Students' Perception on quality of online learning: case study of HNDIT students under COVID 19

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Abstract- The Covid-19 pandemic profoundly affected traditional face-to-face education, particularly in Sri Lanka's higher education sector, compelling institutions to adopt online learning methods. Online learning, supported by digital technologies such as virtual classrooms and learning management systems, enables students to access educational content beyond the physical classroom. However, as this approach was relatively new to both lecturers and students, many challenges arose in adapting to the new mode of delivery.
This study investigates students' perceptions of online learning during the Covid-19 pandemic at the Advanced Technological Institute (ATI) in Galle, Sri Lanka. Data were collected from 90 students enrolled in the Higher National Diploma in Information Technology (HNDIT) program through a self-administered questionnaire distributed via Google Forms. The study's conceptual framework was developed around three key dimensions: lecturer characteristics, learner characteristics, and course content.
Statistical analyses, including Cronbach's alpha, the Kaiser-Meyer-Olkin (KMO) measure, Pearson correlation, and regression analysis, were employed to examine the data. The findings revealed positive and significant relationships between students' perceptions of lecturer characteristics, learner characteristics, and course content with the overall quality of online learning. These results highlight the importance of strengthening these factors to enhance the effectiveness and quality of online education.

Index Terms- lecture characteristics, learner characteristics, students' perception, quality of online learning

I. INTRODUCTION

A. Background of the Study

The global education landscape has undergone a profound transformation over the past two decades, driven by rapid advancements in information and communication technologies (ICTs). The rise of the internet, digital devices, and cloud-based platforms has reshaped the way people learn, teach, and access knowledge. Among these transformations, **online learning**, also known as **e-learning**, has emerged as a flexible and inclusive mode of education that transcends geographical boundaries and time constraints.
According to (David Howlett, 2009) , electronic or online learning can be defined as the use of electronic technology and media to deliver, support, and enhance both learning and teaching. It also involves communication between learners and instructors through online content. The online learning method is rapidly expanding worldwide and has become increasingly popular among educational institutions. Although many educators are familiar with this approach, it is crucial for them to understand how students perceive, access, and respond to it, as these factors can influence how online learning is implemented across different contexts and learner groups.
Since the outbreak of COVID-19, online learning has become an integral part of people's lives. The pandemic forced schools, universities, and companies to adopt remote operations, resulting in a surge in the use of online education platforms. This shift posed new challenges for both lecturers and students who had to adapt to teaching and learning from home. Before the pandemic, most educational institutions relied on traditional face-to-face learning, where instructors could easily interact with students, facilitate learning, and provide immediate feedback. However, due to the global health crisis, traditional classroom teaching was replaced by online learning—a transition that was not easily accepted by lecturers and students who were unprepared for the sudden change (Roudlotun Nurul Laili, 2021) .
During the COVID-19 pandemic, several researchers investigated students' perceptions of online learning to improve the quality of e-learning. (Antonius Setyawan Sugeng Nur Agung, 2020) examined students' perceptions at STKIP Pamane Taleno in Indonesia and found that students were unprepared for the new learning style and lacked access to suitable technology. Similarly, (Rahman, 2020) explored the English Language Education Program at a State Islamic University in West Nusa Tenggara, Indonesia, and found that students struggled with poor comprehension of online materials and technical issues such as weak Internet connections. (Roudlotun Nurul Laili, 2021) also reported that students held both positive and negative perceptions toward online learning—acknowledging its flexibility but also citing challenges such as unstable Internet connections, low motivation, and high data costs.

The success of online learning depends on various factors, including accessibility, teaching methods, course content, and assessment criteria (Baczek M, 2021). Although online learning offers many advantages and disadvantages for both students and lecturers, this study focuses on examining Information Technology (IT) students' perceptions of the quality of online learning systems in Advanced Technological Institutes (ATIs) in the Southern Province during the COVID-19 pandemic. Understanding these perceptions is essential for lecturers and institutions to improve their teaching models, strategies, and the overall quality of online learning systems.

B. Problem Statement

Despite the growing global emphasis on online education, there remains limited empirical evidence on how Sri Lankan students, particularly those in technological education programs, perceive the quality of online learning. As both lecturers and students were compelled to adapt quickly during the pandemic, their readiness, access to resources, and perceptions varied widely.

The **HNDIT (Higher National Diploma in Information Technology)** program at ATI Galle represents a case where students had to rely heavily on technology-mediated instruction. Although these students are generally expected to be more digitally literate compared to students in non-technical disciplines, many still encountered barriers such as unreliable internet connectivity, lack of engagement, and challenges in adapting to asynchronous learning environments. Therefore, this study seeks to answer a key research question:

What are the perceptions of HNDIT students regarding the quality of online learning, and how do lecturer characteristics, learner characteristics, and course content influence these perceptions?

C. Justification of Collaboration

E-learning has emerged as a new trend in education during the COVID-19 outbreak, a period when people were advised to practice social distancing and avoid large gatherings as part of national pandemic prevention strategies. The COVID-19 pandemic encouraged lecturers to teach from home and students to learn from home, making online learning a practical and necessary alternative (Roudlotun Nurul Laili, 2021).

During this situation, most higher education institutions shifted entirely to online teaching and learning methods. However, this sudden transition created numerous challenges related to the quality and effectiveness of online education. Understanding students' perceptions has become a crucial factor in identifying these challenges. Students' perceptions provide valuable insights into their experiences, levels of engagement, and the barriers they face in an online learning environment. Therefore, analyzing students' perceptions can help improve the quality of online learning systems. Consequently, this study aims to identify students' perceptions and determine how these perceptions contribute to the improvement of online learning quality during the COVID-19 pandemic.

Online learning has been recognized as one of the best solutions for continuing education during the pandemic. (Roudlotun Nurul Laili, 2021) found that e-learning is a valuable and effective method for enhancing teaching and learning outcomes among medical students. Similarly, (Roudlotun Nurul Laili, 2021) highlighted several critical factors influencing the success of online learning, including the availability of technological tools, stability of internet access, and appropriate use of online learning platforms. (Oliver R. , 2001) argued that four major issues often prevent universities from realizing the full potential of online learning technologies: developing cost-effective approaches, ensuring and maintaining quality, providing equitable access, and establishing sustainable strategies for online program delivery.

The study also addresses a research gap in the Sri Lankan context. While a number of studies have explored online learning adoption in universities, fewer have examined technological diploma-level institutions such as Advanced Technological Institutes (ATIs), which cater to a diverse socio-economic student population. The findings of this research can therefore serve as a valuable reference for the continuous improvement of online learning practices within the Sri Lanka Institute of Advanced Technological Education (SLIATE) and similar institutions.

These insights justify the importance of collaboration among educators, administrators, and policymakers to develop strategies that address these challenges and enhance the quality and accessibility of online learning.

D. Objectives of the Study

The **main objective** of this study is to identify the perceptions of HNDIT students in SLIATE regarding the quality of online learning in the Southern Province during the Covid-19 pandemic.

The **specific objectives** are:

1. To examine the relationship between lecturer characteristics and the quality of online learning.
2. To examine the relationship between learner characteristics and the quality of online learning.
3. To examine the relationship between course content and the quality of online learning.

E. Hypotheses

Based on prior studies and the conceptual framework, the following hypotheses are formulated:

- **H1:** Lecturer characteristics have a significant impact on the quality of online learning.
- **H2:** Learner characteristics have a significant impact on the quality of online learning.

- **H3:** Course content has a significant impact on the quality of online learning.

II. Literature Review

In the era of the Fourth Industrial Revolution (Industry 4.0) and 21st-century education, online learning—facilitated by the Internet—has emerged as a significant trend in modern education (Rahman, 2020). During the COVID-19 pandemic, online learning became a crucial alternative for teaching and learning. To ensure the success of e-learning, it is essential to implement a well-planned and structured online learning system (Elumalai, 2020).. Several studies have demonstrated that the learning environment significantly influences learning outcomes (Teuku Azhari, 2020). Among the various factors determining the effectiveness of online learning, students' perceptions are considered the most critical. The literature provides evidence that connects the quality of online learning with how students perceive it, emphasizing the role of learner engagement, accessibility, and interaction.

Online education is one of the most widely used terms to describe information and communication technology (ICT)-based learning approaches. Other terms such as *e-learning*, *distance learning*, *distance education*, and *web-based learning* are often used interchangeably. (Lee, 2010) defined online learning as an educational approach facilitated by ICT and enhanced by social interaction, enabling regular engagement between instructors and students. (L Vitoria, 2018) described e-learning as a system that uses Internet technology to deliver educational content and facilitate interaction through digital interfaces. Similarly, (Baczek M, 2021) defined e-learning as the application of information technology to improve the quality of education.

Perception is the process of interpreting and organizing sensory information to create meaningful experiences of objects, events, and relationships. It involves elements such as attention, expectation, motivation, and memory (Antonius Setyawan Sugeng Nur Agung, 2020).. Numerous studies have investigated students' perceptions of online learning, and the findings generally indicate a mix of positive and negative responses depending on contextual factors (L Vitoria, 2018).

(L Vitoria, 2018) examined students' perceptions of online learning in terms of participation, accessibility, material and assignment delivery, and the usability of e-learning platforms. The study identified several major obstacles, including unstable Internet connections, limited access to teaching media, and technological incompatibility. The researchers concluded that accessibility is the primary factor influencing the success of online learning.

(Elumalai, 2020) analyzed seven independent factors affecting e-learning quality—administrative support, course content, course design, instructor characteristics, learner characteristics, social support, and technical support—and found a positive relationship between these variables and the overall quality of e-learning systems. Likewise, (L Vitoria, 2018) identified two key factors influencing the acceptance of e-learning technologies: *perceived usefulness* and *perceived ease of use*. Their findings revealed that students viewed web-based learning modules as helpful for improving understanding, independence, self-discipline, motivation, and interaction among peers and teachers.

(Teuku Azhari, 2020) investigated learning processes, environments, and motivation among students during the COVID-19 pandemic. Their findings indicated that students generally held negative attitudes toward online learning, largely due to technological and motivational challenges. In another study, (S Bali, 2018) compared students' perceptions of online learning and face-to-face learning in terms of social presence, interaction, and satisfaction, concluding that perceptions of face-to-face learning were generally higher.

(Mohammad Alawamleh, 2020) explored the impact of online learning on communication and productivity between instructors and students. The study found that online learning can negatively affect interpersonal communication and engagement. To address this, the authors suggested that instructors should balance formal communication channels (such as online platforms and email) with informal ones (such as instant messaging, online chat groups, and private video calls). Encouraging informal communication and offering participation incentives were recommended to enhance motivation and engagement in online classes.

In summary, previous studies highlight that while online learning offers flexibility and accessibility, its effectiveness is strongly influenced by students' perceptions, interaction quality, and institutional support. The literature also emphasizes the need for reliable technology, engaging instructional design, and continuous feedback mechanisms to enhance students' online learning experiences.

III. Research Methodology

A. Introduction

The methodology chapter describes the research design, approach, and analytical techniques used to investigate students' perceptions of online learning during the Covid-19 pandemic at the Advanced Technological Institute (ATI) in Galle, Sri Lanka. The purpose of this section is to outline how the study was systematically planned and executed to ensure reliability, validity, and relevance of the findings. This research employed a quantitative approach using a self-administered questionnaire distributed through Google Forms. The data collection, analysis, and interpretation processes were guided by the study's conceptual framework, which focuses on three primary dimensions—lecturer characteristics, learner characteristics, and course content—as predictors of the quality of online learning

B. Research Design

A descriptive correlational research design was adopted for this study. The descriptive component aimed to capture students' perceptions and demographic profiles, while the correlational aspect sought to examine relationships between the independent variables (lecturer characteristics, learner characteristics, and course content) and the dependent variable (quality of online learning).

This design was chosen because it allows for quantitative measurement of attitudes and relationships between variables without manipulating the study environment. According to Creswell (2014), descriptive-correlational designs are effective in identifying

patterns, associations, and trends in social science research. The choice of a quantitative method also ensured objectivity, as numerical data could be statistically analyzed to draw valid conclusions.

C. Population and Sample

The population of this study consisted of students enrolled in the Higher National Diploma in Information Technology (HNDIT) program at the Advanced Technological Institute (ATI), Galle. As one of the leading technological education institutions in Sri Lanka, ATI Galle provides IT-focused diploma programs under the governance of the Sri Lanka Institute of Advanced Technological Education (SLIATE).
During the data collection period, approximately **150 students** were actively enrolled in the HNDIT program across different academic years.
A **simple random sampling** technique was employed to ensure that each student in the HNDIT population had an equal chance of being selected. This approach helps to reduce sampling bias and enhances the generalizability of the findings. The selection process involved sharing the questionnaire link across student communication groups (WhatsApp, Google Classroom, and email).

A total of **90 responses** were collected. This sample size was considered adequate for the statistical analyses employed (correlation and regression), following the rule of thumb suggested by Green (1991), which recommends a minimum of 50 + 8m participants for regression analysis (where *m* is the number of independent variables). With three independent variables, the required minimum was 74 respondents—hence, 90 was sufficient.

D. Research Instrument

The research instrument used for data collection was a **structured questionnaire**, designed to measure the key constructs of the conceptual framework. It was developed using insights from previous literature and validated tools used in online learning perception studies (e.g., Sun et al., 2008; Elumalai et al., 2020).
The questionnaire comprised **two main sections**:

- **Section A:** Demographic information — including gender, age, year of study, and frequency of online learning use.
- **Section B:** Statements measuring perceptions under the four dimensions:
    1. Lecturer characteristics
    2. Learner characteristics
    3. Course content
    4. Quality of online learning

All items were measured using a **five-point Likert scale**, ranging from *1 = Strongly Disagree* to *5 = Strongly Agree*.

IV. Data Analysis and Result

A. Demographic information

The demographic characteristics of the respondents provide insight into the composition of the sample and help interpret the data contextually.

		Frequency	**Percentage**
Gender	Female	46	51.1%
	Male	44	48.9%
Year of study	First year	42	46.7%
	Second Year	48	53.3%
Device used to log online class	Both laptop and smart phone	38	42.2%
	Desktop	5	5.6%
	Laptop	24	26.7%

	Smart phone	22	24.4%
	Other devices	1	1.1%
Internet mode used to connect	Broad band	4	4.4%
	Mobile data	48	53.3%
	Wi-Fi	38	42.2%

Table 1:Demographic information

The sample represents a balanced distribution across genders, with a slight majority of female students (51.1%). The majority (53.3%) were in their second year, indicating that they had already experienced both traditional and online learning environments. Additionally, the largest proportion use both laptops and smartphones (42.2%) and depend on mobile data (53.3%) for online learning.

B. Validity and Reliability of the Instrument

The content validity of the questionnaire was ensured by consulting three academic experts with experience in online education and quantitative research. They reviewed the instrument for clarity, relevance, and appropriateness of each item. Based on their feedback, minor revisions were made to improve question phrasing and logical flow.

Exploratory Factor Analysis (EFA) was conducted to reduce a large number of individual items into a smaller set of dimensions and to simplify the dataset. It was also used to assess the uni-dimensionality of the constructs. All factor loadings were significant and exceeded 0.60, meeting the recommended threshold suggested by (Hair, Black, Babin, & Anderson, 2010). Subsequently, the normality of the data was assessed using Skewness and Kurtosis values. According to (Hair, Hult, Ringle, & Sarstedt, 2013), acceptable ranges for univariate skewness and kurtosis are ±2.00 and ±7.00, respectively. The obtained values fell within these acceptable limits, indicating that the data were normally distributed. The corresponding Skewness and Kurtosis values are presented in Table 02.

	Skewness		**Kurtosis**	
	Statistic	Std. Error	Statistic	Std. Error
Lecturer Characteristics	-1.023	0.254	3.405	0.503
Lerner Characteristics	-0.413	0.254	0.268	0.5034
Course content of online learning	-0.617	0.254	2.292	0.503
Quality of online learning	-1.092	0.254	2.779	0.503

Table 2: Results of Test of Normality

Content validity and construct validity were used to ensure the validity of the study. In conducting this research, the researchers carried out a comprehensive literature review, and the research instrument was developed based on established literature. Therefore, content validity was ensured.
Construct validity was assessed through convergent validity. The summary of the convergent validity results is presented in Table 03.

Variable	KMO	Bartlett's test of Sphericity	AVE	CR
Lecturer Characteristics	0.825	0.000	0.430215	0.789722
Lerner Characteristics	0.782	0.000	0.75425	0.840935
Course content of online learning	0.642	0.000	0.697333	0.740556
Quality of online learning	0.904	0.000	0.731444	0.84731

Table 3: Results of Convergent Validity Test

According to Table 03, the Kaiser-Meyer-Olkin (KMO) values were greater than 0.5, while all Bartlett's Test of Sphericity significance values were below 0.05, indicating the suitability of the data for factor analysis. In addition, the Average Variance Extracted (AVE) values of all variables exceeded the recommended threshold of 0.5, except for one variable which was close to the acceptable minimum level. Furthermore, the Composite Reliability (CR) values of all variables were above 0.7. Therefore, the validity of the data was confirmed.

Reliability refers to the extent to which measurements are free from error and capable of producing consistent results. Cronbach's Alpha values were used to assess the internal consistency of the data. According to the accepted standard, Cronbach's Alpha values should exceed 0.7. The results of the reliability analysis are presented in Table 04.

The Cronbach's Alpha values obtained for this study were all above 0.7, indicating a high level of reliability and acceptable internal consistency. This demonstrates that the items used to measure the constructs were both reliable and valid.

Variable	Number of items	Cronbach's Alpha	Reliability status
Lecturer Characteristics	5	0.825	Reliable
Lerner Characteristics	4	0.860	Reliable
Course content of online learning	3	0.744	Reliable
Quality of online learning	9	0.917	Reliable

Table 4: Results of Cronbach's Alph Test

C. Independent and dependent relationship

Pearson Correlations					
	QL	LC	LR	CC	Bas
QL	1				
LC	0.696"	1			
LR	0.843"	0.662"	1		
CC	0.783"	0.656	0.741"	1	
**. Correlation is significant at the 0.01 (2-tailed).					

Table 5: Results of Pearson Correlations Test

Note: QL-Quality of online learning, LC-Lecturer Characteristics, LR-Lerner Characteristics and CC- Course Content of online learning.

The main aim of this study was to examine the impact of students' perceptions of online learning factors—namely Lecturer Characteristics, Learner Characteristics, and Course Content—on the Quality of Online Learning Satisfaction.
According to Table 05, there were significant positive correlations between Lecturer Characteristics and Quality of Online Learning ($r = 0.696$, $p < 0.01$), Learner Characteristics and Quality of Online Learning ($r = 0.843$, $p < 0.01$), and Course Content and Quality of Online Learning ($r = 0.783$, $p < 0.01$). These findings provide statistical evidence that Lecturer Characteristics, Learner Characteristics, and Course Content are positively associated with the Quality of Online Learning Satisfaction.

D. Model Summary of the Hypothesis Testing

The main aim of this study was to examine the impact of the independent variables—Lecturer Characteristics, Learner Characteristics, and Course Content of Online Learning—on the dependent variable, Quality of Online Learning. Linear regression analysis was employed to statistically test the related hypotheses and to determine the extent to which the independent variables influence the dependent variable.

R	R Square	Adjusted R Square	F	Sig.
0.883[a]	0.779	0.772	101.321	.000

Table 6: Results of Model Fit

According to Table 06, the model summary shows that the R^2 value is 0.779, while the adjusted R^2 value is 0.772. This indicates that approximately 78% of the variance in the Quality of Online Learning is explained by the factors related to students' perceptions.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.246	0.245		1.006	-0.240
LC	0.185	0.083	0.160	2.230	0.028
LR	0.439	0.068	0.521	6.485	0.000
CC	0.314	0.086	0.292	3.660	0.000

. Dependent Variable: QL

Table 7: Results of Regression Analysis

The researchers employed the multivariate linear regression method to conduct the regression analysis. The F-statistic was significant at the 0.01 level, indicating that the linear regression model was appropriate for the study. This result implies that the factors included in the model have a significant effect on the Quality of Online Learning.

V. Conclusion

The COVID-19 pandemic accelerated the digital transformation of education in Sri Lanka. Although the transition to online learning initially emerged as a response to the crisis, it has now become an integral component of modern higher education.
This study concludes that students' perceptions of online learning are influenced by three key factors: Lecturer Characteristics, Learner Characteristics, and Course Content. All three dimensions were found to have a significant positive impact on the perceived Quality of Online Learning among HNDIT students at ATI Galle.

- Lecturer characteristics influence student engagement and satisfaction.
- Learner characteristics determine students' adaptability and motivation toward online learning.
- Course content influences the clarity, relevance, and overall effectiveness of the learning experience.

The findings highlight that successful online learning requires an integrated approach in which pedagogy, technology, and human interaction are effectively aligned. Educational institutions should move beyond merely transferring traditional classroom content to online platforms and instead focus on creating interactive, inclusive, and accessible learning environments.
Ultimately, this study emphasizes that quality online learning is not solely dependent on technological adoption, but on the ability to create meaningful learning experiences that empower both educators and students.

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