

# **Undergraduates' Satisfaction with Zoom e-learning Application: Empirical Evidence from Management Undergraduates**

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## **Abstract**

E-learning is developing as the new paradigm of modern education. The global e-learning business is growing at a 35.6 percent annual rate and still, there are failures. The success of e-learning systems is predicted mainly by user satisfaction. However, factors derived from users' satisfaction with using zoom for e-learning are still underexplored. Therefore, the purpose of this study is to explore the factors that might impact undergraduate satisfaction regarding the use of zoom applications for e-learning. A theoretical foundation was laid for the study from empirical findings based on that conceptual framework was developed. Data was collected from 213 Management undergraduates of the University of Ruhuna by using a questionnaire survey. Results of the study indicated that perceived quality, perceived value, and technology self-efficacy positively impact undergraduates' satisfaction with using the Zoom application for e-learning. Further, the study found that perceived utility has a significant negative impact on undergraduates' e-learning satisfaction by using Zoom. The study was conducted from a student's point of view and implies their actual desires for e-learning specifically the Zoom application. Based on the findings stakeholders can pay attention to taking necessary actions to fulfil students' needs and guiding them to gain higher satisfaction with e-learning and finally it will lead to the overall success of implemented e-learning system.

**Keywords:** E-learning, satisfaction, Technology self-efficacy, Technology Acceptance Model (TAM), Zoom

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## Introduction

The world in 2021 is suffering from the pandemic situation and each sector of the world struggling to cope with that convergent situation. This was started by the raise of the rapidly spread deadly virus namely Covid 19 disease. Generally, Covid 19 influence affects every area of the business positively and negatively and it is similar to education. As a result, most governments implement restrictions to limit the spread of the new virus and due to that current business world face fluctuating situations (WHO, 2020). Most educational institutions close their physical academic activities to the students as a proactive mechanism (Almaiah, Alkhasawneh, & Althunibat, 2020) and educational institutions have begun to incorporate new technology into the teaching and learning processes for continuing academic activities without interrupting (Almaiah et al., 2020). Learning with technology is not a new concept in developed countries but there are so many obstacles associated when it comes to the developing context (Authors, 2019). In the pandemic, this situation became an alternative to face-to-face learning activities and it is a safe method for continuing educational activities without being susceptible to the disease (Almaiah et al., 2020).

Due to the impact of information and communication technologies development, education sector evolved and emerging of e-learning is the result of that (Chen, 2008). E-learning describes in different ways and is most commonly defined as the online distribution of learning materials and techniques through the use of information technology to study, teach, or acquire knowledge at any time and from any location (Nasri & Charfeddine, 2012). Due to the world's pandemic situation, the use of e-learning drastically increased (Almaiah et al., 2020). To gain maximum benefits from e-learning, students have to take a more active role in the learning process, while the lecturer acts as a facilitator and monitors the entire process (Kasmin & Hii, 2017).

According to the Sri Lankan university grant commission in the year 2020, 98,919 undergraduates and 34,739 postgraduate students are enrolled in 15 state universities. Face-to-face lectures were closed in higher education institutions because of the pandemic circumstances. To mitigate the impact of interrupted learning, Moodle-based learning management systems are hosted on university web servers. Lanka Education and Research Network (LEARN) was connected to university web servers and introduced a zoom application to undergraduates with free access (Points & Maddawin, 2020). Zoom is a video conferencing tool that has been introduced and enforced as a handy medium for digitally connecting with students and disseminating material while they are in class. Sri Lankan universities continue their education system with the use of the Zoom application from the 17<sup>th</sup> of March 2020 to date.

Overall fatalities and afflicted individuals in Sri Lanka have been gradually growing for more than a year as a result of the rapid transmission of the Covid 19 outbreak (Epidemiology SL, 2021). According to the Sri Lankan Health Ministry, the entire number of deaths will reach 20,000 in September 2021 (Epidemiology SL, 2021). Several times in the past, from 2020 to 2021, Sri Lankan universities sought to re-open universities for physical education programs, but all efforts failed (Almaiah et al., 2020), and Sri Lankan state universities continued education operations using the Zoom application.

One necessary prerequisite for successful e-learning is that students are overall satisfied with the use of a teaching-learning system (Kasmin & Hii, 2017).

Undergraduate satisfaction is an important phenomenon that needs to be explored more, as involvement in online teaching varies substantially over time. As the university administration expects this practice to continue until the situation returns to normal, knowing the elements that impact student satisfaction with using the Zoom system is important for the future success of Sri Lankan state universities' academic activities done by using Zoom.

## Research Problem

E-learning is emerging as the new paradigm of modern education. Worldwide, the e-learning market has a growth rate of 35.6%, however failures exist (Lee, Sung, & Jeon, 2019). During this pandemic era, most of the empirical studies identified that students were initially eager to actively participate in online instruction; their engagement level has been declining with time (Almaiah et al., 2020; Maddawin, 2020). In the e-learning setting, students must be more independent while dealing with online resources than they would in a traditional context since they have less face-to-face social interaction with their peers and teachers (Sawang & Newton, 2013). Students would have to be extremely motivated and devoted to studying in such settings (Martín et al., 2015).

Moreover, the exact date of beginning the offline academic activities in the state universities of Sri Lanka cannot predict and they intend to maintain online teaching and learning in the future due to the pandemic situation. Thus, low participation and dropout rate have become major concerns. As well as, if learners do not use and engage the e-learning system properly, the productivity of a particular system will not be reached (Hone, Tarhini, & Liu, 2014). Previous studies emphasized that e-learning programs have higher failure rates when compared to traditional courses (Wu, Tennyson & Hsia, 2010; Zaharias & Polylymenakou, 2009) and have a greater rate of tendency to absent for the lectures (Sawang & Newton, 2013). Further, previous studies by Wu, Tennyson, & Hsia (2010) and Arquero et al., (2015) discovered that e-learning systems have a higher drop-out rate than face-to-face learning programs. Adequate answers must be pursued to understand why users quit using or dislike the system after their initial experience.

The numerous benefits associated with e-learning include increased efficiency and cost reduction, transparency, scalability, flexibility, accessibility consistency, and improved student performance (Cavus, Uzunboylu & Ibrahim, 2007; Borstorff, & Keith, 2007) while students in e-learning environments may feel isolated, frustrated, and confused (Hara & Kling, 2000), or they may lose interest in the subject (Maki et al., 2000). Therefore, student satisfaction and e-learning effectiveness have been brought into question (Piccoli, Ahmad, & Ives, 2001; Santhanam, Sasidharan, & Webster, 2008). Empirical studies highlighted those advantages of e-learning systems experienced in institutions in developed countries (Paulsen, 2003) and most e-learning initiatives in developing countries have not been successful either totally or partially (Cavus, Uzunboylu & Ibrahim, 2007; Paulsen, 2003; Saeedikiya, Mooghali, & Setoodeh, 2010; Shahid, 2005; Sife, Lwoga, & Sanga, 2008).

The success of e-learning system deployment is dependent on students' satisfaction with the used system (Merhi, Hone, & Tarhini, 2019). Moreover, numerous studies found that continuous intention to use e-learning is determined by the satisfaction (Al-Busaidi & Al-Shihi, 2012; Hayashi, Chen, Ryan & Wu, 2004). The level of student learning satisfaction with e-learning

courses is an important factor in determining the efficacy of e-learning adoption (Wu et al., 2010). The use of e-learning to support learning has made it critical to investigate the vital determinants that would entice learners to use e-learning and improve their learning satisfaction (Wu et al., 2010). Understanding the factors that influence user satisfaction with e-learning is a critical issue for both researchers and practitioners, and thereby, educational institution administrators can gain insight into developing effective strategies that will allow teaching staff to create new educational benefits and value for their students. Furthermore, there are just not enough studies to determine whether computer self-efficacy is a direct predictor of online course satisfaction, and previous studies used self-efficacy as a mediator and moderator of user satisfaction (Chu, & Chu, 2010; Saadé, & Kira, 2009). By expanding on the learning continuation model and attempting to fill a research gap on computer self-efficacy, this study contributes to the e-learning literature. Thus, it is critical to examine the variables that impact students' satisfaction with e-learning systems.

Since Sri Lankan state universities extend academic activities via online mode, it is important to know about undergraduate satisfaction regarding the using system and it is important for the success of future academic activities as well. It should assist administrative and academic agents in improving the e-learning system and striving for high-quality teaching and satisfying learning experiences (Paechter, Maier, & Macher, 2010). Therefore, understanding the elements impacting user satisfaction with e-learning is a significant topic for both researchers and practitioners. There have been few studies conducted to date to investigate the effectiveness of e-learning implementation in developing countries (Bhuasiri, et al., 2012); Abbasi et al., 2020). The previous studies have attempted to the learning satisfaction of using e-learning (Ramayah & Lee, 2012), the intention to continue using e-learning (Chandradasa, & Galhena, 2021), and the effectiveness of e-learning (Al-rahmi et al., 2015). There is a lack of research into the factors that contribute to student satisfaction with e-learning in developing countries, particularly among students who are new to the e-learning environment and are in the early stages of implementing an e-learning system in higher education. Thus, the purpose of this study is to investigate the key factors that impact undergraduates' satisfaction with using Zoom applications for e-learning. The following section of the paper describes the literature review of the study, conceptualization, and hypothesis development, and the third section discusses the methodology. In the fourth section, the empirical results are presented. The final section summarizes the theoretical and practical implications, limitations, and areas for future research.

## Literature Review

### *E-Learning*

E-Learning is a web-based system that makes information or knowledge available to users or learners and disregards time restrictions or geographic proximity. E-learning is a powerful tool that transforms traditional learning methods by facilitating the development of teaching and learning by providing an efficient and effective channel for educational institutions for teaching and learning among students, as well as efficient knowledge delivery (Alfraih et al., 2018). The term e-learning refers to flexible learning that makes use of ICT resources, tools, and applications, with a focus on information access, interaction among teachers, learners, and the online environment, collaborative learning, and the creation of materials, resources, and learning experiences (Kasmin & Hii, 2017).

### *E-learning satisfaction*

A review of the literature to date indicates several definitions for user satisfaction. Most studies regard it as a measure of the disparity that exists between a standard of comparison, such as one's expectations or wishes, and the yield perceived in terms of the item or service in question (Oliver, 1999). User satisfaction in information technology is greatly influenced by subjective measurements like perceived gains, expected utility, ease of use, and user expectations (Sawang & Newton, 2013). E-learning is commonly associated with technology. In this study, the authors focus on undergraduate's satisfaction in the e-learning context.

### *Theories of study variables*

Fishbein and Ajzen's (1975) theory of reasoned action (TRA) is a well-established model that has been widely utilized to predict and explain human behaviour in a variety of fields. According to the TRA model, attitudes are a consequence of beliefs, especially behavioural beliefs that are directly related to a person's desire to do a defined activity. Davis (1989) proposed a technology acceptance model (TAM) derived from TRA in modeling user technology acceptance behaviour. The original TAM consists of perceived ease of use, perceived utility, behavioural intention to use, and actual system use. Perceived ease of use and perceived utility are the two most important determinants for actual system use.

Davis (2000) further proposed an extended TAM named TAM2, which includes social influence processes (subjective norm, voluntarism, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use). The research indicated that both social influence processes and cognitive instrumental processes significantly influenced user acceptance. User acceptance can be assessed by a good attitude toward the system based on TAM (Taylor & Todd, 1995). Therefore, TAM 2 is the recent theory found to describe user satisfaction by using technology. Thus, based on the support of TAM 2 laid the foundation for the conceptual model, the current study examines the learner's satisfaction by using the Zoom application. Satisfaction is a strong approximation for user acceptance and is frequently used to assess learners' attitudes in learning-related research (Chau & Kong, 2001).

Furthermore, in the developing context student's ICT literacy rate is lower than developed context students (Merhi et al., 2019). thus, there hasn't been enough research done to see if computer self-efficacy is a direct predictor of e-learning satisfaction in developing contexts (Martín et al., 2015). Thus, this study added technology self-efficacy as a direct variable.

Prior research in education had found that perceived utility and perceived value were positively related to student satisfaction (Sawang & Newton, 2013). Further technology self-efficacy (Chau & Kong, 2001) and perceived value (Leong, Hew, Tan, & Ooi, 2013) have been identified from literature that impact areas of students' satisfaction with e-learning usage. Concerning the theoretical background and empirical shreds of evidence mentioned were developed a research model displayed in Figure 1.

## Research Model

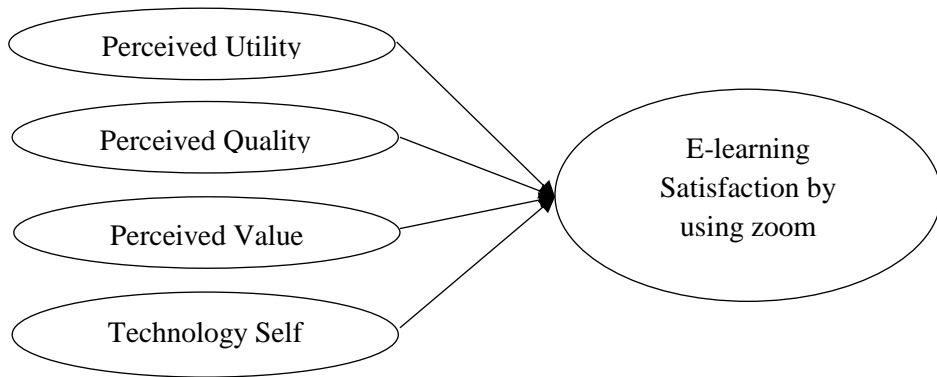


Figure 1: Research Model  
 (Source: Authors Constructed, 2021)

## Hypotheses

### *Perceived utility*

The perceived utility is the degree to which a product or service is utilized by a set of users in a given context in terms of the product's efficacy and efficiency, as well as the user's pleasure (Chiu et al., 2005). The perceived utility is comprised of three sub-constructs namely usefulness, ease of use, and compatibility (Chiu et al., 2005). Perceived usefulness is defined as the degree to which a person feels utilizing a certain system would improve his or her work performance, whereas perceived ease of use is defined as the degree to which a person believes using a specific system would be free of effort (Davis, 2008). The compatibility refers to how well the system in use fits the user's present needs, values, and prior experiences (Taylor & Todd, 1995). According to research, perceived usefulness enhances user satisfaction with technology use (Seddon, 1997). Previous literature implies that perceived usefulness, perceived ease of use, and compatibility all increase user satisfaction (Chiu et al., 2005). As a result, the following hypothesis was derived

*H1:* Perceived utility is positively related to undergraduate satisfaction by using zoom for e-learning

### *Perceived value*

Perceived value is the “consumer’s overall assessment of the utility as a product based on perceptions of what is received and what is given” (Chiu et al., 2005). Customer satisfaction is closely connected to perceived value as the perceived value rises, so does customer satisfaction will increase (Bojanic, 2008). Using perceived value as a metric assists e-learning system designers in becoming more aware of client values, and working toward fulfilling customer goals improves the likelihood that customers will be satisfied with the e-learning application (Roffe,

2003). As a result, it is critical to incorporate perceived value into models meant to assess user satisfaction. As a result, the following hypothesis was derived.

*H2: Perceived value is positively related to undergraduate satisfaction by using zoom for e-learning*

### *Perceived quality*

Perceived quality is defined as the overall output that expects by customers from its providers (Chau & Kong, 2001). It applies to an e-learning system since e-learning may be viewed as a service that provides students with information. Customer satisfaction is favourably influenced by the quality of IT-based services (Leong, Hew, Tan, & Ooi, 2013). Perceived quality is divided into three sub-constructs: system quality, information quality, and service quality ( Chiu et al., 2005).

System quality pertains to ‘how productively information is processed within the system’ (Delone & Mclean, 1992). ‘Information quality refers to the relevance, timeliness and accuracy of the information generated by an e-learning system’ (Seddon, 1997). The quality of the system, as well as the quality of the information, has a positive influence on user satisfaction (Seddon, 1997; Iivari, 2005). “Service quality refers to providing high-quality service to the customer” ( Chiu et al., 2005). If service quality improves it will increase user satisfaction (Delone & Mclean, 1992). According to research, Mckinney, Yoon, & Mariam, (2002) found that there is a favourable link between perceived quality with user satisfaction. Further, Roca et al. (2006) used perceived quality to represent information quality, service quality and system quality of e-learning systems. Therefore, it is believed that the three aspects that comprise the perceived quality variable have a beneficial impact on user satisfaction in the e-learning context. Based on that, the following hypothesis was derived.

*H3: Perceived Quality is positively related to undergraduate satisfaction by using zoom for e-learning*

### *Technology self-efficacy*

Self-efficacy is defined as a person's self-evaluation of his skills concerning a certain course of action (Bandura, 1999). This study focuses on technology self-efficacy, which is defined as a person’s self-evaluation regarding the accomplishment of a task using technology (Sun et al., 2008). Self-efficacy has been studied as both a direct (Chau & Kong, 2001) and a moderating component impacting reported ease of use and perceived usefulness (Hayashi, Chen, Ryan & Wu, 2004). Since it is acceptable that computer self-efficacy is important to explain users' e-learning behaviour, we consider computer self-efficacy to be a construct that directly influences satisfaction in this study.

If consumers are not confident in their ability to utilize technology successfully, their views about the outcome may not be sufficient to influence their behaviour (Sun et al., 2008). Previous studies found that self-efficacy and performance are positively connected (Fagan et al., 2016). Thus, we propose that users with high technology self-efficacy utilize e-learning tools more

competently and are more satisfied than users with low technology self-efficacy. Concerning that, the following hypothesis was derived.

*H4:* Technology self-efficacy is positively related to undergraduate satisfaction by using zoom for e-learning

## Methodology

The purpose of this study is to investigate Sri Lankan undergraduates' satisfaction of using Zoom application for e-learning. This study used a survey research approach, which allowed for the evaluation of the relationships between the variables stated in the model. Four independent variables namely perceived quality, perceived value, perceived utility, and technology self-efficacy were identified after a review of the literature. This study's population consists of undergraduates in Sri Lankan state universities as the findings are generalized to the Undergraduates in the state Universities in Sri Lanka. Among Sri Lankan state universities second-largest annual intake for Sri Lankan national universities enrolls under the Management stream (UGC, 2021). From that, Management undergraduates of the University of Ruhuna were chosen as the study population. The faculty of Management and Finance is the sixth Faculty of the University of Ruhuna established in 2003. Since 2021, annually second largest batch of the management stream enrolled in the Faculty of Management and Finance, the University of Ruhuna among 16 management faculties of 16 state universities in Sri Lanka (UGC, 2021). Each undergraduate year represents students from 9 provinces in Sri Lanka and different demographic and socio-economic backgrounds. Therefore, the undergraduates of the Faculty of Management and Finance, the University of Ruhuna were selected as the study population and data gathered from them. Thus, the analysis of the present study is highly individual.

The study model's constructs were operationalized based on the extant literature and used empirically validated scales with slight modifications to be compatible with the context. All the constructs were evaluated using a five-point Likert scale, with respondents indicating their level of agreement ranging from strongly disagree (1) to strongly agree (5). The operationalization table is displayed in table 1. By using the questionnaire gathered responses categorized into two groups as early and late responses based on the time responses received. After that t test was done to check nonresponses biases and results indicate that there is no significant difference between these two groups that confirm non-responses bias is not a grave concern in this study.

Table 1: Operationalization

Variable	Constructs	Source
Technology self-efficacy	I feel confident while using zoom for e-learning	(Islam, 2020)
	I feel confident while operating zoom functions	
	I feel confident while using zoom contents	



	I am confident in sharing my ideas and perspectives with others through zoom while e- learning	
Perceived utility	Using zoom increase my efficiency in e-learning	(Lee, 2006)
	The zoom application makes it easier to keep track of my learning tasks	
	Using zoom increase my learning productivity	
	Using zoom increase the effectiveness of my works	
	The zoom platform allows me to better manage my time	
Perceived quality	Operate zoom is easy for me	(Teas, 1993)
	The user interface of the zoom is clear and understandable to me	
	I would find zoom is flexible to interact with	
	I believe the zoom application is user friendly	
	I believe that using the zoom service can simplify my e-learning process	
	The set-up of the e-learning service is compatible with the way I learn	
Perceived value	I can be actively involved in the e-learning process by using the zoom	(Cronin, 2000)
	Zoom has options to address my questions and concerns	
	I can give my voice, my opinion and viewpoints through zoom	
	Understanding the course materials is easy by using the zoom application	
	Zoom application stimulate my interest in the subject	
	Zoom is a cost-effective method for e-learning	
Undergraduate e-learning satisfaction of	I am satisfied with the tool and options available in zoom	(Islam, 2020)
	Zoom empowered me to e-learning	

using zoom for e-learning      Zoom interface attracts me to use for learning

Overall, I am satisfied with using zoom for learning

I recommended zoom for others to use e-learning

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Google Forms were used to create the questionnaire. By using the self-administered questionnaire, data was collected from 2021 March to June and in that period as a proactive mechanism university fully conducted academic activities by using the Zoom application. It was started in 2020 March and after one year of using that application; this study was carried out to examine the e-learning satisfaction using the application. The designed questionnaire was distributed to Management undergraduates of the Faculty of Management and Finance at the University of Ruhuna via email and social media networks. Respondents were asked to share the questionnaire among undergraduates in the faculty. Thus, the study had to employ the snowball sampling approach. The minimum sample size indicated for the study is 100 (Cohen, 1988) and 213 responses were received by exceeding the minimum sample size. Data analysis was done by using SPSS 23 version.

## Data Analysis

After the collection of data, the data cleaning process was carried out. Outliers and missing values were identified during data cleaning. As a pilot study was carried out, expert feedback was gathered, and the questionnaire was adjusted accordingly. As a consequence, there were very few missing values, and the median was imputed for the identified missing values, as proposed by Little and Rubin (2002). Outliers were identified using box plots and omitted, as suggested by Aguinis, Gottfredson, and Joo (2013). In order to test the common method bias Harmon’s single factor test was carried out result revealed unique factor structure with five factors which indicate that there is no concern with the common method bias. The normality test results confirmed that the data set is normally distributed. Frequency distributions were used to analyse the sample profile of the respondents and correlation analysis was used to measure association among independent variables to verify that that were no multicollinearity issues. Cronach alpha test runs to confirm the reliability of the constructs. Finally, multiple regression analysis was performed to test the hypothesis postulated based on the research model of the present study. The sample composition of the study is present in Table 2.

Table 2: Sample Compositions

Category	Subcategory	Frequency	Percentage
Age group	19-20	4	1.9
	21-22	108	50.7
	23-24	38	17.8

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	25-26	53	24.9
	More than 27	10	4.7
Undergraduate Year	1st year	91	42.7
	2nd year	42	19.7
	3rd year	20	9.4
	4th year	60	28.2
Gender	Female	148	69.5
	Male	65	30.5
Use the device to access zoom	Laptop	89	41.8
	Smart Phone	123	57.7
	Tab	1	0.5
No of the semesters use the zoom	0-1	76	35.7
	2-3	131	61.5
	3-4	6	2.8
Internet Service providers used	Airtel	15	7.1
	Hutch	23	10.8
	Mobitel	64	30.0
	Dialog	111	52.1

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*(Source: Survey data, 2021)*

### Reliability and Validity

For measuring internal consistency of the constructs the Cronbach's alpha (CA) values were used. According to Bagozzi and Yi (1988), a threshold level of 0.6 or higher is required to demonstrate satisfactory reliability. According to table 3, the current study indicates all variables Cronbach's alpha values are greater than 0.6 and Composite Reliability greater than 0.7 Based on the table no 2 results this study achieved internal consistency.

Table 3: Reliability and Validity Analysis

Variable	CA	CR	AVE	TSE	PU	PQ	PV	USZ
TSE	0.899	0.850	0.588	0.766				
PU	0.938	0.868	0.713	.862**	0.866			
PQ	0.936	0.903	0.669	.810**	.792**	0.817		
PV	0.902	0.760	0.519	.831**	.836**	.856**	0.871	
USZ	0.940	0.796	0.549	.801**	.859**	.847**	.886**	0.892

(Source: Survey Data, 2021)

CA: Cronbach's Alpha, CR: Composite Reliability, AVE: Average Variance Extracted, TSE: Technology self-efficacy, PU: Perceived Utility, PQ: Perceived Quality, PV: Perceived Value, USZ: Undergraduates' e-learning satisfaction by using Zoom

To achieve convergent validity if the AVE (Average Variance Extracted) threshold level should be more than 0.5 for each constructs, composite reliability is better than 0.7, and standardized factor loadings of individual items in their respective constructs are greater than 0.6 (Fornell & Larcker, 1981). Based on table 3, convergent validity was proven in this study. To verify discriminant validity, Fornell and Larcker (1981) suppose that the square root of each independent variable's AVE should be larger than the latent variable correlations. As shown in Table 3, every latent variable's square root of AVE is greater than the correlations of the latent variables. As a result, it may be stated that the researchers were instrumental in delivering discriminant validity.

### Correlation and Multicollinearity

According to the table 4 correlation coefficient values between the independent variables were very high. Multicollinearity was evaluated using Tolerance and VIF values and the findings indicate that there is no multicollinearity among all independent variables since the Tolerance values are greater than 0.10 and the VIF values are lower than 10.

Table 4: Correlations and Multicollinearity Diagnostics

	TSE	PU	PQ	PV	Tolerance	VIF
TSE	1				.203	4.927
PU	.862**	1			.209	4.793
PQ	.810**	.792**	1		.233	4.288
PV	.831**	.836**	.856**	1	.191	5.227

(Source: Survey data, 2021)

TSE: Technology self-efficacy, PU: Perceived Utility, PQ: Perceived Quality, PV: Perceived Value

### Hypothesis Testing

The hypothesis was tested using multiple regression analysis using SPSS and regression results are shown in Table 5. The Adjusted R Square value amounts to .876. Thus, the regression model explains 87% of the variance in undergraduate satisfaction by zoom e-learning with the four independent variables specified in the research model and the ANOVA test confirmed that the regression model is statistically significant ( $F = 61.541$ ,  $P = 0.000$ ).

Table 5: Regression Analysis

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
TSE	0.430	0.054	8.658	0.000
PU	-0.134	0.050	-2.481	0.014
PQ	0.347	0.047	7.435	0.000
PV	0.365	0.050	7.280	0.002
Adjusted R square	0.876			
ANOVA	F=61.541, Sig (0.000)			

(Source: Survey data, 2021)

TSE: Technology self-efficacy, PU: Perceived Utility, PQ: Perceived Quality, PV: Perceived Value, USZ: Undergraduates' e-learning satisfaction by using Zoom

According to the table 5, technology self-efficacy ( $b = .430, p = 0.000$ ), Perceived quality ( $b = .347, p = 0.000$ ), and perceived value ( $b = .365, p = 0.002$ ), have significant positive effect on explaining undergraduate satisfaction on zoom application for e-learning. Thus, derived H1, H3 and H4 hypothesis were accepted with observed data. Perceived utility ( $b = -.134, p = 0.014$ ), has a negative impact on undergraduate satisfaction on zoom application for e-learning. Thus, H2 was not accepted in the present study.

## Discussion of findings and Implication

The main objective of this study is to investigate the factors that might influence the satisfaction of using the zoom application for e-learning in undergraduates of Sri Lankan universities. Results of the study indicate that technology self-efficacy, perceived quality, and perceived value significantly and positively impact the undergraduate satisfaction with zoom application for e-learning. Further, perceived utility is negatively related to undergraduate satisfaction with the use of zoom applications for e-learning.

This study found empirical support for the relationship between perceived value and student satisfaction with the use of zoom applications for e-learning. This emphasized that if the student feels used to the zoom application for e-learning enhances their academic performance while adding value to their academic life and providing low cost they will satisfy with e-learning. Especially in Sri Lankan university system provide free access to the students for zoom. A then associated major cost is free. Therefore, we believe that benefits are greater than cost. The findings of the study are consistent with the previous work (Chau & Kong, 2001; Lou, Tian, & Koh, 2017). This has implications for the instructors the teach by using zoom that if they can add more value to student's life, their satisfaction will be increased.

The relationship between perceived quality and student satisfaction of use zoom applications for e-learning is confirmed by this study. Findings indicate that undergraduates are satisfied with using zoom if the user application provides a system, information, and service quality as overall perceived quality to their academic activities. This finding confirms the work done by (Martín et al., 2015). This finding implies that vendors must concern about the overall quality of the system. If developers provide more features by adding high quality to the system, higher customer service to their users will lead to higher satisfaction among its users, especially in the e-learning context.

Consistent with the previous empirical findings of Roffe, (2003) and Chiu et al., (2005) the present study found empirical support for the relationship between technology self-efficacy and student satisfaction with the use of zoom applications for e-learning. This means when students have a clear idea about the system and how to use the system for e-learning it will lead them to higher satisfaction. This implies to developers that if they can provide demo sessions, regular updates about newly added things to the system, and instruction manuals with the application, it will guide students to higher satisfaction with e-learning. Moreover, if system implementers can provide online pieces of training about how to handle the system it will also lead undergraduates to higher satisfaction with e-learning.

Previous studies by Seddon, (1997) and Chiu et al., (2005) indicate that perceived utility has a significant positive impact on the satisfaction of use in technology. However, this study found a

significant negative impact on perceived utility and undergraduates' satisfaction with e-learning by using zoom. The possible reason for negative results would be that Sri Lankan universities provide free access to the zoom and the only application used for e-learning is zoom. Therefore, students have no alternatives currently. In sum, Sri Lankan university students' e-learning satisfaction with using zoom is explained by the perceived value, perceived quality, and technology self-efficacy.

## Conclusion

During the pandemic era, Sri Lankan universities launched the zoom platform for e-learning. As a result, universities must continue to use zoom during the pandemic period. Sri Lankan undergraduates have been using zoom for over a year, but there is a question about whether they satisfy with the using zoom application for e-learning. This study investigated the reasons that undergraduates seek from the system and system operators to e-learning satisfaction by using zoom. According to the findings, the factors that Sri Lankan universities considered a perceived utility, perceived quality, and perceived value for satisfaction with zoom application for use e-learning.

## Theoretical and Practical Implications

From a theoretical standpoint, the conceptual model validated in the developing context gives a clearer understanding of the variables that affect students' satisfaction and e-learning system usage behaviour and most importantly how technology self-efficacy directly influences e-learning satisfaction.

The results will point out that more effort could be paid to make high satisfaction of e-learning. It gives them a deeper view of the preferences of university students in the case of e-learning system implementation, as well as what these students would want to see and, in their technology, assisted learning phase for lead them to a high satisfactory level of e-learning. So those potential implementations and current installations can be better tailored to meet these students' needs and desires and finally, it leads success of implemented e-learning program.

Moreover, this study provides implications to vendors and developers regarding how future online teaching software designs and give higher satisfaction to its users. The first one is students expect more user-friendly, understandable and manageable features and tools. Thus, they must develop software that ensures the convenience of its users in future to enhance users' satisfaction. Moreover, after selling software, giving necessary training sessions, demo sessions and reading materials ensure a higher level of user satisfaction of its users. Therefore, vendors must design modify applications, and provide after selling services to increase the usefulness of users and it derive user satisfaction. In addition, users expect more value for their paid amount. Providing exceed the value for their paid amount is necessary to gain more user satisfaction. Perceived quality is another variable that this study identified as a major determinant of deriving user satisfaction. Providing regular updates and upgrades which ensure an increase in system quality, information quality and service quality is the way that enhances users' perceived quality regarding the systems. Thus, developing their software consisting of high-quality features and

tools would increase user satisfaction. Therefore, vendors must address these things to provide a higher user experience to their users to gain more business value for their businesses.

## Limitations and Future Research

We identified the following study limitations while proposing future research objectives in this work. The sample was limited to 213 University of Ruhuna respondents. A bigger sample size would enhance statistical power and provide more robust results (Hair et al., 2010). Future research with a larger sample size covering underrates at other institutions is also recommended. This study applied a cross-sectional design, with data collected at a single moment in time. Students' satisfaction is considered a psychological concept that requires longitudinal empirical investigations to obtain a thorough understanding. Future studies using a longitudinal study methodology would substantially contribute to the literature.

The current study collected primary data regarding the phenomena of interest using a questionnaire survey. Alternative techniques, like interviews, might allow for a more in-depth study of satisfaction and its causes. As a result, future research that utilizes interviews and qualitative analysis of interview data will yield crucial insights into this phenomenon. Moreover, the study used only four factors based on empirical findings. Additional variables specified in other theories, transaction cost theory, extended expectancy disconfirmation model, and Theory of recent action might have an impact on the satisfaction of e-learning. Future researchers can overcome these limitations in their studies.

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