lecturers and students are not proficient in using online teaching software, causing time-consuming and interruptions in the class.

V. Conclusion And Recommendations

E-learning is a trend for all levels of education worldwide. The developed nations have a lot of advantages to e-learning, while the developing nations require more attention for investing in infrastructure, training teachers, and integrating elements of e-learning. This research investigates and states the positive influence of innovative teaching ap-

proaches and the effectiveness of delivering materials on student satisfaction in e-learning.

Based on the findings, the research recommends implementing an innovative teaching approach and delivering materials effectively in online learning courses. The online learning courses include students, lecturers and instructors, and support departments that ensure the online learning process. Therefore, recommendations are made based on stakeholders.

For teachers and instructors: The innovative teaching methods teachers use affect students' satisfaction. Proficient use of information technology and teaching aids help teachers interact with students most naturally and effectively and manage the best students, bringing high efficiency to teaching. Teachers must be knowledgeable in contemporary technology, including computers, online teaching software, and auxiliary equipment like webcams, video recorders, headphones, noise-canceling microphones, etc. Teachers need to pay more attention to grasping the lessons of students because, in reality, it is difficult to assess the student's follow-up like in a live class. Therefore, students must build initiative, positivity, and self-discipline in order to get the best learning effect. The teacher must convey the material as plainly as possible. Because students who occasionally pay more attention to the "hearing" than the "seeing" in online lectures may find that body language is no longer useful. Furthermore, teachers need to prepare in advance the necessary teaching materials, including PDF, word or document images, etc. Providing effective materials to help students enjoy online learning. Homework can be sent to the online chat group, and students can do their exercises.

For higher education institutions: HEIs should provide a manual to help lecturers and students use technology for online instruction. Because of the sudden transition to online schooling brought on by the Covid-19 epidemic, many lecturers will likely have trouble adjusting to new technology, especially those who are seasoned and inept with it. However, if instructors are given enough time to plan and assistance to show them how to use online teaching technologies, this scenario may be readily resolved. As a result, it is imperative that the school arrange classes for instructors to learn how to use online teaching resources. Providing guidance is not only necessary due to the transition under the impact of the Covid-19 pandemic but also necessary when HEIs actively implement blended learning or distance learning programs. In online learning, there is much-specialized software for meetings and online learning, but the problem is choosing suitable software that helps lecturers and instructors provide course materials effectively and fulfill innovative teaching activities. Free software like Moodle or Google Classroom can be challenging to use and requires some attention. These days, Zoom, Webinar, and Webex are the most widely used commercial software solutions. They are often inexpensive, simple to use, and require careful technical support from software license distributors.

For students, students should balance their own study time, improve their self-study competence, and enhance time management skills. Students should engage in online courses more actively.

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