PERCEIVED SATISFACTION TOWARDS EMERGENCY REMOTE TEACHING AMIDST COVID - 19 CRISIS: A CASE AMONG UNDERGRADUATE STUDENTS IN PENANG, MALAYSIA

AnniMalar A/P Muthuraman[1]

Siti Intan Nurdiana Wong Abdullah[2*] (https://orcid.org/0000-0001-7249-8512)

[1]*Center for Australian Degree Program, INTI International College, Penang*

[2*]*Faculty of Business and Communication, INTI International University, Negeri Sembilan*

ABSTRACT

The current pandemic has triggered emergency remote teaching (ERT) to be implemented by higher education institutions globally. This unprecedented circumstance caused serious dissonance between students' learning experience and overall satisfaction. Hence, this research aims to determine the factors influencing their satisfaction with ERT implemented by higher learning institutions in Penang, especially among undergraduate students. Based on the underpinning unified theory of acceptance and use of technology (UTAUT), the four vital influencing factors identified in this study include the usefulness of online materials, network stability, the usability of e-learning platforms, and peer interactions. A total of 504 responses were analyzed using SPSS software. Results indicate that the use of online materials and the usability of e-learning platforms were critical determinants of satisfaction with ERT among undergraduate students. At the same time, internet stability and peer interactions have no significant influence. This current study concludes with relevant implications and recommendations for higher learning institutions to consider to thrive in this changing education landscape.

Keywords: Online learning, Pandemic, Higher Learning Institutions

Introduction

The global Covid-19 outbreak spread worldwide started at the end of 2019, and lockdowns and staying home strategies were implemented to flatten the curve and stop the spread of the virus (Sintema, 2020). This pandemic has affected various industries and learners from all levels of studies, whereby all private and public institutions discontinued their face-to-face teaching. There was an immediate need worldwide to innovate and implement alternative learning methods. COVID-19 pandemic in 2019 has changed the mode to online delivery and mostly finds it convenient due to existing training. However, most are still dissatisfied with technical difficulties of internet connection and computer expertise limitations (Rahim et al. 2020). Moaward (2020) stated that students' expectations are mainly influencing factors for instructors to consider practical technology tools for all the online courses and the satisfaction impact by learning convenience created using the combination of all the e-learning tools made available by the institutions.

Past research on online and distance learning educational technology has analyzed distance learning, distributed learning, blended learning, online learning, mobile learning, and others. Emergency remote teaching (ERT) is a concept found to be practiced and delivered during pressing circumstances, mainly during the COVID-19 pandemic (Hodges et al., 2020). Online and blended learning are usually planned and designed from the beginning, but emergency remote teaching (ERT) is more temporary due to crisis circumstances. ERT fully uses the remote teaching facilities in terms of the available platforms and materials, which will continue through face-to-face lessons, hybrid or blended mode once the emergency end. The main objective of the ERT is not to re-create an educational system but rather to activate the temporary access and the relevant platforms to continue the students' education process (Zimmerman, 2020).

As some higher institutions have been utilizing the online learning tools and materials since the very early stages, transforming to ERT during an emergency state in the country may be more feasible. Education is an essential service even during an emergency as an uneducated mass could, in the longer term, contribute to instability and weak countries (Burde et al. 2011). Those institutions in practice since early online or hybrid and other forms of virtual learning can cope in diverting to ERT. Still, for new ones, this could impose various challenges and result in student satisfaction. Some key elements contributing to students' satisfaction are enhancing the efficacy of knowledge, more accessible communication, and reducing physical contact. These ensure a safe environment, proper accommodation for learning purposes, opportunities to learn anytime and anywhere, cost-effectiveness, and encouragement of innovation (Igbokwe et al. 2020).

Embi (2011) has mentioned that the Malaysian Ministry of Higher Education (MOHE) has strategically planned for transition to online learning as one of their Critical Agenda Projects (CAP) and was participated by 90% of Malaysia Higher Education Institutions (HEI) as their future objective. Online learning is not a new venture for higher institutions in Malaysia, and 90% have e-learning policies, of which 70% have made it compulsory for their lecturers and students to utilize these facilities (Embi & Adun, 2010). In Malaysia, public and private

institutions formed higher education for undergraduate and postgraduate programs, transforming Malaysia into an educational hub in South East Asia. Nearly 50% of these higher institutions offer courses online (Selvaraj et al., 2014). MOHE is taking various initiatives to improve the education system to enhance higher learning institutions' creativity, innovation, leadership, and entrepreneurship.

Penang is a popular destination for many multinational companies such as Dell, Intel, Abbott, Agilent, and Canon due to its accessibility, infrastructure, and logistics, creating a demand for skilled graduates. As a state rich in historical and cultural heritage, Penang strives to be a world-class education hub in the region, attracting local and international students by promoting its first-class institutions of higher learning and affordable cost of living.

Although the private or the public higher learning institutions strategized the planning of online learning a few years ago, there are still grey areas to be improved to provide an influential students' satisfaction with these online learning and ERT. Education institutions' adoptions and students' satisfaction with the online learning experiences depend not only on the user interface (UI) but also on other factors such as technology, system design, environmental category, students, facilitators, and the courses themselves (Aning & Baharum, 2020). According to Narayanan and Selvanathan (2017), students' assessments and feedback are limited in online education, making it difficult to receive feedback for improvements.

Online education also found a lack of interactions among the undergraduates as they prefer face-to-face communications for teamwork and discussions. Lack of discipline in adhering to deadlines and managing files technically due to lack of facilities affects the motivation and contributes to their poor performances (Narayanan & Selvanathan, 2017). Students' fear of online challenges caused by their attachment to conventional approaches results in emotional distress and resistance to change (Aguilera – Hermida, 2020). With the pandemic fear and uncertainty and the sudden panic, students were found to experience a lack of motivation and an unwillingness to continue. In other research, it was found that emergency remote teaching (ERT) often results in depression, anxiety, and other mental – health-related issues that impact students' satisfaction (Gillis and Krull, 2020).

Given the severe long-term implication of ERT and the need to further understand its' effectiveness from students' perspective, this research aims to assess the key factors contributing to students' satisfaction with the ERT during the pandemic. It hopes that the results from this study will assist higher education institutions, especially those in Penang, Malaysia, in optimizing teaching and learning quality during COVID-19.

Literature Review

Students' Satisfaction

According to Gungor (2007), satisfaction can be defined as an overall or global judgment concerning the extent to which a product and service can meet customers' expectations.

Students' satisfaction is essential in considering the effectiveness of online learning as it will determine the effectiveness of adopting the system. It includes various elements such as learning effectiveness, quality of online education, and faculty satisfaction (Alqurashi, 2019). Students' satisfaction with online learning is contributed by various online rather than face-to-face lectures, technology-mediated rather than close group discussions, and electronic methods of mediums rather than physical interactions with instructors (Van Wart et al. 2020). These students' satisfaction expectations lead to various challenges for instructors, such as mastering the new techniques while maintaining the educational integrity and providing a quality online learning mode of delivery (Brinkely-Etzkorn, 2018). Amongst elements identified in students' satisfaction with this online learning are student connections, active learning process between instructors and peers, practical education, learner independence, and technology advancement (Clayton et al. 2018).

Students' satisfaction factors are also contributed by engaged learning. They expect support to facilitate their learning, recognize their abilities and accomplishments, and lastly, on the assessments and their performance feedback (Dziuban et al. 2015). Thus, the roles of students are also crucial in technology to enhance learning, or else inactive cognitive learning due to students' passive behavior would lead to undesirable learning outcomes (Wang & Wegerif, 2019). Students' perceived satisfaction is often reflected in their learning effectiveness and their assessment of the quality of learning mechanisms (Moore, 2005).

Key Factors Influencing Students' Satisfaction

The Unified theory of acceptance and use of technology (UTAUT) model was designed to predict innovation usage behavior (Talukder, 2014). The four main elements include performance expectancy, effort expectancy, social influence, and facilitating conditions (Myung et al. 2011). This study adapts the model from Myung et al. (2011) to study the impact of these four elements on user satisfaction. UTAUT model has been used and applied for testing for predicting system usage and ensuring the technology adoption and usage decisions in various fields, such as interactive whiteboards for teaching purposes. UTAUT model was formulated using eight technology acceptance models, which are the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), the Combined-TAM-TPB, Model of PC Utilization (MPCU), Motivational Model (MM), Social Cognitive Theory (CST) and Innovation Diffusion Theory (IDT) (Attuquayefio & Addo, 2014). These combinations of some models were applied in some situations and extended with additional factors. In 2003, Venkatesh combined all these eight models and developed the UTAUT model, and the application of this model explains seventy percent of the variation in technology adoption (Venkatesh, 2003).

Since its inception, the model has been widely used to explain system usage and technological adoption. However, recent researchers have applied UTAUT successfully in explaining satisfaction and behavioral outcomes (Kabra et al., 2017; Chao, 2019; Wang et al., 2021). User satisfaction must be considered when determining the technology usage and measuring the success of technology implementation (Isaac et al., 2019). Monstesdioca and

Macada (2015) highlighted that UTAUT could be applied to investigate the outcome or success in technology adoption, such as user satisfaction. Bhatt & Nagar (2021) used the model empirically to explain mobile banking users' satisfaction. Although this model elucidates satisfaction towards technologies and information systems quite effectively, several researchers have found that the variables may be too general and thus recommended that the independent variables can be more context-specific to enhance the model's efficacy (Ammenwerth, 2019; Wang et al., 2021).

UTAUT combines elements at the individual (performance expectancy and effort expectancy), organizational (facilitating conditions), and social (social influence) levels (Isaac et al., 2019). The first element of UTAUT is performance expectancy, which is often believed that the technology could perform and satisfy the users' intended objectives (Venkatesh et al., 2003). In this study, performance expectancy is prescribed as the expectations of university students towards the usefulness of the online learning materials used to meet their learning needs in the online platform. According to Gopal et al. (2021), the usefulness of the online materials as part of the course design is a significant predictor of satisfaction with online learning platforms, especially during the pandemic.

The next element is facilitating conditions, which is described as the extent of the existence of infrastructure that supports them (Venkatesh, 2003). In online learning, the network infrastructure is vital to ensure a seamless experience. Hence, in this study, facilitating conditions are referred to as network stability.

Effort expectancy is another construct of the UTAUT model, which measures the ease of information technology use at all levels of technology adoption (Venkatesh, 2003). The ease of using a system or its usability will determine if the users encounter any difficulties or challenges in using the platform. As such, online platforms that are highly complicated would most likely cause feelings of frustration and dissatisfaction among the users (Al-Azawei & Lundqvist, 2015). While the lower effort required reflects higher usability of the system, which could lead to student satisfaction (Abbad, 2021). Thus, in this study, the effort expectancy is equated to the usability of the e-learning platforms.

Lastly, social influence is the final element in the UTAUT model. Social influence is the extent to which users believe that their social circle is important enough to influence their behavior towards the new system (Al-Azawei & Lundqvist, 2015). Ozturk (2021) found that students look forward to connecting with friends and peers during the pandemic. Moreover, Wart et al. (2020) echoed that social presence, quality of social interaction, and group collaboration are essential in influencing students' satisfaction with online learning. Hence, this study prescribes the social influence as peers' interaction.

The usefulness of online materials

Performance expectancy is the level at which the individual believes that using the technology would be useful or helpful in attaining certain benefits (Dwivedi et al., 2021). Hence, in this study, the term "usefulness" is applied to reflect performance expectancy. Online learning materials are the primary resources to guide and enhance students' learning

process. Their quality often influences students' academic performance and satisfaction with the online system (Dowell & Small, 2011). Adopting various teaching and learning modules has become more effective in flexibility and accessibility by not setting any boundaries in terms of time, place, and channel (Chintalapati & Daruri, 2017). Based on Myung et al. (2011), performance expectancy is the individual's view of the usefulness of technology, including information quality, content, and reliability. Since e-learning is unavoidable during the pandemic, this has driven access to better and more flexible teaching resources (Qiao et al., 2021).

It was found that satisfied students appeared to be more engaged, motivated, and responsive if online learning provides a presence of cognitive, teaching, and social engagement through helpful teaching resources (Richardson & North, 2020). For instance, Wilcox and Vignant (2020) identified synchronous and asynchronous videos are effective modes of online materials. Although there is no difference in the effectiveness of the learning environments, the quality of online materials was the determining factor in students' satisfaction with a course (Olson et al., 2020). There are various techniques to deliver the lessons using interactive formats. Still, the presentation of the content delivery is an essential factor in determining students' satisfaction with ERT, especially among undergraduate students who tend to rely heavily on materials provided by the instructors (Brodsky et al., 2021). Hence, the higher students perceive the usefulness of the online materials provided, their satisfaction increases. Therefore, based on the above discussion, the below hypothesis is proposed:

Hypothesis 1: The usefulness of online materials has a significant influence on the undergraduate students' satisfaction with emergency remote teaching (ERT)

Network Stability

Network stability is crucial in facilitating the learning process without disruptions. Facilitating conditions refer to the consumers' perceptions of the resources and support available to perform a behavior by the users (Attuquayefio & Addo, 2014). In this study, the facilitating conditions of the UTAUT model will be referred to as the network stability that the prominent providers in the country provide. Ten to twelve large Internet service providers dominate the Internet network worldwide. Telekom Malaysia Berhad ™ is the largest Malaysia telecommunication provider with a market share of 85.79% of broadband consumption (Asia Nikkei, 2021). Among the other network providers in Malaysia are Maxis, Umobile, Time, and Yeoh Tiong Lay Corporation Berhad (YTL). However, it was found that Telekom Malaysia has the highest rate of customer complaints (Chen et al., 2011). These national and international providers are the leading network providers responsible for most routes and bandwidth stability in all countries. Routing instability explains the changes in network reachability resulting in configuration errors, transient physical and data link problems, and software bugs that could affect user satisfaction with broadband services (Teoh et al., 2022). An extreme increase in routing instability led to the loss of internal connectivity in wide-area, national networks that interrupted the learning process (Shim & Lee, 2020). Internet accessibility determines the network connectivity that determines whether the network services are available and stable (Gyongyosi & Imre, 2020). Basic

internet facilities are crucial to enable seamless access to online materials and learning (Rajadurai et al., 2018). Self-efficacy during online learning environments in higher education focuses on technological aspects such as the internet, computer self-efficacy, and web use efficacy (Alqurashi, 2019). Ismail et al. (2020) found that among the challenges students encounter are smooth access to the internet and the availability of suitable electronic devices that may impact their satisfaction with ERT.

Based on the Internet Users Survey (2018) conducted by the Malaysian Communications and Multimedia Commission (MCMC), a vast digital gap still exists between urban and rural users; 70% of internet users are from urban areas. Students located in less central areas may face limited or slower internet access. Smooth internet connectivity is essential for online learning as the e-learning platforms may use a variety of software that requires high broadband to download without lagging (Sun & Chen, 2016). Increased network stability ensures ERT is conducted effectively (Dhull & Sakshi, 2017). Thus, students with access to a stable high-speed network or mobile connectivity are more likely to be more satisfied as they have higher engagement rates in the teaching and learning platforms (Li & Tsai, 2017). Thus, the hypothesis is drawn as below:

Hypothesis 2: Network stability significantly influences the undergraduate students' satisfaction with emergency remote teaching (ERT)

Usability of e-learning platforms

The third element in UTAUT is effort expectancy, which is operationalized in this study as the extent of usability of the technology implemented in ERT. Effort expectancy also explains that there are relationships between the effort, the achieved performance, and the rewards associated with using the technology (Onaolapo & Oyewole, 2018). The developer of the LMS systems mainly contributes to the usability of the e-learning platform in this study. Developers from higher institutions designed the software using the current technology that can cater to students' teaching and learning feasibility. Users should also learn the system provided so they can follow the lessons conducted by utilizing all services incorporated in the system.

Hence, e-learning platforms, or learning management systems (LMS), are designed to facilitate the teaching and learning process in private and public education institutions. A proper e-learning system should be accessible, reliable, flexible, stable, and easy to use to effectively deliver and enhance the students' learning experience (Al-rahmi et al., 2015). E-learning platforms are often assessed based on their technical quality, service quality, context, learners, and also instructors' perspectives of it (Raspopovic & Jankulovic, 2017). According to Mohd Johari & Ismail (2011), based on a study conducted in Penang, e-learning systems that facilitate online learning need to be further improved to become friendlier and more efficient regarding resource availability. The current platforms in some Penang institutions still lack quality, collaboration, contextualization, and active learning criteria.

In another study by Ismail et al. (2010), it was found that flexibility and conveniences are the crucial elements in online learning platforms and contribute to the delay in response. According to Kumarasamy et al. (2020), the reduction of face-to-face time, learners' motivation, readiness, and quality of the academics' skills and capabilities are found to be lacking in blended learning mode and depend on an effective online platform to reduce these challenges. Thus, students' satisfaction is expected to improve if the e-learning platform enables them to not only learn but helps to reinforce and enhance their knowledge anytime, anywhere (Mohebbi, 2020). Therefore, the hypothesis is proposed as below:

Hypothesis 3: Usability of the e-learning platforms significantly influences the undergraduate students' satisfaction with the emergency remote teaching (ERT)

Peers' Interaction

According to the modified UTAUT model in Myung et al. (2011), peer pressure is a form of social influence that facilitates new technology usage. Social influence is a newly added exogenous factor to the UTAUT model that comprises the students' social circle and influences from peers (Qiao et al., 2021). Besides peer pressure, social influence includes social space, social identity, and social support, which were all found to influence learning satisfaction (Alenezi, 2022). Moreover, social influence from peers is proven to be more significant, especially in higher power distance countries (Myung et al. 2011). A past study found that interactions with their instructors and peers are essential during online learning as it contributes to self-confidence (Watts, 2019). Furthermore, their attitude towards group interaction and collaboration is one of the critical factors in predicting satisfaction, and it serves as an essential soft skill in career advancement (Wengrowicz et al. 2018).

The satisfaction with online learning is dependent on continuous communication and the opportunity to be connected in a collaborative manner (Bickle & Rucker, 2017). Online social presence and peer interaction will improve their motivation, participation, satisfaction, and retention during online learning (Richardson et al., 2017). The provision of group online learning methodologies through group discussions, group assignments, and research projects serves as a platform for academic performance (Duncan, 2018). Overall, peer support and consistent communication enhance the students' learning process (Aderibigbe et al., 2021). Based on the above discussions, below is the proposed hypothesis:

Hypothesis 4: Peers interaction has a significant influence on the undergraduate students' satisfaction with the emergency remote teaching (ERT)
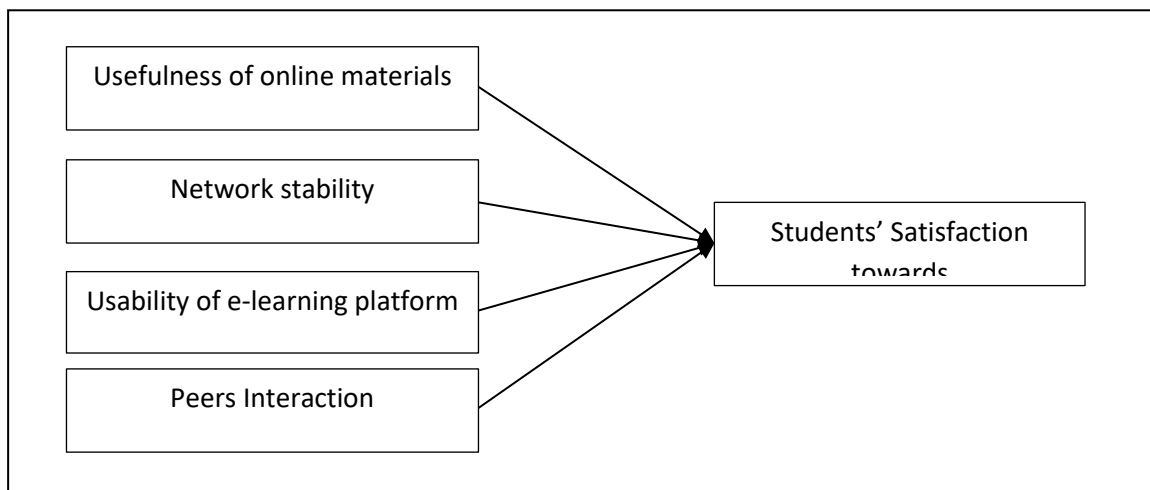
Figure 1: Conceptual framework

Methodology

This is a quantitative-based correlation research design. The investigation is quantitative as the questionnaires are distributed among the respondents. The analysis is focused on establishing the existence or non–the presence of a relationship between the usefulness of online materials, network stability, the usability of e-learning platforms, and peers' interaction. The quantitative approach delivers orderly data collection procedures and analysis to achieve the research objectives (Zikmund et al., 2013). Descriptive analysis can give a clearer impression using numerical data on the researched situation (Weil, 2017). This research method could focus on detailed scenarios of the problems, people, or even incidents of the current state (Rahi, 2017). Structured questions are formed through the questionnaires to collect the data from the target population (Fellows & Liu, 2015). The time horizon of the study is cross-sectional as the data from the questionnaires are only collected once at a specific time from respondents with different undergraduate programs available from all the various private higher institutions in Penang.

Sampling Design

The unit of analysis used for this research is undergraduates from the private higher institutions currently pursuing their undergraduate programs. Research study places the population group as a research target to survey is a sampling design (Hitzig, 2004). The sampling plan for this research is based on a non – probability sampling procedure whereby the questionnaires will be distributed to the selected samples in Penang. It is based on a subjective judgment of the researcher rather than random selection. Convenience sampling is applied whereby students are specified in the various private higher institutions currently pursuing their foundation or A-Level, Diploma, and Bachelor's Degree programs.

The total population in Penang last year was about 1.76 million (Department of Statistics, 2020), while the targeted population of higher education students in Penang was estimated at around 255,000 in 2020 (Penang Monthly, 2021). Due to the exact unknown population of total undergraduate students in Penang currently, it is assumed that the minimum sample

size required is 384, according to Krejcie and Morgan (1970). Thus, 510 questionnaires were distributed to achieve the target response return.

Questionnaire Design

Questionnaires are used to collect data from respondents, which vary between the descriptive and the explanatory data for analysis and derivation of the findings (Saunders et al. 2016). The arrangement of the questionnaire is divided into parts A, B, and C. As for this Part A, participants will be required to provide relevant demographic details which are significant to this research, especially regarding online learning. The required data are gender, age group, education level, and the location of studies. In this Part B, participants would be requested to provide feedback associated with the dependent variable, which is about the students' satisfaction with the emergency remote teaching (ERT) in private institutions in Penang for undergraduates' programs. The statements measuring satisfaction were adapted from Habel et al. (2016). In Part C, participants are requested to provide feedback on the independent variables about reasons contributing to the students' satisfaction with emergency remote teaching (ERT) in private higher institutions in Penang. Dowell & Small (2011) adapted questions to measure the usefulness of online materials, while the questions for network stability and usability of e-learning platforms were adapted from Gyongyosi & Imre (2020). This study also adopted statements from Myung et al. (2011) and Abbad (2021) to measure peers' interaction. Five-point Likert scale is used except for nominal data questions related to the respondent's demographic profile and according to Rahi (2017).

Pilot Test

In any population research, the pilot study comes first before the more extensive actual study. A pilot study minimizes the probability of failure by testing the reliability of techniques, methods, questionnaires, and interviews, besides ethical and practical issues that could interfere with the study (Doody & Doody, 2015). According to Creswell and Creswell (2017), approximately 10% of the proposed sample size is recommended for the pilot test, and referring to the sample size of 510, the number of respondents for the pilot test would be 50. Data collection from respondents in this pilot test would then be used for the Factor Analysis and Reliability test to see the complete analysis.

Data Analysis

Hypothesis testing is done to decide the extent of model fit of the study with the focus on the framework. The goodness of fit, R-Square, should be more than 0.5 for the construct to predict or influence the phenomenon of the study. If the R square is less than 0.5, the conceptual framework is not fit (Gilleland et al., 2018). The construct was found not to have any predicting power or influence on the phenomenon of the study. There might be other factors that influence the phenomenon of the study which may not be included in the study. Multiple Regression analysis tests the association between the independent and dependent variables, and R2 is the coefficient of determinant that predicts the model's goodness of fit with the value of more than 0.5, or else the model is unfit for the research (Sekaran & Bougie, 2016).

Results and Discussion

In this research, 510 responses were collected. Out of these 510 responses, only 504 were usable, and the six were not usable because those respondents were not from Penang. However, the number of valid responses was adequate to perform further analysis as the minimum sample size for a population exceeding 1 million people, per Krejcie and Morgan (1970), is only 384. Hence, the 504 data sets collected are sufficient for this study.

Demographic Profile of Respondents

The total number of respondents who participated and were used for data analysis is 504, of which 63.4% (256) are female, and 36.6% (148) are male. There are only two categories of age used to collect the data, which are from 18 – 21 years old and 22 – 30 years old because these are the category of respondents who are currently pursuing undergraduate programs. 64.1% (259) of respondents are from 18 to 21 years old, and 35.9% (145) are from 22 to 30 years old. Levels of education are categorized into foundation or A-Level programs, Diploma, and Bachelor's Degree because this study focused only on undergraduate programs. The highest accumulation of respondents is from Bachelor's Degree which is 40.1% (162) and followed by foundation or A-Levels at 32.4% (131) and lastly from Diploma which is 27.5% (111). The total respondents of 504 are all from Penang because those outside Penang were filtered out due to the requirement of this research.

Table 1: Respondents' demographic profiles

Information	Number of Responses	%
Gender		
Male	148	36.6%
Female	256	63.4%
	504	100.00%
Age Group		
18 – 21 years	259	64.1%
22 – 30 years	145	35.9%
	504	100.00%
Level of Education		
Foundation or A - Levels	131	32.4%
Diploma	111	27.5%
Bachelor's Degree	162	40.1%
	504	100.00%
Location of Education		
Penang	504	100%
	504	100.00%

Results of Reliability Analysis & Factor Analysis

Based on the results in Table 2.0 below, the Cronbach's alpha values for each variable are more significant than 0.70. The network stability has the highest Cronbach's Alpha value of

0.776, while the peers' interactions have the lowest value at 0.712. The reliability values of independent and dependent variables are accepted to proceed further with other analyses. As for the factor analysis results, the overall KMO sampling adequacy shown is 0.761, the significant value is <.001, and the KMO of the dependent variable is 0.677. Among the questions designed for the dependent variable, SS3 has the lowest factor loading, 0.652. SS4 and SS5 have the highest factor loading of 0.943. As the KMO value is more significant than 0.6, the value is acceptable and falls under 'Medium', indicating the dependent variable's relevancy in this study (Howard, 2016). On communalities value, all items have a factor loading greater than 0.5. According to Mooi et al. (2018), all the factor loading with the given factor must be above the acceptable level of 0.50. Overall KMO value is at 0.811, and since the value is more significant than 0.6, this is deemed satisfactory sampling adequacy (Howard, 2016). Hence, further inferential analyses are conducted.

Table 2: Reliability Test Result

Variable	Cronbach's Alpha	Number of Items
Dependent Variable		
Perceived satisfaction	0.767	5
Independent Variables		
Usefulness of online materials	0.741	5
Network stability	0.776	5
Usability of e – learning platforms	0.732	5
Peers interactions	0.712	5

Table 3: KMO and Bartlett's Test Result

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.761
Bartlett's Test of Sphericity	Approx. Chi-Square	452.781
	df	10
	Sig.	<.001

Table 4:   Factor Loading Result (for Dependent Variable)

No.	Questions	Factor Loading
SS1	I am satisfied with the current course management system used by my institutions.	0.792
SS2	I am satisfied with the technologies used (live streaming, recorded videos, audio materials) by my facilitators from my institutions.	0.741
SS3	If I had a choice, I would choose online learning over the face – to – face classes.	0.652
SS4	Overall, the online courses conducted by my institutions have effectively presented the desired learning outcomes.	0.943
SS5	Overall, the online courses conducted by my institutions have effectively presented the desired learning outcomes.	0.943

KMO: 0.677   Bartlett's Test of Sphericity – p-value 0.000 < 0.001

Table 5:   Factor Loading Result (for Independent Variables)

No.	Questions	Factor Loading
EFF1	The learning materials are well–organized in the course management system.	0.534
EFF2	I can easily access all the learning materials anytime.	0.734
EFF3	The learning materials prepared can fulfill the needs of my studies.	0.700
EFF4	I can understand the information provided with minimal guidance from my instructors.	0.742
EFF5	Instructors have provided sufficient and informative learning materials.	0.749
KMO: 0.787	Bartlett's Test of Sphericity – p-value 0.000 < 0.001	
INT1	The internet connectivity is fast and enables me to follow the online courses smoothly.	0.864
INT2	I can participate in live streaming during my online lectures.	0.618
INT3	I can always download all the files or videos uploaded in my courses.	0.957
INT4	I can complete my assessments in time, even with time constraints.	0.659
INT5	The current internet stability enables me to complete the course online until the situation is back to normal.	0.967
KMO: 0.782	Bartlett's Test of Sphericity – p-value 0.000 < 0.000	
EL1	Various media and digital tools instructors use to make online learning more exciting.	0.615
EL2	The real-time learning session through live streams is helpful for me to learn online.	0.617
EL3	The new online teaching method implemented by my institution is user–friendly.	0.791
EL4	I can reach out to my instructors and receive assistance on technical difficulties accessing course materials.	0.807
EL5	I receive help with problems related to the information systems from the institution's IT department.	0.770
KMO: 0.810	Bartlett's Test of Sphericity – p-value 0.000 < 0.001	
PEER1	I learn through my interactions during the participation in group discussions	0.775
PEER2	I like the flexibility of online communication with my peers and instructors	0.572
PEER3	I feel comfortable communicating and collaborating online with my peers.	0.684
PEER4	I believe that online communication has made the learning process more effective than a regular face–to–face class.	0.664
PEER5	The course management system designed by my institutions enables me to interact and collaborate with my peers effectively.	0.698
KMO: 0.811	Bartlett's Test of Sphericity – p-value 0.000 < 0.001	

Results of Inferential Analysis

Table 6.0 below shows the model summary of the multiple regression analysis. In this regression, the predictor variables are the effectiveness of online materials, internet stability, e-learning platforms, and peers' interactions and collaborations. These predictors are required to estimate the students' satisfaction with online learning. As per the table, the R-value, or the multiple correlation coefficient, has a value of 0.535, showing a good level of prediction. The multiple regression model has an adjusted R square value of 0.286. This indicates that the independent variables in this research explain 28.6% of the variability of the dependent variable. Per Sekaran and Bougie (2016), the remaining 72% variation could not be explained by the predictors and is explainable using factors that have not been studied in this research. This is addressed in the limitations. R square is not an absolute measure for the goodness of fit; it is just a relative measure to explain the variance relative to the total variance in the dependent variable (Mayer, 1975).

Table 6:   Result of Multiple Regression Model

Model	R	R Square	Adjusted R Square	Std. An error in the Estimate	Durbin-Watson
1	.535ᵃ	.286	.281	.60563	1.843

a. Predictors: (Constant), PEER, EL, INT, EFF

b. Dependent Variable: SS

Results from table 7.0 below show the study shows that the independent variable of the usefulness of online materials has the highest coefficient beta value (0.533) and p-value of <.001. The usability of the e-learning platform followed this, showing a coefficient of beta value (0.73) and p-value of <.001. These two variables are significant to students' satisfaction as $p < 0.05$ is the cut-off that indicates the statistical significance as per the rule of the thumb (Sekaran and Bougie, 2016). Stability of the network with the beta coefficients of beta value (0.41) with a p-value at .293 and peer interactions with coefficient beta value at (0.25) with a p-value of 0.515 are not significant towards the students' satisfaction. Equation of Regression Line is Y (Student satisfaction) = 0.666+ 0.533 EFF + 0.073 EL + 0.353. This is an outcome that the usefulness of online materials and usability of e-learning platforms are significant towards the undergraduates' students' satisfaction with emergency remote teaching (ERT) in private higher institutions in Penang.

Table 7:   Results of hypothesis testing

Hypotheses	Std Beta	t-value	p-value	Result
		13.567	0.001	
H1: Usefulness of online materials☐ students' satisfaction	0.842			**Accepted**
H2: Network stability ☐ students' satisfaction	0.062	1.053	0.293	Rejected
H3: Usability of e-learning platforms ☐ students' satisfaction	0.129	1.904	0.001	**Accepted**
H4: Peers' interaction☐ students satisfaction	-0.036	0.652	0.515	Rejected

Implications of Study

This study analyzed the effectiveness of ERT from students' perspectives by delineating the key factors contributing to students' satisfaction with the ERT. The role of ERT and the students' satisfaction with this teaching method during the COVID19 pandemic became clearer. According to Abdullah et al. (2022), the satisfaction of e-learners explained 68.3% of their preference for continuous remote learning mode. Although some higher education institutions have started implementing hybrid learning, it is essential to reflect on the experiences of ERT to be better ready for future changes. Moving forward, it is also observable that some of the institutions may decide to operate in a fully online mode. Hence, this study could contribute insights into students' responses and guide key improvement areas for institutions implementing remote teaching and learning. Despite the COVID19 being declared endemic in Malaysia, we cannot say for sure that there will not be any other pandemic or crisis that may arise in the future. Thus, this study must be conducted for us to learn the lessons and for higher education institutions, academicians, and government agencies like the Ministry of Higher Education to be more well-prepared.

This study concluded that the use of online materials and e-learning platforms' usability significantly influence undergraduate students' satisfaction with emergency remote teaching (ERT). The usefulness of the online materials significantly affects undergraduate students' satisfaction with emergency remote teaching (ERT) in private institutions in Penang. Similar to Myung et al. (2011) postulations, performance expectancy or one's perceived usefulness significantly impact its adoption. Hence, information and online materials should be helpful for the students, with suitable language usage and fulfilling their future career needs (Bielousova, 2017). According to Li and Tsai (2017), online materials that allow them to use annotation tools to review help increase their overall motivation and satisfaction in online learning. Thus, materials should be prepared adequately for students to gain attention and interest, including attractive teaching slides, audio, video, web-conferencing tools, and other forms of gamification simulations (Martin et al. 2019). According to Moore & Kearsley (2012), online learning materials that the students access can be presented in various formats such as text, pictures, infographics, video clips, and so on (Moore & Kearsley, 2012). The contents of the online materials that are provided in various media forms need to be engaging and support the students' learning outcomes of the course and program. Hence, the implications for the preparedness of the educators to spend more time ensuring the quality of the online learning materials should not be overlooked. Moreover, institutional policy should be put in place to have a periodic review to maintain the recency of the materials. Key industry players and subject matter experts can be invited to participate in this review process to ensure its relevance.

In terms of practical implications, higher education institutions are also expected to continue to invest in more advanced and efficient e-learning platforms to cater to the requirements of the online learning mode. In this study, the usability of e-learning platforms significantly influences undergraduate students' satisfaction with emergency remote teaching (ERT).

Among the e-learning platforms or learning management systems (LMS) designed for online learning are Moodle, Google Classroom, and Blackboard, which seek to provide users with compelling learning experiences (Rajadurai et al., 2018). Mobile-compatible E-learning platforms are also an effective strategy that is more user-friendly and essential to current learners as more students nowadays are connected to their mobile phones than conventional laptops or desktops. A user-friendly and powerful e-learning platform can provide access and convenience to the students, making their learning more enjoyable (Prasetyo et al., 2021). Besides the functions and features of the e-learning platforms, LMS developers should also look into how these functions can be synched rather than expecting students to use different platforms or download several apps for various parts. For example, some institutions require the students to download materials from Moodle and check plagiarism in a separate web-based Turnitin. An e-learning platform such as Blackboard with multiple functions will have an edge and give students an optimum and seamless user experience (Mahmud et al., 2021).

Although, in this study, it was discovered that the stability of the internet does not significantly influence undergraduate students' satisfaction with emergency remote teaching (ERT), one cannot deny that the instability of the internet may disrupt their overall learning experience. Under the Penang Connectivity Master Plan and Penang 2030 vision, the state government has mandatory all-new property development projects to provide fiber optic telecommunications infrastructure as an essential utility (Hussain, 2020). It became the first state in Malaysia to take a step in delivering high-quality and comprehensive digital infrastructure to bolster the digital economy and reduce the digital gap between urban and rural areas. Nonetheless, the digital divide remains a challenge in many other states in Malaysia. Furthermore, the deployment of 5G technology in Malaysia has been delayed and postponed to 2023 (New Straits Times, 2022). Hence, local municipalities should collaborate with network providers to ensure that the accessibility and speed of the internet are up to par. Perhaps, network instability and lack of functional IT infrastructures are more evident in under-developed countries (Aung & Khaing, 2016). Difficulty in focusing during online lessons occurs when there is poor connectivity, especially in areas with poor network availability (Desai et al., 2020). This study found that students in Penang did not face any difficulties related to network stability that could have influenced their satisfaction despite past studies which found otherwise (Hermanto et al., 2021; Zuo et al., 2021). Yet, this could still be a relevant factor depending on the students' geographical location.

The findings of this study implied that the influence of peer-to-peer interaction is not that important. In hindsight, this is important for educational institutions to monitor the form of interactions that happens continuously. Especially in dealing with millennial students born between 1982 and 2000 may have different perceptions towards interaction and collaborative learning (Harvey et al. 2017). Although the isolation problem faced by students during ERT did not turn out to be a significant influence on their overall satisfaction, there could be further reasons that require the university's attention. As this study was conducted almost a year into the pandemic, students may have accustomed themselves to the isolation and self-studying method. According to Saputra et al. (2021), students have adapted to the social distancing attitude and resume an autonomous learning style. Alternatively, some of these

learners may find these social bonds in other forms of their lives, such as online communities within their social network or gaming communities. Apart from ERT, they are likely to seek interaction and collaboration through other means or may have adapted to an independent and self-learning method.

Nonetheless, teachers' absence has impacted their learning satisfaction (Syaharuddin et al., 2021). In terms of online learning, past studies found that students' satisfaction is more likely influenced by the interaction between the instructor and the learners (Baber, 2020). Also, with the loss of conventional face-to-face learning, the implementation of ERT could have acted as a detractor on students' social awareness and socializing skills (Mumtaz et al., 2021). The lack of face-to-face interaction in the virtual platforms may have created a more severe and long-term impact on our future graduates. Thus, higher education institutions should nurture more personal interactions during the learning process between the instructor with students; and students with peers to have a positive impact on their overall online learning experience.

Conclusion and Recommendations

Identifying the key elements contributing to online learning satisfaction is crucial to increasing the likelihood of students using the various platforms. Hence, by applying the modified UTAUT model by Myung et al. (2011), this study was conducted to identify further these influential factors based on students' perceptions to improve ERT development during the crisis. This study concluded that the usefulness of the online materials has the most significant influence, followed by the usability of e-learning platforms among undergraduate students' satisfaction with emergency remote teaching (ERT), especially in private higher education institutions.

Elevating E-Learning Platforms

Because of the findings, it is recommended that ERT can be elevated through the usage of information and technology (ICT) during the pandemic lockdown (Hodges et al., 2020). As more students are gravitating toward learning online, the e-learning platforms should be multi-functional, flexible, up to date, handle different formats of content and provide a good user experience for both students and instructors.

Besides the role of lecturers, the management of higher education institutions plays an essential role in supporting the lecturers' delivery. This is by ensuring that an efficient e-learning management system is used to avoid over-burdening the lecturers and students with additional administrative and technical issues arising from e-learning platforms. Instead, higher education institutions should be willing to invest in providing interactive and practical e-learning platforms to ease the teaching and learning process. This is not an area that the management of educational institutions can skimp on. One such local university in Malaysia requires its lecturers to download all the learning materials from the e-learning platform every semester to avoid paying for storage space. Indeed, this is a cumbersome and inefficient use of lecturers' time. Besides, a good e-learning platform provides various methods of expression and increases engagement (Labencik et al., 2015). Hence, a reliable

and user-friendly e-learning platform enables students and educators to learn and teach more effectively and efficiently.

Relevant Course Materials

Furthermore, course content and materials that are well designed depends on lecturers' preparedness to deliver it effectively in a virtual manner during the pandemic (Salleh & Azman, 2020). Besides preparing and uploading materials such as quizzes, videos, and pdf documents to achieve the relevant course learning outcome and program learning outcomes, lecturers are required to utilize the available functions and online resources optimally. The extensiveness of online materials was found to contribute to students' satisfaction. Hence educators need to improve their preparation by having clear lesson plans and being ready with recent and relevant teaching materials such as case studies, online games, and extra reading materials to assist students in their online studies. Educators now no longer play the role of facilitators but also as designers of their courses.

Understanding each student's learning style may be a useful guide for lecturers to determine what teaching materials are appropriate to enhance the students' satisfaction with the ERT experience. Apart from that, higher institutions should also provide relevant training for instructors and allocate sufficient time to attend webinars or courses that enhance their skills in materials preparation to support ERT (Montelongo, 2019). Ultimately, students' satisfaction highly depends on the interaction between instructors, technology, and the students themselves.

Encourage Personal Interactions

Interaction is vital in online learning to make the journey more compelling. Learners should be given equal opportunities to collaborate, share their ideas, and participate in intellectual discourse. Social skills are depleting due to online learning. Thus, it should be encouraged and cultivated as it helps learners build knowledge and empowers them to initiate communication with others. Some more passive students may be struggling in silence behind their screens. Central to this, some students may be facing social exclusion. According to Abid et al. (2021), students and educators were reported at risk of developing mental health problems, including depression. Some have tried to overcome this by seeking interactions on other platforms such as social media networks. However, different coping mechanism strategies that the higher education institutions suggest include implementing proper support groups and processes. In mitigating the stress issue, active peer support groups can be formed to forge a strong bond and balance their social and mental wellbeing.

The different learner types and their needs must be understood. Hence, it is the responsibility of the educators to play their role as a facilitator and foster more open communication during the online lessons. Educators must motivate their students to switch on their cameras and microphones to be fully immersed in the online discussions. Educators themselves should lead by example and slowly form this a norm in the class for everyone. Some might feel a little discomfort initially, but in the long run, the benefits of personal interactions outweigh the challenges. As the students' transition to becoming future job seekers, their confidence

levels will be elevated. However, many students have cited various reasons for not participating interactively during online classes (Ballena and Feranil, 2021). Some of the reasons include limited internet access and hardware problems. Thus, these issues should be addressed beforehand. Higher learning institutions are binding in providing relevant infrastructure, including seamless internet access in the surrounding campus area, to teach social skills and networking as this is a relevant employability skill.

Limitations and Future Studies

Nonetheless, this study has a limitation whereby it only focuses on undergraduate students in a specific locality. Although it involves students from across programs and a few institutions in that area, future studies can attempt to include other programs and increase the geographical coverage for cross-comparison purposes. Another limitation is the four variables identified based on the pre-pandemic theory, which may not have included all possible vital influencing factors. This limitation is reflected in the low R2 value in this study, which could be due to the uncertainty that the pandemic brought. New factors may emerge that could not have been included when the research was conducted. Hence, it is also suggested that future studies can consist of a more extensive literature review and consider more recent underlying pandemic-related factors to have a better measure of their satisfaction, such as students' wellbeing, emotional and mental stress levels, excessive screen time, student-instructor interaction, student-support system interaction, home learning environment, quality and integrity of online assessment and students' self-preparedness amongst others.

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