International Journal of Learning, Teaching and Educational Research
Vol. 25, No. 5, pp. 860-886, May 2026
https://doi.org/10.26803/ijlter.25.5.38
Received Sept 11, 2025; Revised Dec 29, 2025; Accepted May 14, 2026

Online Teaching and Learning Quality and Learner Satisfaction: A University Student Perspective

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Abstract. Higher education is increasingly exposed to disruptions arising from pandemics, floods, student unrest, and political instability, which compel institutions to adopt alternative modes of delivery such as online and blended learning. Despite the rapid growth in online education, limited empirical research has examined how the quality of online teaching and learning services influences learner satisfaction, especially in developing countries. The purpose of this study was to investigate how the various aspects of online teaching and learning influence learner satisfaction in Kenya. A sample of 175 students from public universities in Nairobi participated in the study. Data was collected through a structured questionnaire and analysed using structural equation modelling. The study found that the overall quality of online teaching and learning was strong. Tangibility and reliability dimensions emerged as key drivers shaping perceptions of learning content and website content, which together informed students' overall evaluation of online learning quality (OLQ). In turn, higher OLQ was associated with stronger learner satisfaction. The findings highlight that students prioritise stable digital learning platforms, accessible content, and functional virtual learning environments over relational dimensions such as empathy and assurance. The study proposes a contextualised model of online learner satisfaction tailored to higher education institutions in emerging economies. It recommends targeted investments in digital infrastructure, instructional design, and staff capacity building to enhance the reliability,

Citation:
Ombati, O. T., Mageto, J. N., & Pisa, N. (2026). Online Teaching and Learning Quality and Learner Satisfaction: A University Student Perspective. *International Journal of Learning, Teaching and Educational Research*, *25*(5), 860–886. https://doi.org/10.26803/ijlter.25.5.38

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accessibility, and relevance of online learning systems, supporting greater resilience and sustainability in periods of disruption.

Keywords: Online teaching; Service quality; Online learning quality; Higher Education Institutions; Learner satisfaction

1. Introduction

Higher education operates in an increasingly uncertain environment shaped by multiple, intersecting disruptions. Pandemics, climate-related disasters such as floods and droughts, political instability, student unrest, and rapid technological change have repeatedly disrupted traditional, campus-based teaching and learning systems across the world. These pressures have forced higher education institutions (HEIs) to rethink how learning can be sustained in times of crisis while maintaining quality, continuity, and learner satisfaction. As a result, online and blended learning modalities have shifted from being supplementary options to becoming essential strategic responses for institutional survival and resilience.

In the recent past, pandemics such as COVID-19 have triggered an unprecedented transformation in higher education systems globally. Universities were compelled to move teaching and learning to virtual platforms almost overnight, with varying degrees of preparedness (Bordoloi et al., 2021; Watermeyer et al., 2021). Many institutions adopted learning management systems (LMSs), video conferencing technologies, and digital content repositories to enable continuity of instruction. In Kenya, this transition occurred against the backdrop of infrastructural inequalities, high data costs, inconsistent electricity supply, and uneven digital literacy levels among both instructors and students. These conditions created significant challenges for effective service delivery and equitable access to learning (Gamage et al., 2022; Mphahlele, 2022).

While the shift from traditional face-to-face teaching and learning to online classes can be swift, teaching and learning in some universities can be disrupted due to being inadequately equipped, the high cost of data bundles, poor internet connectivity, regular power outages, and disruption from weather conditions (Ampo et al., 2025; Bordoloi et al., 2021). Additionally, the limitations of digital resources, such as technology, disrupts learning and teaching from remote locations (Gamage et al., 2022; Mphahlele, 2022). In developing-country contexts, these constraints are often compounded by financial limitations and inadequate technological support, resulting in fragmented learning experiences. Consequently, while online education offers flexibility and expanded access, it also raises serious concerns regarding content quality, student engagement, assessment integrity, and overall satisfaction (Hafeez et al., 2022).

In responding to these challenges, universities are increasingly being called upon to ensure not only continuity of instruction but also the maintenance of high-quality teaching and learning services. Quality in higher education is a multidimensional concept that varies across contexts, disciplines, and stakeholders. It may be viewed in terms of compliance with standards, continuous improvement, innovation in pedagogy, student achievement, and stakeholder

satisfaction (Schindler et al., 2015; Zuhairi et al., 2020). In online contexts, quality is particularly influenced by the effectiveness of digital platforms, the clarity and relevance of learning content, instructor responsiveness, feedback mechanisms, and system reliability (Hafeez et al., 2022; Kerimbayev et al., 2023).

From a service perspective, higher education can be conceptualised as a structured service environment in which students are primary beneficiaries. As such, models of service quality, particularly the SERVQUAL framework, offer a useful lens for analysing student perceptions. Service quality in higher education has been linked to several institutional attributes, including the availability of trained academic staff, adequacy of learning resources, communication effectiveness, and technological capacity (Nadiri et al., 2009; Ikram & Kenayathulla, 2023).

In online settings, these dimensions are translated into digital equivalents such as platform usability, availability of content, stability of connections, and clarity of interaction. Although HEIs have rapidly expanded online teaching and learning, little systematic attention has been given to how students judge the quality of these experiences. Existing evaluations tend to focus on institutional or pedagogical perspectives, leaving student satisfaction, an essential indicator of the effectiveness and sustainability of online provision, under-examined. This gap limits universities' ability to design online learning environments that genuinely meet learners' expectations and support meaningful learning outcomes.

Learner satisfaction is regarded as a critical indicator of educational effectiveness and institutional performance. Previous studies have shown that student satisfaction is influenced by factors such as the quality of teaching, access to learning resources, administrative support, and institutional responsiveness (Burgess et al., 2018; Li et al., 2023). In technology-mediated environments, satisfaction is further shaped by system quality, perceived usefulness, and the learner's overall online experience (Alqurashi, 2019; Mtebe & Raphael, 2018). However, these studies tend to examine isolated elements such as platform quality or instructor interaction, with limited attention to how teaching service quality, content quality, and website content collectively influence OLQ and, ultimately, learner satisfaction.

Moreover, while research on online learning has expanded significantly since 2020, a substantial proportion of existing studies are situated in developed countries or focus on general e-learning systems without addressing the unique challenges of HEIs in Sub-Saharan Africa. The relationship between online teaching service quality and aspects such as learning content, website content, OLQ, and learner satisfaction in Kenyan universities remains underexplored. This gap is particularly significant given Kenya's expanding higher education sector, growing reliance on blended learning, and the persistent digital divide.

This study seeks to address this gap by examining how university students in Kenya perceive the quality of online teaching and learning during periods of disruption, and how these perceptions shape their overall satisfaction. Drawing

on the SERVQUAL framework, total quality management principles, and insights from e-learning research, the study develops and tests a conceptual model in which the dimensions of online teaching service quality influence learning content and website content, which in turn affect OLQ and learner satisfaction.

This study sought to answer the following research questions:

1. What is the level of online teaching quality in HEIs?
2. What is the relationship between online teaching quality, learning content, website content, and OLQ?
3. What are the antecedents of student satisfaction with online teaching?

By answering these questions, this study makes three key contributions: First, it provides empirical evidence on the perceived quality of online teaching and learning in Kenyan universities. Second, it develops and validates a contextualised model of learner satisfaction tailored to emerging economies. Third, it offers practical insights for education managers and policymakers on how to strengthen the resilience, effectiveness, and sustainability of online and blended learning systems in times of disruption. The remainder of the paper is structured as follows: Section 2 presents the literature review and theoretical background, Section 3 outlines the methodology, Section 4 presents the results, Section 5 discusses the findings and their implications, and Section 6 concludes the paper with recommendations and directions for future research.

2. Literature Review

2.1 Online Teaching and Learning in Higher Education

Online teaching and learning have become integral components of modern higher education, driven by advances in digital technology and the need to provide flexible, accessible, and resilient education systems. Originally viewed as a complementary mode of delivery, online learning has increasingly evolved into a central strategy for teaching continuity, especially in response to major disruptions such as the COVID-19 pandemic (Bordoloi et al., 2021; Watermeyer et al., 2021). In times of disruption (including conflicts, pandemics, or natural disasters), universities are compelled to rapidly transition to virtual platforms, exposing deep disparities in infrastructure, pedagogy, and digital preparedness.

In developing-country contexts, including Sub-Saharan Africa, this transition has been characterised by significant challenges relating to internet connectivity, affordability of data, access to digital devices, and limited institutional capacity (Mtebe & Raphael, 2018; Mphahlele, 2022). While online learning offers increased flexibility and broadens access beyond physical campuses, its effectiveness is often constrained by technological, financial, and skills-related limitations. As a result, the quality of online teaching and learning has become a critical area of scholarly and policy concern.

Research suggests that successful online learning depends on several interrelated dimensions, including technological infrastructure, instructional design, lecturer competence, interactivity, and institutional support (Hafeez et al., 2022; Singh & Meena, 2024). Without a holistic approach to these factors, online education risks

becoming a mere replication of face-to-face teaching in a digital format, rather than a pedagogically transformed learning experience.

2.2 Conceptualizing Quality in Online Teaching and Learning

Users of services have various needs that they expect or desire to meet once they interact with the actual service. Therefore, the ability of a service to satisfy the user's expectations is an important consideration among service seekers and providers (Kumar et al., 2011). Service quality is a concept that is viewed from the perspective of a consumer who utilises the service that is offered. Kaur and Amanpreet (2021) argued that in the higher education sector, students are considered consumers of the product, hence their perceptions of service quality are an area that has attracted significant interest. Many definitions of service quality exist. Kumar et al. (2011) considered quality from the Total Quality Management (TQM) perspective as the extent to which a product conforms to the requirements of the user or customer. Hoffman & Bateson (2010) claimed that service quality is an attitude resulting from long-term assessment of the performance of an organisation. Therefore, the customer is central to the determination of service quality.

Measuring service quality in higher education institutions is fundamental. Various dimensions such as the availability of properly trained staff, modern teaching equipment, as well as up-to-date instructional materials impact positively on higher education service quality (Ikram & Kenayathulla, 2023; Nadiri et al., 2009). Additionally, properly trained faculty and support staff with relevant qualifications, and supporting them to navigate technological challenges in adopting blended learning, ensure quality service (Porter et al., 2014). Recruitment of trained staff with reputable academic standing and strong communication skills is also paramount to the provision of quality service in HEIs (Rajab et al., 2011).

Ahmad (2014) conducted a study to identify the determinants of satisfaction with service quality among higher education students. The researcher found that seven important dimensions influence service quality, namely, the reputation of the higher education institution, quality of the course, available faculty with doctoral degrees and quality of their teaching, the learning conditions, availability and usage of technology, student support and counselling programmes, as well as the social amenities the university provides for the students.

2.3 Online Learning Quality (OLQ)

Online learning, also referred to as e-learning or electronic learning, is the acquisition of knowledge that takes place through electronic technologies and media and is defined as learning that is enabled electronically (Basar et al., 2021). Online learning in higher education has been made possible through the incorporation and advances in information and communication technology (ICT) that enable students to learn online from different locations (Fatimawati et al., 2022).

The proponents of online teaching and learning believe that it can be as effective as the conventional face-to-face learning mode, or even better, and totally disagree with the notion that the media through which content is delivered is likely to distort learning outcomes (Allen et al., 2004; Zheng et al., 2021). However, the opponents of online learning argue that learners who participate in online programmes experience reduced satisfaction and learning effectiveness, citing that the learners might be frustrated and confused (Zaborova & Markova, 2016). Several factors have been identified as being key in influencing the quality of online learning outcomes. Salyers et al. (2014), for example, emphasise the significance of appropriate expertise in the design of online teaching as well as the delivery of content. Markova et al. (2017) argue that delivering quality online teaching requires strong faculty commitment to the design and implementation of effective virtual learning environments.

The availability and use of modern ICT have also been lauded as one of the factors that can lead to the provision of quality online teaching. Modern ICT tools significantly enhance student-centred interaction in online environments, enabling greater engagement, access to resources, and peer collaboration (Kerimbayev et al., 2023). However, effective outcomes depend on well-designed pedagogical training and instructors with content-aligned training who adopt more active, learner-centered strategies; whereas ICT-technical workshops alone have limited impact on instructional practice (Haarala-Muhonen et al., 2023).

Student support is critical for ensuring quality in online learning environments. Effective support encompasses coaching, communication strategies, technical assistance, and academic engagement (Akpen et al., 2024). Likewise, continuous online assessment has been shown to enhance learning by providing ongoing feedback and enabling progress tracking, although it may also introduce rigidity and access inequalities (Fynn & Mashile, 2022). In addition, formative online assessments support student autonomy and metacognition, while monitoring performance early allows for timely instructor intervention (Lu & Cutumisu, 2022).

2.4 Disruption of Teaching and Learning activities in a Dynamic Environment

A disruption to teaching and learning in higher education is any planned or unplanned event that causes a significant break from established instructional practices, compelling rapid adaptation and transformation across institutions (Cain et al., 2024; Watermeyer et al., 2021). These disruptions, whether arising from crises (e.g., pandemics), technological shifts, or institutional decisions, interrupt conventional educational models and require students, instructors, and institutions to adjust quickly, often unintentionally. Disruptions can arise from natural calamities such as earthquakes, floods, typhoons, and cyclones. Annually, education in some countries is disrupted, and learners lose several months of schooling due to the destruction of educational institutions by natural disasters (Marin et al., 2024).

Teaching and learning activities can also be disrupted by political instability as well as international conflicts, which might result in wars. Devi (2017) established that frequent demonstrations and strikes normally disrupt learning in higher education institutions since the people involved do not want the institutions to remain open, and the students fear attending classes due to the frequent strikes and demonstrations. Devi (2017) also revealed that economic blockades as a result of political instability in Manipur led to an increase in the prices of petroleum products such as petrol and diesel, thus impacting the commuter expenses of the students in HEIs. In addition, the closure of more than 2,500 schools amid escalating conflict is affecting over one million children in the eastern Democratic Republic of the Congo (Tasamba, 2025).

Disruption of teaching and learning in HEIs occurs due to student unrest, floods, pandemics, and political instability. To mitigate this, HEIs are required to have innovative thinking that provides impetus for change through transformative practices such as online teaching and learning. Universities, especially in developing countries, face challenges with the online offering of classes, including limited access to digital devices for students, given their high cost. Limited internet connectivity, lack of appropriate online learning facilities in most HEIs result in disruptions in social interaction among the learners, creating issues relating to student discipline and motivation, as well as evaluation and assessment challenges faced by HEIs regarding online learning (Hermanto & Srimulyani, 2021; Yuzulia, 2021). There is a need to think more innovatively in developing adaptive approaches that facilitate online learning to ensure learner satisfaction.

2.5 Learner Satisfaction

Learner satisfaction is widely recognized as an essential indicator of educational quality and institutional effectiveness. It reflects the extent to which learners' expectations are met, and their educational experiences are perceived as valuable and meaningful (Burgess et al., 2018). In online contexts, satisfaction is influenced not only by academic content but also by the functionality of the platform, communication with instructors, perceived effort required, and the ease of interaction. Expectation–Confirmation Theory (ECT) suggests that satisfaction arises when actual performance meets or exceeds initial expectations. In online learning environments, this confirmation process is closely tied to usability, system reliability, clarity of instructional materials, and learner support (Alqurashi, 2019). When these factors align positively, learners are more likely to express satisfaction, continue participation, and recommend the learning mode to others.

Students and stakeholders, including policymakers and institutional leaders in the education sector, demand high-quality education, recognizing that leadership at multiple levels significantly influences learning outcomes (UNESCO, 2024). Universities are experiencing intensified pressure from rapid digital transformation as a result of technologies such as artificial intelligence (AI), adaptive learning systems, and blended-learning platforms, which demand agile institutional responses to ensure both pedagogical effectiveness and academic

integrity (Katsamakas et al., 2024). Research indicates that the quality of resources, teachers, and university management has a significant effect on student satisfaction (Burgess et al., 2018). Similarly, learner satisfaction is influenced by the quality of service provided through online learning (Jiménez-Bucarey et al., 2021). The quality of services provided by university administrative personnel is also crucial in determining the level of satisfaction among students (Sipayung, 2024).

Additionally, student-centered and relational teaching styles significantly enhance student satisfaction, with the method of instruction serving as a key indicator of quality (Bell, 2022; Tibog & Generalao, 2025). Despite the growing body of research on student satisfaction with online and blended learning, especially in Kenya, existing studies primarily emphasize system quality, instructor interaction, service delivery, or learner self-efficacy (Alqurashi, 2019; Gachanja et al., 2021; Li et al., 2023; Mtebe & Raphael, 2018).

2.6 Research Gaps and Conceptual Orientation

Existing literature offers valuable insights into online learning and service quality in higher education, yet several gaps remain evident. First, most empirical studies on OLQ originate from developed countries, with limited representation from African and other developing contexts. Second, prior research often focuses on isolated components such as system quality or instructor interaction rather than examining the integrated pathway linking service quality, content quality, OLQ, and learner satisfaction. However, the relationship between teaching and learning service quality, learning content, website content, and overall OLQ with learner satisfaction remains underexplored. Third, inconsistent findings regarding the roles of empathy and assurance suggest the need for further contextual examination.

In light of these gaps, this study developed a contextualised conceptual model grounded in SERVQUAL, TQM principles, and ECT. The model proposes that the dimensions of online teaching service quality influence learning content and website content, which subsequently shape overall OLQ and determine learner satisfaction in Kenyan HEIs. This integrated approach provides a more nuanced understanding of how quality is experienced and evaluated by students in technology-mediated learning environments in emerging economies. Thus, the present study investigates the OLQ dimensions and satisfaction from a university student perspective, thereby contributing unique insights to the field.

2.7 Conceptual Framework and Hypotheses Development

This study developed a conceptual framework by integrating the SERVQUAL model, TQM principles, and insights from online learning theories to explain how students evaluate the quality of online teaching and learning. The framework assumes that online teaching service quality acts as the primary institutional input, which shapes students' perceptions of both learning content and website content. These, in turn, determine the overall OLQ, which ultimately influences learner satisfaction.

The conceptual model is therefore structured as a series of causal pathways flowing from institutional and instructional factors to student outcomes. Specifically, the SERVQUAL dimensions of tangibility, reliability, assurance, empathy, and responsiveness represent critical attributes of online teaching service quality. In virtual learning contexts, these are reflected in factors such as login reliability, clarity of interface design, consistency of class sessions, timely feedback, and the instructor's digital competence and responsiveness.

Drawing on TQM principles, quality is viewed as an interrelated process rather than a single outcome. High-quality input in the form of reliable systems and effective teaching services produces high-quality learning and website content, which subsequently enhances the perceived effectiveness of online learning experiences. In line with ECT, learner satisfaction emerges when students perceive that online learning performance meets or exceeds their initial expectations.

Based on this theoretical grounding and the empirical insights from prior studies, the following hypotheses were formulated:
H1: Assurance has a positive and significant relationship with learning content.
H2: Tangibility has a positive and significant relationship with learning content.
H3: Empathy has a positive and significant relationship with learning content.
H4: Reliability has a positive and significant relationship with learning content.
H5: Responsiveness has a positive and significant relationship with learning content.
H6: Assurance has a positive and significant relationship with website content.
H7: Tangibility has a positive and significant relationship with website content.
H8: Empathy has a positive and significant relationship with website content.
H9: Reliability has a positive and significant relationship with website content.
H10: Responsiveness has a positive and significant relationship with website content.
H11: Learning content has a positive and significant relationship with OLQ.
H12: Website content has a positive and significant relationship with OLQ.
H13: OLQ has a positive and significant relationship with learner satisfaction.
In addition to these direct effects, earlier research suggests that content-related factors may serve as mediators between service quality and learning outcomes. Thus, the following indirect relationships were also proposed:
H14: Learning content mediates the relationship between online teaching service quality and OLQ.
H15: Website content mediates the relationship between online teaching service quality and OLQ.
H16: OLQ mediates the relationship between learning content, website content, and learner satisfaction.
This conceptual structure provided the foundation for the empirical analysis conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM) and allowed for the examination of both direct and indirect effects among the constructs.

3. Methodology

This study adopted a positivist research philosophy. This was considered appropriate because learning quality and learner satisfaction are well established from a definitional point of view and hence easily measurable. Data was collected from university students in Nairobi, ranging from undergraduate to graduate levels. Nairobi was purposively selected because it hosts a concentration of major public universities and has comparatively higher exposure to online learning infrastructure. The sample was selected using convenience sampling of students enroled in public universities within Nairobi. This sampling method offered an efficient opportunity to obtain responses from a representation of students across faculties. Representativeness was achieved by collecting data from students enrolled in various faculties or schools, including Arts and Humanities, Business and Management Sciences, Science, Engineering, Education, and Computer Science.

Within each stratum, questionnaires were distributed using institutional mailing lists, class-based WhatsApp and Telegram groups, and student online portals. Participation was voluntary. Although responses were received from all faculties, a higher proportion was obtained from students in Business and Management Sciences, reflecting both larger enrollment in those programmes and their greater engagement with online modes of instruction during disruptions. A total of 175 valid responses were obtained and used for data analysis. This sample size was adequate for PLS-SEM, in accordance with the "10-times rule" and recent recommendations for minimum sample requirements in structural modelling studies.

The Postgraduate Faculty of Business and Management Sciences, which is in charge of research within the faculty, approved ethical clearance before proceeding to data collection. In addition, student consent was sought before they responded to the questionnaire. While the demographic information was analysed using percentages and frequencies, the constructs were analysed using descriptive statistics. The level of online teaching service quality was analysed using measures of central tendency and measures of dispersion. The relationship between teaching service quality, learning content, website content, and OLQ was analysed using correlation analysis, and the relationship between OLQ and learner satisfaction was measured using correlation.

PLS-SEM in SmartPLS (Ringle et al., 2022) was used to analyse the complex relationships between the online service quality variables and learner satisfaction. PLS-SEM is a multivariate analysis technique, which was preferred due to its causal-predictive capabilities (Cheah et al., 2024), to draw insights on managerial implications of the results. PLS-SEM was also selected because of its capability to analyse complex models with many indicators and constructs. A SEM model is evaluated in two steps: step one involves the evaluation of the measurement model, also known as the outer model. The criteria used included:

- Indicator loadings, which should be at least 0.708.

- Internal consistency using composite reliability and Cronbach's alpha, with reliability values above 0.60 considered acceptable; however, values above 0.95 are problematic and indicate redundancy.
- Convergent validity measured using the average variance extracted (AVE), where AVE > 0.5 is expected.
- Discriminant validity examined using the Heterotrait–Monotrait (HTMT) ratio.

Step two involved the evaluation of the structural model, also known as the inner model. The criteria included:

- Examining the R-square, where values of 0.75, 0.50, and 0.25 can be considered as substantial, moderate, or weak.
- Predictive relevance (Q2 > 0) whereby values of 0, 0.25, and 0.50 imply small, medium, and large predictive accuracy. Using the PLS predict algorithm, a model has high predictive power if all the root mean squared error (RMSE) values are less than the linear model (LM) values (Hair et al., 2019).
- Effect size (f2), which shows the impact on R-square of removing a particular variable. Cohen (1988) claimed that values of 0.02, 0.15, and 0.35 refer to small, medium, and large effect sizes.
- Finally, statistical significance should be examined to conclude the model evaluation.

4. Results and Findings

4.1 Demographics

The research findings on the gender of the students undertaking online studies who participated in the study revealed that 58.9 per cent were male and 41.1 per cent were female, as shown in Table 1. The gender disparity in this dataset was in line with national university enrolment, whereby there are more males than females (CUE, 2024). Of the respondents, 58.3 per cent were unemployed, while 32 per cent were in full-time employment and 9.7 per cent were in part-time employment. This finding reflects the huge youth unemployment challenge across Sub-Saharan African countries, which is approximately 60 per cent on average (Ighobor, 2017).

Concerning the programme of study pursued by the respondents, it was evident from the results that the majority of the respondents, represented by 77.1 per cent, were from Business and Management Sciences. Other programmes represented included Engineering (9.7%), Arts and Humanities (8%), Computer Science (1.7%), Science (1.7%) and Education (0.6%). This indicates that the sample was representative of various programmes, although the vast majority of respondents were from Business and Management Sciences.

Table 1: Frequency distribution of demographic variables

Demographic	Category	Frequency	Per cent
Gender	Male	103	58.9
	Female	72	41.1
Employment	Full-time	56	32
	Part-time	17	9.7
	Unemployed	102	58.3
Programme	Arts and Humanities	14	8
	Business and Management Sciences	135	77.1
	Computer Science	3	1.7
	Education	1	0.6
	Engineering	17	9.7
	Science	3	1.7
	Other	2	1.1
Mode study	Online	103	58.9
	Face-to-face	2	1.1
	Blended	70	40
Study device	Laptop/PC	88	50.3
	Tablet	2	0.6
	Smartphone	85	48.6
Mode preference	Synchronous/live classes	99	56.6
	Asynchronous/recorded classes	14	6.9
	Blended	62	35.4

In terms of the mode of study, 58.9 per cent of the respondents were enrolled in online programmes, 40% in blended learning, and 1.1 per cent were participating in face-to-face classes only. The results thus reveal a shift from physical classes, which were dominant in many universities before disruptions, especially during the COVID-19 pandemic. This suggests that universities in Kenya need to invest in robust LMSs to support online or blended modes of study.

Regarding the study device used by the respondents to access online learning, laptops or personal computers (PCs) were the most commonly used devices (50,3%), followed by smartphones (48.6%), while tablets accounted for the smallest proportion (0.6%) of devices used for online learning. The results imply that, while the respondents at least have a device to access online teaching and learning content, almost half lack laptops, which are a preferred device for online learning (Abram, 2022).

Concerning the most preferred mode of online learning, 56.6 per cent of the respondents preferred synchronous or live online classes as opposed to either asynchronous or recorded classes (6.9%) and blended ones (35.4%), that is, a "blend" of both synchronous and asynchronous classes Live classes might be

more preferred because they allow students to ask questions and get clarifications during lectures.

4.2 Level of Online Teaching Service Quality and OLQ

Online teaching and learning quality were measured using 20 SERVQUAL items customised to online learning (Uppal et al., 2018). The overall service quality index was categorised as low, moderate, or high. A Likert-type scale of 1 to 5, where 1–2 was classified as low, 3 as moderate, and above 3 as high, was used. The mean scores, standard deviations, and reliability scores of the SERVQUAL constructs are presented in Table 2. There was a high online learning quality in all the dimensions that were examined. Assurance had the highest mean of 4.22, and tangibility had a relatively low mean of 3.85 in the teaching service quality category. The website content and learning content constructs had a mean of 3.75 and 3.80, respectively.

The other two constructs, OLQ and learner satisfaction, had a mean score of 3.85 and 3.89, respectively. The results reveal that many universities managed to offer quality online classes and learning opportunities to students. This can be considered an important achievement, especially in Sub-Saharan Africa, where physical facilities in HEIs are limited. The success in offering online classes can be attributed to the high mobile data penetration, as depicted by the Communications Authority of Kenya (2023). Confirmatory factor analysis via SmartPLS 4 (Ringle et al., 2022) was conducted, and the outer loadings of the PLS-SEM were obtained as presented in the table. The results reveal that the majority of the observed indicators had outer loadings above 0.7, with only a few slightly below 0.7; thus, all indicators had high reliability.

Table 2: Descriptive statistics and outer loadings

Construct	Indicator	Mean	Std. Deviation	Construct mean	Outer loadings
Assurance	ASS1	4.42	0.84	4.22	0.780
	ASS2	3.84	1.16		0.645
	ASS3	4.13	1.03		0.864
	ASS4	4.50	0.80		0.638
Tangibility	TAN1	4.13	1.10	3.85	0.704
	TAN2	4.22	1.10		0.645
	TAN3	3.34	1.42		0.747
	TAN4	3.71	1.27		0.787
Empathy	EMP1	3.90	1.25	3.84	0.828
	EMP2	3.37	1.40		0.829
	EMP3	3.80	1.27		0.964
	EMP4	4.28	1.00		0.720
Reliability	REL1	4.08	1.12	3.96	0.809
	REL2	3.61	1.30		0.834
	REL3	3.95	1.34		0.821
	REL4	4.00	1.15		0.761

	REL5	4.18	1.04		0.744
Responsiveness	RES1	3.93	1.13	4.07	0.875
	RES2	3.78	1.26		0.801
	RES3	4.49	0.79		0.702
Learning content	LC1	3.74	1.40	3.80	0.899
	LC2	3.87	1.26		0.888
	LC3	3.78	1.29		0.914
Website content	WC1	3.89	1.17	3.75	0.726
	WC2	3.46	1.35		0.775
	WC3	3.79	1.24		0.860
	WC4	3.79	1.30		0.798
	WC5	3.80	1.18		0.823
Online learning quality	OLQ1	3.86	1.17	3.85	0.948
	OLQ2	3.83	1.16		0.846
	OLQ3	3.83	1.16		0.805
	OLQ4	3.89	1.10		0.833
Learner satisfaction	LSAT1	3.88	1.37	3.89	0.945
	LSAT2	3.90	1.36		0.966
	LSAT3	3.87	1.38		0.958
	LSAT4	3.89	1.35		0.963

4.3 Online Teaching Service Quality and Learner Satisfaction

The interaction between online teaching and learning service quality and learner satisfaction was examined indirectly via learning content, website content, and OLQ. Online teaching and learning service quality was measured using five service quality dimensions that were customised for online teaching. The correlations between the constructs were tested to reveal the strength and direction of the relationships between the constructs. As depicted in Table 3, all the correlations were positive and either moderate or strong. Thus, all the constructs had a positive relationship with the outcome construct – learner satisfaction, as expected. This result implies that an enhancement of any one of the dimensions would lead to an increased quality in any of the other corresponding constructs.

Table 3: Correlations

	Assurance	Empathy	Learner Satisfaction	Learning Content	Learning Quality	Reliability	Responsiveness	Tangibility	Website Content
Assurance	1.000								
Empathy	0.805	1.000							
Learner Satisfaction	0.602	0.567	1.000						
Learning Content	0.708	0.663	0.751	1.000					
Learning Quality	0.701	0.651	0.663	0.857	1.000				
Reliability	0.863	0.894	0.692	0.795	0.744	1.000			
Responsiveness	0.814	0.893	0.564	0.672	0.700	0.864	1.000		
Tangibility	0.791	0.757	0.753	0.765	0.725	0.843	0.749	1.000	
Website Content	0.643	0.594	0.598	0.821	0.906	0.734	0.657	0.727	1.000

The results of the SEM model reveal high internal consistency measured through the high Cronbach's alpha and composite reliability values as presented in Table 4. The AVE values are all above 0.5, indicating that the estimated model explained more than 50 per cent of the variance; thus, convergent validity is established. The discriminant validity of the model was ruled out to establish the distinctiveness of each of the latent constructs using the Fornell and Larcker criterion, cross-loadings, and the HTMT ratio (Sarstedt et al., 2021). Therefore, the outer model revealed strong relationships between the manifest variables and the latent constructs (Mageto et al., 2018).

Table 4: Outer model evaluation

Latent variable	Cronbach 's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Assurance	0.823	0.839	0.825	0.544
Empathy	0.904	0.914	0.905	0.705
Learner Satisfaction	0.978	0.978	0.978	0.918
Learning Content	0.928	0.928	0.928	0.811
Learning Quality	0.921	0.922	0.918	0.739
Reliability	0.895	0.897	0.895	0.631
Responsive ness	0.832	0.846	0.837	0.634
Tangibility	0.814	0.817	0.813	0.522
Website Content	0.895	0.9	0.897	0.637

The inner model was evaluated to reveal the relationships between the latent constructs. The evaluation of the inner model involved the examination of the coefficient of determination (R-square), effect size (f-square), predictive relevance (Q-square), and the significance of the path coefficients. The R-square revealed the proportion of the variance explained by the model in each of the dependent latent variables. The model's R-square and path coefficients are presented in Figure 1.

The R-square values revealed that 67.6 per cent of the variance in learning content was influenced by the five dimensions of online teaching and learning service quality. Specifically, reliability and tangibility had the highest influence based on the path coefficients. Similarly, 61.6 per cent of the variance in website content was explained by the five dimensions, with reliability and tangibility contributing the most. Further, 85.9 per cent of OLQ was explained by learning content and website content, as well as the indirect effects of the dimensions of online teaching and learning service quality. Finally, the model explained 44 per cent of learner satisfaction through OLQ as well as the indirect effects.

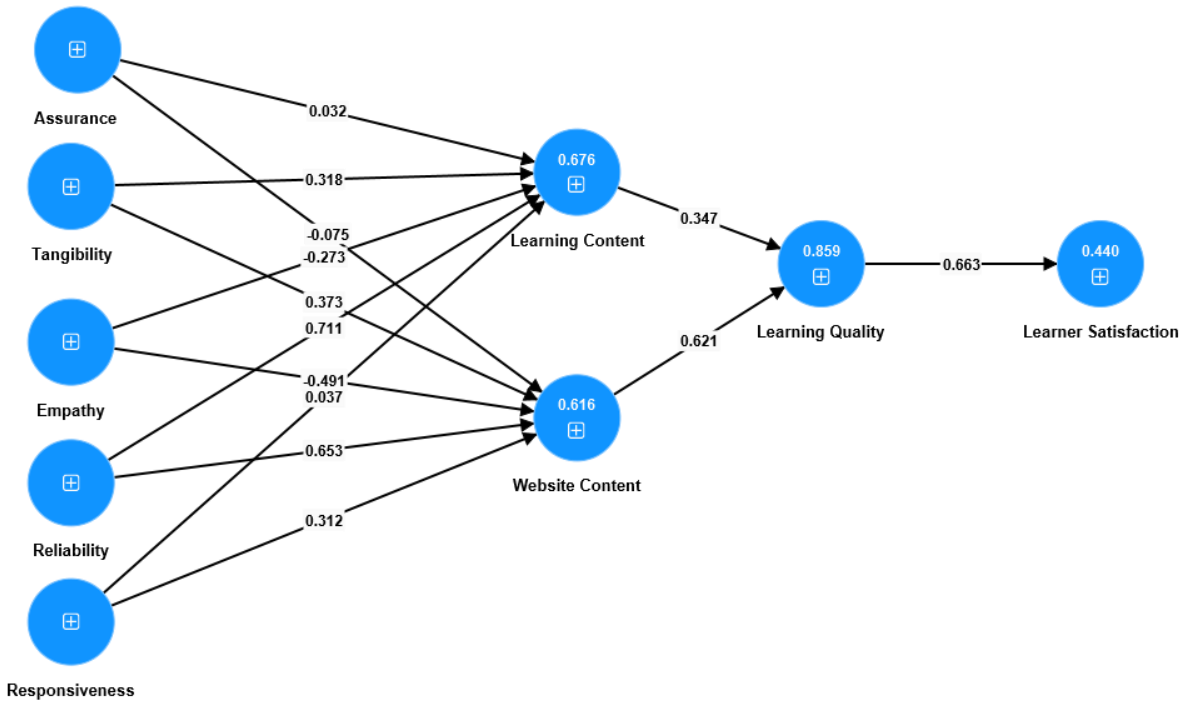

Figure 1: Path coefficients and R-square of the inner model

The significance of the path coefficients was examined by running a bootstrap of 5,000 samples at a 0.05 level of significance. The results are presented in Table 5. The results reveal that tangibility and reliability dimensions had a statistically significant ($p < 0.05$) influence on website content and learning content. Similarly, learning content and website content had a statistically significant effect on OLQ. The results also reveal that high OLQ can result in higher learner satisfaction. Therefore, tangibility and reliability are the most important dimensions of online teaching and learning service quality. Additionally, the effect of empathy and assurance on website content was negative, although not statistically significant.

Table 5: Significance of the path coefficients – hypotheses testing

	Path coefficients	T statistics (|O/STDEV|)	P values	Accept/reject hypothesis
Assurance -> Learning Content	0.032	1.188	0.235	Reject
Assurance -> Website Content	-0.075	0.638	0.523	Reject
Empathy -> Learning Content	-0.273	0.398	0.69	Reject
Empathy -> Website Content	-0.491	1.177	0.239	Reject
Learning Content -> Learning Quality	0.347	5.369	0.000	Accept
Learning Quality -> Learner Satisfaction	0.663	11.645	0.000	Accept
Reliability -> Learning Content	0.711	3.138	0.002	Accept
Reliability -> Website Content	0.653	3.327	0.001	Accept
Responsiveness -> Learning Content	0.037	0.572	0.567	Reject
Responsiveness -> Website Content	0.312	1.428	0.153	Reject
Tangibility -> Learning Content	0.318	2.824	0.005	Accept
Tangibility -> Website Content	0.373	2.812	0.005	Accept
Website Content -> Learning Quality	0.621	6.885	0.000	Accept

The predictive relevance (Q-square) of the model was examined by running PLSpredict and revealed that all the endogenous variables had $Q^2 > 0$ as reflected in Table 6. Furthermore, all the naïve LM values in the model were equal to 1.00, thus above the RMSE (or MAE) values. Thus, a strong degree of predictive relevance was established based on Hair et al.'s (2013) criterion.

Table 6: Predictive relevance and R-square

	Q^2predict	RMSE	MAE	R-Square
Learner Satisfaction	0.41	0.777	0.635	0.440
Learning Content	0.53	0.693	0.495	0.676
Learning Quality	0.491	0.723	0.558	0.859
Website Content	0.443	0.755	0.59	0.616

The effect size (f-square) was examined and presented in Table 7. The results reveal that website content has a high effect size on OLQ. Similarly, OLQ has a high effect size on learner satisfaction. The online teaching service quality dimension of assurance has a negligible effect size.

Table 7: f-square and effect size

	f-square	effect size
Assurance -> Learning Content	0.001	Negligible
Assurance -> Website Content	0.003	Negligible
Empathy -> Learning Content	0.033	Small
Empathy -> Website Content	0.089	Small
Learning Content -> Learning Quality	0.278	Medium
Learning Quality -> Learner Satisfaction	0.785	High
Reliability -> Learning Content	0.178	Medium
Reliability -> Website Content	0.127	Small
Responsiveness -> Learning Content	0.001	Negligible
Responsiveness -> Website Content	0.044	Small
Tangibility -> Learning Content	0.085	Small
Tangibility -> Website Content	0.099	Small
Website Content -> Learning Quality	0.890	High

The results in Table 5 reveal that seven hypotheses were accepted based on the p-values ($p < 0.05$). Many of the exogenous constructs had a positive influence on the endogenous constructs, except for Assurance -> Website Content (-0.075), Empathy -> Learning Content (-0.273), and Empathy -> Website Content (-0.491), although they were all not statistically significant. The resultant model for predicting learner satisfaction with online teaching service quality is presented in Figure 2. The model identifies the antecedents of learner satisfaction with online teaching as being the service quality dimensions of tangibility and reliability, as well as the content on the website and the learning content. The presence of these aspects can result in higher levels of OLQ and, subsequently, higher levels of learner satisfaction with online teaching and learning.

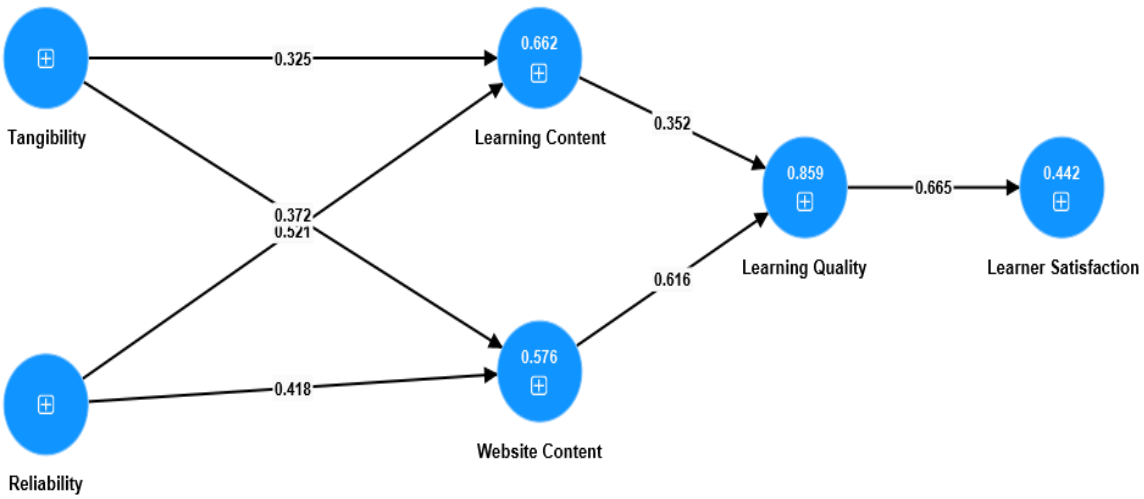

Figure 2: Online teaching learner satisfaction model

5. Discussion of Research Findings

This study sought to examine how online teaching service quality, learning content, and website content shape overall OLQ and, ultimately, learner satisfaction among university students in Kenya. Grounded in SERVQUAL, TQM,

and ECT, the findings provide both theoretical and practical insights into how students in a developing-country context perceive and evaluate online education. The results indicate that, overall, online teaching and learning quality was rated relatively high, with mean scores above 3.75 on a five-point scale. This suggests that, despite infrastructural constraints and the sudden transition to online modes brought about by crises, Kenyan public universities have made measurable progress in adopting digital platforms, creating learning content, and supporting virtual instruction. This finding confirms earlier observations that HEIs in resource-constrained environments are increasingly demonstrating resilience and adaptive capacity (Mtebe & Raphael, 2018; Mphahlele, 2022).

Consistent with the SERVQUAL framework, the dimensions of tangibility and reliability emerged as the strongest predictors of both learning content and website content, and indirectly of learner satisfaction. Our results are in line with the findings of Pham et al. (2019) who found that e-learning service quality positively impacts learner satisfaction. In the context of online education, tangibility no longer refers to physical buildings and facilities but rather to the visual quality of the platform, clarity of digital materials, accessibility of files, and user-friendly interfaces. Reliability, on the other hand, captures the consistency of platform performance, stability of the internet connection during live sessions, and dependable access to course materials. The strong influence of these two dimensions confirms that, in virtual environments, students prioritise functional and technological attributes over relational cues when forming judgments of quality.

This outcome extends SERVQUAL to digital learning contexts by demonstrating that "virtual tangibles" and system dependability substitute for physical classroom cues. These findings also align with TQM principles, which emphasise that process stability, system consistency, and standardisation are critical drivers of high-quality outcomes. In other words, when the system functions smoothly and predictably, students are better able to engage with the learning materials, resulting in a higher perceived quality of learning.

Contrary to some traditional service settings, empathy and assurance were found to be weak and statistically non-significant predictors. While these dimensions are often important in face-to-face environments, their diminished role in this study may reflect the impersonal nature of digital platforms, large class sizes, and limited opportunities for one-on-one interaction in online settings. In resource-constrained contexts, students may also adopt more pragmatic expectations, focusing more on whether the system works rather than on relational aspects or personalised attention. This finding contributes to current debates in the literature, which show mixed evidence on the relevance of relational service dimensions in online education (Li et al., 2023).

In addition, learning content and website content are critical mediating pathways through which service quality influences OLQ. Together, these variables explained more than 85% of the variance in OLQ, highlighting the central role of content relevance, organisation, navigability, and structure in shaping students'

learning experiences. This supports existing e-learning quality models, which argue that well-designed content and intuitive platform architecture are essential for maintaining engagement, reducing cognitive overload, and promoting deeper learning (Kerimbayev et al., 2023; Hafeez et al., 2022).

Furthermore, the strong link between OLQ and learner satisfaction ($R^2 = 0.440$) reinforces the relevance of ECT. According to the theory, satisfaction arises when perceived performance meets or exceeds initial expectations. In this study, when students experienced organised content, a stable platform, and effective instructional delivery, their expectations of online learning were confirmed, resulting in higher levels of satisfaction. This finding is consistent with prior studies demonstrating that system quality and content quality directly influence satisfaction and future usage intentions (Alqurashi, 2019; Li et al., 2023).

Students in Kenyan universities preferred either online learning or blended learning, in that order. Our findings are in line with previous studies that found evidence of student inclination towards online or blended formats (Harwani, 2020). Online and blended modes are preferred because students value the flexibility and accessibility of online learning (Klimova, 2016; Shlomo & Rosenberg-Kima, 2024). The preference for online learning by students can be attributed to the presence of stable internet and affordable data in Kenya, especially in urban areas. However, this implies that many students have to move to urban areas to access fast internet that can support their online classes because internet speeds are usually low in rural areas (Munoz-Najar et al., 2021).

The results revealed that students accessed the online classes via laptops or smartphones and preferred synchronous classes. Our findings corroborate the findings of Abram's (2022) study, which found that learners prefer the use of laptops or personal computers when participating in online learning. Similarly, our results are in line with the findings reported by Adams and Chuah (2022) that e-learning tools and platforms are important in the provision of online learning. The findings also support the conclusions made by Akkara and Mallampalli (2021), who identified Microsoft Teams, learning management systems such as Google Classroom and Moodle, and communication and videoconferencing tools including WhatsApp, Google Meet, Zoom, and WebEx as some of the notable platforms used during periods of disruption to deliver online classes. Therefore, information technology and digitisation are known to be transforming higher education in Sub-Saharan Africa, especially by increasing access (Daniel & Bisaso, 2023).

Engaging qualified and competent academic staff was found to be key to good online service quality among universities in Kenya. Our findings align with existing literature, for example, Rajab et al. (2011) found that the recruitment of academic staff with relevant qualifications, the ability to communicate proficiently, and a sound reputation was paramount to the provision of quality service in higher education. Our study established that universities in Kenya offered high-quality online teaching service. This was evident from the results provided through measuring the level of online teaching service quality using the

20 SERVQUAL items customised to online teaching and learning. It was revealed that assurance and responsiveness had the highest scores regarding online teaching quality. This implied that the instructors were not only highly knowledgeable in their areas of expertise but were also ready to assist students during the learning process. Online teaching quality was also high on the reliability dimension, implying that the institutions and the instructors delivered online teaching consistently. Although tangibility and empathy were least ranked, they were also within the high-level quality category, revealing that the instructor cared about the students and that the virtual classroom was of acceptable standards. The results resonate with the position of proponents of online teaching and learning, such as Allen et al. (2004) and Shachar and Newmann (2003), studies which support the use of technology and different media in providing online learning.

The contribution of this study is the development of an online teaching and learning satisfaction model tailored for HEIs in emerging economies. The model provides a practical framework to guide institutional managers and instructors in strategically allocating resources and designing targeted training interventions, thereby enhancing teaching quality, improving learner experiences, and ultimately achieving higher educational returns. Specifically, the study makes the following recommendations based on the model:

- HEIs should prioritise investments in improving the quality of online teaching methods in terms of tangibility and reliability, improving digital pedagogy, and course content development. This will ensure that resources are not thinly spread but directed towards high-impact areas.
- Since teaching quality and content drive satisfaction, institutions should design continuous professional development programmes that enhance digital teaching skills, relational pedagogy, and online content delivery. Policies should mandate regular upskilling of faculty to align with evolving technologies and learner expectations.
- Effective online learning requires stable platforms and supportive services. Universities in emerging economies should adopt policies that ensure robust learning management systems, accessible digital resources, and adequate student support mechanisms to sustain satisfaction with online teaching and learning.
- The model highlights cross-influences between constructs (e.g., service quality to satisfaction via OLQ). Policy frameworks should promote benchmarking across programmes, institutions, and countries to identify best practices. Quality assurance bodies can integrate learner satisfaction metrics into accreditation and monitoring processes.
- The relatively modest explanatory power for learner satisfaction ($R^2 = 0.442$) suggests that external contextual factors—such as internet access, affordability, and institutional support, might be critical. National and institutional policies should therefore address digital divides by subsidising internet costs, providing devices, and ensuring inclusive access.
- The model confirms that learner satisfaction is not just an outcome but also a proxy for educational effectiveness. HEIs should embed the model into

strategic planning to monitor satisfaction indicators, aligning them with institutional performance targets and budgetary allocations.

5.1 Implications for Theory and Practice

Theoretically, this study reinforces SERVQUAL's adaptability while simultaneously challenging its traditional assumptions. It demonstrates that in online environments, tangible and reliable digital structures replace physical environments, and that relational dimensions may diminish in importance depending on context.

Practically, the results suggest that universities seeking to improve online education should prioritise:

- Stability and reliability of their LMSs and servers
- Professional design and layout of online interfaces
- High-quality, well-organised, and accessible learning materials
- Continuous training of academic staff in digital content development

Although empathy and assurance are not significant in this model, this does not imply that human connection should be ignored. Rather, institutions should explore innovative mechanisms, such as virtual office hours, discussion forums, and AI-based support tools, to reintroduce human presence in structured digital formats.

6. Conclusion

The results highlight that learners were generally satisfied with the quality of online teaching offered by HEIs. Education managers of HEIs are encouraged to offer either or both fully online or blended learning synchronously. To improve online teaching quality, education managers should focus more on the tangibility and reliability aspects. Therefore, the antecedents of learner satisfaction were established as tangibility, reliability, learning content, website content, and OLQ. This requires HEIs to invest more in online teaching and learning platforms that offer ease of access and navigation from a student perspective. This might require platforms that have an enhanced graphical interface. HEIs should ensure that the content on the online learning platforms is regularly monitored to ensure it is current and relevant to the course material and industry trends. The online instructors should be subject experts with the ability to link theory and practice for students to understand the course content.

This study has limitations that should be acknowledged. First, the use of cross-sectional data from a single country restricts the generalisability of the findings, as learner satisfaction with online teaching may differ across African contexts due to variations in infrastructure, pedagogy, and institutional policies. Future research could address these limitations by employing longitudinal or multi-country comparative designs to capture broader insights into online teaching and learning quality across diverse African settings. Second, while this study focused on students, further research should incorporate the perspectives of instructors, who play a critical role in shaping teaching quality and student experiences. Third, future research could explore comparative studies across modules, programmes, institutions, and countries would also be valuable for identifying

best practices and contextual factors that enhance teaching effectiveness and learner satisfaction. Such work would deepen understanding and guide policy and practice in higher education.

Acknowledgements
The authors would like to thank the reviewers for their constructive comments.

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