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# Effect of Teaching Quality on Students' Satisfaction in Nigerian Tertiary Institutions: The Moderating Role of E-Learning Amid COVID-19 Recovery

By Shuaib, Kabir Musa, Inusa, Auwalu, Bichi, Jazuli Muhammad & Abdulrazak, Madu Yuguda

*Ahamdu Bello University*

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*GJHSS-G Classification:* *LCC code: LB1028*


*Strictly as per the compliance and regulations of:*

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*Keywords: covid-19, e-learning, education, student satisfaction, teaching quality.*

## I. Introduction

The World Health Organization (WHO) declared COVID-19 a pandemic at the beginning of 2020, causing a global shutdown. Many countries worldwide adopted a lockdown strategy to halt the spread of the deadly virus, which claimed many lives and infected millions, including health workers. Measures were taken through cooperation and collaboration to find a solution to the nearly paralyzed global economy. The service industry is among the most severely affected sectors, including the education enterprise. Hence, the recovery era witnessed a service-oriented age for many countries. Although many developed economies resolved online academic activities, developing countries like Nigeria suffered a whole session without academic programs. With the education service industry expanding yearly, there is a growing gap in quality teaching services between countries. Many developing countries are yet to recover from the COVID-19 lockdowns. Moreover, the literation on education indicates that one of the major challenges that education service providers face is managing service quality to satisfy, retain, and create loyalty among their students (Ibojo & Asabi, 2015).

Literature on education management indicates that providing effective service and teaching are significant responsibilities of staff and teachers. Every institution of higher learning prioritizes improving the quality of teaching and learning, and the quality of teaching and learning is also among the government's critical agenda. Thus, tertiary institutions must develop a long-term culture of quality teaching and enhanced learning. (Suarman, 2015). According to Vogt (1984), quality teaching refers to providing instruction to students of different abilities while integrating instructional objectives and evaluating students' effective learning modes (Markley, 2004). Similarly, teaching quality has evolved to determine or influence effective teaching and learning procedures and resource allocation. That affects how institutions work internally and respond to external pressures to gain a competitive advantage. Therefore, the rate at which institutional goals are met is reflected in students' satisfaction. Satisfaction is a student's general attitude or behavior towards the gap between what they expect and what they get when fulfilling specific desires and demands (Hansemark & Albinsson, 2004; Singh, 2006). Students who are satisfied with the services offered are more likely to form a positive and friendly relationship with the school.

Literature reveals several studies that investigated the association between service quality and students' satisfaction in higher institutions over the years with inconsistent findings (Farooq, Khalil-Ur-Rehman & Tijjani et al., 2019; Pedro, Mendes & Lourenço, 2018; Yilmaz, Ari, & Gürbüz 2018; Weerasinghe & Fernando 2018). However, the challenges posed by the COVID-19 pandemic were occasioned by lockdowns, restrictions and other protocols to control the spread of the dreaded

*Corresponding Author α: Ph.D, Department of Accounting Education, Federal Collage of Education (Tech), Bichi, Kano-Nigeria. e-mail: kabirms01@gmail.com*
*Author σ: Ph.D, International Centre of Excellence for Rural Finance and Entrepreneurship, Ahamdu Bello University, Zaria - Nigeria. e-mail: aygdanzaki@yahoo.com*
*Author ρ: Center for Dryland Agriculture, Bayero University, Kano – Nigeria. e-mail: jazuli04@yahoo.com*
*Author ω: Ph.D, Department of Public Administration, Ahmadu Bello University, Zaria – Nigeria. e-mail: abdurrazakmadu@yahoo.com*

virus. Developed countries with internet access and connectivity maintain their academic programs online, resulting in a gap between poor and advanced countries, with many students missing an entire session. Thus, the current study introduced the moderating role of e-learning to strengthen the relationship between teaching quality and students' satisfaction. E-learning, if effectively implemented, will aid in sustaining academic programs and improving teaching quality to achieve student satisfaction.

Additionally, studies established that teaching quality is an antecedent of student satisfaction. Recent developments like COVID-19 that shut down academic programs worldwide require more studies to guide the management of education enterprises on how to fill the gap created by the unexpected closure of institutions. Moreover, Sekaran (2003) states that a moderator can be used when a relationship is contingent on a third variable, also called an intervening variable. In this study, the researchers firmly believe that the relationship between teaching quality and students satisfaction can be strengthened by good e-learning that aligns students' behavior with institutions' objectives to meet paradoxical demands for control and flexibility (Mubi Qadri, 2015). The dimensions on which scholars evaluate the quality of education provided are many; significant among the aspects of education is students' perspective; what is their perception of the quality of education they receive (Zaheer et al., 2015)? This is especially important when discussing e-Learning, where physical interaction between student and teacher is minimal or absent. Thus, physical distancing is a necessary COVID-19 protocol. Students can also continue their academic programs online with e-learning.

The primary aim of these online classes (e-learning) is to maintain communication with students, promote self-confidence, and enhance students' confidence in their ability during the recovery era of the COVID-19 pandemic (Yekefallah et al., 2021). Thus, improving teaching quality and students' satisfaction. Therefore, given the preceding, an essential research question that requires an answer is: what is the moderating effect of e-learning on the relationship between teaching quality and student satisfaction? Thus, this study aims to find the answer to the above research question to develop better insights and perspectives on the relationship that would help make meaningful managerial and theoretical contributions. This paper is structured into five sections: introduction, literature review and theoretical framework, methodology, results and discussion and conclusion. Similarly, directions for future research are presented based on the paper's findings.

## II. Literature Review

### a) *Concept of teaching quality*

According to Anderson & Burns (1991), teaching is an interpersonal interaction involving language which helps students to learn or modify their learning behavior. However, teaching is more than just explaining or implying inflexible instructional materials. Thus, instructors must create positive learning environments to reveal learning motivation and teach students how to learn independently by doing and doing by learning (Vermeulen & Schmidt, 2008). Deming & Edwards (1982) defined quality as the ability to cost-effectively produce the most valuable products on the market. According to White et al. (1987), clusters of behaviors strongly associated with student learning include student behavior, management of instructional time, instructional monitoring, instructional presentation and feedback.

Marsh (1990) opined that teaching and learning quality encompasses academic staff teaching effectiveness and good interaction between teachers and students, including how students are being entertained by their lecturers in the classroom, how information is being transferred from the institution's board to the students, or how they encourage students in learning activities. However, Groundwater-Smith & Mockler (2003) pointed out that the curriculum framework needs to contain a detailed description of skills, knowledge and outcome at every stage of the learning process. Again, the quantity and quality of student interaction should be the primary focus of the educator. Teaching quality is measured by the SERVQUAL model, like in many previous studies.

#### i. *SERVQUAL model*

Literature established that service industries, like tertiary institutions, spend considerable time and resources measuring and managing teaching quality and students' satisfaction. Thus, they regularly identify and measure essential students' service aspects against performance standards. The SERVQUAL model, designed by Parasuraman et al. (1988), is the most widely recognized and used model for measuring service quality in various industries. The SERVQUAL model presents a multidimensional construct of perceived service quality that uses tangibility, reliability, responsiveness, assurance, and empathy as measures for service quality (Zeithaml et al., 1990; Parasuraman et al., 1988). Despite criticisms attached to the SERVQUAL model in the literature (Johnston, 1995), it is the most commonly used model due to its confirmatory factor analyses in many cases. The SERVQUAL has thus far proven to be a cost-effective methodology for evaluating service quality in different service organizations and industries, including the education industry (McAlexander et al., 1994; Lymperopoulos et al., 2006;

Levesque & McDougall 1996; Newman & Cowling 1996; Sureshchandar et al., 2002; Paswan et al., 2004; Seth et al., 2005;).

*b) Concept of students' satisfaction*

Satisfaction refers to attitudes or feelings that a person has towards various factors influencing a specific situation (Bailey & Pearson, 1983). According to Kotler & Clarke (1987), a person feels satisfied when a performance or outcome meets his or her expectations. Satisfaction is a perception of performance based on the level of expectations. In addition, satisfaction is also defined as a deliberate action that brings about happiness (Malik et al., 2010). According to Sapri et al. (2009), customers are the lifeblood of any institution, whether public or private. Student satisfaction is critical in determining the accuracy and authenticity of the system. Student satisfaction is conceptualized as students' perceptions developed from the perceived value of education and experience acquired at an institution of learning (Astin, 1993).

User satisfaction means the extent of conformity between the information systems used by users and what they need (Cyert & March 1963). In recent years, satisfaction has been applied to education enterprises. Based on the minimal research available, student satisfaction appears to be a complex construct with several dimensions (Richardson, 2005; Marzo-Navarro et al., 2005). Elliott & Shin (2002) describe student satisfaction as "the favorability of a student's subjective judgment of the many outcomes and experiences involved with education", in line with Oliver & Desarbo's (1989) opinion. Thus, student satisfaction is shaped by repeated experiences within the school environment.

*c) Concept of e-learning*

Studies indicate that e-Learning involves delivering information through telecommunication technology to train and educate students. Thus, e-learning emerged as a new paradigm in today's educational system because of tremendous advancements in communication and information technology (Zaheer et al., 2015). The characteristics of e-learning contain all the modern learning requirements, and thus have higher demand among tertiary education institutes due to this special quality (Alshwaier et al., 2012). However, online learners must be well acquainted with the technology used (Belanger & Jordan, 1999). E-learning has gained popularity and emerged as a credible alternative to conventional classroom teaching. Because e-learning provides the benefits of low cost, broader access, and shared resources, conventional teaching education has also been preferred for distance learning courses in addition to traditional courses (Zaheer & Munir, 2020).

Moreover, the literature reveals that the economy's significant sectors severely affected by the pandemic are education, aviation, hospitality and tourism, and the financial system. For example, according to Sept & March (2020), the COVID-19 pandemic has caused panic in the education and financial system, resulting in high volatility in several markets. Thus, with e-learning, tertiary institutions in Nigeria can keep and sustain their academic activities online like their counterparts in developed countries.

## III. Theoretical Background and Hypotheses Development

*a) Expectation disconfirmation theory*

The Expectation Disconfirmation Theory (Oliver, 1997), also referred to as the expectancy disconfirmation paradigm (EDP), is described by the previous studies as the dominant customer satisfaction model and is thus appropriate for this study. The theory explains the possible significant effect of teaching quality on students' satisfaction. The theory provides a solid theoretical foundation for the current model's depiction of the relationship between teaching quality and student satisfaction, with moderating role of e-learning. It is common sense that all students derive utility for their money when purchasing a product or service, which applies to teaching services.

There have been limitations to the preceding theories of consumer satisfaction. Thus, Oliver (1997) & Oliver (1980) presented the expectancy-disconfirmation paradigm as the most influential theoretical framework for assessing customer satisfaction. According to the theory, consumers always have some prepurchase expectations about how well products and services will perform. The level of expectation then serves as a yardstick against which the product is assessed. Thus, the outcome is compared to the customer's previous expectations after using the product or service. Confirmation exists when the performance or outcome matches the expectation. In contrast, disconfirmation exists when a mismatch occurs between performance and expectations. A positive or negative discrepancy between expectations and perceptions shows that a consumer is either satisfied or dissatisfied.

The current study reviewed relevant empirical studies and theories that explain the variables under study. Most articles reviewed reported the relationship between teaching quality and students' satisfaction. Moreover, the study pays attention to the current situation in Nigerian tertiary institutions occasioned by the COVID-19 pandemic and the recovery scenario. Similarly, as indicated earlier in the literature review, most studies used the SERVQUAL model to measure teaching quality, like the current study.

*b) Hypotheses development*

i. *Relationship between teaching quality and students' satisfaction*

Academic research has recently focused on teaching quality and student satisfaction. Many

researchers used a single-term scale to operationalize students' satisfaction, while others used multiple-item scales. The relationship between teaching quality and students satisfaction has been studied, and the findings indicate that the two constructs are independent but closely related, meaning that an increase in one is likely to increase the other (Sureshchandar et al., 2002b).

According to Groundwater-Smith & Mockler (2003), the curricular framework must include thorough descriptions of the knowledge, abilities, procedures, and results at each learning stage. Again, the quantity and quality of student interaction should be the primary focus of the educator. According to Guolla (1999), satisfaction evaluates consumer psychology after using a product or service. Thus, students' satisfaction with their learning program is considered a cumulative satisfaction of the entire program of their study. As a dependent variable, students are the institution's valuable clients; their interests and satisfaction must be prioritized.

There are empirical studies that used similar variables as the current study, which lay support to the current study's model and broaden the contributions to education enterprises worldwide. For example, Sun et al. (2016) developed and tested a structural model of satisfaction with university teaching and recommended that universities improve teaching satisfaction levels. Similarly, Astin (1993) claims high-quality interactions between students, their peers, and faculty about intellectually meaningful subjects produce the most productive learning outcomes. Kember (2004) opined that the exploration and assessment of the nature of teaching were teaching quality, and he described teaching quality as the gap between teaching plans and teaching activities as they were carried out.

However, studies also assumed that students with greater learning and satisfaction would have a corresponding greater quality interaction with the instructor and other students (Shea et al., 2001). Teachers can use various instructional strategies, resources, and media to guide student learning and teaching objectives and student characteristics to improve learning effects and learner satisfaction and achieve students' learning objectives (Dewar, 2002). Based on the preceding discussion, the study suggests the following hypothesis:

*H1:* Teaching quality (SERVQUAL) is significantly associated with students' satisfaction

ii. *Moderating role of e-learning between teaching quality and students' satisfaction*

Literature on information systems reveals that user satisfaction is one of the most significant aspects of determining system success (DeLone & McLean, 1992). Several factors, including teacher, student, course, system design, technology, and environmental aspects, affect user satisfaction in an e-learning environment (Arbaugh & Duray, 2002; Hong, 2002; Lewis, 2002; Stokes, 2001; Wang & Bagaka, 2002).

According to Powers & Rossman (1985), student-faculty interaction, peer interaction, and a sense of literary inspiration in both the student and the student's peers strongly influence student satisfaction. Similarly, these aspects of student satisfaction were also revealed in studies of online courses at the graduate and undergraduate levels (Bailie, 2015; Diekelmann & Mendias, 2005). Issues that have to do with timely and useful contact with the teacher, guidelines that are crystal clear regarding the expectations of the course, enrollment support, student assignments and requirements, and data security have all been mentioned by previous research studies on online courses. Consequently, these issues can raise student satisfaction (Choy et al., 2003; Hara & Kling, 1999; Vonderwell & Turner, 2005). The previous areas can be further broken down into those that focus mostly on the delivery and content of programs.

The availability of technology primarily drives student satisfaction with e-learning (Bower & Kamata, 2000). In general, those students are dissatisfied and frustrated while using technology in the course (Bonk & King, 2012; Hara & Kling, 1999). Thus, to successfully complete the course, online students must be conversant with the new technology being used (Belanger & Jordan, 1999). According to studies, e-learning is useful for meeting educational needs, particularly in developing countries, because it improves sustainable teaching quality and student satisfaction (Yekefallah et al., 2021). Similarly, universities and other tertiary institutions used digital media to make student education easier, uninterrupted and sustainable during the COVID-19 pandemic (Prober & Heath, 2012). From the preceding discussion, e-learning can boost the reaching quality and improve students' satisfaction. That suggests the next hypothesis:

*H2:* E-learning moderate the relationship between teaching quality and students' satisfaction

iii. *Research model*

Following the extensive literature reviewed and hypotheses developed, the study conceptualized the proposed model in figure 1. The model shows the relationship between teaching quality (independent variable) and students' satisfaction (dependent variable). Similarly, the model presents e-learning moderating the relationship between teaching quality and students' satisfaction. Furthermore, the SERVQUAL model is adopted to measure teaching quality.

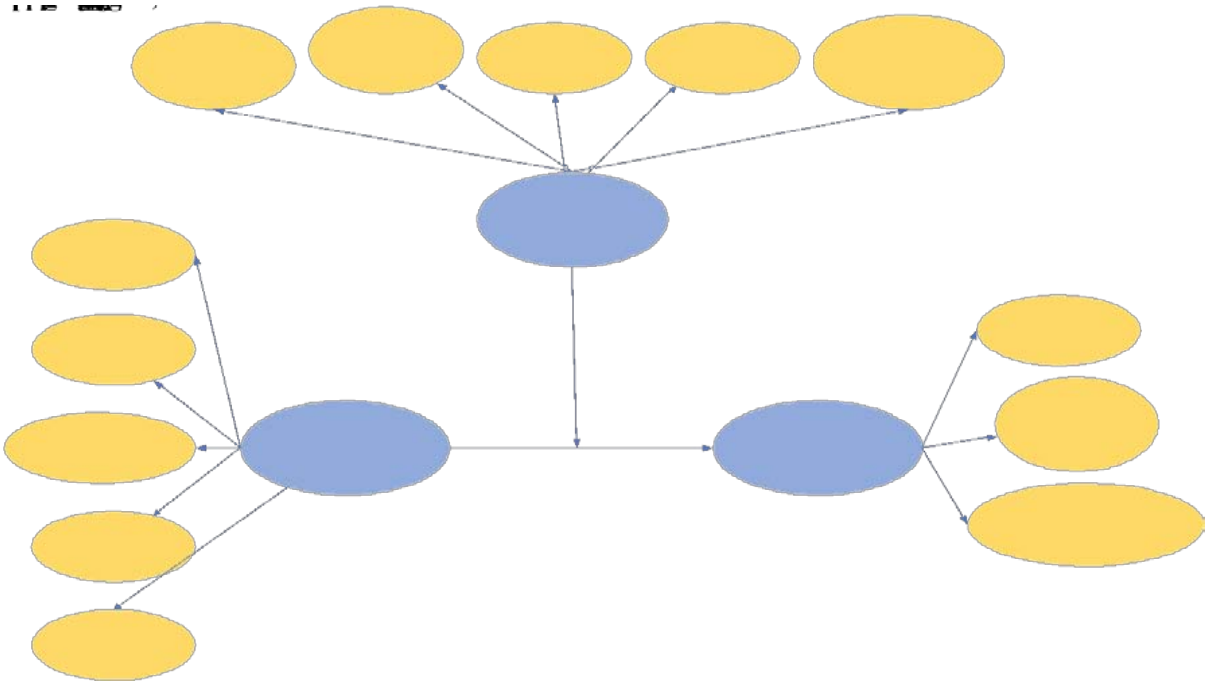

*Figure 1:* Research model

## IV. Methodology

*a) Research design, population, and sampling technique*

The study's main objective is to measure the effect of teaching quality on students' satisfaction with moderating the role of e-learning. The study used a cross-sectional survey design to achieve the study's purpose. Similarly, survey data was collected using a questionnaire adapted from previous studies. The study used final-year students from two tertiary institutions in Kano state. The population for the study is 1,620. Using final-year students became necessary as they were the only students who remained in the institution at the beginning of the industrial action embarked on by the academic staff union of universities (ASUU). The study used Krejcie & Morgan's (1970) scientific table to determine sample size. From the population of 1,620, the sample size is 310.

Additionally, 10% was added to compensate for nonresponse Israel (1992) and improper filling of the instrument, raising the figure to 341. A convenience sampling technique was adopted during the data collection to enable the researchers to collect data from available and willing respondents to participate in the survey (Sekaran, 2003). Responses were recorded on a 05-point Likert scale ranging from strongly agree to strongly disagree. The study received 311 responses, but 32 surveys were eliminated because they were not completed correctly. Therefore, the study had 279 valid responses for further analysis. The response rate represented 82% of the total questionnaire administered, which was adequate for analysis.

*b) Measurement of variables*

The teaching quality (SERVQUAL) measures were adapted from (Parasuraman et al., 1988; Zeithaml et al., 1990), consisting of tangibility (TAN), reliability (REL), responsiveness (RES), assurance (ASSU), and empathy (EMP) represented by four, four, four, five, and five items. The students' satisfaction construct consisted of teaching (TCG), assessment (ASS), and generic skills and learning experience (GSLE) and was measured by six, five, and six items adapted from Fieger (2012). Finally, e-learning consists of content and educational materials (CEM), learning-teaching activities (LTA), feedback and evaluation (FE), flexibility (FXB) and infrastructure, technology and support (ITS). It was measured by five, six, five, six, and six items, each adapted from the study of (FATHI et al., 2011).

## V. Data Analysis and Results

*a) Reliability and Validity*

This section presents the results of Cronbach's Alpha, outer loadings, composite reliability and AVE for evaluating the measurement model. The decision criterion for outer loading is 0.70, which implies that indicators with loadings below 0.70 would be deleted if the deletion could increase the reliability of the constructs (Hair et al., 2017). However, some scholars argued that loadings of 0.4 could also be considered reliable in some cases. As shown in figure 2, the AVE, composite reliability and Cronbach's Alpha values range from 0.531 to 0.969, indicating convergent validity.

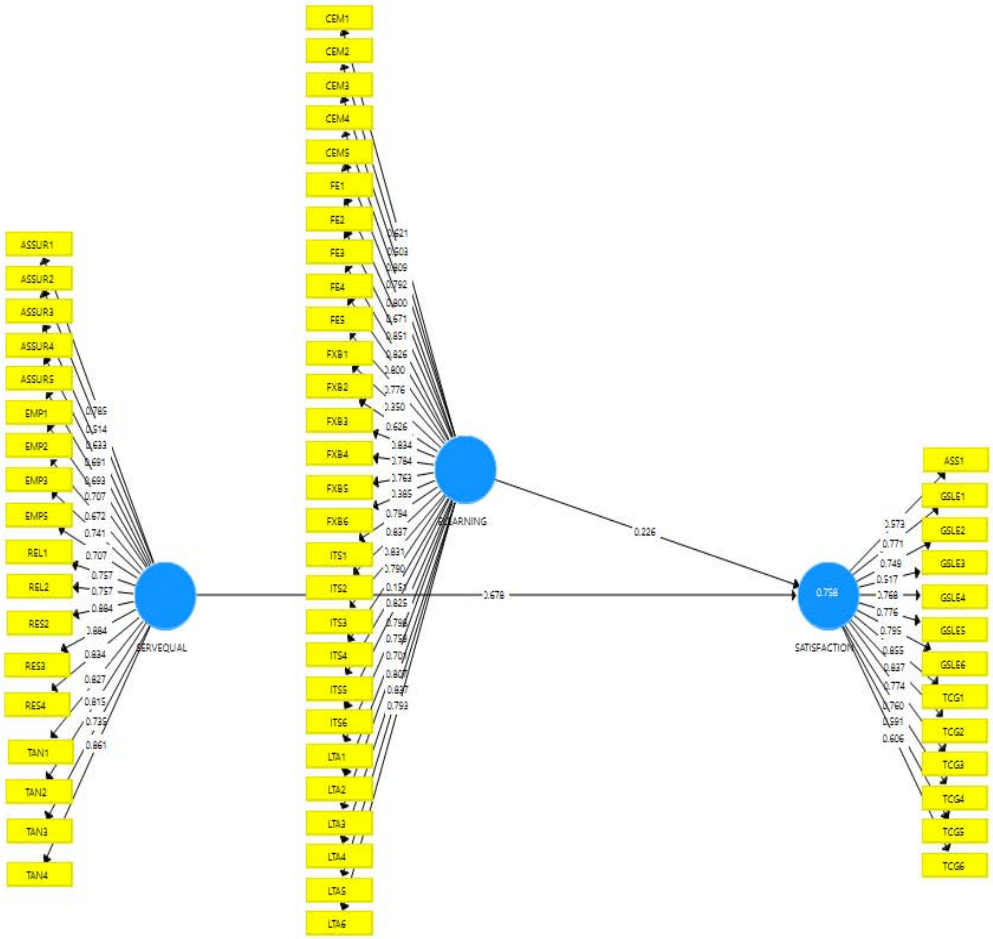


*Figure 2:* Measurement model

Figure 2 shows that two items (REL3 and REL4) from reliability, one item from responsiveness (RES1) and one item from empathy (EMP4) were deleted as dimensions of SERVEQUAL. Similarly, four items from the assessment (ASS2, ASS3, ASS4 and ASS5) were also deleted because their loadings fell below the acceptable threshold to enhance their reliabilities. All other items were retained because their loadings were in line with the minimum threshold. In the same vein, the HTMT criterion and cross-loading were used to assess the discriminant validity.

*Table 1*

| HTMT criterion | E-learning | Satisfaction | Servequal |
|---|---|---|---|
| E-learning | | | |
| Satisfaction | 0.786 | | |
| Servequal | 0.817 | 0.879 | |

*Note: Satisfaction stands for students' satisfaction, while serv-equal stands for teaching quality.*

Table 1 shows the Heterotrait-monotrait (HTMT) ratio for all the latent variables. The HTMT compares the values to a predefined threshold. The HTMT ratio of correlation, according to Henseler et al. (2015), is a superior ratio than the Fornell-Lacker and the cross-loading criterion due to its higher specificity and sensitivity rate. As decision criteria, a value close to 1 indicates a lack of discriminant validity. Thus, some scholars (Gold et al., 2001; Kline, 2011) recommend a threshold of 0.85 and 0.90. For this study, the maximum threshold of 0.90 was used to decide the HTMT. Therefore, the values of 0.879 for this study are below the HTMT0.90 and indicate no multicollinearity among the variables, as Gold et al. (2001) argued.

*b) Structural model evaluation*

This section presents the results of the structural equation model testing the study's hypotheses. The p-value at a 5% level of significance was used to accept or reject the hypotheses, as shown in Table 2.

*Table 2:* Structural model results

| | Original Sample (O) | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values | Decision |
|---|---|---|---|---|---|
| ELEARN-> SAT | 0.248 | 0.070 | 3.515 | 0.000 | Supported |
| QUAL *ELEARN-> SAT | 0.027 | 0.053 | 0.509 | 0.611 | Not Supported |
| QUAL -> SAT | 0.686 | 0.080 | 8.607 | 0.000 | Supported |

*Note: Satisfaction stands for students' satisfaction, while serv-equal stands for teaching quality.*

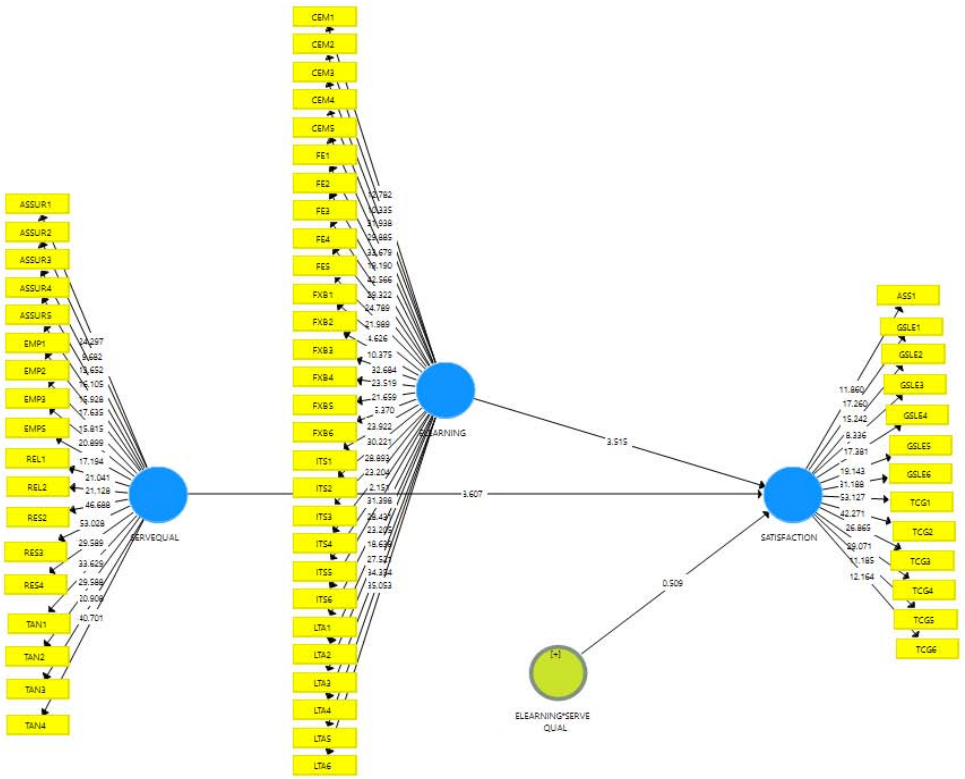


*Figure 3:* Structural model

As shown in both table II and figure 3, the relationship between e-learning and students' satisfaction is positive and significant, with a p-value of 0.000 and a beta value of 0.248. Also, teaching quality was found to have a positive and significant effect on satisfaction, with a p-value of 0.000 and a beta value of 0.686. This finding is consistent with previous findings (Shea et al., 2001; Sureshchandar, Rajendran & Anantharaman, 2002b; Sun, Yang & Jiang, 2016) found a positive and significant association between teaching service quality and students' satisfaction in different contexts. However, e-learning was found to have a positive but insignificant moderating effect on the relationship between teaching service quality and students' satisfaction, with a beta value of 0.027 and a p-value of 0.611. This clearly shows that no sufficient empirical evidence supports the moderating effect. This might be because students generally get dissatisfied or even frustrated using technology in learning, especially if unfamiliar with it, as Bonk & King (2012).

*c) Coefficient of determination*

At this point, assessing the coefficient of determination ($R^2$ value) is also essential. The R-square values of 0.25, 0.50 and 0.75 are considered small, medium and substantial, respectively (Hair et al., 2016; Chin, 1998). In some cases, however, Falk & Miller (1992) suggest that 0.10 could be considered as the minimum acceptable level of $R^2$ value. Table III shows the $R^2$ value of this study.

*Table 3:* Coefficient of determination

| Construct | R-Squared |
|---|---|
| Students' satisfaction | 0.758 |

The R-square value of this study's model, as shown in table 3, is 0.758. This suggests that teaching quality and its interaction with e-learning has explained 75.8% of the variance in students' satisfaction in Nigeria, while other factors not examined in this study explain the rest.

*d) Effect size ($f^2$), VIF and Predictive relevance ($Q^2$)*

The $f^2$ value provides an overview of an exogenous construct's effect on the endogenous latent variable. The values are 0.02, 0.15, and 0.35 for small, medium, and large effect sizes, respectively (Selya et al., 2012). The VIF indicates the absence or presence of multicollinearity.

*Table 4:* Effect size ($f^2$), VIF and Predictive relevance ($Q^2$)

| Constructs | $f^2$ B-Perf | Effect Size | |
|---|---|---|---|
| Servequal | 0.664 | Large | |
| E-learning | 0.074 | Small | |
| **VIF** | | | |
| Servequal | 2.862 | | |
| E-learning | 2.862 | | |
| **Predictive Relevance** | | | |
| Indicator | SSO | SSE | $Q^2$ (=1-SSE/SSO) |
| E-learning | 7812 | 7812 | |
| E-learning*Servequal | 279 | 279 | |
| Satisfaction | 3627 | 2230.49 | 0.385 |
| Servequal | 5022 | 5022 | |

From table 4, SERVQUAL has a large effect, while e-learning has a small effect on students' satisfaction. The VIF for the two constructs indicates no multicollinearity problem, as none has a value greater than 5. The $Q^2$ value, which shows the predictive relevance of the model, is greater than zero, as suggested by Duarte & Raposo (2010).

*e) Importance performance map (IPMA) analysis*

This study further conducted the importance-performance map analysis (IPMA) of the exogenous variables to the dependent variable, and the result is shown in figure 4:

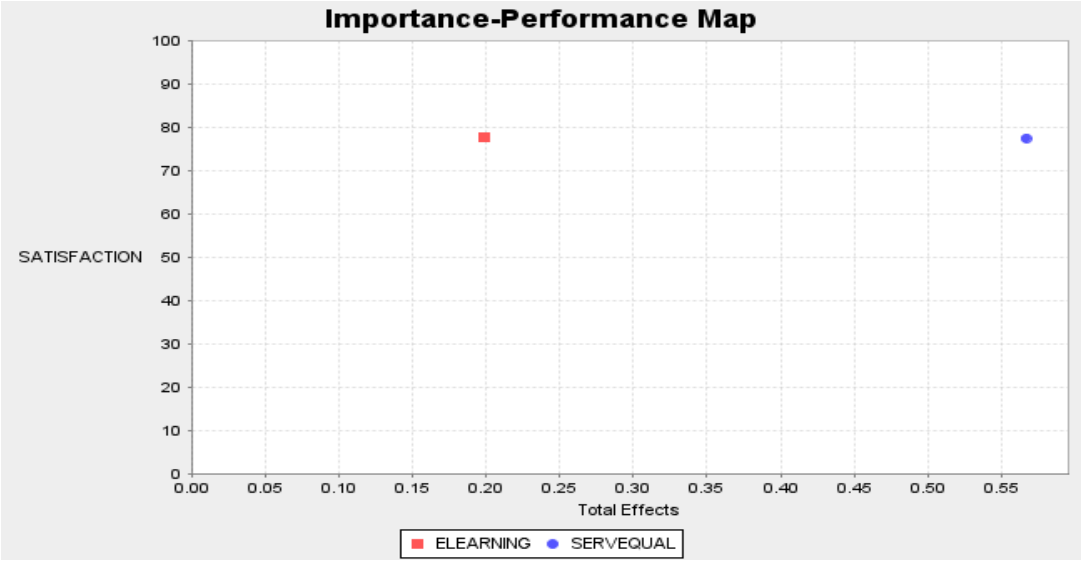


*Figure 4:* IPMA analysis

From figure 4, the red (e-learning) and blue dots (servequal) show higher performance (77.612 and 77.506). However, e-learning has shown lower importance (0.199), while teaching quality has moderate importance (0.566). This suggests that lower priority should be attached to e-learning, but higher attention should be paid to teaching quality towards better improvement of students' satisfaction. It also suggests that for managerial actions, no reasonable investments should be made on e-learning despite its high performance because it would have little impact in improving students' satisfaction.

*f) Implications*

This study aimed to test whether e-learning moderates the relationship between students' perceptions of teaching quality and student satisfaction. It was found that teaching quality is positively related to students' satisfaction. This suggests that teaching quality characterized by teaching effectiveness on the part of teachers, good and effective interaction with students, entertaining students in the classroom, and encouraging students in learning activities could bring students' satisfaction. It also implies that a curriculum designed to contain detailed information and description of processes, knowledge, skills and outcomes at every learning stage facilitates students' satisfaction with the teaching quality. This is in line with Groundwater-Smith & Mockler (2003). Additionally, the findings suggest that instructors must create conducive learning environments to expose students' learning motivation and teach how to learn freely by doing to boost their satisfaction. This research suggests that high-quality teaching is required to achieve high student satisfaction.

Similarly, the study has found that e-learning positively and significantly affects students' satisfaction. The finding indicates that those teachers who embraced the delivery of information via telecommunication technology to educate and train students were able to drive their students' satisfaction upward. However, the increase in satisfaction resulting from e-learning resulted from acquaintance with the technology used by the students. It was also found that those who embraced E-learning could gain the benefits of lower cost and broader access much more than those who did not embrace e-learning. This corroborates previous studies (Choy et al., 2003; Vonderwell & Turner, 2005) on effective e-learning on students' satisfaction.

Furthermore, the results show a positive but insignificant moderating effect of e-learning on the relationship between teaching quality and students' satisfaction. Although the study reveals insufficient empirical evidence to support the moderating effect of e-learning, it shows that e-learning significantly affects students' satisfaction. However, the insignificant moderating effect could be due to students' lack of familiarity with the new technology, which sometimes makes them dissatisfied and frustrated. As previous studies established, familiarity with technology plays a key role in influencing the impact of e-learning on students' satisfaction (Belanger & Jordan, 1999).

Finally, the findings and contributions provide insights and critical practical implications for managers of higher institutions in the country. The current study has provided useful theoretical grounds and practical implications to the growing body of knowledge on students' satisfaction and teaching quality. Furthermore, the study made a significant contribution to practice by confirming the linkage between teaching quality and students' satisfaction via interaction with e-learning. Therefore, the findings provide a fertile ground for policymakers in the education industry to develop new policies that promote effective quality teaching and e-learning in Nigeria's institutions.

## VI. Conclusion and Limitations

The study concludes that teaching quality characterized by effective interaction with students and training them through communication technology contributed significantly to their satisfaction. We conclude that teaching quality is an essential predictor of students' satisfaction regarding learning. Similarly, it is concluded that learning via information and technology tools has facilitated students' satisfaction in institutions of higher learning in Nigeria, especially during the Covid-19 pandemic. However, we conclude that insufficient empirical evidence supports the interaction between teaching quality and e-learning in improving students' satisfaction. The study concludes that lack of familiarity with and limited access to the e-learning technology contributed to the absence of empirical evidence to support the moderating effect of e-learning on the relationship between teaching quality and students' satisfaction.

The study was limited to Kano metropolitan area, which limits the extent to which findings could be generalized, especially to other states and even beyond Nigeria. Thus, future researchers can extend the sample to include additional states or even cover the entire country to give room for generalization. Additionally, the study assessed the effect of teaching quality on students' satisfaction with the moderating effect of e-learning. The dimensions of all the constructs were merged and analyzed collectively in the PLS software. Future studies can replicate the study analyzing the dimensions individually to ascertain their individual effects on the outcome variable.

*Declarations*

Competing interest statement
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