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# An Application of E-learning on Training and Education: An Empirical Study in Vietnam

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## Abstract

The current article examines the interactions among students' attitudes to e-learning, their implementation of e-learning in their studies, and learning effectiveness. Significantly, it emphasizes the mediating role of accepting e-learning in training. It applied reliability analyses to test the measurement of items and construct validity, using the research data collected from students at Vietnam National University of Ho Chi Minh. Then, the current article used multiple regressions to inspect the causal relations; and applied procedures to investigate the mediating influence. The empirical results indicate students' attitude to e-learning positively influences their implementation of e-learning in their studies. When students apply e-learning in their studies, they likely achieve the best possible training effectiveness. Statistical evidence on the mediating role of accepting e-learning in training by students on the linkage between their attitude to e-learning and training effectiveness is revealed in this article. The findings of this article make some contributions. For educational administrators, it offers insight into the links among students' attitudes to e-learning, their implementation of e-learning in their studies, and training effectiveness, which likely allows them to establish suitable online training programs. This will be beneficial to both learners and educational institutes.

**Keywords:** E-learning, Training, Mediation, Attitude, Effectiveness

**JEL Classifications:** C12, C13, C51, I20, M15

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## 1. Introduction

The outcome of global development is the Industrial Revolution 4.0, which emphasizes the digital economy that is known for disruptive innovation (Marlina et al., 2021). In the current era, technology is crucial to how we study and live our daily lives.

In the current era, there is a different generation, called the "digital generation", which is surrounded by screens, multitasking, prosumers, and multimedia. In general, it is no surprise that information technology is now a part of people's daily life (Prensky, 2001; Jones et al., 2010).

As a result, it mandates that the educational training system be modified. The instructors must also manage and train virtual communities, act as a voter and prescribe resources and information, in addition to being facilitators, mediators, and guides (Buckingham, 2005; Almenara, 2015; Man et al., 2018; Giri et al., 2021). Globalization has intensified competition, which is visible across the globe; as a result, in recent years, communication technology and digital age literacy have become necessary abilities for learning or working (Mujtahid et al., 2021).

E-learning technologies recently changed the methods used by instructors to teach (training) and the way students learn. For instance, technology enables teachers and students to exchange educational resources in a number of ways (Vululleh, 2018). Additionally, the Internet and technological information have come to be seen as crucial tools for providing students with learning resources to master knowledge (Richard & Haya, 2009). The method of traditional teaching has gradually improved into an innovative technique, accredited as e-learning. E-learning has been employed to facilitate teaching processes due to techniques generated from technical information and the Internet.

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According to Salloum et al. (2019), educational institutions around the world have chosen to use the e-learning system in teaching (training) students. E-learning not only enables instructors to mold the training perception but also aids students in learning by encouraging discussion to develop critical thinking abilities. As a result, accepting e-learning for training has several advantages. Many educational institutions have chosen to use e-learning methods to provide their students with distance learning packages that are intended to offer education to students who are unable to attend in-person classes. (Tarhini et al., 2017). Accepting e-learning for learning and training is beneficial to students and teachers respectively, where they do not need to meet up in traditional classes to discuss lessons. The infrastructure for e-learning in developing countries is ineffectual, and the adoption of this technology is still viewed as being below the necessary level. Moreover, the effectiveness of e-learning practices has to be locally evaluated, as learners and teachers are generally imperilled to native norms (Lopez-Fernandez, 2017), which is especially important in developing countries (Tigabu, 2017). The above-mentioned opinions reveal a lack of inclusive understanding of the causes and effects of e-learning in developing countries.

Furthermore, in the e-learning setting, the attitude to using e-learning for the study of learners is likely a driving force in their accepting e-learning in the study (Davis, 1986). Additionally, numerous scholars (Harwell & Jackson, 2021; Franklin & Nahari, 2018; Hartshorne & Ajjan, 2009) underlined the implementation of e-learning in learning could result in students' learning effectiveness; whereas a study by Jawad and Shalash (2020) showed the acceptance of e-learning in training organizations is a significant antecedent in improving learners' learning effectiveness. Mediating procedures introduced by Baron and Kenny (1986) suggested the attitude toward using e-learning in studies imposes a mediating influence on the relationship between students' implementation of e-learning in training and their training effectiveness. Nonetheless, it seems that no studies have argued and explored the mediating influence of students' implementation of e-learning in learning on the linkage between students' attitudes to using e-learning in learning and their learning effectiveness.

The purpose of the research is to examine the factors that influence how well e-learning is used by learners. The current effort aims to investigate the relationships between learners' attitudes toward adopting e-learning in their studies and their acceptance of it. More importantly, it aims to examine how learners adopted e-learning in their studies and the relationship between that attitude and the effectiveness of the institution. This study will employ the procedures supported by Aroian (1947) to check the mediating effect. The current research is going on as follows. Subsequently,

the hypotheses development will review the related literature and then support the hypotheses. Next, the research design will guide the data collection and facilitate the data analyses. The empirical results will be delivered in a subsequent part. Successively, some conclusions will be summarized in the last part.

## 2. Literature Review

Herrington (2000) asserted that a growing body of research on learning is emphasizing learning as an active process of building knowledge that takes into account personal understanding and "meaning-making." Students should work on complex assignments requiring cognitive abilities. Furthermore, Lim et al. (2011) suggested that using information and communication technology for educational purposes is a practical way to foster students' creative abilities. Students need to express and acquire necessary abilities and skills rather than only deliver indicators and information (Shah, 2017; Tjahjadi et al., 2019). Access to university instruction should be copious in a learning environment, accommodating a wide range of circumstances. The main goal is to increase the effectiveness of learning support, which results in students' training performance (Mujtahid et al., 2021).

E-learning is also described by Marlina et al. (2021) as a collection of dynamic technologies that are integrated into numerous technological elements and devices that enable information and communication, including broadcast media, telecommunication, and other digital technologies. According to Bhuasiri et al. (2012), e-learning is one of the most important factors contributing to success in educational institutions since the quality of training is increased. Due to the streamlining of the instructional processes, the adoption of e-learning in educational institutions has become an interesting topic for academics and training executives. Davis (1986) revealed that the model of technology adoption was an important cause of accepting a new tool of technology. Accordingly, a new method of technology could be e-learning. The adoption of e-learning in training is likely an effect of learners' attitude to e-learning in training, but a cause of learners' learning effectiveness. Based on the model of technology adoption by Davis (1986), it can recommend learners' attitude toward e-learning in their studies is one of the important antecedents to the acceptance of e-learning, which in turn improves their learning effectiveness (Sibanda & Donnelly, 2014). The aforementioned relationships, according to Baron and Kenny (1986), may also facilitate the inclusion of e-learning in the research model. In particular, it can suggest that e-learning implementation for the study could mediate the relationship between students' attitudes toward e-learning and their academic performance.

According to Eslamian and Khademi (2017), the use of e-learning in studies encourages effective learner engagement, improvement in training, and agreement of the learners to complete their learning plan by streamlining communications between learners and resources, learners and mentors, and learners and resources. The effectiveness of online learning depends on how well the students comprehend the material. Additionally, Cavanaugh (2001) emphasized the technique of online teaching and that of traditional teaching in person are analogous. The technique of e-learning could improve students' effectiveness which likely boosts them to register for online teaching programs. Furthermore, learners adopting online training services will achieve superior training effectiveness in comparison with the teaching courses in person (Franklin & Nahari, 2018; Park & Lee, 2021). The study's findings show that e-learning has a positive impact on how well teachers and students are trained. According to Sibanda and Donnelly (2014), embracing e-learning in training has a positive impact on students' commitment, which will lead to training effectiveness. The study's findings show that training effectiveness is consistent regardless of whether e-learning is used.

The impact of students adopting e-learning and their school efficiency was examined by Mothibi (2015). E-learning has been shown to improve learners' training efficacy. Based on Fatima and Jabeen (2021), e-learning adoption in training could improve learners' capacity to complete tasks more quickly. Al-Qahtani and Higgins (2013) discovered a statistical difference in training effectiveness among diverse techniques of teaching comprising e-learning. The method of e-learning had better be wholly grasped by mentors; thereby, information can be quickly conveyed to students remarkably and well (Tuna et al., 2018). Consequently, the implementation of e-learning in teaching can lead mentors and students to achieve effectual training aims (Hakim et al., 2019). Additionally, previous studies (Sugiyanta & Sukardjo, 2018; Hoerunnisa et al., 2019; Hwang et al., 2019) suggested that the use of e-learning in the classroom could improve students' attention and motivation as well as the efficiency of the educational institution. E-learning in teaching organizations has raised concerns from academics and educational executives. It is essential for facilitating the training procedures, especially for online training programs. The acceptance of e-learning is comparable to the adoption of a new system of technology (Davis, 1986). Users' attitude to using the new technology is their positive opinion of using a new system of technology (Cheong & Park 2005). Particularly, users' positive attitude to using the new system of technology can encourage them to use it. Hence, it is useful for the e-learning setting to forecast and assess learners' adoption of e-learning in training. According to

Farahat (2012), attitude is the extent of attention related to a user's actual behavior. A positive attitude can boost their willingness to adopt a new tool of technology. Additionally, Edumadze and Owusu (2013) recommended the usage of e-learning in training as a solution to reduce learners' poor training effectiveness; while Kwabena et al. (2021) indicated user behavior is related to their acceptance of e-learning.

Reis (2010) scrutinized students' attitudes to e-learning in management and revealed students are reflected to have a positive attitude toward e-learning programs in the study. Additionally, Lazim et al. (2021) emphasized students' attitude is a vital sign for e-learning and revealed students' positive attitude can produce a positive result when they are willing to adopt e-learning for their study. Moreover, Abdulla (2012) analyzed students' attitudes toward e-learning courses, indicating the linkage between students' attitudes toward e-learning and their adoption of e-learning programs. Various studies (Yu et al., 2007; Yu, 2006) offered statistical evidence on the influence of students' attitude to e-learning on their adoption behavior of e-learning in training. Furthermore, Jan et al. (2012) exploring the acceptance of e-learning in training recognized students' positive attitude toward utilizing e-learning is a driving force in their accepting e-learning in training. The above-mentioned arguments can posit students' acceptance of e-learning in training can be determined by their attitude to utilizing e-learning in training. As above declared; students' attitude to e-learning can result in their implementation of e-learning in training that will in turn improve the students' training effectiveness. Anchored in Baron and Kenny (1986), it could establish the mediating hypothesis of students' implementation of e-learning in training.

### 3. Data and Research Methods

The aforementioned arguments will be utilized as an underpinning knowledge to construct a suggested research model where (H1) Students' application of e-learning in their studies can lead to their improved training performance; (H2) Students' positive attitude to utilizing e-learning in studies can increase their application of e-learning in training and (H3) Students' application of e-learning in training may mediate the linkage between their attitude to utilizing e-learning in training and training effectiveness. Having explained the hypotheses derived from the reviewed literature, we can arrive at the proposed research model as presented in Figure 1. Next, we will discuss the research design that is used to guide the data collection and facilitate the statistical analyses as below (Figure 1).

A five-point scale was used to calculate the elements. Attitude to using e-learning (AUE) is evaluated on 4 components. "The 4 questions are (AUE1) "Using e-learning

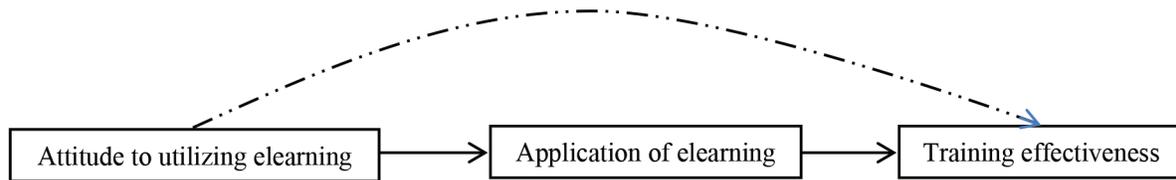


Figure 1: Research Model

Table 1: Convergent Analyses

Factor	Item	Loading	Cronbach's $\alpha$	CR	AVE
AUE	AUE1	0.719	0.879	0.911	0.678
	AUE2	0.840			
	AUE3	0.881			
	AUE4	0.833			
IME	IME1	0.798	0.876	0.893	0.735
	IME2	0.857			
	IME3	0.871			
	IME4	0.878			
TRP	TRP1	0.844	0.904	0.918	0.562
	TRP2	0.840			
	TRP3	0.766			
	TRP4	0.788			
	TRP5	0.741			
	TRP6	0.789			

is a good idea, (AUE2) I would feel that using e-learning is pleasant, (AUE3) In my opinion, it would be desirable to use e-learning, and (AUE4) In my view, using e-learning is a wise idea intention, modified from Jan et al. (2012). Implementation of e-learning (IME) is designed on the 4 items that are (IME1) – “Intending to utilize e-learning in training as much as possible, (IME2) - Intending to utilize online instruction to support study, and (IME3) - Intending to suggest e-learning to friends, (IME4) - Intending to utilize e-learning to support study, modified from Okazaki and Renda dos Santos (2012). Training effectiveness (TRP) is assessed on the 6 elements that are (TRP1) – “Online lessons have improved my analytic skills; (TRP2) - Online programs attempt to obtain the best out of all their students; (TRP3) - Online courses have aided me to cultivate the ability to plan my job; (TRP4) - Online lessons have stimulated me to advance my academic interests as much as possible; (TRP5) - Online lessons have improved my written communicating skills; and (TRP6) - Because of doing online lessons, one feels more confident about confronting unfamiliar difficulties, modified from Gopal et al. (2021).”

The data was collected from a sample of students at the Vietnam National University of Ho Chi Minh. We requested data from the initial sample of 1500 students for our study. However, only 1023 students responded. Finally, only 437 quality responses that contained the precise information needed for this paper could be found. Salloum et al.'s (2019) analyses were undertaken to test the measurement of items and construct validity. The study then used Aroian's (1947) methodologies to examine the mediating effect while using regressions to analyze the causal links.

#### 4. Empirical Results

To assess the measurement of items, the techniques of Salloum et al. (2019) were applied. The results are displayed in Tables 1, 2 & 3. The values in Table 1 show all factor loadings, Chronbach's  $\alpha$ s, as well as CRs, exceed 0.7. Additionally, the AVEs surpass the 0.5 level. Those figures ratify the convergent validity of the research model. The values of the square root of AVE in Table 2 all exceed their

**Table 2:** Cross-Loadings & Square Root of AVE

	<b>AUE</b>	<b>IME</b>	<b>TRP</b>
AUE1	<b>0.719</b>	0.187	0.230
AUE2	<b>0.840</b>	0.046	0.229
AUE3	<b>0.881</b>	0.072	0.193
AUE4	<b>0.833</b>	0.108	0.253
IME1	0.181	<b>0.798</b>	0.047
IME2	0.093	<b>0.857</b>	0.170
IME3	0.052	<b>0.871</b>	0.006
IME4	0.054	<b>0.878</b>	0.172
TRP1	0.121	0.127	<b>0.844</b>
TRP2	0.154	0.203	<b>0.840</b>
TRP3	0.229	0.023	<b>0.766</b>
TRP4	0.254	0.183	<b>0.788</b>
TRP5	0.164	-0.014	<b>0.741</b>
TRP6	0.261	0.060	<b>0.789</b>
AUE	<b>0.823</b>		
IME	0.243	<b>0.857</b>	
TRP	0.487	0.242	<b>0.749</b>

**Table 3:** Multiple Regressions

Model	Dependent Construct	Independent Construct	$\beta$	S.E.	$t$	$P_t$	$F$	$P_F$	$R^2$
1	IME	C	2.766	0.166	16.705	0.000	29.550	0.000	0.064
		AUE	0.225	0.041	5.436	0.000			
2	TRP	C	1.810	0.176	10.297	0.000	74.170	0.000	0.262
		IME	0.119	0.040	2.964	0.003			
		AUE	0.380	0.036	10.645	0.000			

correlations. The loadings of every item in Table 2 all surpass that of its corresponding factor, indicating the measurements of constructs in the model obtain the goodness of fit.

Successively, regression analyses were performed to scrutinize the causal bonds, the findings of which are exhibited in Table 3. With Model 1,  $F$  is 29.550 with a  $P_F$  of 1%.  $R^2$  reveals that students’ attitude to use e-learning in their studies explains 6.4% variance in the implementation of e-learning in training ( $F = 29.550$ ;  $P_F = 0.000$ ;  $R^2 = 0.064$ ). Those figures show Model achieves the goodness of fit.

Students’ attitude to utilizing e-learning in the study positively influences their implementation of e-learning in training at the 1% significance level with the influential estimate of 0.225 ( $\beta = 0.225$ ;  $t = 5.436$ ;  $P_t = 0.000$ ), offering

statistical evidence in supporting H2: “Students’ positive attitude to utilizing e-learning in training can increase their implementation of e-learning in training”.

With Model 2,  $F$  is 74.170 at the 1% significance level.  $R^2$  demonstrates students’ attitude toward using e-learning and their implementation of e-learning in their studies conjointly explains 26.2% of students’ training effectiveness ( $F = 74.170$ ;  $P_F = 0.000$ ;  $R^2 = 0.262$ ), demonstrating Model 2 obtains the goodness of fit. Both students’ attitude to using e-learning and their implementation of e-learning in their studies affect their effectiveness at a 1% statistical significance ( $\beta = 0.380$  & 0.119;  $t = 10.645$  & 2.964;  $P_t = 0.000$  & 0.003), in statistical support for H1: “Students’ implementation of e-learning in their studies can improve their effectiveness”.

**Table 4:** Mediating Analyses

Mediator	Relation	Coefficient	S.E.	t	$P_t$
IME	AUE → TRP	0.026	0.010	2.582	0.009

To explore the mediating effect, the current work employed Aroian's (1947) techniques. The results are displayed in Table 4. The figures indicate students' implementation of e-learning in training mediates the bond between students' attitude to e-learning and their training effectiveness at the 1% significance level with  $t$  of 2.582 ( $t = 2.582$ ;  $P_t = 0.009$ ) with the estimate of 0.026, indicating statistical support for H3: "Students' implementation of e-learning in training may mediate the linkage between their attitude to utilizing e-learning in training and training effectiveness". As a result, the mediating role of accepting e-learning in the study should be considered when analyzing the causal relationship between students' attitudes toward e-learning in training and their training effectiveness.

## 5. Conclusion

The linkages among students' attitudes to e-learning, their implementation of e-learning in their studies, and training effectiveness are more complex than causal relationships. Numerous previous studies have investigated the causal links; however, it seems that none of them have explored the mediating effect of accepting e-learning in training in the research model. The current article attempts to analyze the interplays among students' attitudes to e-learning, their implementation of e-learning in their studies, and training effectiveness. Meaningfully, it tries to emphasize the mediation of accepting e-learning in training. The empirical results reveal students' attitude to e-learning positively affects their implementation of e-learning in training which will in turn improve the training effectiveness. More meaningfully, the empirical outcomes deliver statistical evidence on the mediating effect of accepting e-learning in training on the causal relation between students' attitudes to e-learning and training effectiveness.

This article underlines the importance of accepting e-learning in training as a mediator in the research model. The acceptance of e-learning in training is not only one of the important causes of students' training effectiveness, but it is also a consequence of students' attitude to e-learning. Importantly, the acceptance of e-learning in training takes a mediating role in the research model between students' attitudes to e-learning and their training effectiveness. This article makes some contributions. It is one of the first to provide statistical evidence on the interference of accepting e-learning between students' attitudes to e-learning and their training effectiveness. It is beneficial to educational administrators when offering insight into the relations among students' attitudes to e-learning, their application

of e-learning in training, and learning effectiveness, which likely allows them to establish suitable online training programs. This will be beneficial to both learners and educational organizations because e-learning students could achieve better training effectiveness.

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