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Impact of Virtual Learning Exposure on Students' Satisfaction during the Covid-19 Pandemic Epoch: A Study at Sri Lankan University

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The swift shift to virtual education due to the COVID-19 pandemic required a detailed assessment of students' satisfaction with this new learning environment. This study aims to examine the factors influencing students' satisfaction with online learning, focusing on how challenges of e-learning, learner motivation, and interaction affect their experience. Specifically, it investigates the extent to which these independent variables such as challenges of e-learning, learner motivation, and interaction impact students' satisfaction with online education during the COVID-19 pandemic, with a focus on the University of Jaffna in Sri Lanka. The study seeks to determine how these factors contribute to students' overall satisfaction with the transition to online learning. Using a convenience sampling, data gathered from 100 students at the University of Jaffna through a structured questionnaire. The data were then analyzed with SPSS version 25.0, utilizing Multiple Regression Modeling to evaluate the proposed hypotheses. This study highlights the strong correlation between learner motivation and student satisfaction in online education, especially during the COVID-19 pandemic. This study findings indicate a significant and positive relationship between student satisfaction and learner motivation, with learner motivation having the most substantial impact on satisfaction. Although e-learning challenges and interaction did not significantly influence satisfaction, this study has implications in practical, theoretical, and managerial areas. These results enhance comprehension of the factors influencing online learning satisfaction during exceptional global difficulties. Future research should expand to other universities and include perspectives from teachers and staffs to enhance generalizability.

Keywords: *Challenges of E-Learning, Interaction, Learner Motivation, Virtual Learning*

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Introduction

The unexpected emergence of the COVID-19 pandemic has affected nearly every sector, including higher education institutions around the globe (Adedoyin & Soykan, 2020). During the peak of the COVID-19 pandemic, numerous countries globally shifted to online instruction (Bokayev et al., 2021). In reaction to this emergency, academic institutions throughout the nation, supported by Sri Lanka's Ministry of Higher Education, chose to adopt an online teaching platform to lessen the impact (Gangahagedara, Karunarathna, Athukorala, Subasinghe & Ekanayake, 2021). Numerous organizations face diverse challenges due to major shifts, and one institution profoundly impacted by the COVID-19 pandemic is the university, crucial to higher education systems. Universities are crucial in the service sector, serving students at various educational stages who embody the future workforce potential (Indrawati & Kuncoro, 2021). In Sri Lanka, certain university students have little experience and limited exposure to online learning platforms for participating in educational activities (Hettiarachchi, Damayanthi, Heenkenda, Dissanayake, Ranagalage & Ananda, 2021). Online learning has become the main method of education, providing the only feasible solution to maintain continuous learning in a world that favors isolation over social interaction to curb the spread of COVID-19 (Bozkurt, 2020). The term 'virtual learning' is specifically employed in the educational realm to denote learning conducted through the internet and various media, including television, radio, and digital versatile discs (DVDs) (Arslan & Kaysi, 2013). In the current environment, the term 'virtual learning' may be unclear since it covers both real-time (Shamir-Inbal & Blau, 2021) (e.g., video conferencing, live chat, and instant messaging) and self-paced (e.g., web-based course materials) approaches to education. Tools like Zoom facilitate these interactions, allowing both lecturers and students to connect through web-based technologies. “Virtual learning” has emerged as the prevailing method in the "new normal" following the COVID-19 pandemic, facilitating continuous education for students without

disrupting their academic timelines (Buheji et al., 2020). Utilizing virtual learning is a practical approach to ensure, students can continue their studies amidst the challenges posed by the pandemic (Nartiningrum & Nugroho, 2020). COVID-19 arrived suddenly, catching many countries off guard with little to no preparation in place (Gupta & Loberg, 2021). During the COVID-19 era, the educational system has entered a phase often referred to as the "new normal," which signifies a shift following significant change (Sharma et al., 2022). Initially coined in business contexts, the term now describes situations that were once uncommon but have since become typical in various aspects of life (Eraut, 2004). The integration of virtual learning has served to complement traditional teaching methods. The sudden change from face-to-face teaching to fully online formats was triggered by the COVID-19 pandemic (Elshami et al., 2021). The term virtual learning has been in common usage since the 1990s (Corbeil & Corbeil, 2015). In current literature on higher education, terms like e-learning, virtual learning, and online learning are commonly utilized to depict various study methods adopted globally amid the COVID-19 pandemic (Alsop & Bencze, 2020). Yet, the rapid deployment of virtual learning during emergencies may not match the rigorous, well-planned online learning specifically developed for higher education (Achen, 2021). Hodges et al. propose that Emergency Remote Teaching (ERT) is a more accurate term to characterize the instructional approach adopted by many educational institutions during the COVID-19 pandemic. Previous research suggested that participants expressed higher satisfaction with in-person learning (McCutcheon, 2015). Shifting from traditional classroom teaching to online instruction presented many challenges and obstacles during its initial phases. This shift in the learning environment, coupled with the unfamiliarity of the new format, has impacted students' satisfaction with continuing their online learning journey (Atwa, 2022). There is no denying that the use of ICT applications empowered by internet technologies has emerged as a powerful tool contributing significantly to the swift evolution of electronic learning (Rosenberg,

2005). The abrupt onset of the COVID-19 pandemic and the subsequent shift to impromptu virtual learning undoubtedly had an immediate and substantial effect on student contentment (Rodriguez-Segura et al., 2020). Yet, the sudden and exclusive dependence on these digital tools during COVID-19 could potentially negatively impact students. This could be due to various obstacles that might impede many students' learning processes (Al-Kumaim, Alhazmi, Mohammed, Gazem, Shabbir, & Fazea, 2021). Several studies have evaluated student contentment with online learning post-COVID-19 (Sharma & Alvi, 2021). In this research, elements affecting students' satisfaction with online learning can be divided into three primary domains: difficulties of electronic learning, learner engagement, and interpersonal interaction. Each category encompasses distinct metrics to gauge levels of student contentment. This study also pinpointed several challenges linked to virtual learning in Sri Lanka. These issues encompassed problems like unreliable internet connections, the demanding aspects of online education, difficulties with digital assessments and exams, minimal interaction between faculty and students, inadequate video conferencing software quality, and restricted availability of devices. These challenges mirror common issues associated with online learning worldwide. There is a lack of studies addressing student satisfaction with online learning in the Sri Lankan University context. The research focused on undergraduate students at a Sri Lankan university and identified various difficulties associated with virtual education. The challneges of e-learning included problems like unstable internet connections, the rigorous demands of online learning, obstacles in administering online tests and exams, limited interaction between faculty and students, inadequate video conferencing software quality, and restricted availability of devices Therefore, this study seeks to examine and clarify university students' viewpoints and attitudes toward the use of different emergency ICT online programs during the COVID-19 pandemic. Moreover, this study seeks to pinpoint the challenges and outcomes of adopting a complete e-learning approach during the

COVID-19 pandemic from the standpoint of students, especially when incorporating new e-learning technologies. This study investigated the elements that impact students' contentment with their experience of learning online.

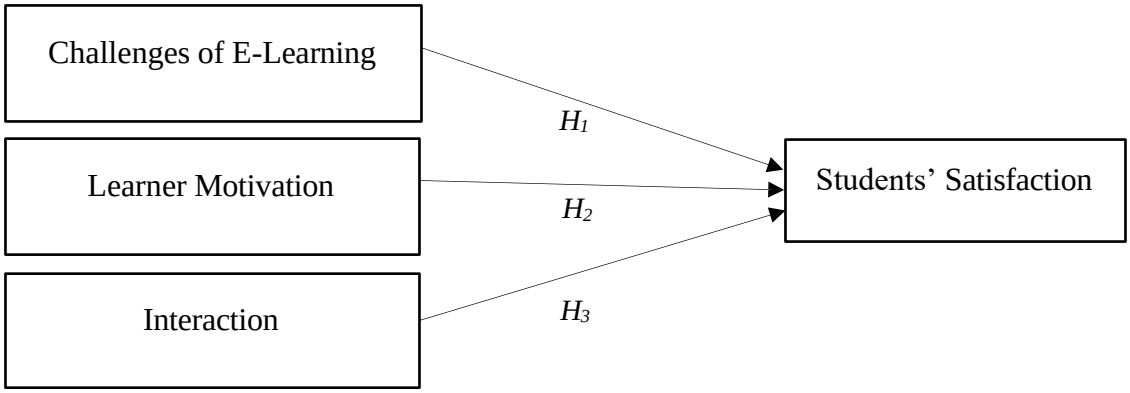
Problem Statement

Satisfaction with online education involves various aspects, such as communication, student participation in virtual discussions, flexibility, workload, technical assistance, teaching methods of instructors, and response mechanisms (Elshami et al., 2021). Several elements led to decreased student satisfaction during the COVID-19 pandemic, including limited interaction, difficulties in adapting to e-learning, inadequate communication infrastructure, internet connectivity issues, technical challenges, insufficient e-resources, low IT literacy, device handling problems, inadequate electronic equipment like laptops, lack of classmates' physical presence, lack of smartphone support, decreased motivation, unsupportive home environment, and heavy study/workload (Al-Kumaim, Mohammed, Gazem, Fazea, Alhazmi & Dakkak, 2021). While observing students during virtual learning sessions, it became apparent that they encountered numerous challenges. These included difficulties in staying motivated, as many found it challenging to perceive their home environment as a conducive space for learning, struggling to adopt the appropriate mindset. Moreover, issues with technology such as unreliable internet connections and device failures increased irritation and interrupted the progression of online learning sessions. Occasionally, the computer may unexpectedly shut down, and there are instances of spotty and weak internet connections. Additionally, having inadequate monitors can pose challenges in keeping up with virtual classmates and the learning environment. Most degree programs provide ample opportunities for social interaction among peers within their layouts. This may occur through virtual classroom activities or even designated "social lounges" created outside the digital classroom environment (Das, 2022). Moreover, some students may feel left behind,

as unlike in a traditional classroom where teachers can monitor and adjust their pace to accommodate those needing extra time, such individualized attention may be lacking in virtual settings. In an online learning environment, it's more challenging to gauge emotions. With virtual interactions, reading body language becomes harder, leading learners to stay silent or "put on a brave face," resulting in feelings of discouragement, frustration, and a sense of learning nothing by the end of the session. Moreover, the online platform often lacks many social aspects, contributing to a diminished sense of social connection compared to traditional methods (Das, 2022). There is no particular study conducted in Sri Lankan Jaffna University context. This study shows that students in the context of Jaffna University in Sri Lanka felt dissatisfied with their online learning experiences during the COVID-19 pandemic. Based on this research problem, the study utilized correlation and regression analysis to reveal answers to these framed research questions: What is the extent of the impact of e-learning challenges on students' satisfaction with their online learning? How does learner motivation influence students' satisfaction with online education? And to what degree does limited interaction affect students' satisfaction with online learning? Therefore, this study aimed to investigate the factors affecting students' satisfaction and to determine how much independent variables such as Challenges of E-Learning, Learner Motivation, and Interaction influence students' satisfaction with online learning during the COVID-19 pandemic, particularly in the context of Sri Lanka's Jaffna University. The study also seeks to analyze whether these independent variables (learner motivation, challenges of e-learning, and interaction) significantly impact on students' satisfaction with their new online learning experience.

Figure 1

Conceptual Model



Theoretical Background and Hypotheses Development

Student Satisfaction

Satisfaction entails the realization of desires, expectations, and needs, or the joy derived from one's experiences (Gnoth, 1994). Evaluating student satisfaction acts as an indicator of the effectiveness of education, whether the learning is conducted online or in-person (Johnson, 2000). Student satisfaction is a crucial element in higher education, and systematically examining this aspect can result in better student performance, advancements in online learning methods, and increased student retention in their academic endeavors (Naidu, 2006). Kotler and Clarke (1986) state that satisfaction is the desired outcome of any effort that fulfills an individual's preferences. Positive interactions between instructors and students enhance student satisfaction (Malik et al., 2010). Moreover, the student is vital in evaluating the effectiveness of online learning (Piccoli et al., 2001). Sanchez-Franco (2009) defines student satisfaction as the extent to which a student perceives that their needs, goals, and desires have been completely met. Yunusa and Umar (2021) categorize the various elements affecting student satisfaction in e-learning into four

dimensions: communication dynamics (e.g., interaction and information quality), e-learning environmental factors (e.g., course structure and content), organizational factors (e.g., technological support and service quality), and personality and situational factors (e.g., autonomy, self-efficacy, and motivation). Similarly, Zeng and Wang (2021) provide a comprehensive review of research on online learning during the COVID-19 pandemic, suggesting that in Emergency Remote Teaching, comparable factors can affect the level of student satisfaction. Various elements impact students' satisfaction with online learning during the COVID-19 pandemic. This research classifies the factors influencing student satisfaction into three categories: e-learning challenges, learner motivation, and interaction. In this research, student satisfaction is considered the outcome variable, while the factors studied include e-learning difficulties, learner motivation, and interaction. Accordingly, within these independent variables, numerous factors contribute to affecting the dependent variable. For instance, under the challenges of e-learning, factors encompass technology, internet access, family background, and available devices. For learner motivation, factors include ease of use, perceived usefulness, learner characteristics, faculty capacity, course content, course design, student learning skills, peer influence, and environmental factors. Within the interaction variable, factors consist of lecturer-student interaction, peer interaction, learner-content interaction, and access to e-resources.

Challenges of E-Learning

Amid the COVID-19 pandemic, students face various difficulties with online education in contrast to traditional in-person lectures (Serhan, 2020). Several obstacles emerge during virtual education, such as difficulties in attending lectures due to technical issues, challenges in maintaining concentration, insufficient proficiency in IT, limited chances for collaboration resulting in feelings of isolation, and a lack of opportunities to acquire practical skills essential for success in certain

subjects. A prevalent technical obstacle reported by students in various virtual learning settings is poor internet connectivity, impacting their capacity to regularly engage in live online learning sessions (Khalil, 2020). According to a study in Sri Lanka by Hayashi et al. (2020), the majority of students, 70%, cited unreliable internet access as a major obstacle in their online education. The learning environment also significantly impacts students' performance (Ames & Archer, 1988). Traditional classroom teaching has historically been regarded as an effective method for achieving educational goals (Ames & Archer, 1988). In contemporary times, online teaching has become a successful method for delivering lectures, utilizing web-based tools that have evolved into digital classrooms (Azlan et al., 2020). Recent studies show that both faculty members and students face various challenges while conducting online classes using virtual platforms (Simamora, 2020). The difficulties involve several technical problems, such as lack of familiarity with specific IT systems, limited internet connectivity, inadequate skills in managing online learning platforms to improve student involvement, interaction, and engagement. Furthermore, there is a need for improved assessment methods to accurately gauge online learning results, along with insufficient expertise in creating digital course materials or converting courses from face-to-face to virtual formats. Additional difficulties include cultural factors within academic institutions, minimal active participation from students in virtual classes, and learners facing social isolation or feelings of depression (Al-Kumaim, 2021). Usually, the education system in Sri Lanka consists of different elements including teachers, students, curricula, and numerous dedicated resources and supports carefully structured to guarantee a valuable learning journey. As a result, fully embracing virtual learning during the unforeseen situation of this COVID-19 era is not easy for anyone without encountering numerous issues and challenges (Yasmin et al., 2020). Students' virtual learning experiences are often hindered by software and hardware problems with

their devices. Moreover, some students lack sufficient internet access and proper devices, particularly those who rely on mobile phones for virtual learning. These challenges may be exacerbated by compatibility issues with essential software like Word, Excel, and PowerPoint, which are necessary for accessing online platforms and virtual learning resources. The consistent identification of inadequate or unsuitable devices for virtual learning highlights how the inability to fully access and benefit from online platforms can impact student satisfaction with virtual learning (Salas-Pilco et al., 2022).

The lack of adequate e-learning resources significantly impacts student satisfaction and poses a significant challenge for accessing the e-resources uploaded through online platforms (Millawithanachchi & Jayasundara, 2010). During in-person lectures, students find it easier to stay focused and attentive because of the direct presence of the instructor and their peers' physical attendance (Lehman & Conceição, 2010). For instance, in research conducted by Means and Neisler (2020) with American undergraduate students, 57% of respondents reported that their concentration during online sessions was lower or significantly lower than in traditional classroom settings. In a qualitative study by Yeung and Yau (2022) on online education among undergraduate students in Hong Kong universities, participants highlighted the difficulty of staying focused during sessions as a significant hurdle. Means and Neisler (2020) found that a majority of participants in their study at American universities felt that the level of academic rigor was lower in online learning settings. In virtual learning platforms, students often experience feelings of isolation and have fewer opportunities for collaboration with peers and lecturers (Wieser & Seeler, 2018). Huang et al. (2020) also point out that social isolation is a notable difficulty encountered by learners in online education. Virtual learning presents many obstacles and challenges, particularly amid the COVID-19 pandemic, that can greatly influence students' overall contentment with online education. Therefore, researcher hypothesize that:

Hypothesis 1: The Challenges of E-Learning negatively impact on students' satisfaction.

Learner motivation

Motivation is a crucial concept in understanding virtual learning, as it drives students to work towards achieving specific productive outcomes (Lin et al., 2017). In this regard, Motivation is crucial in enhancing students' satisfaction levels with e-learning on virtual platforms (Yilmaz, 2017). We can classify motivation into two categories: intrinsic motivation, which is driven by internal rewards, and inwardly directed self-motivation, which refers to the self-generated energy that guides an individual's behavior towards achieving specific objectives (McCombs, 2012). Therefore, self-directed learning, which includes thoughtful planning, monitoring, and adjusting one's thoughts, emotions, and behaviors in an iterative manner, becomes essential for achieving success in online education (Zimmerman & Schunk, 2011). Researchers have also found that self-motivation is a crucial variable for student satisfaction. Threlkeld and Brzoska (1994) describe maturity, strong motivation, and self-control as fundamental traits of online learners who achieve greater satisfaction and success. According to Rovai et al. (2007), existing literature commonly finds that factors linked to online education, such as the excitement of using new technology, decreased commuting to the learning site, curiosity, and a thirst for knowledge, can boost learner motivation. In a recent study conducted by Dhinigra et al. (2021), findings showed that despite facing numerous difficulties, a majority of medical students surveyed in India remained enthusiastic about receiving online education. Simultaneously, Oxford et al. (1993) identify it as the foremost determinant of student success in online education. Learner motivation significantly influences their engagement in online classes in the absence of instructors and peer (Conrad & Donaldson, 2011). It relates to how instructors approach pedagogy in virtual education. The lecturer's student-centered teaching style can encourage

students to consistently attend their virtual lectures. Yet, challenges such as unreliable internet connections and an unsupportive home learning environment can amplify learner discouragement (Hettiarachchi et al., 2021). Means and Neisler (2020) discovered that the primary issue frequently mentioned by their subjects was the struggle to sustain motivation throughout online sessions. 79% of participants recognized this as an issue. Self-driven motivation is pivotal in yielding favorable outcomes and improving performance and contentment in online education. Inadequate learner motivation in virtual learning can result in harmful consequences, such as an increased number of students giving up on virtual learning. Additionally, students may engage in passive procrastination, such as delaying tasks even when faced with negative consequences, leading to poor academic performance and dissatisfaction with virtual learning (Lucey, 2018). Therefore, researcher hypothesize that:

Hypothesis 2: Learner motivation positively impacts on students' satisfaction.

Interaction

Interaction plays a vital role in achieving fruitful results in e-learning and ensuring students' satisfaction on this virtual platform (Rajabalee & Santally, 2021). Social interaction with instructors or peers, along with access to e-resources, is essential for achieving the desired aspects of e-learning (Zozie, 2020). By fostering robust engagement and employing a consistent approach, e-learning can achieve effectiveness (Allen, 2016). The quality of the instructor, when lacking fanaticism, can negatively impact students' satisfaction (Gopal et al., 2021). The instructor's quality is a crucial factor that impacts student satisfaction and, consequently, the overall success of the educational process (Munteanu et al., 2010). According to Garrison and Shale (1990), education is essentially defined by interaction: "at its core, education involves an interaction between the instructor, the student, and the subject matter". Moreover, in virtual education, interaction entails the involvement

of students with the online platform employed by the course (Cacheıro-gonzalez et al., 2019). Interaction is crucial in traditional classroom settings, virtual learning environments, and any form of education (Shu & Gu, 2018). Numerous researchers have highlighted the substantial influence of online learning in improving quality and effectiveness (Zare et al., 2016). Williams et al. (2012) propose that interaction ought to be a core principle in the development of higher education curricula. As per Moore's (1989) renowned classification, interaction can be divided into three categories: learner-content interaction, learner-instructor interaction, and learner-learner interaction. Learner-content interaction refers to the emotional and cognitive connection that students establish with the e-resources, such as handouts and other study materials provided in the course curriculum. E-resources include assigned textbooks, designated course readings, lecture notes, audio-visual materials, and computer software (Laltlanmawii, 2011). In online education, particularly during the COVID-19 pandemic, higher education students usually interact with a variety of e-content, such as e-books, e-journals, simulations, presentations, animations, databases, websites, audio-video productions, discussion forums, and immersive content (Murithi, 2020). Bervell et al. (2019) indicate that among all types of interaction, student-content interaction is the most critical factor contributing to student satisfaction in online learning. According to Moore's (1989) framework, interaction between learners and instructors can maintain students' interest and boost their overall engagement in education. As examined by Zeng and Wang (2021), learner-instructor interaction plays a crucial role in determining student satisfaction in online education (Gan & Balakrishnan, 2018). Commonly, the literature indicates that enhanced student-lecturer interaction contributes significantly to student satisfaction. On the other hand, insufficient interaction between instructors and students can cause students to feel isolated from the academic community, leading to decreased satisfaction. The final type of interaction is lecturer-learner interaction, often referred to as peer interaction, which encompasses interactions among students

with or without the presence of the lecturer. Peer interaction influences students' engagement and interest in virtual learning. Additionally, Sher (2009) finds that interaction among learners significantly impacts student satisfaction. Based on this, researcher hypothesize that:

Hypothesis 3: Inadequate interaction (Lecturer-Student; Student-Student; Student-Content) leads to lack of students' satisfaction.

Methods

Data collection procedure and sample

The sample of this research comprises students from the Faculty of Management Studies and Commerce, University of Jaffna, Sri Lanka. This study focuses to explore the factors influencing satisfaction and analyze the impact of independent variables (challenges of e-learning, learner motivation, and interaction) on student satisfaction.

For data collection, this study employed self-administered questionnaires. Out of the 103 questionnaires distributed, a total of 100 questionnaires were returned and deemed usable, resulting in a response rate of 97%. Convenience sampling was used as the sampling method. Convenience sampling is a non-probability sampling technique where this study selects participants based on their availability, proximity, or ease of access rather than using a random or systematic method. Participants who are easy to reach or nearby at a location and can also select participants based on time constraints or limited resources. The goal is quick data collection rather than representative sampling, conduct a survey only with students visiting to University of Jaffna during a particular period. The main advantage of convenience sampling is the simplicity and speed of data collection, no need to seek out hard-to-reach participants. Prior permission was obtained from the relevant heads of the departments and dean of faculty to conduct data collection, and the questionnaires

were distributed along with a cover letter explaining the purpose of study. Participants were guaranteed anonymity and confidentiality of their responses.

Among the 100 participants in this study, 77% were females. Here, most of the respondents (72%) are studying third year. In terms of age distribution, 69% were in the 23-24 years age group, while 20% fell between the ages of 21-22 and 11% are between 24-25. However, there are no respondents have above the year 25. In terms of districts, 46% of the respondents are from Jaffna district, and 4% of the respondents were from Chunnakam and Kaithady. Regarding the results, learner preferences for online learning (43%) of the respondents prefer the live sessions facilitating student-lecturer interaction and 35% prefer the recorded video lectures, also other 21% of respondents prefer the education via lecture notes and handouts for online learning. And only 1% of respondents prefer pre-recorded audio lectures.

Measures

Measurement levels clarify how values assigned by researchers relate to each other. Stevens (1946) categorized measurement into four levels: nominal, ordinal, interval, and ratio. Nominal level measurements are categorical. Ordinal measures indicate the rank order of cases. Interval measures have consistent distances between the values.

This study elaborates on the measurement scale and the scaling methods utilized in the survey. The questionnaire comprises three sections. Section A solicited personal details and demographic information from the participants and comprises questions about the demographic information of the participants. All the questions in this section are closed-ended. This section includes seven variables adopted from Tabiu (2016). Section B pertained to the elements influencing student satisfaction with online learning were assessed. Students' satisfaction itself was measured with eight items embrace from Khan, M. A. et al., (2021). Challenges of e-learning were assessed with five questions adopted from Means and Neisler (2020) and Richardson

et al., (2017), interaction was gauged with three items derived from Moore, S. F. (1989), and learner motivation was evaluated with five variables embrace from Means and Neisler (2020) and Pelikan et al. (2021). The satisfaction levels were measured using a seven-point Likert scale, ranging from "Strongly disagree" to "Strongly agree".

Section C include one question designed to determine the learner preferences for online learning. The question provides four variables to gauge students' perceptions. The first option is live sessions that facilitate student-lecturer interaction. The second option is pre-recorded video lectures. The third option is pre-recorded audio lectures, and the last option is education via lecture notes and handouts. These options help identify which mode of virtual learning students prefer the most.

Findings of the Study

Table 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Satisfaction	100	1.38	5.00	3.7625	.73092
Challenges of e-learning	100	1.00	4.80	3.6360	.73930
Interaction	100	1.00	5.00	3.5933	.91573
Motivation	100	1.20	4.80	3.5380	.67192

Source: Descriptive analysis by SPSS

This table shows that the mean and standard deviation of each variable. Based on the data it would suggest that the satisfaction had a high mean value of 3.763 and a

standard deviation of 0.730. The mean value of challenges of e-learning is 3.636 and standard deviation is 0.739. Interaction had 3.593 mean score and high standard deviation 0.916. The mean value of motivation is 3.538 and standard deviation is 0.672.

Correlation analysis

Table 2

Results of Correlations

		Challenges e-learning	Interaction	Motivation
Satisfaction	Pearson Correlation	-.035	.044	.404**

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

Source: Correlation Analysis by SPSS

The table above shows the correlation between the variables. Learner motivation is positively and significantly correlated with satisfaction ($r = 0.404$, $p < 0.01$), indicating that higher motivation leads to greater student satisfaction. The challenges of e-learning are negatively correlated with satisfaction ($r = -0.035$), but this relationship is not statistically significant. Similarly, interaction is positively correlated with satisfaction ($r = 0.044$), though this correlation is also not significant.

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Regression Analysis

Table 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.423[a]	.179	.153	.67261

a. Predictors: (Constant), Motivation, Interaction, Challenges of e-learning

Source – Regression analysis by SPSS

The model summary in Table 3 indicates how well the independent variables motivation, interaction, and challenges of e-learning predict students' satisfaction with online learning. The R value of 0.423 shows a moderate correlation between the predictors and satisfaction. The R Square value of 0.179 means that approximately 17.9% of the variance in student satisfaction can be explained by the combined effect of motivation, interaction, and challenges of e-learning. The Adjusted R Square of 0.153 suggests that, after adjusting for the number of predictors, the model explains 15.3% of the variance. The standard error of the estimate (0.67261) indicates the average distance that the observed values fall from the regression line.

Table 4

ANOVA Chart

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.460	3	3.153	6.971	.000[b]
	Residual	43.430	96	.452		
	Total	52.891	99			

a. Dependent Variable: Satisfaction

b. Predictors: (Constant, Motivation, Interaction, Challenges of e-learning)

Source: ANOVA test by SPSS

Table 5

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.441	.475		5.139	.000
	Challenges	-.137	.101	-.139	-1.357	.178
	Interaction	.052	.080	.065	.649	.518
	Motivation	.461	.102	.424	4.506	.000

a. Dependent Variable: Satisfaction

Source: Coefficients test by SPSS

To test the hypotheses that challenges of e-learning have negative impact on satisfaction, motivation has positive impact on satisfaction, inadequate interaction leads to lack of satisfaction employed multiple regression analysis. The prediction model was statistically significant, F=6.971, P<0.05, and accounted for approximately 18% variance of satisfaction (R^2=0.179). In other words, 18% variance of satisfaction is explained by the predictor variables taken into account. The 82% of the variance can be explained by other variables that have not been include in the model.

While motivation (B=0.461, P<0.05) has positive and significant impact on satisfaction. Interaction (B=0.052, P<0.05) has positive and not significant impact on satisfaction. Challenges of e-learning (B = -0.137, P<0.05) has negative and not significant impact on the satisfaction. This means that the students who have high motivation is more likely to get high level of satisfaction. The Challenges of e-learning and Interaction have no any significant impact on satisfaction. The coefficient values indicate that the Motivation has high impact on the satisfaction. When the Motivation is increased by one unit the satisfaction is increase by 0.461 units which implies that there is a positive relationship between learner motivation and students' satisfaction.

Discussion

This study aimed to identify and analyze the factors influencing students' satisfaction with virtual learning and to determine the impact of independent variables on this satisfaction. Regarding the hypotheses, H1 (challenges of e-learning, learning negatively impact satisfaction) was not supported (β = -0.137, not significant). H2 (learner motivation positively impacts satisfaction) was supported (β = 0.461, significant). H3 (inadequate interaction leads to lack of satisfaction) was not supported (β = 0.052, not significant). Overall, the predictor variables (challenges of

e-learning, interaction, and motivation) explained approximately 18% of the variance in satisfaction (R^2=0.179).

Theoretical Implications

This study enhances comprehension of how learner motivation correlates with satisfaction in online education, particularly amid the COVID-19 pandemic. It highlights that even typically self-reliant online learners may need additional support when forced to adopt virtual learning as the sole mode of education.

Practical Implications

The results suggest that simply transitioning from face-to-face to online learning does not ensure self-reliance and motivation among students. Lecturers need to provide ongoing guidance, encouragement, and training to help students manage their learning effectively. This involves considering student needs and preferences in the design of online teaching activities.

Managerial Implications

University faculties and departments should address the challenges students face in online learning by offering technical support and ensuring consistent engagement. Students need to be familiar with the technology and applications used for online education, and they should be encouraged to attend all sessions and complete assignments. This study helps identify factors affecting student satisfaction and provides insights for improving the online learning experience. Overall, this research contributes to understanding how to enhance student satisfaction with online learning and offers strategies for overcoming related challenges.

Limitations and Future Research Directions

This study was conducted exclusively on students from the University of Jaffna, limiting the scope for comparative analysis with other universities. Expanding the sample to include multiple universities could provide a broader perspective. Additionally, this research focused solely on student satisfaction; future studies could explore teacher satisfaction under similar conditions. Future research should also consider including perspectives from teachers, lecturers, and administrative staff to enhance the generalizability of the results. Interviews could be utilized to gather in-depth information on the factors influencing student satisfaction.

Conclusion

This study focusing on the determinants of students' satisfaction such as, challenges of e-learning, learner motivation and interaction. Multiple regression analysis revealed that learner motivation significantly impacts student satisfaction, aligning with existing literature. Among the three variables, learner motivation had the strongest positive influence on satisfaction, emphasizing the importance of self-regulated learning in online environments. Despite facing challenges such as poor Internet connectivity and less conducive home environments, students' motivation remained high, suggesting that motivated learners are more likely to be satisfied with online learning. However, the challenges of e-learning and inadequate interaction did not significantly impact student satisfaction, possibly due to the effective use of technology and sufficient resources provided by the university. This study also found that 43% of students preferred live sessions for better interaction with lecturers, highlighting the importance of student-lecturer engagement in online learning. This preference underscores the need for enhancing interactive elements in online education to boost student satisfaction. In a research article focusing on online education, the conclusion that learner motivation emerges as the most influential predictor of student satisfaction suggests that students who are more motivated tend

to be more satisfied with their online learning experience. This conclusion emphasizes the critical role motivation plays in determining how students perceive the quality, effectiveness, and overall enjoyment of online courses. The research likely indicates that when students are motivated, they engage more deeply, persist through challenges, and achieve better outcomes, all of which contribute to higher satisfaction levels.

The implication for educators and institutions is to design online learning environments that actively foster and support student motivation. This can be achieved through engaging content, interactive learning activities, clear goals, and support mechanisms that cater to student needs and preferences, ultimately enhancing their overall experience and satisfaction.

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