DIGITAL MARKETING

Tanvir Hossain

THE FINAL MASTER'S THESIS

VEIKSNIAI, ĮTAKOJANTYS SUVOKIAMĄ FIZINIŲ IR INTERNETINIŲ ŠVIETIMO PASLAUGŲ PASLAUGŲ KOKYBĘ BEI MOKYMO TIPO PASIRINKIMĄ	*FACTORS' INFLUNCING PERCEIVED SERVICE QUALITY IN PHYSICAL AND ONLINE EDUCATIONAL SERVICES AND LEARNING MODE PREFERENCE*

Student(-s) _____
(signature (-s))

Supervisor _____
(signature)

 Prof. dr. Mangirdas Morkūnas
Name, surname, academic title,
scientific degree of the supervisor

Vilnius, 2026

SUMMARY

VILNIUS UNIVERSITY BUSINESS SCHOOL

FACTORS' INFLUNCING PERCEIVED SERVICE QUALITY IN PHYSICAL AND ONLINE EDUCATIONAL SERVICES AND LEARNING MODE PREFERENCE

Supervisor of MA thesis - Prof. dr. Mangirdas Morkūnas

Thesis writing MA thesis - in 2025, Vilnius.

Scope of MA thesis - 130 pages

Tables in MA thesis - 25 pcs.

Page count in MA thesis -2 pages.

Number of Literature and sources - 120 items.

Summary

The last several years have seen a radical transformation of the higher education sphere due to rapid digitalisation and the use of online and hybrid learning styles, and the COVID-19 epidemic has only intensified it. The expectation of the students in terms of human interaction, as well as the technological infrastructure, has shifted with the educational institutions involving technology in delivering academic services to an increasing rate. Hence, it is now important to understand the impact of aspects on the service quality on the students in terms of their perceptions, confidence, and happiness and their most preferred modes of learning. Despite the abundance of research on the topic of service quality in the educational sector, past studies have largely been on satisfaction as opposed to behavioral consequences such as preferred learning mode. Moreover, the study has largely discussed physical and online learning settings separately and has been very intensive on the traditional SERVQUAL measures. Accordingly, this thesis aims to explore the relationship between human and technological dimensions of service quality with the perceptions of service quality, satisfaction, and trust shown by students on the preference of learning styles.

The theoretical framework of the study is the Stimulus-Organism-Response (S-OR) framework of psychological investigations where the preference of learning modes is considered a form of behavioral response, the psychological responded is considered an

organismic state and the facets of service quality is perceived as a form of stimuli to achieve objectives of the research. To collect data, a systematic survey of questionnaires was administered to students in the institutions of higher learning to fill. Measurement and structural models were evaluated by using partial least squares structural equation modelling (PLS-SEM) that enables investigation of complex interactions, mediation pattern, and latent variables. Although vital elements of quality of service such as, dependability, responsiveness, assurance, empathy, tangibles and technical usability were analyzed, the outcome variables were perceived service quality, trust, contentment and preferred learning style. The findings indicate that the perceptions of the students about the quality of the services provided by the learning institutions are medium and high with human related factors such as empathy, responsiveness and dependability scoring high. It was discovered that technological aspects like the design of websites, usability, and security were significant driving forces, although it might have been the case that online learning experiences also led to increased heterogeneity. Students use the results of the structural model demonstrating that human and technology component of service quality significantly influence the perception of service quality to evaluate the overall quality of the services offered by educational institutions. Moreover, it is also found that the perceived service quality predicts trust that has a significant effect on satisfaction significantly. Their satisfaction in students was identified as the strongest predictor of the preferred learning mode with physical, online, or hybrid learning mode being chosen more based on the overall experience with the services, rather than on its features.

The mediation study also indicates that trust is one of the major aspects of transforming the perception of service quality into satisfaction, though there is no mediation of perceived service quality between service factors and the selection of learning mode. The implication of this finding is that individual convenience, emotional comfort, and trust in institutional institutions is more influential in determining the choice of learning mode than individual technical and instructional quality. In general, by presenting a composite paradigm that combines the human and technical features of the quality of services with psychological and behavioural outcomes, this thesis contributes to the academic study and the teaching practice. Within a more adaptable and digitally motivated educational setting, the results have valuable implications on a higher education institution aiming to

enhance the satisfaction of students, instil trust and promote the selection of learning modes with informed opinions.

SANTRAUKA

VILNIAUS UNIVERSITETO VERSLO MOKYKLA

VEIKSNIAI, ĮTAKOJANTYS SUVOKIAMĄ FIZINIŲ IR INTERNETINIŲ ŠVIETIMO PASLAUGŲ PASLAUGŲ KOKYBĘ BEI MOKYMO TIPO PASIRINKIMĄ

Magistro baigiamojo darbo vadovas - Prof. dr. Mangirdas Morkūnas

Magistro baigiamojo darbo rašymas - 2025 m., Vilnius.

Magistro darbo apimtis - 130 puslapių

Lentelių magistro darbe - 25 vnt.

Puslapių skaičius magistro darbe - 2 puslapiai.

Literatūros ir šaltinių skaičius - 120 pavadinimų.

SANTRAUKA

Per pastaruosius kelerius metus dėl sparčios skaitmeninimo ir internetinių bei hibridinių mokymosi stilių naudojimo aukštojo mokslo sfera radikaliai pasikeitė, o COVID-19 epidemija šią transformaciją tik sustiprino. Studentų lūkesčiai dėl žmogiškosios sąveikos ir technologinės infrastruktūros pasikeitė, švietimo įstaigoms vis dažniau taikant technologijas akademinių paslaugų teikimui. Todėl dabar svarbu suprasti paslaugų kokybės aspektų poveikį studentams, atsižvelgiant į jų suvokimą, pasitikėjimą savimi, laimę ir labiausiai pageidaujamus mokymosi būdus. Nepaisant gausybės tyrimų paslaugų kokybės tema švietimo sektoriuje, ankstesni tyrimai daugiausia buvo skirti pasitenkinimui, o ne elgesio pasekmėms, tokioms kaip pageidaujamas mokymosi būdas. Be to, tyrime daugiausia atskirai aptartos fizinės ir internetinės mokymosi aplinkos ir daug dėmesio skirta tradicinėms SERVQUAL priemonėms. Todėl šio darbo tikslas – ištirti žmogiškųjų ir technologinių paslaugų kokybės aspektų ryšį su studentų paslaugų kokybės suvokimu, pasitenkinimu ir pasitikėjimu dėl pageidaujamų mokymosi stilių.

Tyrimo teorinis pagrindas yra psichologinių tyrimų stimulo-organizmo-atsako (S-O-R) sistema, kurioje mokymosi būdų pasirinkimas laikomas elgesio atsako forma, psichologinis atsakas – organizmo būsena, o paslaugų kokybės aspektai suvokiami kaip stimulai tyrimo tikslams pasiekti. Siekiant surinkti duomenis, aukštųjų mokyklų studentams buvo pateikta sisteminė anketų apklausa. Matavimo ir struktūriniai modeliai

buvo įvertinti naudojant dalinių mažiausių kvadratų struktūrinį lygčių modeliavimą (PLS-SEM), kuris leidžia tirti sudėtingas sąveikas, tarpininkavimo modelius ir latentinius kintamuosius. Nors buvo analizuojami tokie gyvybiškai svarbūs paslaugų kokybės elementai kaip patikimumas, reagavimas, užtikrintumas, empatija, apčiuopiamieji elementai ir techninis pritaikomumas, rezultato kintamieji buvo suvokiama paslaugų kokybė, pasitikėjimas, pasitenkinimas ir pageidaujamas mokymosi stilius. Rezultatai rodo, kad studentų suvokimas apie mokymosi įstaigų teikiamų paslaugų kokybę yra vidutinis ir aukštas, o su žmogiškaisiais veiksniais susiję veiksniai, tokie kaip empatija, reagavimas ir patikimumas, yra aukšti. Nustatyta, kad technologiniai aspektai, tokie kaip svetainių dizainas, patogumas naudoti ir saugumas, buvo reikšmingos varomosios jėgos, nors galėjo būti, kad internetinio mokymosi patirtis taip pat lėmė padidėjusį heterogeniškumą. Studentai, vertindami bendrą švietimo įstaigų siūlomų paslaugų kokybę, naudoja struktūrinio modelio rezultatus, rodančius, kad žmogiškasis ir technologinis paslaugų kokybės komponentas daro didelę įtaką paslaugų kokybės suvokimui. Be to, nustatyta, kad suvokiama paslaugų kokybė lemia pasitikėjimą, kuris daro didelę įtaką pasitenkinimui. Studentų pasitenkinimas buvo įvardytas kaip stipriausias pageidaujamo mokymosi būdo prognozavimo veiksnys, kai fizinis, internetinis ar hibridinis mokymosi būdas buvo pasirinktas labiau remiantis bendra patirtimi su paslaugomis, o ne jų savybėmis.

Tarpininkavimo tyrimas taip pat rodo, kad pasitikėjimas yra vienas iš pagrindinių aspektų, lemiančių paslaugų kokybės suvokimo transformaciją į pasitenkinimą, nors nėra jokio tarpininkavimo tarp paslaugų veiksnių ir mokymosi būdo pasirinkimo tarp suvokiamos paslaugų kokybės. Šio tyrimo išvada yra ta, kad individualus patogumas, emocinis komfortas ir pasitikėjimas institucinėmis institucijomis yra labiau įtakingos mokymosi būdo pasirinkimui nei individuali techninė ir mokymo kokybė. Apskritai, pateikdama sudėtinę paradigmą, kuri apjungia žmogiškuosius ir techninius paslaugų kokybės aspektus su psichologiniais ir elgesio rezultatais, ši disertacija prisideda prie akademinių studijų ir mokymo praktikos. Labiau prisitaikančioje ir skaitmeniniu būdu motyvuotoje švietimo aplinkoje rezultatai turi vertingos reikšmės aukštojo mokslo įstaigai, siekiančiai didinti studentų pasitenkinimą, ugdyti pasitikėjimą ir skatinti mokymosi būdų pasirinkimą remiantis informacija.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AI – Artificial Intelligence

AVE – Average Variance Extracted

COVID-19 – Coronavirus Disease 2019

f^2 – Effect Size

HEI – Higher Education Institution

ICT – Information and Communication Technology

LMS – Learning Management System

MA – Master of Arts

PLS-SEM – Partial Least Squares Structural Equation Modeling

PSQ – Perceived Service Quality

R^2 – Coefficient of Determination

SD – Standard Deviation

SEM – Structural Equation Modeling

SERVQUAL – Service Quality Model

S-O-R – Stimulus–Organism–Response

TAM – Technology Acceptance Model

TQM – Total Quality Management

VIF – Variance Inflation Factor

ρa – Composite Reliability (rho_a)

ρc – Composite Reliability (rho_c)

INTRODUCTION

The model of service quality of learning environments has experienced a shift with the increased digitization of postsecondary education. The attitude of students regarding learning services outside classroom has also changed due to increasing number of online and hybrid learning methods used by colleges. Technology in learning has expanded learning service paradigm by transforming how institutions of learning deliver, structure and evaluate the quality of their teaching. Service quality is no longer confined to the areas of administration and interpersonal services, but now also includes technical timeliness, usability of user interface, information security, and end-to-end digital experiences that influence student happiness and engagement. The alteration requires a more in-depth and extensive knowledge of how the students of the digital age perceive and judge the quality of educational products available. Parasuraman first introduced the SERVQUAL in 1988 as Perceived Service Quality (PSQ) and remains one of the most popular concepts to be used to evaluate service experiences, although Teeroovengadum et al. (2019) explicitly revalidated SERVQUAL in the context of higher education. The five factors identified in the theory include tangibility, assurance, responsiveness, empathy, and dependability, according to which the perceptions of service quality would rely considerably (Teeroovengadum et al., 2019). The aspects should be remapped to make it possible to explore new digital contexts as educational organizations become increasingly dependent on online systems and technology mediated communication. Along with the traditional human connection features such as instructor support and institutional caring, there are other types of features that influenced the quality rating of students such as the system usability, interface, privacy, and data security.

To better represent the extent to which the given factors influence the behavior of the student, the present study relies on the SERVQUAL model and the Stimulus-Organism-Response (S-O-R) model that was initially put forward by Mehrabian and Russell but was later revised by Tang and Hew (2022). This paradigm holds that the stimuli of the wider environment, in this instance, the human and the technological quality of the service, can affect internal psychological indices or organismic states such as perceived service quality and associated trust, which leads to behavioral responses such as satisfaction and preference of a particular learning method. Besides the aspects of service quality,

the nature of integration will allow the study to examine the cognitive and emotional process of the reactions of students. It is possible to study the effects of the trust, subjective satisfaction, and cognitive load on behavioral responses in human-technology interaction in computer learning systems. Scarcely any studies have considered the aforementioned factors all at once and within a similar broad umbrella model, including both the emotional and technological elements of the learning environment, although previous studies have considered online services quality and student satisfaction as two variables without considering them as entities (Seow and Hussain, 2024). Thus, empirical studies are required to identify the influence of psychological intermediate attributes, the variables of service quality, and the ICT skills on their preferences and attitudes towards modern higher education. This research aims to investigate the role of human and technological components of service quality in the perceived service quality and the role of the latter in influencing the behavioral preference, the perception of trust and pleasure of online learning in students. The study will thus strive to develop a single model by synthesizing the processes through which the determinants of service form a base of perceived quality and behavioral responses making use of the SERVQUAL and S-O-R models. It examines the moderating effects of subjective enjoyment and digital literacy, and the mediating effects of perceived cognitive burden and trust. This contribution is useful as it brings emotional and technological aspects to an already established conceptual framework on service excellence. The findings will assist institutions of higher learning in establishing the critical elements of perceived quality, which will enhance service delivery, student satisfaction, and competitiveness of an institution in the ever-digitalized education sector. The findings will provide a clearer picture on the ways in which the education service design can be used to integrate human touch and technical effectiveness to create more adaptable and inclusive environments that can be learning.
The research problem is how different aspects of service quality affect the perceptions of service quality among the students, and how it affects their learning method selection?
The aim of the study is to evaluate the influence of different elements of service quality on the perception of quality of online and traditional learning by the students to reveal if these and the subsequent impact of their perceptions affect the choice of the desired mode of learning.

The research gap

This study aims at bridging an existing clear and significant gap in the literature on service quality in higher education. The COVID-19 pandemic created a precedent in terms of how much educational services can be transitioned to digital platforms, as more people are utilizing online learning (Camilleri, 2021; Murphy, 2020). This transformation provided more liberty, availability, and technological assistance to studying to students besides enabling institutions to maintain scholarly continuity. It, however, also illuminated several downsides particularly on the perspective of the students such as reduced human connection, intermittent service experiences, digital fatigue, varied levels of trust, satisfaction, and personal emotional contact with educational services.

Although this has changed, most studies so far have concentrated on the quality of services offered in either online or physical (face-to-face) learning environments singly. On one hand, the traditional face-to-face research studies are focused on institutional facilities, reliability of instructors, and responsiveness of administration to the change (Teeroovengadum et al., 2019). On the other hand, the quality of websites, system reliability, and technological support are the priorities of the research in online education (Lee and Lin, 2025). This fragmented method inhibits serious comparison and does not reflect the way students evaluate service quality in a more comprehensive way, especially when it involves blended learning or hybrid learning, which now has become more popular with the pandemic.

In addition, the SERVQUAL paradigm that is subject to criticism due to its contextual instability, logic of expectation-perception gap, and its inapplicability to electronically mediated services is an essential element of most of the previous studies (Naylor, 2024; Ilieva and Lukanova, 2025). The wide-ranging application of ad hoc and often unproven SERVQUAL changes in the field of digital and hybrid learning only weakens explanatory power and gives inconsistent results (Yoda, 2025; Teeroovengadum et al., 2019). Due to this fact, there is a common tendency in recent studies to document the beliefs of students but without a comprehensive description of the way in which these perceptions lead to behavior outcomes.

Moreover, a substantial percentage of existing literature overlooks the behavioral implications, such as students' preference to an online learning mode, readiness to switch

between online and face-to-face learning, or sustained behavioral use of professional services over descriptive outcomes such as perceived service quality or satisfaction (Sheng, Fan, and Weng, 2025; Seo and Um, 2023). This limitation is imperative in the present context of higher learning where students are becoming more inclined to pursue online, hybrid and physical learning based on their service experiences.

Also, service quality research in higher education has been poorly theorized concerning high-profile behavioral frameworks such as the Technology Acceptance Model (TAM) or the Stimulus-Organism-Response (S-O-R) model. Consequently, psychological processes such as satisfaction and trust remain ill-conceived as mediating variables that relate to the learning mode preferences of the students and their perception of the quality of service (Ismail, 2022; Jain, Dixit, and Shukla, 2023). This theoretical gap has led to conflicting empirical results concerning the relative importance of technological and human factors of service quality.

Finally, advanced approaches to analysis such as Partial Least Squares Structural Equation Modelling (PLS-SEM) are not extensively applied to service quality research regardless of the complexity of the educational ecosystem. To examine multidimensional dimensions, mediation effects, and causal interactions, most past studies have been based on descriptive or regression-based analysis which are not sufficient (Hair and Alamer, 2022). Consequently, the lack of empirical data explaining the relationship between human and technical service quality factors and the preference of the learning mode, trust, and satisfaction in a post-pandemic environment remains.

Therefore, this research aims at establishing the factors that affect the quality of learning services, online or offline, and whether they tend to change their learning mode preference due to the factors. The author is not aware of any other previous studies that have incorporated online and offline learning materials in a single integrated system. Therefore, this study, having integrated human and technological aspects into an S-O-R model and tested the influence of these two factors on trust, satisfaction, and preference of the learning mode based on the PLS-SEM, is one of the first comprehensive studies to explore the service quality as a unit.

The objectives of the research are-

1.   Based on extensive literature review, to distinguish main human and technological factors determining students' perceptions on service quality

2.   To create a research methodology aimed at revealing the determinants of learning mode selection based on the integration of S-O-R and SERVQUAL frameworks

3.   Based on empirical research results to reveal which determinants are focal in defining students' intentions of learning mode preference.

4.   To formulate conclusions, recommendations, theoretical and managerial implications based on the results of empirical research.

This thesis is broken down into three major chapters. The first chapter introduces the research challenge, the rationale and objective of the research as well as explains the theoretical foundations of the study. Chapter 2 discusses the research design, methods of data collection, and analysis which were applied in the hypothesis testing. The third chapter covers the empirical findings of the study, interpreting them and gives recommendations and conclusions of the findings of the study. These chapters are a combination that is aimed at giving a detailed analysis of perceived service quality and its implications on behavioral effects in remote learning to give a theoretical and practical definition of quality assurance in the present state of higher education.

1. THEORETICAL ANALYSIS OF PREVIOUS STUDIES ON PERCEIVED SERVICE QUALITY IN PHYSICAL AND ONLINE EDUCATIONAL CONTEXTS

1.1: Concept of Perceived Service Quality in Education

Perceived service quality education (PSQ) has received significant interest in the field of educational administration and service marketing. It focused on the belief of the students on whether the learning experience was good or better than what they expected. Although Teeroovengadum et al. (2019), especially represents SERVQUAL in the framework of higher education and incorporates trust and satisfaction, PSQ was originally employed by Parasuraman in the marketing domain to demonstrate how the demands of consumers differed according to their experiences. It has been used in teaching classes as students were the teachers. Both tangible and intangible components include classrooms, labs, libraries, computer infrastructure, intellectual content, administrative efficacy, and student support techniques. All these factors affect perceptions of students on how valuable their education is. Due to the broad spectrum of areas of application of SERVQUAL, it is a common method of measuring PSQ (Roh et al., 2025). This establishes the level of contentment of the people, their duration of stay and the level of understanding of the school.

SERVQUAL considers five variables, namely, the dependability, responsiveness, reassurance, empathy, and tangibility of a service. Reliability in classroom is used to refer to teachers who are always willing to go with the lesson plan, give the feedback within the required time and also teach at the same level. When teachers and other staff are polite, they are also more willing to help pupils with their studies. Empathic teachers help students in the manner that will be most effective to them. A good example of anything tangible is infrastructure, both virtual and physical. The reliability of SERVQUAL in higher education is supported by the studies of Taiwanese schools and Italian colleges, which prove that these factors are the key contributor to the happiness of students (Nikolopoulou, 2022).

There are certain positive sides of SERVQUAL, but it is also characterized by certain severe flaws, especially referring to what students believe and feel. Most individuals feel that quality of higher education depends on the structure and interpersonal relationship within the traditional higher education institution. Based on this

paradigm, the organism is the mental and emotional health of students, institutional service delivery is the stimulus, and the behavioral outcomes such as advocacy, loyalty and persistence are the responses (Qalati et al., 2021). S-O-R model mentions that the customers are not just satisfied with the way a business conducts business. It also involves being emotionally connected, believing in someone, and perceiving that thing are just, and getting weary of the use of technology. It is a better way of learning about PSQ than simply observing it being implemented.

Social facts, cultural norms and technological abilities can influence PSQ. Vietnamese, Indian, and Bangladeshi students are mostly worried about its accessibility, affordability, and coordination as they are students of poor countries (Hai, 2022; Rahman & Nasrin, 2024). Europe and East Asia are more technologically advanced than the rest of the globe in terms of technology. Also, they attach importance to collaborative learning, safe internet pathways, and personalized web assistance (Chen & Chen, 2025).

The results confirm the importance of evaluation of PSQ based on methods that consider the situation. In the modern world, it is difficult to understand PSQ because of the blistering development of digital and blended learning. Most of the population was eager to study on-line because of the COVID-19 pandemic. There are merits and demerits of that. It is faster and more involving but also implies less face-to-face interaction, less efficient learning, and internet fatigue (Qalati et al., 2021). The teachers are engaged when the computer platforms are in proper operation, and the students can obtain guidance and assistance with computer problems, they will be more satisfied with the service. The cross-national data provides that poor areas show that the students have more continuity and access concerns, whereas the students of affluent areas have more concerns related to larger digital infrastructure and individualized support (Jia et al., 2025). PSQ is not a school, it just helps people in employment, mental health services, borrowing of library books and extracurricular activities.

Middle Eastern and Southeast Asian studies demonstrate that the interconnection between academic and non-academic services is high, and the comprehensive institutional enhancements are observed (Ramzi et al., 2022). The numerous aspects of PSQ in schools are academic, administrative, technological, cultural, and psychological just to mention a few. S-O-R models are used to explain the influence of emotions and

their effects on an entire experience, but SERVQUAL offers a framework. The role of technology, culture, and even society in understanding PSQ is relevant. Advanced planning is necessary hence flexible. When students get access to well trained teachers, well integrated systems, supportive services, and modern digital infrastructures, they enjoy better experiences in schools, and they are highly motivated to achieve. This causes high school retention and attendance. This is because such schools offer children subjects that they deem significant to them. Quality of services is defined by the efficiency of the administration, facilities, and teaching in the traditional higher education. You may attend colleges to learn and get help. Students acquire knowledge and grow. This proves the importance of customer perception in the capacity of a company to compete, stay in business and have a good reputation (Roh et al., 2025). Positive individuals are happier and more committed people or organizations are likely to get a job and are rated higher in the world. The primary sources of quality perceptions manifested by people are honesty and certainty. You are reliable when you are always managing, grading, and teaching in the same ways. Sincerity on the part of the educators who do not wing it is an assurance. Sayaf et al. (2022) does state that students in the University of Pavia would not be content unless norms were clearly presented, and classes provided in a conventional way.

Rahman & Nasrin (2024) states that the residents of Punjab believed that the quality was better due to the qualified teachers and fair tests. The quality of a school may be indicated by the age. Taiwanese students were more satisfied when their classroom and laboratory were new, whereas Vietnamese ones were less satisfied when they were older (Hai, 2022). But in the resource-abundant places such as Mauritius, contacts were more valuable than commodities (Teeroovengadum et al., 2019). The service is best when the staff members are friendly and accommodative. Trust is built by effective teachers and administrators who aid students immediately (Dugenio-Nadela et al., 2023). Educators, who care about their students, create loyalty and emotional bonds (Guo et al., 2024).

Most individuals feel that quality of higher education depends on the structure and interpersonal relationship within the traditional higher education institution. The more one does not have something, the more valuable it becomes. The more complicated the situation is, the more important it is to be nice, accommodating, and responsive.

Instructing kids to invest in infrastructure and connectivity will help them to get the best experience possible.

1.2: Historical Factors of Perceived Service Quality

Service quality perceptions of customers are developed based on one bunch of concepts and factors. It has been established that both physical and non-physical aspects influence the quality of educational services. The inputs are the SERVQUAL dimensions, namely, tangibles, assurance, responsiveness, empathy, and reliability. The S-O-R paradigm has behavioral outcomes, including satisfaction, loyalty, and mode preference, in the reaction stage and cognitive and emotional evaluation of the students (organism) in the perceived service quality.

1.2.1: SERVQUAL Dimensions as Determinants

Parasuraman, along with his co-workers, developed SERVQUAL model in 1988. It was modified by Teeroovengadum et al. (2019) to incorporate the quality of higher education services, student satisfaction, and loyalty. It has since become one of the most popular means of measuring the quality of the services in all fields, education included (Granic, 2022). The quality of the educational services is determined by five dimensions of the perceived nature by the pupils; tangibles, certainty, responsiveness, empathy, and dependability. The three dimensions of the SERVQUAL conceptual framework address both the relational and the functional components of service delivery, rendering it a generic tool towards understanding the perceptions of students in different learning contexts.

Reliability is probably the primary factor since it incorporates consistency and reliability in the provision of education. Reliability in higher education can be described as the case where instructors were timely in the classes that they conducted, timely feedback was given, and continuous assessment procedures were continuously monitored. The academic literature has highlighted the role of trust and integrity in influencing perceptions of academic dishonor, integrity and credibility of the scholar. Scholars at the University of Pavia in Italy found out that due to experience of instructors and the chance to interact with them, students believed the services to be superior (Elshami et al., 2021).

In Pakistan, Punjab, the perceived service quality attributes of best competence among the teaching staff and their unbiased marking were the strongest (Ajmal, Islam, & Islam, 2023). These results show that the primary aspects that enhance the learning experience of students are their honesty and integrity. Physical facilities such as labs, classrooms and computer facilities are still much sought after in the face of resource constraints. Taiwanese statistics show that the quality of school buildings and campus facilities directly affect the perceptions of the students on the quality of education (Han & Sa, 2022). Conversely, a study carried out in Vietnam showed that students were not happy when provided with outdated learning resources and facilities (Hai, 2022). These examples depict how real resources play a significant role in defining perceptions within developing or resource-poor systems. Conversely, in developed education where the infrastructures are standardized, learners have more interests in relational and emotional issues such as empathy and personalized attention (Teeroovengadum et al., 2019).

It is proven that empathy of the staff and faculty as the ability to give personal attention and care to each employee and student enhances motivation of students and leads to emotional connections with them. As the study held in Pakistan and the Philippines shows, students are happier and more loyal to the institution if it can deliver on the expectations and establish a good relationship between students and teachers (Dugenio-Nadela et al., 2023). The findings affirm that empathy has an effect drivers and predictors of long-term institutional membership.

The SERVQUAL outcome demonstrates that the quality of the services provided by the higher education depends on the individual as well as the environment. In rich infrastructure system, trust and compassion are more essential than visible, touchable, and dependable things. In systems that have poor infrastructure, reliability and touchable and visible items gain greater importance. This paradox emphasizes the importance of customizing strategies of service quality to institutional and cultural settings, to optimize the student pleasure, trust, and loyalty.

1.2.2: Integration with the S-O-R Model

The SERVQUAL tool is designed to help you evaluate the quality of service in five categories namely, tangibles, assurance, responsiveness, empathy, and dependability. Despite its efficiency in identifying the functional elements of the service, it does not take

into consideration the cognitive mechanisms that are employed by students to learn and respond to such experiences. Mehrabian and Russell developed the Stimulus-Organism-Response (S-O-R) paradigm, which are applied in schools to enable the same (Zhai, Wang, and Ghani, 2023). This observation can be used to prove that SERVQUAL dimensions are triggering factors in this context, and the stimulus would be considered as offering quality service, and responses would consist of behavioral intentions, loyalty, or satisfaction. This combination is evidenced. Although Seo and Um (2023) paid more attention to perceived quality as compared to other factors in blended learning, Busquets saw that it resulted in pleasure and loyalty in e-learning. Reliability and trust provide satisfaction and loyalty in offline, whereas the responsiveness of websites and platform functionality are driving powers and predisposing factors to trust and intent to interact in online settings (Sumi & Kabir, 2021; Sureshchandar, 2023).

The S-O-R is also concerned with the problems of relationships and feelings. As one example, empathy and personalization will boost client loyalty and make them feel valued and content (Dugenio-Nadela et al., 2023). Some of them such as happiness, trust, and digital fatigue are yet to be quantified (Banerjee et al., 2024). When defining the importance of the relational and physical aspects, the cultural factors are considered as well (Hai, 2022). At this point, you would observe that, aside SERVQUAL, S-O-R, the way services are provided can also affect how people feel and behave. That is how the traditional and distant learning institutions are rated in terms of quality.

1.2.3: Critical Reflection on Factors and Theoretical Relevance

The quality of educational services requires the assessment of a comprehensive model that will consider the complex relationships between teaching, learning, and student satisfaction. Stimulus-Organism-Response (S-O-R) paradigm and SERVQUAL are two most famous models which give effective but time-consuming results. The combination of them is useful, yet to be able to convey the particularity of higher education in its entirety, each model will have to be adapted to the context. Nevertheless, most European institutions pay significant attention to academic trust and belief where credibility, openness, and excellent academic support take the first position in the list of factors that help students become satisfied and confident in studying (Malhotra et al., 2023). The use of SERVQUAL needs to be applied in its business context instead of being directly

applied. The SERVQUAL model was not originally designed to be used in socially anchored and development-oriented services such as education; on the contrary, it was developed to quantify business services (Ali, Saleem, & Ahmad, 2025). Although universally applicable, the five columns assurance, responsiveness, empathy, tangibles, and reliability are rather differently interpreted in terms of context. As an example, such tangibles as classrooms, infrastructure, and internet facilities are significant, particularly in countries with a low number of resources, such as Punjab or Vietnam, where the experience of students is strongly affected by their real environment (Hai, 2022). In Europe, universities tend to be more concerned with the issues of academic trust and confidence, particularly the issues of satisfaction that help students to have positive and positive attitudes towards learning (Ismail & Heydarnejad, 2023). SERVQUAL should be applied in its business context instead of being applied directly. SERVQUAL provides the S-O-R model with a cognitive aspect. According to the S-O-R model, the service quality (stimuli) affects emotions and perception of students (organism) and subsequently changes the behavioural responses such as retention, loyalty, or satisfaction (responses) (Seo and Um, 2023). This three-factor model simplifies the process of comprehending the student use and response to educational offering. It is widely accepted that the features of a living being, including faith, self-sufficiency, or even health, cannot be quantified, especially regarding the provision of this type of services (Chen & Chen, 2025).

Due to the dissimilarity in the environments and cultures, the utilization of objects is difficult. As an example, Asian students will be more infrastructure and cost-oriented because their social and economic issues are more significant, and Western students will be more networking, teamwork, and self-development oriented (Ramzi et al., 2022). This indicates that SERVQUAL and S-O-R need to be adopted and not always used as they are both contextual and culturally sensitive. The contemporary global trends and the technological developments also challenge traditional assumptions regarding the quality of the services. In response to the COVID-19 pandemic, higher education was forced to make some changes concerning the quality of online education, online learning, and mental health counselling of students.

Similarly, artificial intelligence-learning transformed the original structure of SERVQUAL to provide flexibility, digital trust, and personalized learning channels (Singh et al., 2023). The current generation of students is obsessive with courses, which embrace flexibility, innovative thinking, the ability to solve international issues, as opposed to possessing a well-known professor. With everything said and done, SERVQUAL and S-O-R remain the most effective models in assessing the services of education. However, they also need to be revised to accommodate the latest occurrences. They are forced to change by increased cultural diversity, psychological sophistication, and technical sophistication. Consequently, these models can be used to represent the status quo of multigenetic education effectively and enable the evaluation of the quality of services to remain in line with the changing international demands.

1.3: Service Quality in Online and Distance Education

The quality-of-service perspective is disrupted by the COVID-19 pandemic and the increasing rate of digitalization in the academic environment. Tangibility, dependability, responsiveness, assurance, and empathy that can be found in the old approaches like SERVQUAL can still be applied, but they should be taken into consideration in the framework of online and remote learning. The current quality of service provided must involve technological, human, and psychological aspects such as the Stimulus-Organism-Response (S-O-R) theory proposes the influence of service exterior stimuli on the inner perceptions and behavioral reactions of learners (Qalati et al., 2021).

The dimensions of SERVQUAL are stimuli that create emotive and cognitive judgements of the learners in this integrated environment. The days, tangibles come with usability, texture and appearance, and site accessibility; Assurance is organizational confidence in their information security and system reliability; responsiveness is instructional communication ability and technical support; empathy is the ability of the instructors to customize the web learning with care and one-on-one communication; and reliability is steady performance to expectations, prompt feedback and systems reliability. All of them are related to the development of students' Perceived Service Quality (PSQ), a cognitive-emotional indicator of the learning.

This argument is justified by studies which indicate that the attributes influence the happiness and interest of students. Besides, Shela et al. (2023) asserted that PSQ is founded on well-organized digital infrastructures and structured resources, and Stribbell and Duangekanong (2022) emphasized that the confidence of students in e-learning depends on the favorable learning conditions and the delivery of prompt and positive feedback during the studying process.

The implications of these results include that effective e-learning is more of an interaction between the human and technological factors in the creation of the student experience than electronic technology. The S-O-R theory states that the internal organismic states of the students of affective interest, cognitive effort, and a sense of mastery serve as a mediator between the inputs of the internal organismic state and their reactions, which are mode selection, loyalty, and satisfaction. Emotive fulfilment is caused by the human factors of empathy and responsiveness, and the perceived delight is caused by the technological factors of usability and data security. Empirical studies by Selwyn et al. (2023) and Halaweh and Salameh (2023) have demonstrated that properly designed, interactive, and supportive online learning classes generate pleasant psychological results and are rewarding and enduring. Sensitive instruction or ineffective process imposes cognitive load and affective exhaustion and decreases motivation (Banerjee et al., 2024). The new conceptualization of online service quality claims that it is an integrative construction that is driven by both technological and human inputs and is limited by synergy.

Ease, understanding in the educational environment, and protocols reduce the dissatisfaction with digital devices and promote trust. Moreover, the theories of psychological pleasure, trust and enjoyment state that the factors play a role in making learners perceive and respond to learning services. Seo & Um (2023) suggests that affective engagement is as powerful as functional efficacy and trust, and enjoyment are powerful commitment and satisfaction enhancers of hybrid learning. Finally, the level of e-learning and distant learning services is no longer determined by the level of technical or pedagogical skills. It is a complex, full-fledged notion embracing psychological comfort, social awareness, and technological effectiveness. When the computer hardware, instructor behavior, and affective experience are combined to create a learning

environment that enhances self-confidence, trust, and continued motivation, then effective remote learning will be achieved (Jia et al., 2025).

1.4: Factors Influencing Perceived Service Quality

The human factors term is used to refer to the interpersonal and educational factors which are offered in the form of instruction, student interaction and administrative facilitation. It happens to be the case especially in both the real and virtual classroom.

1.4.1: Reliability

Service quality also includes reliability as a part as it leads to confidence. Higher education students trust that the institutions will provide the academic and administrative services that they promise at a regular and reliable time. Specifically, credibility is achieved when institutions in higher education ensure consistency and reliability in provision of services, including communications, assessment, and course materials, and the delivery of these elements is done in a timely manner and in the manner that is agreed upon. Reliability in service operations is one of the largest impacts of TQM techniques as it is necessary in forming an opinion of the students about the legitimacy of an institution and its overall level of satisfaction (Rahman & Nasrin, 2024). Colleges and universities that demonstrate reliability in the academic-operational features of their services provide some stability as well as consistency, overall trust, and trust over a long-term duration.

Reliability enhances institutional trust where students have dependence on the institution (Hai, 2022; Ali, Saleem, & Ahmad, 2025). Such trust is necessary in every educational environment, but it is specially needed in the physical education environment where a professional atmosphere is created through a reliable teacher presence, timely, well-organized presentation, and professionally designed teaching and administration services. On the contrary, incompetent scheduling, tardiness of feedback and marking are instances of unreliability that are comparable and can most probably influence the quality and satisfaction.

Romanovska and Novak (2024) indicate that online PSQ is defined based on the functionality of the system, the stability of the platform, the accessibility of the platform, as well as the delivery of content. In the event when learning management systems (LMS)

are working correctly, course materials are hard to access, and timely technical support is provided, students assess virtual education positively. Dependability on technology was essential to the allies due to the absence of the traditional ways of education. Conversely, failure to have effective systems may be considered as a technological failure or a mistake and not an institutional failure.

The relevance of reliability in the research is also congruent with the S-O-R paradigm. Reliability is a stimulus to access a definite internal assessment (organism) and ultimately, determining a specific mode of study as a behavioral outcome (response). There will always be negative feelings in the case of the absence of intricacy either in the real world or in the online one. The implication of the distinction between responsiveness, certainty, and dependability on the grade is implicated. To ensure the institutional credibility and the establishment of a positive attitude towards the student, the ground established during the post-pandemic will be reliable and will also play a crucial role, both physically and virtually (Qing et al., 2023).

1.4.2: Responsiveness

Service quality includes the readiness and timely disposition of teachers and administrative personnel of the institution to help students and take care of their needs. The scope of responsiveness in a higher education involves communication, problem solving exercises and even fulfilling teacher-student interaction. As Latif et al. (2021) suggest, the role of an educator in online learning and the quality of response is vital in the quest to attain sustained quality assurance. The reason is that the perceptions of the students on the effectiveness of an institution are determined by prompt feedback and the prompt solution of technical and academic inquiries. Provided the help is offered on time and with the right zeal, then institutions will most likely be viewed as truly interested in the activities of the students. The traditional concept of responsiveness, grounded on social systems and interaction, relates to the fact that people converse and find a solution to a problem within the physical learning context. Hai (2022) and Ali, Saleem, and Ahmad (2025) show how the willingness of the staff members to predict the needs and resolve the issues contributes to the trust and satisfaction of the students with the school. The most reacting or supportive physical learning environment is through social systems of

interaction. The social setting benefited the most on the level of perceived services in this instance. The major response of digital education is technology. According to Kobra (n.d.), responsiveness in e-learning environments in the form of automated support systems, virtual office hours, and instant messaging had a major influence on student happiness and loyalty. The fact that online systems could quickly give feedback on the learning activities helped the students in their educational activities to feel less apathetic towards the institution and compensate for their absence of face-to-face learning. Similarly, Herrera et al. (2018) assert that the instructions of instructors in asynchronous classes enhance the perceptions of students to the quality of their services and reduce their feelings of loneliness.

The S-O-R theory considers responsiveness to be an event that may stimulate the learner (organism) to respond positively, or induce affect, which may be engagement, motivation, and support in the immediate learning environment. One of the associated behaviors that the motivated response will provoke includes the choice of learning mode (out of the possible educational modalities) which best meets the expectation of timely communication. This reactive behavior has developed to encompass the ability of the institution to adapt its communication strategies within a fast and seamless manner to meet various learning modalities within the hybrid learning context (Adera, 2025).

1.4.3: Assurance

The extent to which students trust and put their faith in learning institutions is referred to as assurance, and is anchored on the ethical behavior, competence, and credibility of the staff. It consists of academic and psychological safety that are the elements of students' trust in an institution, the ability of the school to deliver high-quality education, and psychological integrity. Almaiah et al. (2023) argues that trust and satisfaction are increased by confidence. When students believe the institution to be reliable and professional, chances of demonstrated effective and behavioral commitment are high. This argues with the background of service quality; assurance is involved in the quality of services and trust as well as reputation of the institution.

In absence of more abstract wording, the confidence of face-to-face teaching is built by tangible signs such as congruence in academic communication, equitable assessments and grading, and competence of teacher. It is interesting to note that assurance is pegged

into the governance structures of the students and on the institutional transparency because assurance is a significant element of psychological trust that precedes quality and satisfaction (Seitova, 2024). The S-O-R theory considers responsiveness to be an event that may stimulate the learner (organism) to respond positively, or induce affect, which may be engagement, motivation, and support in the immediate learning environment.

Nevertheless, online learning is more likely to be trusted when the system has dependability, the algorithm is transparent, and the use of digital resources is responsible. Sukhera and Poleksic (2021) state that the views of students regarding fairness and ethical treatment are conditioned by automated assessment tools and other resources with AI. Similarly, Er et al. (2025) have observed that different students have different confidence and assurance systems, such as comparing instructor and AI-generated feedback, which proves that the trust and digital systems of education make a considerable contribution to the quality of the system. Information assurance and risk perception are mental constructs which are however, also framed to be within the system assurance design. Confidence in the online setting is equivalent to a decrease in uncertainty and an augmentation of manageability over the elements influencing the satisfaction quality perceived (PSQ). The students tend to show institutional trust in case teachers are competent, likable, and demonstrate psychological safety as well as trust, which are all the necessary elements of the organism stage of the S-O-R paradigm. In turn, the organism is given a commitment by a response. The teacher creates emotional contact with the student in a blended learning setting and decreases the application of technology as a control mechanism. The increasing dependency of higher education on technology affects the perception of quality of service by ensuring that there is a transition of the assurance process through the smooth introduction of assurance via ethical use of technology in assessment and logical trust (Shukla, 2022).

1.4.4: Empathy

Regarding the quality of services provided, empathy is a term that denotes the quality of school in terms of providing individualized support, emotional support, and personal attention to the pupils. It incorporates the humanistic and emotional elements of the service provision and how the organization recognizes and addresses the needs,

challenges and expectations of each client in a unique way. Dugenio-Nadela et al. (2023) claim that empathy has the most significant association with student satisfaction in tertiary education and ratings of service quality when teachers are anxious about the educational experiences of their students. Jafarkhani et al. (2024) enhances the emotional inclusion and involvement of students and invites the input of emotionally supportive and empathic interaction in the context of different cultures and languages. The physically educational contexts cover the emotional contexts, expression of emotional support, the instructor student interaction, and the educational assistance context.

Ali, Saleem, and Ahmad (2025) also found that young people respond to emotionally supportive and gender-sensitive learning environments and the emotional connection aspect is notable because the quality of perception at the institution is significant. Also, empathy leads to satisfaction, which encourages engagement and assists students to accept the emotionally supportive facets of community learning in the institution.

As Ajmal et al. (2024) observe, distance learning is challenging especially without face-to-face, real-life interaction concerning empathy. Perceived service quality (PSQ) is usually achieved when organizations are involved with empathetic digital experiences, including personalized emails, virtual consultations, and tailored feedback. Isolation of students may be solved by online teachers who offer adaptive tools and react emotionally to students. The feedback systems offered by AI adaptive technology send sympathetic feedback and respond as a considerate instructor (Er et al., 2025).

Based on S-O-R model, empathy influences and guides the selection of learning modality and behavioral satisfaction among students. The lack of empathy, particularly in non-interaction with a human, reduces PSQ and makes students disengage in the distance learning environment. Hence, the concept of empathy, in this case, a human instructor and AI technologies, must be included to achieve excellence in remote/hybrid learning settings. Empathy as an element in learning is another approach that would transform learning into an act of service excellence by improving relational engagement and the process of learning (Grace et al., 2021).

1.4.5: Tangibles/Website Design

Examples of tangibles include facilities, technology infrastructure and the aesthetic packaging of the instructional materials, i.e., things that can be touched and seen under

quality services. Based on the S-O-R paradigm, institutional assurance is a stimulant as it generates a feeling of security by courteously identifying with a body that creates reliability and trust. Educational spaces are purposely designed. There are certain implications that dictate the boundaries of the resource arrangement and flow of any educational service. Well-organized and coordinated tangible factors, including the design of the campus infrastructure and the learning environment, according to Dangaiso et al. (2022) have said that the predictability of comfort and effectiveness of learning was determined by the quality of design indicators. As Lin and J. suggest, traditional educational setting has the most significant influence on qualitative sensorial judgements of students on the quality of educational services.

The tangibles applied in the context of learning over the net extend beyond the use of physical space. This would include the usability, visual design as well as the inter-activeness of the online learning materials. Margolis et al. (2022) found that interactive tools and user interfaces that are appealing to the eyes are associated with the engagement and cognitive retention of students. To achieve experience of manufacturing learning and being immersed in it, a digital platform, where there is a planned order and organized resources, can substitute the actual classroom. Similarly, the perceived quality of the services was observed to be influenced by the planned digital platform being easy to navigate and visually coherent (Sumi & Kabir, 2021). The terms professionalism, serve quality, and integration of design of the provided platform demonstrate the professionalism of the organization and the employees.

The tangibles are symbolic: they show that the institution is committed to the process of modernization and excellence. As an example, Chen and Chen (2025) show that the inclusion of advanced multimedia tools in blended learning positively impacts the perceptions of students regarding innovation and engagement. The physical elements of impressions of quality in the students comprise physical (campus infrastructure) and digital (online interface) elements as education becomes more of a hybrid.

The S-O-R structure claims that tangibles are beneficial in the organizational stage, which is the cognitive evaluation of the way in which the environment influences the learning process. The responses of the students towards specific teaching methods are considered. Similarly, Ali, Saleem, and Ahmad (2025) discovered that trust, which is a

good sign of confidence relating to the use of modern learning tools and facilities in excellent conditions, is a requisite of trust in the overall quality of services delivered by an institution. The physical room layout is important to make the instructional modes visually attractive. Even the virtual teaching-learning process is greatly influenced in the design and aesthetic experience.

1.4.6: Usability/Ease of Use

The most common aspect that defines the quality of educational services is usability, which is described as the simplicity, ease of use, and efficiency of educational technology, especially in the background of digital and blended learning environments. It captures details on the system structure, the cognitive load on the learner and the interface and content clarity and instructiveness. Following the intensive use of online and blended learning as the educational system, usability no longer remains a mere technological consider ability but a central pedagogical one, which determines the involvement of students and their satisfaction.

The increased usability leads to more direct and efficient satisfaction as it is not complicated by barriers, which Sumi & Kabir (2021) describe as seamless interaction, intractability, and involvement. In their studies on e-learning services, students who engage in teaching-learning activities, assimilate and stream teaching and learning facts and can interact with teachers' online feel that the educational systems are effective. The latter is in line with the results of Halaweh and Salameh (2023), who discovered that efficient navigation, a low rate of system errors, and regularity of design requirements positively influenced cognitive experiences of the students, which, consequently, enhanced perceived service quality (PSQ). The perceived interaction and interface of the inconspicuous systems is improved using technology that has fewer operations phases, which affect the confidence and enjoyment. Being a stimulus, usability initiates an evaluation process (cognitive organism) during which the students determine the presence of an educational goal to be achieved in the learning environment or a hindrance.

Very utilizable environment will mean reduced cognitive load, and this will be positively related to motivation and satisfaction as they perceive the environment to be helpful, and it will improve learning. On the other hand, stress and confusing situations will enhance

indifference, frustration, and mental immobility. This reduces the PSQ and points to poor responses, including preference of face-to-face teaching over the digital complexities.

The scope of usability of educational technology has grown with more recent advancements as a range of simple navigation to interactive and responsive ones. As one example, Er et al. (2025) describe the real-time personalized feedback augmentation by feedback mechanisms controlled partially by artificial intelligence as a usability learning indicator, the way the improvements dramatically increase efficiency. On the same note, like other publications (TIME, 2024).

The ease of the application of the generative AI technology in academic works remains a key aspect in the establishment of confidence in the online system. Thus, a safe, workable system or environment that is emotionally, psychologically, and cognitively satisfying.

1.4.7: Security and Privacy

Security and privacy are two components of technology that go hand in hand and determine the levels of comfort and trust that the students feel when using educational technologies. With the increase in online learning, the education community is adopting technologies that require personal information collection, installing authentication systems, and cloud storage. Students are also becoming more sensitive to the management of their data when assessing the quality of a technology-based educational program. Although the concepts of privacy and transparency by institutions are related to the user control of personal data and the visibility of the institution on data practices, security is the capacity to avoid unauthorized persons accessing and using the data. Privacy and security will affect how users perceive security which is vital to their enjoyable experience in an online learning setting as well as trust.

Ramzi et al. (2022) reports that the inclusion of security knowledge is associated with a better perception of the value of online learning platforms by the students. Institutional confidence is also respected by the students as soon as the personal history of the students is considered. Ismailova and Inal (2018) state that when student privacy information has not been violated, privacy trust is also perceived in a positive manner. This implies that the level of trust that students have their information that would not be abused is linked with the evaluation of the quality of service. These instances reveal that

although the technological aspects of the educational systems are very beneficial, the ethical systems regarding the scope of digital trust are equally essential.

The balance between security, privacy, and the application of advanced AI in education raises a few issues. Learners assess artificial intelligence-based feedback panel systems. They particularly look at whether the systems producing AI feedback are equitable, safe, trusting, and open and whether it has an educational value (Er et al., 2025). The apparent lack of trust in the educational AI systems is caused by a lack of clarity in communication and instructions on how the systems manage and store data. On the other hand, trust will be created through a clear understanding of systems and open communication of control and results of AI. This positive perception will be associated with institutional responsibility.

The S-O-R architecture regards the security and privacy policies of an organization as a perceived stimulus that triggers internal response (organism) such as a feeling of control and trust that leads to behavioral response such as loyalty and mode choice. The security available by organizations helps in reducing the levels of concern and offering fulfilment, which motivates individuals to continue utilizing online services. But vulnerability of data is looked upon with suspicion and fear, and this creates a lack of involvement and intent to attend the classes personally when there are no perceived threats of data exposure.

The analyses of empirical literature also favor the mediating role of the perceived control in the said paradigm. Ramzi et al. (2022) also note that students who stated that they were satisfied with the quality of services they received were those whose expectations were met during the provision of the services, and the control of the process was preserved due to the privacy and security settings. It conforms to the conceptual framework of the current study, which assumes that perceived control mediates the linkage between the relationship between PSQ and technical elements. The balance in the ethical and technological nature of data control should exist as the educational sector evolves to be more technologically advanced. Institutions that protect their systems and provide clear governance tools (such as privacy regulations) will improve their opinions of the quality of services and instill confidence in online and hybrid learning in students (Chen & Chen, 2025).

1.5: Trust as a Contributory Factor in Diverse Scenarios of Digital Learning

Trust is a mediator in the integrated SERVQUAL-S-O-R-TAM paradigm that interjects people and technology in qualities of service and outcome behaviors such as satisfaction, loyalty, and the resulting interaction. Developing confidence in the institution by a student is a psychological and emotional feature of remote education that reduces the level of uncertainty and raises the level of trust in the reliability of the institution. To be regarded as trustworthy, a system should operate in both cognitive and emotional pillars of confidence which positively prioritize pillars of security, justice, and transparency.

Therefore, in the S-O-R model, the Assurance scale of SERVQUAL, and the similar concept of perceived safety and usefulness in the Technology Acceptance Model (TAM), trust is the internal affect response (Er et al., 2025). To keep trust in a system, there is a need to balance between technical progress and human capabilities. The trust of the students is grounded by the key principles of security and transparency and institutional legitimacy. It has been proven using empirical evidence that credible digital services, timely administrative services, and effective data security measures enable institutions to be legitimate in-service level and credibility assessments (Chiou & Lee, 2023). Nevertheless, technical failures, information loss, or even the slow response by the staff suppresses trust, frustration, and emotive alienation causing the lack of satisfaction and belonging among the students (Er et al., 2025).

The COVID-19 pandemic gave heartbreaking examples of the significance of institutional trust in the digital age. The ability to retain students as satisfied and reliable was achievable particularly when students in schools effectively put learning management systems into practice accompanied by equitable assessment procedures and authentic communication principles. On the other hand, organizations that were poorly equipped in terms of infrastructure and lacked organizational responsiveness were forced to cope with dissatisfaction, confusion, and disappointments among students. The latter situations, as well as student unhappiness, were described by Seitova (2024) as systems, which resulted in higher levels of stress and lower student engagement due to the unbalanced system of online evaluation, coupled with poor communication systems. This leads to the discovery that trust is dynamic, transient, in the way that it is constantly being created and maintained by good quality contact, reliability of technology and institutional behavior.

The mediating construct is trust which converts perceived service quality into emotive and behavioral responses by using S-O-R process. The mental evaluation of the functionality of the institution in the minds of the students is translated into emotive attachment when they observe the presence of fairness, empathy and openness that results in advocacy, commitment, and satisfaction. Thus, system stability, usability, and data security as the motivation factors that encourage technology stimulation directly affect Perceived Service Quality (PSQ) by perceived control over personal data. The students who are more psychologically comfortable and those who have access to reliable systems would tend to use websites and engage in more time periods.

However, definition of and establishing trust depends on the situation. Ramzi et al. (2022) states that trust in the Third World is focused on such practical problems as cost, instructor reliability, and accessibility. If the online learning websites are available, affordable, and supported by human compassion, the trust of the students will be secured. In highly advanced technical systems, trust, however, relies significantly more on institutional compliance with the privacy rules, the elicitability of algorithmic determinations, and the effectiveness of cybersecurity defenses (Seow & Hussain, 2024). In developing trust measures of several educational systems, such cross-cultural differences will explain the contextual accommodations.

Lastly, trust has cognitive, emotional, and behavioral components of the integrated conceptual model. The acceptability aspect of system dependability and perceived safety in TAM, affective safety and membership in S-O-R, and capacity and dependability in SERVQUAL are trust. Regular institutional commitment towards resilience of technology, transfer of knowledge and ethical management of information must be carried out to enable the perpetuation of trust. Whenever trust is established effectively, emotional bonds of the students with online postsecondary education are heightened, their satisfaction is boosted, and their long-term loyalty is promoted. Trust is the factor that holds the human and the technological and psychological elements together in the pursuit of the best quality and not the product of service quality in the current online learning.

1.6: Satisfaction as a Mediating Response in the S–O–R Framework

One of the major results in the integrated SERVQUAL-S-O-R paradigm is a state of satisfaction, which is an emotional-organismic state. It captures the general emotional and mental evaluations of the students once they have accessed the educational services during their period of learning. Teeroovengadum et al. (2019) suggest that the academic success, human and technology service experiences that either exceed or fall short of expectations are the factors that bring about a sense of fulfilment in higher education. In their study, Suker and Poleksic (2021) used the awareness of service quality as a middle variable between perceived service quality and service-related loyalty, intention to stay, and desired attitude towards the study. In the case of Sukhera and Poleksic (2021), the meaning of satisfaction was used as an intermediate variable of perceived service quality and service-related loyalty, intention to stay and preferred study attitude.

Psychological emotional response to service stimulus such as dependability, usability, security, and empathy are under the stimulus/response category. When these stimuli have a positive relationship with the cognitive and emotional judgement of the students, they are positively motivated to the desired behavior in terms of illegitimate retention and preference of online learning and blended learning compared to physical learning (Seo & Um, 2023). Nevertheless, feelings of dissatisfaction are caused by service gaps and dissatisfaction expectations resulting in service withdrawal and negative word-of-mouth.

Empirical study has found that perceived service quality (PSQ) is a strong predictor of satisfaction. Guo et al. (2024) stated that PSQ positively affects learning satisfaction with the dimensions of justice, clarity, and morally connected academic behavior in vocational educational environments. Similarly, Seitova (2024) found that satisfaction mediates student loyalty and the perceived quality of the Kazakhstani universities. It is implied that the positive emotion is a key affective process that converts the joint engagement and perceived institutional competency to behavioral engagement in the activities of the institution.

Regarding digital learning, satisfaction is an assessment of whether the psychological and cognitive needs of learners were met due to the technological affordances. Hiatt et al. (2023) state that perceived usability, engagement, and confidence in data management by the institute are the key aspects of influencing e-learning satisfaction.

Erkan Er et al. (2025) considered AI feedback systems to be essential to customer satisfaction as they provide content and feedback in almost real-time in comparison with conventional education. Control is required almost in every structure. Transparent privacy policies, user-friendly interfaces, and control of the information enhance the satisfaction of learners (Ramzi et al., 2022).

In this research, the conceptual model will be applied based on the use of happiness as a response variable and a mediator. It mediates the preference in behavior and the trust by changing the cognitive confidence which students have attained in their learning institutions into an emotional confirmation of the learning process. The learning methods adopted by students depend on their satisfaction levels, which encourage further commitment and loyalty. With the increasing level of digital integration of higher education, the measure of contentment is enhanced beyond being a passive determination of quality; it is an action-driven feeling that lies with trust, builds a stronger image of the university, and enhances the long-term learning relationship (Seow & Hussain, 2024).

1.7: Conceptual Framework for the Present Study

This research's integrated framework is based on Stimulus-Organism-Response (S-O-R) Theory by Mehrabian & Russell, which asserts that behavior stems from external stimuli, internal mechanisms, and corresponding responses. When this theory is applied to an educational setting, this research sees the human and technological factors as external stimuli affecting the cognitive internal state of students in educational services, evaluated as service quality. This cognitive state then translates into psychological trust and satisfaction, which leads to a behavioral outcome of mode preference for learning—physical, online, or blended. This is the satisfaction, trust, and preference framework for educational services that this research seeks to elucidate.

This model views human and technological factors as the primary external stimuli which influences students' perceptions of educational service quality. Human factors encompass the interpersonal dimensions of aid educational service that institutions provide and the ways in which organizations relate to and engage with their learners. This

includes the dimensions of reliability, responsiveness, assurance, and empathy of educators and institutional staff.

Fairness and consistency in academic engagements and the promptness of concerned faculty as well as the sincerity of institutional support foster reliability and trust, strengthening students' assessment of value. Institutions likely accompanied with positive service quality perceptions and trust from students are those that offer timely responses to students' queries and complaints, provide promised and contracted educational services, and are empathetic to students' diverse educational needs. Unresponsiveness, inconsistency, and a lack of empathy are likely to accompany service quality perceptions and considerable decline in student trust in the institution.

Educational services in higher education are delivered through the simple infrastructural and digital framework (i.e., "tech"). The digitalization of higher education services increases the importance of the quality of technology-mediated learning experiences as a determinant of service quality perceptions. This study considers tangibles, and site design, usability, security, and privacy as the major technological dimensions. The level of students' trust and satisfaction is highly influenced by the design and functionality as well as ease of navigation on learning platforms and the level of user data protection. Usability of a platform is quite high, and student engagement is encouraged when the platform is visually appealing and stable. Students' trust in online education is increased when data management and privacy are protected. Thus, incorporating both human and technological components enable a complete appreciation of the stimuli affecting students' evaluations of services.

Perceived service quality remains central in this framework, serving as the organismic component of the mediation model and the link between external stimuli and internal psychological imprints. Perceived service quality is the students' judgment of whether the educational services offered are sufficient or exceed the expectation at the educational institution. It includes both the tangible and intangible components in education, such as the effectiveness of teaching and administrative support, and the architecture and usability of the platform. Service quality is positive, and trust and satisfaction are positive service psychological impressions when students perceive the institution provided reliable, responsive, and technology-advanced services. Trust and satisfaction are

positive psychological impressions when students perceive the institution provided reliable, responsive, and technology-advanced services. In service quality perceptions are negative, especially in educational services, students feel frustration, disengagement, diminished trust, and reduced satisfaction.

In the framework, trust and satisfaction follow the organismic stage, constituting the primary mediating psychological responses. Trust is the students' perception of the institution's reliability, competence, and integrity, which is formed through consistent, transparent, and service-related experiences. In situations of online or blended learning where physical interactions are restricted, the role of trust becomes crucial, as it affects students' willingness to engage with the offered digital resources and rely on the institution. Satisfaction, on the other hand, comprises the emotional assessment of the educational experience in its entirety. It occurs when the quality of services received and the trust placed in the institution meet or exceed students' expectations regarding the educational experience. Such students will positively engage in 'word of mouth' regarding the institution and the educational modality, as well as educational engagement, wherein trust and satisfaction act as the psychological service quality determinants.

The final element of the conceptual framework is mode preference; this represents the behavioral aspect in the S–O–R framework. Mode preference indicates the students' attitudes toward physical, online, or blended learning based on their experiences and perceptions. If students perceive and evaluate the trust and satisfaction perceptions to quality services received highly, they will likely choose the preferred learning option. For instance, students who perceive the online learning systems as trustworthy, user-friendly, and secure will likely favor online learning, while those who appreciate social and physical interaction will tend toward traditional in-person teaching.

The preference for certain modes serves as the most concrete behavioral indication of how various stimuli and personal assessments materialize in the educational decisions someone makes. The conceptual framework provided in this study adds to the understanding of the interaction between human and technological factors in shaping students' perceptions and behaviors both from a theoretical and empirical perspective. It builds upon earlier models of service quality to incorporate the emotional and cognitive dimensions of the Stimulus–Organism–Response model. In contrast to most service

quality and satisfaction models which regard these variables as fixed elements, this model accounts for the dynamic, sequential, and interrelated components of these constructs to demonstrate the ways educational organizations build trust and satisfaction. This occurs through the refinement of satisfaction on the interpersonal and technological facets of service provision, thus offering greater scope for analysis of students' behavioral preferences in the context of changing higher education.

1.8. Learning Modes in Higher Education

In the last decade, the learning approaches in the higher education sector have been altered drastically with the growing application of digitized tools in the classrooms. Face to face learning or physical learning was the most dominant style of education in the past where direct communication, pre-determined schedules and immediate feedback between students and teachers were given high importance. Nonetheless, due to the rapid increase in technology-mediated education, higher learning establishments are embracing online learning and blended learning as competitive options to normal classroom-based learning. These advancements have transformed the education experiences in students, as well as influencing the way they evaluate the quality of service, satisfaction, and learning preferences.

Due to its possibilities of social interaction, organized academic environment, and human interaction, physical learning is extremely appreciated. Based on previous studies, face-to-face teaching facilitates a better communication process, stronger emotional connection between learners and educators, and increased academic support feelings (Teeroovengadum et al., 2019). The presence of teachers and peers enhances the confidence and emotional comfort of students since it creates the opportunity to react openly and clarify the learning issues in a timely manner. These characteristics often result in the heightened degree of perceived reliability, attentiveness, and certitude in the delivery of educational services in the context of interpersonal interactions being a vital part of the learning process (Ajmal et al., 2024).

Online modalities ensure that the students can manage their learning processes despite barriers related to time and location due to its flexibility, accessibility, and convenience.

The studies show that usability, system stability, and platform design have a great impact on how students perceive the effectiveness of online learners (Sumi & Kabir, 2021; Halaweh and Salameh, 2023). Technological aspects such as system security, accessibility of learning material, and ease of navigation have a significant impact on cognitive evaluation of online educational services by the students (Ramzi et al., 2022). Online learning is more flexible, though in comparison with the classroom environment, there are such disadvantages as reduced social presence, slow feedback, and reduced emotional engagement (Sayaf et al., 2022).

A blended learning approach that integrates both the strengths of a face-to-face and virtual course has developed. Blended learning is a way to find a balance between flexibility and human interaction by using digital learning tools and interacting face-to-face. Empirical research studies report that blended learning may positively influence satisfaction with learning among students by providing them with an opportunity to access online learning resources without losing the opportunity to have the structure of a classroom environment (Seo and Um, 2023; Singh and Jasial, 2021). This form of hybrid is increasingly gaining popularity in institutions of higher learning today because it provides diversification of learning styles and considers the diverse needs of students.

Learning mode will represent a few service surroundings which are employed to offer educational services upon the franchise of quality of service. According to the SERVQUAL framework and its changes in the field of education, students evaluate learning modalities by their experiences of using human and technical service qualities and the results of instructions (Teeroovengadum et al., 2019; Khan and Gul, 2022). Whereas, in online and mixed learning environments, technology such as tangibles, usability, security, and privacy is the focus, in physical learning environments, the focus is on human aspects such as empathy, certainty, and responsiveness. Rong et al. (2023) states that these elements are included in overall perceptions of the quality of the services provided by the student, and it influences the reaction to the behavior, trust, and satisfaction.

Learning mode preference is no longer considered a purely cognitive evaluation of the features of the services, and increasingly it is known as a behavioral consequence affecting emotive and experience factors. Based on research examining satisfaction and

trust in an educational setting, students often decide to choose in-person, online, and mixed learning depending on emotional comfort and perceived fairness and trust in institutional procedures (Linus et al., 2025; Guo et al., 2024). The level of student satisfaction is the indicator of their overall assessment of the learning process that encompasses instructional effectiveness, technological effectiveness, and emotional satisfaction. As such, preference in learning mode is an outcome of the overall experiences which influences the feeling of well-being and confidence of the students to a particular type of learning and not just a product of the perceived quality of the service.

Recent research showed that the mode of learning is not necessarily directly related to perceived service quality. Instead, service evaluation to behavioral decisions is largely contingent on mediating psychological processes such as satisfaction and trust (Istrefi et al., 2025). This perspective aligns with Stimulus-Organism-Response (S-O-R) paradigm where learning modes are perceived as the product of a response that is influenced by affective and cognitive states of the organism. Due to this, despite the similarity or even higher technical qualities of other learning modalities, students might still prefer one that provides emotional comfort and stability.

In literature, because of the complexity of service experiences of learning in higher education, it is wise to consider them as factors that are determined by psychological responses, technical operation and human relationships. All three of the learning modalities physical, online, and blended have their specific advantages and disadvantages, and the preferences of the students depend on other factors other than the perceptions of service quality, like satisfaction, trust, and even emotional comfort. This underscores the importance of considering the learning mode preference as part of the integrated theoretical framework that considers the influence of the affective behavioral mechanisms and service quality in the modern higher education environment.
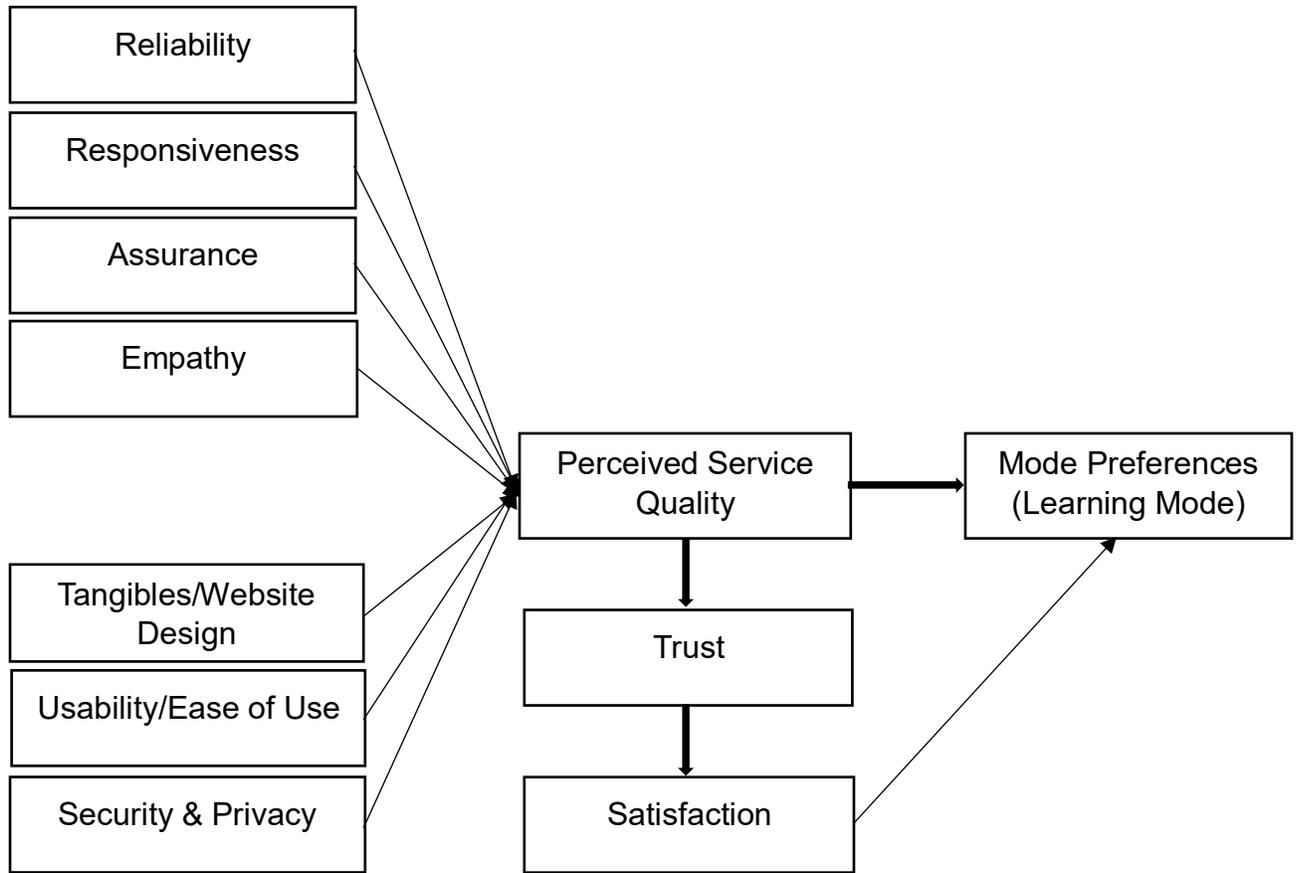
Figure 1: Conceptual Framework, developed by the author

2. RESEARCH METHODOLOGY

The methodology used for the present study titled **"Factors' Influencing Perceived Service Quality in Physical and Online Educational Services and Learning Mode Preference"** has been summarized in this chapter. It identifies the research design, theory base, population, sampling procedure, data collection, instrumentation, analysis techniques, and ethical considerations. The purpose of the chapter is to outline the methodological process through which the study objectives were translated into empirical variables that can be quantified. Methodological approach ensures validity, reliability, and replicability of research for rigorous empirical tests of interdependencies among human and technological service quality variables, perceived service quality, and behavior outcomes.

2.1: Purpose of the Research and Research Model

2.1.1: Purpose of the Study

Understanding how various human and technological aspects together impact students' perceived service quality in higher education and how this service quality influences trust, satisfaction, and preference for physical, online, or blended learning is the focus of this research. Although, in previous studies, the factors influencing service quality have been widely researched, especially in physical or online-only learning environments, the integration of both contexts has rarely been addressed. Filling this conceptual and empirical void is the central aim of this research. It is anchored in the Stimulus–Organism–Response (S–O–R) theory and seeks to expand the SERVQUAL model and trust-satisfaction interrelationships to develop a comprehensive multilevel model that examines students' behavioral intentions across different learning modes.

This research focuses on the impacts of human factors—trust, responsiveness, assurance, and empathy—and technological factors, including design and usability, on potential students' perceptions of quality of service of the institution value service. This investigation also focuses on the quality-of-service perceived organism quality of service and the trust, satisfaction, and mode preference which are viewed as emotional and behavioral responses and are classified as organism responses behavioral responses. Trust is viewed as an important mediating variable which demonstrates the psychological

confidence of students when educational quality is continuously provided. In addition, satisfaction is viewed as an emotional outcome and behavioral outcome, which leads the students to a preference of a certain mode of learning. For this reason, the study will provide an all-round understanding on the pathways the students adopt for their decision to learn.
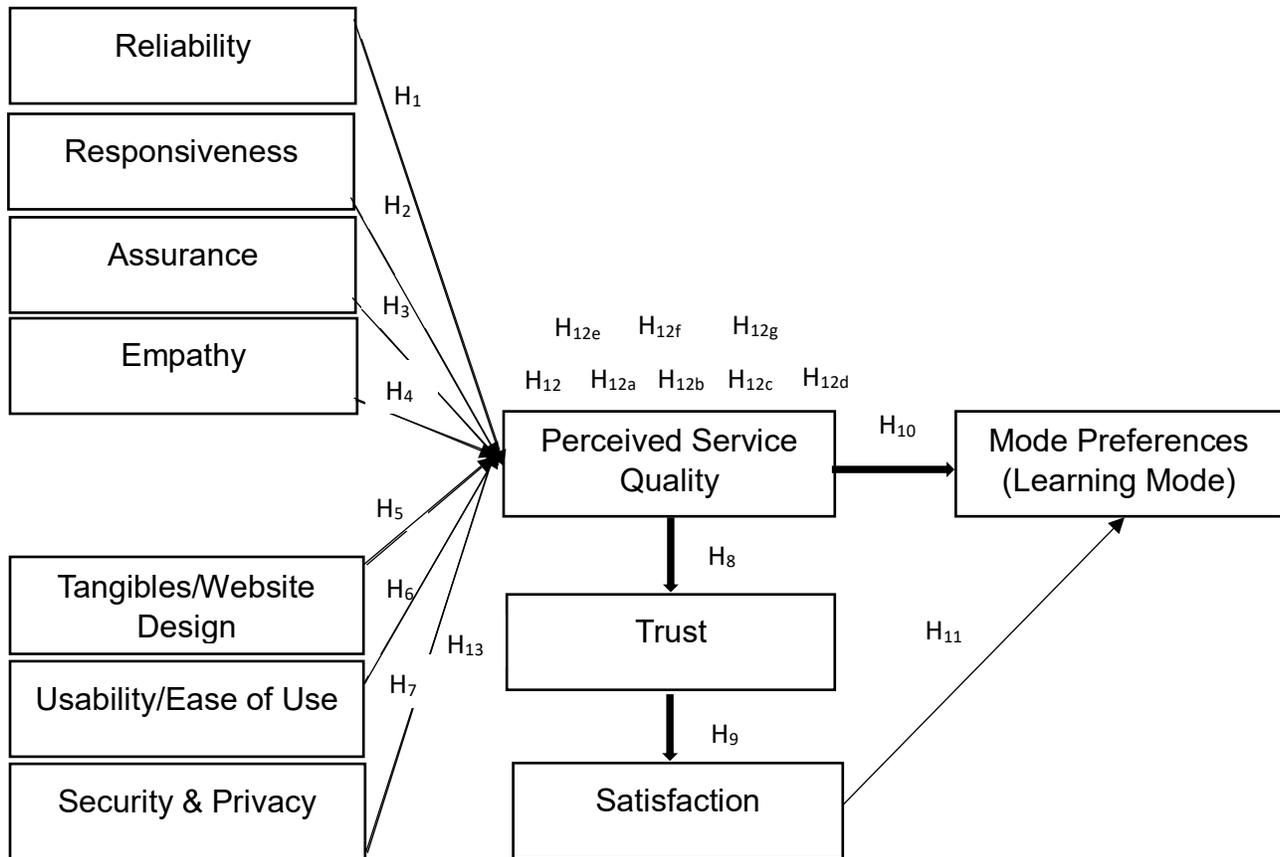
Figure 2: Conceptual Framework in correspondence with hypotheses, developed by the author

Combining the behavioral aspects of educational research with the traditional features of the service quality, the current study tries to make a theoretical contribution. The use of the S-O-R framework in the sphere of higher education extends the scope of the concept to consumers and places students into the role of knowledgeable consumers of services whose attitudes and preferences are shaped in a multidimensional interaction between

the affective and utilitarian dimensions of the educational process. Hopefully, the results of this study can assist universities, educational policymakers, and administrators to create learning environments, physical, online, or blended, responsive, dependable, and, ultimately, more satisfying so that the universities will increase their chances to engage in long-term student engagement and loyalty with the cutthroat educational market.

One of the most crucial aspects of the dimensions of service quality perception is the human element that is part of the interpersonal aspects of service delivery in higher education institutions. This follows dependability, certainty, attentiveness, and empathy. These are parts of the famous SERVQUAL model though they have been modified and optimized to the application in pedagogy and education. From the student's point of view, academic institutions and all the services that are being rendered are evaluated based on service professionalism, reliability, and communication. Students develop a sense of trust and belonging for the institution that delivers academic services, consistently responds to their requests, is professionally supportive, and shows empathy. As mentioned in the study of Al-Refaei et al. (2023), empathy and promptness significantly enhance satisfaction, as well as the emotional bond a student has towards the institution. Assurance during academic processes, as noted in the work of Grace et al. (2021), correlates to service quality too. Therefore, human interaction still, and perhaps will for a long time, represent the emotional and relational aspects of quality perception in a service, even one that is advanced technologically. Thus, the following is the first hypothesis:

The reliability of an organization is the ability of organizations to deliver services committed without imprecision, dependence, and uniformity. Reliability, on the part of offering educational services, encompasses schedules of classes, regular academic processes, availability of information, and the smooth running of the operations in the institutions. Based on the existing literature about service quality, students judge the reliability of institutions primarily according to their ability to fulfill their obligations without introducing unnecessary delays and inconveniences (Naidoo, Adam & Akpa-Inyang, 2024; Nilson & Stanny, 2023). When the services of the institution operate in a stable and efficient way, students develop confidence in the institutional systems and this increases the perception of the service quality (Latif, Bunce & Ahmad, 2021; Teeroovengadum et

al., 2019). Empirical studies demonstrate that consistency in performance reduces the level of anxiety and academic stress and ambiguity in students and thus reliability is one of the ideal predictors of service assessments (Grace et al., 2021; Jia et al., 2025). Nevertheless, recent studies show that reliability could become a less significant component of digitally mediated learning situations compared to technological and psychological factors like perceived control, trust, and usability of a system (Bodó, 2021; Zheng & Xiao, 2024). The present research focuses on the influence that the perception of the quality of service would have when reliability is considered with the increasing value of technologies in higher education and the necessity to recognize schools with high performance. Consequently, the next theory is offered:

Hypothesis-1 (H₁): Reliability is positively related to Perceived Service Quality of Educational Services.

Responsiveness is a term that is used to describe the willingness of an institution to assist students in academic, administrative, or technological issues in a prompt and effective approach. It demonstrates the swiftness and efficiency of the school in responding to student-directed questions, solving problems, and advising. Since the responsiveness of the organizational response to the students increases the level of trust to the support structures in the institution and serves as a marker of organizational commitment to the needs of students, previous studies have identified responsiveness as a key factor in creating a positive perception of service quality (White, 2021; Setiono & Hidayat, 2022; Idayati et al., 2020). Ginting et al. (2024) and Teeroovengadum et al. (2019) found that students consider the service proactive and student-centered in case they are provided with timely help in such cases, such as the accessibility of learning materials or the explanation of academic instructions. Research findings however indicate that responsiveness may be negatively affected if human intervention in the learning process is less in a highly automated environment. It causes disproportionate impact on the perceived quality of service in different delivery options (Chiou and Lee, 2023; Wang et al. 2024). The aim of the current study is to explore empirically the impact of responsiveness on the perceptions of the quality of services in learning institutions in the

presence of these contextual factors. Consequently, the following theory will be suggested:

Hypothesis-2 (H₂): Responsiveness is positively related to Perceived Service Quality of Educational Services.

It encourages students to believe in their professionalism, ethical behavior, good communication and justice due to the knowledge, competency, and credibility of the staff members of the institution, and particularly teachers and administrative authorities. As it has been observed in previous research (Ma et al., 2024; Khan & Gul, 2022; Abu Bakar, Baharun, & Hasanah, 2021; Teeroovengadum et al., 2019), qualified and polite employees reduce the level of academic uncertainty and increase confidence in an institutional system, which significantly affects the students in service assessment. The sense of instructor competence and the perceived impartiality in evaluation processes minimize the anxiety levels and bring an additional level of satisfaction with the institutional processes, which subsequently leads to the increased psychological comfort of students (Goncharuk & Cirella, 2022; Główczewski & Burdziej, 2023). Other scholars, however, argue that, when there is a high level of automation in digital educational settings and minimal human interaction is involved, the role of staff-related cues can be reduced in quality assessment (Selwyn et al., 2023; Shang & Sivaparthipan, 2022). Against this backdrop of opposing perspectives, the current research paper examines the influence of assurance on the perception of students in regard to the quality of education services. Consequently, the following theory will be suggested:

Hypothesis-3 (H₃): Assurance is positively related to Perceived Service Quality of Educational Services.

Empathy is the degree of care, individual interest, and emotional intelligence that the staff members of the institutions display to the academic and personal interests of their students. Previous studies have indicated that empathetic behaviors such as listening to the concerns of students, providing a personalized idea or accommodation of individual challenges contribute greatly to the service assessment and enhancing good psychological rapport between students and institutions (Cartee, 2021; Romanovska &

Novak, 2024; Teeroovengadum et al., 2019). Empathy is especially relevant in the case of online learning, where students often experience depressed stress levels, lack of confidence, and social alienation. Positive and empathetic communication builds a feeling of belonging, emotional relief, and interaction, which positively affect the perceived quality of the services (Bove, 2019; Bahadur, Aziz, & Zulfiqar, 2018). Nevertheless, other studies argue that the absence of interpersonal contact and the ratio of students to staff members in huge digital learning systems make it challenging to sustain empathy, and it can reduce its influence on quality perceptions (Mojtahedzadeh et al., 2024; Kalmar et al., 2022). Based on these conflicting findings, the present research paper aims at exploring the influence of empathy on student attitudes in terms of the quality of educational services. Consequently, the following theory will be suggested:

Hypothesis-4 (H$_4$): Empathy is positively related to Perceived Service Quality of Educational Services.

In educational services, tangibles refer to both digital and physical aspects, such as classrooms and equipment as well as virtual elements such as learning management systems. Websites and other digital platforms can contribute significantly to the contact points between students and material, as well as in contact with teachers, and to submit assignments in the blended and online learning setting. Researchers find that the perception of the quality and satisfaction of the services offered by learners via digital interfaces is positively related to the design of the latter, which enhances the quality of the content, its layout, and level of navigation (Ayada & Hammad, 2023; Shi, Huo, and Han, 2021). The reason is that these aspects enhance user experience and usability (as in fact the perceived quality of e-learning has been demonstrated to be highly dependent on the quality of the design and content of the site).

Empirical studies on the relationship between website design often operationalized as online counterpart to tangibles and the perceived quality of online educational services positively correlate in e-learning settings, based on models of service quality such as SERVQUAL (Dangaiso, Makudza, & Hogo, 2022; El Saghier, n.d.). Moreover, the general quality research in service settings emphasizes the role of tangible elements, either digital infrastructure or physical facilities, in expressing professionalism and influencing the

judgment of users on the quality in general (Schiavone et al., 2023; Liu et al., 2025). This is also true of blended learning settings, in which students appreciate both online and offline service indicators.

Hypothesis-5 (H$_5$): Tangibles/Website Design is positively related to Perceived Service Quality of Educational Services.

Usability or ease of use entails the ease with which students find it easy to utilize digital tools, learning environments, and institutional systems. One of the factors of the Technology Acceptance Model (TAM) is perceived ease of use, which determines technology acceptance and use behavior through perceptions of usefulness and user satisfaction (Han & Sa, 2022; Alyoussef, 2022) based on the TAM theory). Since intuition systems maximize the mental load, maximum frustrations and promote continuous use of learning resources, empirical studies have always shown that the perceived ease of use in platforms translates to better user satisfaction and increased acceptance of educational technologies, thus enhancing the overall comprehension of educational services. Interestingly, in e-learning contexts, studies have found that ease of use influences the contentment and the intention of students to use learning platforms positively with ease of use being strongly related with perceived usefulness and positive user experience outcomes (Nuryakin, Rakotoarizaka, & Musa, 2023; Roslan et al., 2021). Nonetheless, there are studies that suggest that even heavily usable sites may not manage to counteract the lack of instructional quality; the efficiency of content delivery and scale experiences of academics may diminish the effect of usability on the perceived service quality (Mamakou, Zaharias, & Milesi, 2024). In turn, usability remains an important technological factor to evaluate the blended learning setting, and the next assumption is presented:

Hypothesis-6 (H6): Usability/Ease of Use is positively related to Perceived Service Quality of Educational Services.

Security and privacy relate to the protection of the privacy of students, their academic records, and even their online behavior in the digital learning environment. It has been proposed by previous research that strong privacy policies and effective security practices

enhance user trust and reduce worries about identity theft and cybercrime and enhance confidence in the educational systems, all of which positively affect the perceived service quality (Alnaim, 2022; Almaiah et al., 2023). The use of robust security measures and clear privacy regulations is essential to build integrity and professionalism in the digital learning environment as students often provide personal information that can be deemed sensitive to the institutional solutions. Results show that the more favorable attitudes towards educational technology adoption are, the stronger are the perceived security and privacy, which enhances the desire of students to engage in online learning and develop trust in digital services of the institutions (Sayaf et al., 2022; Granić, 2022). Conversely, ambiguous privacy laws and a lack of security may lead to anxiety, reduce the commitment of users to the web space and negatively influence their perception of quality (Wang et al., 2025; Malik et al., 2024). Security and privacy concerns have significant effects on the attitudes and intentions of students to use educational technologies, as it was found that they are the key determinants of overall experience and satisfaction with services offered by cloud-based and online learning systems.

Hypothesis-7 (H$_7$): Security & Privacy is positively related to Perceived Service Quality of Educational Services.

The overall evaluation of the performance of an institution in terms of delivering educational services is referred to as perceived service quality or PSQ. A high PSQ makes students believe that the school is reliable, competent, and committed, which leads to their increased confidence and enhanced belief in the promises and processes undertaken by the school (Flick et al., 2024; Ismail & Heydarnejad, 2023). When academic and administrative services constantly exceed expectation, the students will develop positive feelings towards the institution due to their feeling of confidence and reliability. The past research done in the context of higher education has established that not only is the quality of service important in influencing happiness and loyalty, but also trust, as the perception of quality influences how a student thinks about whether the institution will act in his or her interest and can deliver on its obligation, or not in the long run (Al Hassani & Wilkins, 2022; Al-Refaei et al., 2023). Positively associated with better institutional trust and positive behavioral intentions are higher PSQ i.e. based on empirical

research which demonstrates positive impacts on educational service quality on students trust and satisfaction i.e. higher quality of educational services affects student satisfaction and has consequences on trust. Most studies indicate PSQ serves as the major antecedent of trust in education, although other researchers indicate that trust may also be influenced by cultural, psychological, and individual factors other than quality of services (Singh & Jasial, 2021; Stribbell & Duangekanong, 2022). Based on this, the theory can be stated as follows:

Hypothesis-8 (H₈): Perceived Service Quality of Educational Services is positively related to Trust.

Trust is the perception of the institution by the students about its fairness, ethics, dependability, and competence. As per a study, trust in educational institutions enhances the emotional responses of students in service settings, reducing anxiety, increasing confidence, and providing a sense of safety and valuing. It, in its turn, results in a higher number of positive evaluations about their experiences (Ismail & Heydarnejad, 2023; Sayaf et al., 2022). Since trust enhances positive affective judgment, reduces the perceived risk, and enhances institutional commitment, students will find service experiences more fulfilling and satisfying when they are convinced that an institution will act responsibly and in their best interest. Past studies within higher education institutions indicate that trust is a powerful indicator of student satisfaction because when the student believes in the ability and integrity of the institution, he/she is more prone to become satisfied with their study experience (Roslan et al., 2021; El Saghier, n.d.). As an example, research studies have indicated that trust in the service dependability and institutional integrity has a positive relationship with student satisfaction in educational institutions. This relationship has been observed across several institutional and cultural settings. The greater amount of literature validates that trust enhances emotional valuation of students and enhances their general satisfaction, although some scholars have argued that contentment can be achieved through functional advantage only (course outcomes or facilities) (Malhotra et al., 2023; Twum et al., 2025). As a result, the hypothesis is the development of the following:

Hypothesis-9 (H₉): Trust is positively related to Satisfaction.

Mode preference is what students prefer to use between online, offline (in-person) or a combination of the learning modalities. Past studies suggest that the perceived convenience, reliability, and effectiveness of the learning services by the students influence the decision by students to adopt a learning mode. According to the perceived convenient and reliability of online or blended methods, students will tend to adopt a specific mode of study through blended or online, whereas good physical service quality can support preferences to traditional face-to-face learning (Nikolopoulou, 2022; Atwa et al., 2022) the same finding indicates that perceived quality and efficacy of a blended or online model influences student willingness to pursue that mode). Research indicates that the views of students regarding the effectiveness of different modes in addressing their needs including flexibility, engagement and learning outputs are some of the factors that significantly determine the mode of choice (Granić, 2022; Malik et al., 2024). Favorable experiences and quality enhance the probability that students will switch to blended and online formats compared with offline modes only. Moreover, studies on the preferences in the learning modes always show that those students that believe that the quality of blended learning higher tend to prefer blended formats. This implies that perceived service quality affects mode choice even in cases when other such factors as social influence or habitual behavior are also involved. As a result, the theory below is proposed:

Hypothesis-10 (H_{10}): Perceived Service Quality of Educational Services is positively related to Mode Preferences.

Emotional reactions of students to their learning processes can be manifested in the form of their satisfaction that is an important indicator of their attitudes towards the process of learning. Based on prior studies, students tend to adhere to and prefer learning styles that yield the most positive emotional outcomes, since those students are more determined and have positive attitudes towards that learning style (Malacapay, 2024; Xiong, 2025). Voluntary preference has a strong predictor of satisfaction, and this has been demonstrated by studies on intention to persist in online learning which shows that higher satisfaction has a significant effect on intention to persist in the same mode and the way a student makes future decisions on learning. Based on the empirical evidence

of higher education contexts, satisfied students with a specific learning mode, online, blended, or face-to-face, will tend to prefer it and choose it more frequently due to the positive emotional and cognitive impression of the mode (Margolis, Sorokova, & Shvedovskaya, 2022; Nikolopoulou, 2022). Satisfaction has been a common determinant of mode choice in educational studies although other external constraints or situational influences sometimes influence student selections. Owing to this, the next theory is proposed:

Hypothesis-11 (H$_{11}$): Satisfaction is positively related to Mode Preferences of Students.

Perceived service quality (PSQ) mediates students and their preferred learning mode and facet of human and technology service quality. This hypothesis is supported by the literature on service quality, which repeatedly introduces PSQ as an important mental process in mediating the effect of service qualities on downstream behavioral consequences, such as satisfaction, loyalty, and usage intentions (Stribbell and Duangekanong, 2022; Al Hassani and Wilkins, 2022). The factors of service quality are expected to affect the overall estimation of the students of the educational services and then have a direct effect on the behavioral preferences. Owing to this, the next hypothesis is proposed:

Hypothesis-12 (H$_{12}$): Perceived Service Quality of Educational Services mediates the relationship between Human and Technological Factors and Mode Preferences of Students.

The reliance between learning mode preference and dependability is mediated by PSQ which notes the importance of reliable and consistent delivery of services in higher learning. The reliance of academic processes like punctuality of classes, frequent assessment processes, and sound learning systems enhances the perception of students about overall service quality. The earlier studies substantiate the fact that instead of acting as a direct determinant of the preferences, reliability promotes behavioral intentions indirectly by increasing the perceived quality ratings (Twum et al., 2025). The implication of this research is that students will tend to prefer certain learning methods when they

have a positive perception of overall quality of the services provided by companies, which is enhanced by the reliability of the delivery service. As a result, the hypothesis below is proposed:

Hypothesis-12a (H$_{12a}$): Perceived Service Quality of Educational Services mediates the relationship between Reliability and Mode Preferences of Students.

The results are another support of the mediating role of PSQ between mode preference and responsiveness. Timely academic support, timely feedback, and effective communication channels positively influence the assessment of the service quality by the students. Service research in digital and educational contexts states that responsiveness positively impacts on perceptions of quality, which subsequently affects behavioral choices (Sayaf et al., 2022). This implies that the choice of the learning mode depends on the responsiveness that impacts on the student's opinion about the overall service excellence more than responsiveness. As a result, the hypothesis below is proposed:

Hypothesis-12b (H$_{12b}$): Perceived Service Quality of Educational Services mediates the relationship between Responsiveness and Mode Preferences of Students.

Regarding assurance, the PSQ mediation shows the effect of academic proficiency, professionalism, and credibility on the trust that students have in the school. Assurance makes the students more confident in the capabilities of the institution, and this is evident in their more detailed judgments of the quality of the services. Past research has shown that assurance-related qualities have a predominant influence on behavioral intentions not via direct channels but indirectly via perceived quality and trust (Al-Refaei et al., 2023). This supports the argument that the more assurance increases the perceptions of the students regarding the quality of the services, the more they would want to learn in each modality. As a result, the hypothesis below is proposed:

Hypothesis-12c (H$_{12c}$): Perceived Service Quality of Educational Services mediates the relationship between Assurance and Mode Preferences of Students.

The potential mediating role of PSQ between empathy and mode preference may mean that individualized attention and understanding of the student needs have an indirect

effect on the behavioral choices. Empathy enhances the perceived quality of the service by evoking the feeling of inclusiveness and caring though it does not necessarily affect the mode of learning. Following previous studies, the holistic service ratings of students include sympathetic practices, which subsequently influence their mode choices and continued involvement (Stribbell and Duangekanong, 2022). As a result, the hypothesis below is proposed:

Hypothesis-12d (H$_{12d}$): Perceived Service Quality of Educational Services mediates the relationship between Empathy and Mode Preferences of Students.

Dynamic nature of learning service settings is evident in the mediation of PSQ in the relationship between tangibles and web design and preference of mode. Physical infrastructure has become practically comparable to digital interactions, platform design, and usability. These concrete and digital signals affect service quality perceptions which impact student behavioral decisions related to learning, an emerging body of research has found (Sayaf et al., 2022). Therefore, through enhancing the perception of students towards the overall quality, the tangibles affect the mode preference indirectly. As a result, the hypothesis below is proposed:

Hypothesis-12e (H$_{12e}$): Perceived Service Quality of Educational Services mediates the relationship between Tangibles/Website Design and Mode Preferences of Students.

The findings are also in support of the role of PSQ as a mediator between learning mode preference and usability. Low cognitive effort, intuitive design of the platform and ease of use have a strong influence on perceived service quality. In educational contexts that are highly technological in terms of nature, usability is a key factor in quality perception that, in turn, affects the choice of learning modalities by students (Al Hassani and Wilkins, 2022). This highlights the role of PSQ as a critical assessment of the performance between the behavioral results and the system usability. As a result, the hypothesis below is proposed:

Hypothesis-12f (H$_{12f}$): Perceived Service Quality of Educational Services mediates the relationship between Usability/Ease of Use and Mode Preferences of Students.

Finally, PSQ implies that system security and data protection should be regarded as baseline quality conditions through mediating the relationship between mode preference, security, and privacy. Although these factors may not have a direct effect on the choice of learning mode by students, their presence leads to perception of quality of service by creating a feeling of institutional reliability and professionalism. Past studies indicate that instead of direct effects, security and privacy act indirectly on behavioral intentions in the form of perceived quality and trust (Twum et al., 2025). As a result, the hypothesis below is proposed:

Hypothesis-12g (H$_{12g}$): Perceived Service Quality of Educational Services mediates the relationship between Security and Privacy and Mode Preferences of Students.

Even though research has been shown to have a significant reliance of trust that has been proven to fortify the same relationship, delivering quality service often leads to a contented customer (or learner). Good service ratings, in turn, help the students to rely on the integrity of the institution and view it as a competent and reliable service, which makes them feel happier emotionally, as defined by Hiatt et al. (2023). Earlier studies of service and educational service context, including Akram, Abbas, and Khan, 2022; Lin et al., 2023, note that not only functional quality of services but also psychological confidence created by trust results in satisfaction; trust reduces uncertainty, supports positive affective response, and makes students more likely to associate service experiences in a positive manner. The study carried out in the context of consumer behavior revealed that trust is a significant mediating variable between quality of service and consumer satisfaction (Atwa et al., 2022). The research has reported that students who put more confidence in the institution are more likely to report greater levels of satisfaction when the levels of service quality remain the same in the case of e-services as compared to the case of higher education. This indicates that trust might also mediate the service quality-satisfaction relationship (Ismail and Heydarnejad, 2023; Shi, Huo, and Han, 2021). Moreover, within the theoretical approaches, such as the Service-Profit Chain and Expectation-Confirmation Theory, the issue of trust is highlighted as one of the psychological mechanisms of transforming cognitive evaluation of service performance

into emotional outcomes. Although the direct effects of perceived service quality on satisfaction are well determined, the incorporation of trust as an intermediate variable provides a superior understanding of how the perceptions could be translated into positive emotional responses. This causes the hypothesis of the following formulation:

Hypothesis-13 (H$_{13}$): Trust mediates the relationship between Perceived Service Quality of Educational Services and Satisfaction.

2.2: Research Design, Sampling Method, Instruments and Scales

The research methodology was cross sectional and quantitative and explanatory. Quantitative design is used because it enables statistical measurement and determination of interdependencies of variables using quantitative data. The design relies on multivariate statistical analysis to aid in hypothesis testing and validation of the model. The research is explanatory because it tries to answer the questions based on the theory of Stimulus-Organism-Response (S-O-R) paradigm, by establishing causal relationships between the service quality parameters (stimuli), perceived service quality (organism) and the resulting behavioral consequences (responses). The cross-sectional design allows the researcher to gather data at the point in time of the respondents, and it is thus appropriate in establishing perceptions and behavioral pattern without the influence of longitudinal confounding.

Students in higher education were the ones who would offer quantitative data in this study through a standardized questionnaire. This tool was primarily focused on the relations between the elements of the conceptual framework, such as the human factors, technology factors, service quality, trust, satisfaction, and modes of preference. To form theoretical consistency and empirical reliability, the items were borrowed through existing frameworks. The respondents were required to answer close ended questions on a five-point Likert scale, where 1 indicated strongly disagree, and 5 strongly agree. The reason the Likert scale was selected is that it is easy to use, and the measurement of attitudes and perception is standardized (Ginting et al., 2024). The instrument had a statement that was voluntary participation, assurance of secrecy and a short introduction as to the intention of the study. The end of the questionnaire contained demographic questions like age, gender, level of study and previous experience in online and blended learning.

Table 1: Questionnaire Structure

Component	Construct / Dimension	Example Measurement Item	Measurement Basis
Stimulus (S) (Human Factors)	Reliability (Wong & Chapman, 2023)	• Learning sessions of a physical nature take place regularly when they start on time. • Online learning systems are always available and timely with updated course materials. • Physical education programs follow pre-established evaluation timetables. • Online learning sessions are characterized by few delays and disruptions. • Institutions have been delivering the intended academic provisions both online and traditional classroom platforms.	The SERVQUAL reliability dimension in higher education has been enhanced by Zeithaml et al. (1996) and Ajmal, Kausar and Maqsood (2024) after it was introduced by Parasuraman et al. (1988).
	Responsiveness (Alfoudari & Durugbo, 2025)	• When learners pose questions, the teachers respond immediately when the questions are asked face-to-face.	Ajmal et al. (2024) placed the SERVQUAL responsiveness dimension (Parasuraman et

			The online communication technologies such as chat, email and discussion boards enable instructors to respond promptly.	al., 1988; Zeithaml and al., 1996) in a higher education context.
			• In physical learning campuses, academic and administrative staff is available to assist pupils.	
			• In case of issues in online learning, technical assistance is provided promptly.	
			• Institutions offer timely feedback and support both in the physical and virtual learning classroom.	
	Assurance (Rolo et al., 2023)	• Students feel confident with the marking fairness when it comes to physical examinations.	Zeithaml et al. (1996) and Ajmal et al. (2024) extended the SERVQUAL assurance element (Parasuraman et al., 1988) to the field of higher education.
			• Professionalism is always reflected in the conduct of the instructors in both online and other learning settings.	

		• Online learning systems make exams and submission of assignments to be safe and transparent. • Academic communications and institutional policies are regarded as more dependable in terms of physical education. • Students will be guaranteed that online and physical evaluations of their learning process can be accurate.	
	Empathy (Ziatdinov & Cilliers, 2022)	• Teachers in physical classes depict a more understanding attitude towards learning problems among the students. • Online tutors provide useful solutions when the students face technical or personal problems. • In physical education, educators can offer greater academic guidance to individual	Ajmal et al. (2024) altered the SERVQUAL empathy dimension (Parasuraman et al., 1988) to fit the educational services.

		students than in an online learning environment. - Instructors are just as concerned with the welfare of their students, whether they are in an online or an in-person learning environment. - Students, in regular classroom settings compared to online learning environments, are more emotionally attached to their teachers.	
Stimulus (S) (Technological Factors)	Tangibles / Website Design (Çelik & Ayaz, 2022; Kim et al., 2023)	• Physical classroom setting promotes the participation and attention of students in comparison to online learning environments. • The design and format of the online learning platforms enhance ease of learning and convenience. • Physical facilities, such as classrooms, labs, and libraries, provide a better impression of quality	Modified based on technology-enabled service quality frameworks, the focus on interface design and tangibility (Sumi & Kabir, 2021; Halaweh & Salameh, 2023).

		education compared to digital ones.	
		• Online platforms where learning resources are found are easily accessible and visually structured compared to printed or the physical medium.	
		• The online learning environments present a professional and effective set-up that is either equal or superior to the traditional learning environments.	
	Usability / Ease of Use (Mogaji et al., 2024)	• Online learning platforms are user-friendly and easy to understand.	Adapted based on the ideas of technological usability and ease of use, according to Sumi and Kabir (2021) and Ramzi et al. (2022).
		• Online learning processes are complex in comparison with the physical learning processes (attendance, access to materials, and submissions).	
		• Learning and study resources on the internet are readily available.	
		• Learning activities in physical mode have been	

		believed to be simpler and less complex than internet learning. • In both learning modes, students do not have many usability issues (system confusion, navigational obstacles, or glitches with logging in).	
	Security & Privacy (Chua & Yu, 2024)	• It has been believed that academic content is less risky to be distributed in a real learning setting rather than on the web. • The privacy and personal information of the students are effectively protected in online learning environments. • It is estimated that learning institutions will continue maintaining the safety of their digital learning systems. • Physical campuses provide a secure environment of academic and learning interactions. • Physical learning modalities are believed to offer advantages of	According to the privacy, security, and technological trust frameworks which have been used in online learning systems (Halaweh and Salameh, 2023; Ramzi et al., 2022).

		security and privacy protection as compared to online learning environment.	
Organism (O)	Perceived Service Quality (Rong et al., 2023)	• It is believed that online education is of low teaching quality compared to physical education. • Online courses have been believed to offer the same academic value as face-to-face courses. • Educational institutions maintain standardized teaching and learning both online and offline. • Learning outcomes are believed to be easier to achieve through physical learning mechanisms as compared to online learning. • Both learning styles have the overall quality of the educational services that meets the expectations of students.	Appraised as a fourth-level measure, adapted to Khan and Gul (2022) and Teeroovengadum et al. (2019).
	Trust (Li et al., 2024)	• Physical education is perceived to be of more	Scales based on Istrefi et al.

		institutional trust than online education.	(2025) based on institutional dependability, transparency, and credibility.
		• Online examinations are as transparent and fair as face-to-face exams.	
		• Online and offline learning environments are dependent on the fairness and sincerity of grading processes.	
		• Institutional communication is perceived to be more open and reliable in physical learning environments.	
		• It is assumed that every student will be equal in access to both a face-to-face and online learning environment.	
Response (R)	Satisfaction (Hanaysha et al., 2023)	• Students are more satisfied with the in-person instruction compared to online learning.	Affective assessment scales adapted based on Seitova (2024), Guo et al. (2024), and Linus et al. (2025).
		• Online studies are believed to offer more flexibility and less interaction as compared	

		with Face-to-face learning.	
		• Learning satisfaction is influenced by the effectiveness of instructions and communication in the institutions.	
		• Students are satisfied with the way the school manages face-to-face and online learning.	
		• It is believed that academic fulfilment in the physical learning environment is high compared to that of virtual learning environment.	
	Mode Preference (Learning Mode) (Kyei-Akuoko et al., 2025)	• Physical learning is better since it can raise the level of understanding and interest.	Preference and behavioural intention scales that were adapted based on Seo and Um (2023) and Singh and Jasial (2021).
		• Online education is preferred because it is flexible and convenient.	
		• Hybrid learning paradigm is the best to be used, involving both online and offline learning.	

		• The choice of the approach to be adopted in future research also depends on the level of satisfaction on past learning experiences. • According to previous experience, one of the learning approaches is believed to provide better overall quality in the services.	

Demographic controls (gender, level of education, age, course type, and frequency of use of online classes) are included for controlling context effects. Sampling was done via a purposive non-probability sampling, with an emphasis on university students with real experience on web-based, blend, or hybrids learning platforms. The sample comprised undergraduate and postgraduate students across higher education institutes where digital education is a prominent feature in the learning process.

2.3: Sampling Procedure

Target sampling plan was utilized in the research to capture students with a range of institutional and academic backgrounds, achieving representative coverage of opinion across educational and demographic groups. The inclusion criterion required the participants (i) to be studying in higher education on a full-time or part-time basis, (ii) to have experience in digital or blended learning contexts, and (iii) to volunteer to take part in the research. These standards ensured that the respondents experienced exposures to both human and technological aspects of service delivery in higher education.

The sampling process tried to achieve balanced representation by significant demographic categories, gender, level of study, and field of study, to enhance comparability and validity of the findings. Recruitment was carried out in many varied

manners, utilizing institutional university emailing lists, electronic learning management systems, and students' social media contact lists, to provide broad accessibility for participants from various institutions.

The final sample size remained large and representative, thus enhancing statistical quality of analysis and more generalizability of findings in other similar higher education institutions. The design complemented the research aim, that is, to determine slight differences in students' perception towards learning mode preference and service quality.

Table 2: Sample Sizes Used in Similar Research

Reference	Research Topic	Sample Size
Young-Jin Seo (2023)	The role of service quality in contributing to various perceived values towards the happiness of students in blended learning.	417
Teeroovengadum, V. (2019)	Better education services, student loyalty and satisfaction.	501
Qalati et al. (2021)	Stimulus–Organism–Response Theory in E-Learning Quality Assessment. Education and Information Technologies	356
Rita Ismailova (2025)	Comparison of the student views and service quality in Kyrgyz institutions of higher learning.	451
Ola Ibrahim Ramzi (2022)	The influence of the factors on the performance of service quality in a Saudi higher education institution: The opinions of students studying in public health programs.	165
Nguyen Chi Hai (2021)	Factors That affect the Satisfaction of Vietnamese Students with Quality of Higher Education Services.	396
Ana Rolo (2023)	An example of the SERVQUAL instrument of measuring service quality in higher education.	271
Daniel La Rotta (2020)	Service quality factor of online higher education.	356

Dugenio-Nadela (2023)	Institution of Higher Education Quality of service and student satisfaction.	350

Mean of the Sample Size, $n = \frac{417+501+356+451+165+396+271+356+350}{9}$

$$= 362.56$$

$$= 370 \text{ (Making it round figure)}$$

For the research, a round figure of 370 will be used as sample size.

2.4: Data Analysis Techniques

Collected data were summarized using descriptive and inferential statistical tests to enable appropriate appreciation of the dataset and empirically test hypotheses constructed. These summary statistics were comparable to the sample's demographics profile, i.e., frequency distributions, means, and standard deviations, which supplied evidence concerning the sample structure.

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to test the hypotheses as well as validate the model. It was selected as the primary tool for analysis since it can support complex models with vast mediating as well as moderating effects and can endure non-normal distribution of data and medium sample size.

Version 4.0 was used to run the data in a two-stage manner:

- **Measurement Model Testing –** Cronbach Alpha and Composite Reliability (CR) values were used to test internal consistency reliability. The convergent and discriminant validity were tested with the help of the Heterotrait-Monotrait Ratio (HTMT), Fornell-Larcker criterion, and the Average Variance Extraction (AVE) threshold.

- **Structural Model Testing –** Bohstrapping method, path coefficient and p-value of 0.05 were applied to test the structural relationships among the constructs. R2 and f 2 estimates were also conducted to determine the predictive value and explanatory power of the model.

- **Moderating and mediating effects—**i.e., digital literacy, perceived cognitive load, and perceived enjoyment—were examined using interaction terms and testing indirect effects in the context of SmartPLS to achieve dynamic relation between variables.

2.5: Ethical Considerations

Research is carried out in accordance with mutually agreed institutional and academic ethics standards to achieve validity and reliability in research. Every subject is requested to participate voluntarily in research and is made clearly aware of the rights, procedures, and aim of study prior to participation. The participants are briefed with consent so that they can be reminded they are being involved and data are being collected. Confidentiality and anonymity are maintained in the study; identifying data are not being collected and answers are utilized for educational purposes only. The participants are informed that they can withdraw at any moment without penalty. Ethical clearance will be obtained from the relevant institutional review board before data collection to ensure that the research meets all the appropriate ethical norms of human-subjects research.

All data is protected and reported at an aggregated level to protect individuals from anonymity violations. The research design utilized to empirically examine the determinants of perceived service quality of higher education physical and virtual services was discussed in this chapter. It is in the combination of SERVQUAL and S–O–R models with a quantitative PLS-SEM approach that this research has a robust method in determining how technology and human factors influence students' perception, trust, and behavior intention. The following chapter will present the findings and statistical inference that were derived from the data collected.

3. RESEARCH RESULT

Students at the university were provided with a structured questionnaire to fill it in to get empirical data towards this study. The questionnaires were based on their preference of the physical, online, and hybrid learning environments and their attitude towards the quality, reliability, and satisfaction with the services offered. The research was conducted in the months of September and October 2025. The participants were the students of different universities in Bangladesh, and the process was voluntary. The answers were also collected face-to-face as well as online to make sure that students with different learning backgrounds would be equally represented. The questionnaire contained the items testing the technological (tangibles, usability, security) and human (reliability, responsiveness, assurance, empathy) dimensions of the service quality in addition to the categories related to trust, satisfaction and preferred method of learning. The 370 valid responses were the final dataset after the decision to collect and analyze the data in terms of its validity and completeness. The data were analyzed with the help of the Partial Least Squares Structural Equation Modelling (PLS-SEM) to test the hypothesized correlations between the behavioral and psychological outcomes of the service quality dimensions.

3.1: Variable wise Analysis

3.1.1: Reliability

The construct Reliability was evaluated with the help of five indicators that included the class punctuality, the availability of academic materials, compliance with evaluation schedules, continuity of learning, and provision of promised academic facilities. The average scores were between 3.51 and 4.12, which showed that there was moderate-moderate agreement among the students with respect to reliability of institutional services. The standard deviations (1.02-1.16) indicate that there is a lot of variation, which shows that, although a good number of students think that services are reliable, a significant number of students report inconsistency. The high indication reliability is established by the fact that all the indicator reliability indicators have been loaded high on construct (>0.70). Internal consistency was quite high based on the Cronbachs Alpha = 0.923, Composite Reliability = 0.942, and rho_a = 0.923, which are higher than the

recommended values. AVE = 0.764, meaning that the construct explains 76% of the variance in the items of the assessment, which determines the convergent validity.

Under the structural model, Reliability had a significant contribution to the Perceived Service Quality (f^2 = 0.113). Its level was however lower than that of Responsiveness and Empathy indicating that though reliability is critical in maintaining academic stability, it does not independently influence general service ratings in the absence of a powerful interpersonal and instructional support systems.

Table 3: Reliability Mean and Standard Deviation (SD)

Item	Reliability Dimensions	Mean	Standard Deviation
Rel1	Class Delivery Frequency & Punctuality	3.515296	1.080852426
Rel2	Availability of Updated Study Material	4.125228541	1.02495943
Rel3	Evaluation Schedule Compliance	3.618432101	1.034322235
Rel4	Continuity of learning and Interruption frequency	3.955590687	1.047468416
Rel5	Delivery of Contracted Academic Facilities	3.576089976	1.161999958

3.1.2: Responsiveness

The measure of responsiveness was done using five indicators that evaluated the speed of response, effectiveness of digital communication, the availability of academic personnel, the availability of technical support, and the turnaround time of feedback. Mean scores varied between 3.53 and 3.88 which showed positive leanings in perceptions of institutional responsiveness. The ranges between 0.90 and 0.99 indicate moderate variability and indicate the difference in student experiences in different modes. The loading of the indicators was high (>0.70). The internal consistency was high (CR = 0.959, Cronbach's Alpha = 0.946, rho_a = 0.948). The convergent validity was supported with AVE = 0.822.

Differentiation of validity was retained when the values of HTMT were below 0.90. All the parameters such as Reliability (0.320), Empathy (0.179) and Perceived Service Quality

(0.320), were somewhat correlated with responsiveness which means that good contact with the service and support services influences the perception of students greatly.

Having f^2 = 0.115, the responsiveness of the structural model was observed to be among the most effective predictors of perceived service quality; responsiveness, the presence of support, and responsiveness are different elements that can determine the perceived quality of academic service in all the learning modes.

Table 4: Responsiveness Mean and Standard Deviation (SD)

Item	Responsiveness Dimensions	Mean	Standard Deviation
Res1	Speed of Response of the Teacher (Physical vs Online)	3.881154	0.909394
Res2	Digital Communication Responsiveness	3.53162	0.999503
Res3	Availability of Scholarly Personnel	3.714868	0.906836
Res4	The accessibility of technical support is easy	3.714587	0.981851
Res5	Mode Speed of Feedback Delivery	3.705386	0.986353

3.1.3: Assurance

The Assurance construct involved items that referred to the assessment fairness, instructor professionalism, assessment system transparency, institutional communication trust and accuracy of learning progress. The values 3.48 to 3.82 indicate moderate agreement about the fact that the institutions are doing well with fairness and professional conduct. Standard deviations (0.89-1.03) reveal that there is a moderate amount of dispersion meaning that the perceptions differ depending on mode or instructor.

The loading of all the indicators was also over 0.86 which is an indicator of high levels of indication reliability. Internal consistency was great (Cronbachs Alpha = 0.923, CR = 0.942, rho_a =0.943). The convergent validity was high given that the AVE = 0.764.

Strong discriminant validity (HTMT <0.90) was demonstrated, and it had the best correlations with Trust (0.375) and Perceived Service Quality (0.266), indicating that fairness, competence, and transparency are fundamental determinants of institutional trustworthiness.

Assurance was also a significant contributor in Perceived Service Quality ($f^2 = 0.083$) and Trust (indirectly via PSQ). This means that the perceived fairness and transparency of students in the learning modes will form a basis of academic credibility as Assurance is an essential element.

Table 5: Assurance Mean and Standard Deviation (SD)

Item	Assurance Dimensions	Mean	Standard Deviation
As1	Perceived Fairness of Evaluation	3.825599	0.898826
As2	Professionalism of Instructors in Modes	3.480334	1.033483
As3	Online Assessment Systems Security and Transparency	3.512441	0.991081
As4	Belief in Institutional Communication & Policy	3.710031	1.009455
As5	Correctness of Learning Progress Testing	3.643155	0.985297

3.1.4: Empathy

Empathy was rated by indicators that centered on understanding of the instructor, helping during individual/technical problems, academic guidance, support well-being, and emotional connectedness. The means 3.47 to 3.83 represent moderate perceptions of instructor empathy and standard deviations (0.91-1.05) represent considerable variability, which is inconsistent student-instructor relational experience.

The indications were highly reliable in all the indicator loading (>0.87). Cronbach, Alpha = 0.939, CR = 0.953 and rho_a = 0.958 were good indicators of internal consistency. The convergent validity of AVE = 0.804 was high.

The HTMT ratio of less than 0.90 proved the discriminant validity. The strong interrelationships between empathy and satisfaction (0.529) and perceived service quality (0.473) demonstrate that empathy can affect academic and emotional evaluations to a large extent.

The positive effects of empathy on the perceived service quality were only smaller in comparison to other dimensions such as responsiveness or reliability ($f^2 = 0.036$). Nonetheless, the fact that the relationships of emotional support between teachers and

students significantly supported the pleasant learning experiences also pointed to its indirect effect on satisfaction.

Table 6: Empathy Mean and Standard Deviation (SD)

Item	Empathy Dimensions	Mean	Standard Deviation
Emp1	Proficiency of Instructors in Knowing Student Problems	3.837491	0.919082
Emp2	Professor Assistance in Personal/Technical Problems	3.48736	1.041579
Emp3	Academic Guidance Individualization	3.475366	0.980545
Emp4	Concern of Instructor with Student Well-Being	3.634475	0.971981
Emp5	Affective Bondage with Teachers	3.701367	1.05877

3.1.5: Tangible/Website Design

Tangibles and Website Design were rated using the indicators of the quality of the learning environment, platform design, physical facilities, arrangement of materials, and professionalism in cyberspace. The means were between 3.46 and 3.75, which represents moderate-positive ratings. The values of standard deviations (0.91-1.05) represent significant divergence, especially when it comes to the conception of digital platform layout and material organization.

Each of the indicator loadings was more than 0.85, which implied high levels of reliability. Also, internal consistency was good (Cronbachs Alpha = 0.924, CR = 0.942, rho_a = 0.948). The convergent validity of AVE = 0.764 was discovered.

The construct had mediocre associations with discriminant validity (HTMT <0.90), usability (0.072), satisfaction (0.089), and perceived service quality (0.198). This implies that the design of the platform in student evaluation and the quality of the environment is significant.

Tangibles had a slight, but significant contribution to Structural effect on Perceived Service Quality (f^2 = 0.051), which is that there is a slight contribution by the visual, tactile and digital learning environment, in the way that students perceive academic services.

Table 7: Tangibles/Website Design Mean and Standard Deviation (SD)

Item	Tangibles/Website Design Dimensions	Mean	Standard Deviation
Tan1	Classroom Environment Support to Learning	3.756457	0.917153
Tan2	Level of Quality of Design and Layout of the Digital platforms	3.464454	1.056757
Tan3	Physical Learning facilities are of high quality	3.576782	0.941006
Tan4	Organization of Digital vs Physical Materials	3.707128	1.019421
Tan5	Professionalism of Online Learning Environment	3.600898	1.002714

3.1.6: Usability/Ease of Use

Those constructs were Usability/Ease of Use, measured using 5 indicators that represented the ease of using the system, the simplicity of the processes, the ease of access to resources, the frequency of working with the workflow fluency, and the occurrence of technical problems. The average was between 3.47 and 3.73. Such values represent the moderate degree of agreement, which means that students regard the learning systems to be usable in general, but there is still a lot to be desired regarding user-friendliness. The standard deviations of 0.96 through to 1.07 represent the moderate variation showing that the experiences of students vary significantly depending on the individual technological familiarity.

The loadings of all the indicators are greater than the recommended 0.70 level which signifies a high level of indicator dependability. The values of Cronbachs Alpha (0.939), Composite Reliability (0.953), and rho A (0.947) are greater than 0.70, which is an excellent internal consistency. Convergent validity was also justified by the AVE of 0.803 that shows the underlying construct contribution of more than 80 per cent of the variance. The discriminant validity was not destroyed as all the HTMT ratios were below 0.90. Though usability does introduce a significant effect on the general perceptions, it was not the most influential attribute, as the levels of correlation it demonstrated with the variables, such as Perceived Service Quality (0.210) and Satisfaction (0.149) were moderate.

The influence of usability on the perception of service quality was very slight yet significant in the structural model ($f^2 = 0.049$). This demonstrates that the simplicity and accessibility of learning platforms have a rather positive influence on the rating of services by students on the level of their quality.

Table 8: Usability/Ease of Use Mean and Standard Deviation (SD)

Item	Usability/Ease of Use Dimensions	Mean	Standard Deviation
Us1	Online System Ease of Navigation	3.62177	0.992039
Us2	Simplicity of Physical Learning Processes	3.471352	1.065071
Us3	Convenience of Online Availability of Resources	3.549203	1.007006
Us4	Fluency of Learning Processes in Modes	3.732783	0.969155
Us5	Frequency of use troubles (Errors and navigation)	3.527233	1.002703

3.1.7: Security & Privacy

Security & Privacy The measurement scale involved five indicators that reflected the safety of academic information, the effectiveness of online data protection, confidence in the secure digital system, the safety of physical environment, and the degree of privacy protection measures. The mean values were between 3.41 and 3.74, which denotes a moderate level of agreement that institutions have sufficient privacy and security. The standard deviations between (0.90-1.09) show that the variability was normal to substantial in that there was a difference in how students perceive security based on their exposure to digital and physical learning environments.

All the indicator loadings exceeding 0.70 indicate high reliability. All values of Cronbach Alpha (0.947), Composite Reliability (0.958), and rho A (0.982) were large in terms of internal consistency. The congruent validation was found to be good with AVE = 0.821.

There were no worries on discriminant validity in HTMT ratios with values less than 0.90. Security was also loosely correlated with other service quality constructs, including Perceived Service Quality (0.116), Trust (0.049) and Satisfaction (0.053), revealing that the concept of security is considered hygiene factor- need not be strong, but must exist.

The structural modification of Perceived Service Quality generated by Security was only slightly significant (f^2 = 0.015), which means that students attribute security as a standard institutional role instead of a distinguishing variable of academic quality of service delivery.

Table 9: Security & Privacy Mean and Standard Deviation (SD)

Item	Security & Privacy Dimensions	Mean	Standard Deviation
Sec1	Academic Information Sharing Safety	3.742966	0.901994
Sec2	Online Data Protection Effectiveness	3.416523	1.095662
Sec3	Trust in Secure Digital Systems	3.591318	1.016231
Sec4	Physical Learning Environment security	3.670577	0.993125
Sec5	Generality of Privacy Protection Modes	3.728042	0.968462

3.1.8: Perceived Service Quality

The use of five indicators on service improvement (in terms of teaching) and the parity of online and physical academic value, institutional consistency, learning outcomes adaptation, and fulfillment of service expectations were used to assess Perceived Service Quality (PSQ). The average scores were between 3.32 and 3.82 which indicate slightly above-average ratings of the quality of services. The increased variability (SD = 0.87-1.16) is a sign that the students vary significantly in their perceptions especially on effectiveness of online modes as compared to physical modes.

The loading of all indicators has a high score (>0.70) which indicates the reliability of indicators. Cronbach, Alpha, Composite Reliability, and rho_a were used to determine internal consistency (0.932, 0.948 and 0.932). AVE 0.786 had a good convergent validity. PSQ had high correlations with Empathy (0.473), Responsiveness (0.320) and Tangibility (0.198) indicating that interpersonal experiences and instructors' responsiveness are major factors that influence the judgments made by students about service quality.

Perceived service quality has a structural model R^2 of 0.328, with reliability, responsiveness, assurance, empathy, tangibility, security, and usability contributing 32.8 percent to the variance in the perceived service quality. The biggest contributions were

made by Responsibility ($f^2 = 0.115$), Reliability ($f^2 = 0.113$), and Tangible/Website Design ($f^2 = 0.051$).

Table 10: Perceived Service Quality Mean and Standard Deviation (SD)

Item	Perceived Service Quality Dimensions	Mean	Standard Deviation
PSQ1	Improved Physical Mode Teaching	3.818616	0.868846
PSQ2	Online versus Physical Academic Value Equivalence.	3.318697	1.157593
PSQ3	Consistency of Institutions across Modes	3.680715	0.917551
PSQ4	Relaxation of Learning Outcomes	3.561579	1.018586
PSQ5	Achievement of Service Quality Expectations in General	3.65155	0.95066

3.1.9: Trust

Trust measurement was done in five indicators which concentrated on impartiality, transparency, reliability of communication, institutional trust and equality of various forms of learning. The mean scores were between 3.34 and 3.78, which showed that there is moderate trust towards institutional processes by students. Standard deviations (0.93-1.14) show that there is a moderate-high variation meaning that there are still students who are not very certain about online fairness and consistency.

The indicator loading greater than 0.70 is a good measurement. Internal consistency (Cronbachs Alpha = 0.939, CR = 0.954) was good. Since AVE = 0.804, it was found that AVE was convergent.

HTMT values below 0.90 indicated discrimination validity and Trust demonstrated significant correlations with Satisfaction (0.492) and Perceived Service Quality (0.375). These associations highlight that equity, openness and communication are the major issues with academic processes and student confidence.

The structural approach generated R^2 of 0.124 which implies that the perceived service quality and Assurance predict 12.4 percent of variance in Trust. Trust also had significant

impact on Satisfaction ($f^2 = 0.272$), which makes it a significant emotional and evaluative predictor of the student experience.

Table 11: Trust Mean and Standard Deviation (SD)

Item	Trust Dimensions	Mean	Standard Deviation
Tru1	Institutional Trust in Physical or Online Modes	3.778824	0.92543
Tru2	Fairness Online Assessments	3.339418	1.135508
Tru3	Trust in grading openness	3.600597	0.948814
Tru4	Institutional Communication Reliability	3.77149	0.941616
Tru5	Modes Academic Equality Opportunities	3.65295	0.931821

3.1.10: Satisfaction

There were five indicators that were used in the measurement of Student Satisfaction, and they included the overall satisfaction with modes, flexibility, teaching quality, institutional management and academic fulfillment. The range of mean values was between 3.46 and 3.84, which is moderate levels of satisfaction. The online interaction and flexibility have wide variations in opinion, as standard deviations (0.92-1.05) indicate. Indicator loadings of more than 0.87 indicated reliability and CR (0.953), Cronbach's Alpha (0.939) and rho_a (0.940) indicated a high internal consistency. AVE = 0.803 was a sign of great convergent validity.

The value of HTMT under 0.90 demonstrated discriminant validity. There was a high level of satisfaction with Trust (0.492), Perceived Service Quality (0.473) and Empathy (0.529) which implied that emotional support, along with fairness, is very important to student satisfaction. Structurally, Satisfaction had $R^2 = 0.214$ meanings that Trust and PSQ accounted 21.4 percent of its variance. The most common predictor ($f^2 = 0.272$) was trust, which demonstrated that overall satisfaction has a strong relationship with the sense of fairness among students.

Table 12: Satisfaction Mean and Standard Deviation (SD)

Item	Satisfaction Dimensions	Mean	Standard Deviation
Sat1	Physical learning general satisfaction	3.838586	0.923581
Sat2	Flexibility vs Interaction in online learning	3.464794	1.052698
Sat3	Customer Satisfaction based on Quality of teaching and communication	3.662419	0.998469
Sat4	Dissatisfaction With Institutional management of Modes	3.518159	0.9819
Sat5	Academic Fulfilment in Learning Modes	3.748466	0.95532

3.1.11: Mode Preferences

Mode Preference evaluated the propensity of the students towards physical, online, hybrid, and preference-based determinants of satisfaction. The mean values of 3.48-3.77 represent the balanced preferences with slightly more inclinations toward hybrid or physical modes. The standard deviation values of 0.92-1.07 vary greatly and thus the mode of choice of the student in terms of learning is very diverse depending on individual learning preferences.

Items had indicator loadings of > 0.86. The alpha was good with Alpha = 0.939, CR = 0.954, and AVE = 0.805. The discrimination validity was encouraged.

The R^2 of the Mode Preference construct was 0.249 and this implies that Satisfaction and Perceived Service Quality explain 24.9 percent of the variance in the Mode Preference construct. The largest predictor was satisfaction (f^2 = 0.276), which showed that pleasant experiences in learning had a substantial impact on the choice of style of study the students make.

Table 13: Mode Preferences Mean and Standard Deviation (SD)

Item	Mode Preferences Dimensions	Mean	Standard Deviation
MP1	Partiality towards Physical Learning of Engagement	3.773063	0.916647
MP2	Preference in Online Learning in the name of convenience	3.484077	1.075241
MP3	Preference to Hybrid Learning	3.666318	0.958789
MP4	Mode Preference as a Satisfaction Determinant	3.700213	0.958027
MP5	One Mode Superior Service Quality Belief	3.630641	0.994345

3.2: PLS-SEM Analysis

This section covers the findings of the Partial Least Squares Structural Equation Modelling (PLS-SEM) that was utilized to test the structural relationships between the key service quality attributes in multimodal learning settings. PSL-SEM is the most appropriate research method to employ in this study because it is most appropriate when the research is exploratory and predictive, it can be applied to moderately sized samples, and it can be employed in assessing complex models with many constructs (Joseph F. Hair, 2025). Moreover, PLS-SEM can be used to analyze both the measurement model and the structural model at the same time and non-normal data distributions (Fauzi, 2022).

To support the conceptual framework, the relationships among the key dimensions of service quality Reliability, Responsiveness, Assurance, Empathy, Tangibles/Website Design, Usability, Security and Privacy, and their joint effect on the Perceived Service Quality, which subsequently affects Trust, Satisfaction and Mode Preference, was studied with the help of PLS-SEM. Therefore, the methodology offers a detailed insight into the influence of the quality of institutional service on the perception of learners and their behavioral disposition in physical, online, and hybrid learning settings. The standard three-step procedure of analyzing PLS-SEM was used:

3.2.1: Measurement Model Evaluation

To perform the structural analysis, the measurement model was evaluated to make sure that the constructions of service quality possessed the necessary validity and reliability (Sureshchandar, 2023). Each of the items was significant to their respective latent construction through the strong values of the outer loadings, all of which were above the recommended value of 0.70. The internal consistency was also achieved since Cronbach Alpha, Composite Reliability (CR), and rho_a of all the constructs were bigger than the recommended value of 0.70. This is to mean that each of the items in each scale was a measurement of its underlying dimensions in an accurate and consistent manner (Yusuf Haji-Othman, 2022).

Convergent validity was measured using Average Variance Extracted (AVE) and all constructs had an AVE of more than 0.50. This proves that the variation of each construct is more than 50 percent of the range of the indicators of the constructions. Further support that construct were empirically distinct was also obtained using discriminant validity which was examined based on Fornell-Larcker criterion and the HTMT ratios. The square root of AVE of each construct exceeded all its correlations with the rest of the constructions, and the HTMT scores were less than the recommended range of 0.85-0.90, which is the indicator of the lack of significant overlaps between two constructors.

The findings suggest that the measurement model satisfies the PLS-SEM criterion of discriminant, convergent and reliability validity. This gives it a strong base of assessing the structural relationship of the service quality constructs in the further analyses.

Table 14: Construct Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
As	0.923	0.943	0.942	0.764
Emp	0.939	0.958	0.953	0.804
MP	0.939	0.942	0.954	0.805
PSQ	0.932	0.932	0.948	0.786

Rel	0.923	0.923	0.942	0.764
Res	0.946	0.948	0.959	0.822
Sat	0.939	0.94	0.953	0.803
Sec	0.947	0.982	0.958	0.821
Tan	0.924	0.948	0.942	0.764
Tru	0.939	0.94	0.954	0.804
Us	0.939	0.947	0.953	0.803

The construct reliability and validity of the measurement model were evaluated through the traditional PLS-SEM standards that consider strength of the measurement indicators, internal consistency and convergent validity. Construct dependability is usually determined using Cronbachs alpha and composite reliability; a score of greater than 0.70 is regarded as good reliability with a score of greater than 0.90 regarded as good consistency. Cronbach alpha of Assurance (As) and Empathy (Emp), Responsiveness (Res), Tangibility (Tan), and others in this study were 0.923 to 0.947, and composite reliability (rho_a and rho_c) of the same was a range of 0.923 to 0.982, which is a very high measure of internal consistency.

Convergent validity was measured by the Average Variance Extracted (AVE) where the suggested ideal value is 0.50 and above. The constructions all had a value of AVE that ranged between 0.764 and 0.822, which is quite high compared to the necessary minimum. The large values of AVE indicate that every concept explains a large percentage of the variance in its measurements; that is, the items load to their respective latent variables.

All in all, the findings indicate that the measurement model is highly convergent, valid and reliable. The high reliability coefficients and high values of the AVE give a solid background to performing further structural analysis within the PLS-SEM framework because it indicates that all the constructions are measured and measured well.

3.2.2: Structural Model Evaluation

The structural model needed to be tested to calculate the strength and applicability of the proposed connections in the service quality dimensions following the validation and

reliability of the measurement model (Lim, 2024). Depending on the existing PLS-SEM guidelines, various diagnostics were reviewed, such as multicollinearity, significance of paths, explanatory power, effect sizes, and model fit. The Multicollinearity was measured based on Variance Inflation Factor (VIF) values whose tolerable values are below 3.3. It is a range of values, which shows that the predictor constructs are not overly overlapping, and the calculation of the path coefficients is not going to change significantly. The VIF values were found to be within the acceptable limits in the model, and this indicated that there was no issue about collinearity among predictors.

Bootstrapping (using 5,000 resamples) was used to calculate whether the structural routes were significant. This non-parametric test would allow us to test strongly the significance of the path without assuming that it is normally distributed. The t-values and p-values depicted the characteristics of service quality that had a substantial influence on the endogenous constructs in the model. The Coefficient of Determination (R^2) was used to determine the extent to which the model would explain the variation in the dependent variables. Based on generally recognized standards, the values of R^2 below 0.25 suggest weak explanatory power, values between 0.50 and 0.75 moderately explain, and values above 0.75 face strong explanatory power. The R^2 values of the current study are in the acceptable limits of social science research, showing that the predictors make a significant contribution to the explanation of the outcomes of the service quality.

Effect sizes (f^2) were also analyzed to establish the relative effect of the different exogenous variables. The values of minor, medium and high effects are 0.02, 0.15, and 0.35 respectively. These findings can be attributed to the fact that constructions have the largest impact in the structural linkages. Lastly, the fit of the model was measured by indices like the Standardized Root Mean Square Residual (SRMR) with value below 0.08 being a good fit between the estimated model and data that was observed. The SRMR met this criterion and proves the thorough specification of the structural model.

Table 15: Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As -> PSQ	0.237	0.239	0.041	5.798	0
Emp -> PSQ	0.156	0.158	0.042	3.693	0
PSQ -> MP	-0.021	-0.023	0.05	0.433	0.665
PSQ -> Tru	0.352	0.353	0.048	7.387	0
Rel -> PSQ	0.276	0.275	0.041	6.649	0
Res -> PSQ	0.279	0.279	0.042	6.674	0
Sat -> MP	0.508	0.51	0.045	11.166	0
Sec -> PSQ	0.1	0.104	0.044	2.269	0.023
Tan -> PSQ	0.186	0.189	0.041	4.535	0
Tru -> Sat	0.462	0.463	0.042	11.059	0
Us -> PSQ	0.182	0.184	0.04	4.573	0

An association that is considered significant is one in which the t-value is bigger than 1.96 and the p-value is less than 0.05. Path coefficients of PLS-SEM indicate the severity and positivity of the relationships that exist between the constructs (Salifu Yusif, 2020). Positive coefficients mean positive direct effect whereas negative values mean inverse positive effect. Since it is important to bootstrap 5,000 resamples to get constant standard errors, these estimates are important.

As per the results, most of the parameters of service quality have a positive and statistically significant influence on Perceived Service Quality (PSQ). Continuous improvement, empathy, reliability, responsiveness, tangibility, security, and usability have a significant positive effect on PSQ (b = 0.237, b = 0.156, b = 0.276, b = 0.279, b = 0.186, b = 0.100, and b = 0.182). This implies that enhancing these dimensions has continued to enhance perceptions of customers regarding the quality of the services. Among them, reliability and responsiveness seem to be somewhat more evident.

In addition, PSQ is a significant predictor of Trust (b = 0.352) and according to the results, all the values of HTMT are well within the range of acceptability; the estimations are

usually between 0.026 and 0.529, and none of the estimates is near the standards of 0.85 and 0.90. In each construct pair, the 2.5% and 97.5% confidence intervals remain below 1.00 which means that there is no overlap or ambiguity in measurement. These results indicate that the discriminant validity of the model is completely constructed in line with the HTMT requirements and every construction is empirically different.

Satisfaction is greatly predicted by Trust (b = 0.462). On its part, satisfaction is a critical determinant of mobile payment behavior (b = 0.508). These findings show a definite line of progress of service quality generating trust, which subsequently increases satisfaction, which consequently causes behavioral consequences.

The only insignificant path is PSQ-MP (b = -0.021, p = 0.665) which implies that the quality of service does not directly influence the results of mobile payments unless it is mediated by satisfaction. All in all, the structural findings indicate that the model is sufficiently supported and that most of the suggested connections involve significant and statistically significant effects.

Table 16: Heterotrait-Monotrait Ratio (HTMT)

	Original sample (O)	Sample mean (M)	2.50%	97.50%
Emp <-> As	0.04	0.072	0.04	0.133
MP <-> As	0.065	0.084	0.041	0.164
MP <-> Emp	0.071	0.085	0.038	0.176
PSQ <-> As	0.266	0.266	0.16	0.371
PSQ <-> Emp	0.16	0.16	0.058	0.267
PSQ <-> MP	0.215	0.214	0.116	0.312
Rel <-> As	0.039	0.068	0.034	0.142
Rel <-> Emp	0.026	0.063	0.032	0.134
Rel <-> MP	0.056	0.081	0.048	0.142
Rel <-> PSQ	0.294	0.293	0.19	0.395
Res <-> As	0.034	0.066	0.034	0.133
Res <-> Emp	0.032	0.063	0.028	0.134

Res <-> MP	0.057	0.074	0.029	0.164
Res <-> PSQ	0.32	0.319	0.214	0.419
Res <-> Rel	0.035	0.064	0.036	0.121
Sat <-> As	0.103	0.115	0.059	0.202
Sat <-> Emp	0.083	0.098	0.045	0.195
Sat <-> MP	0.529	0.529	0.446	0.608
Sat <-> PSQ	0.473	0.473	0.382	0.558
Sat <-> Rel	0.123	0.128	0.055	0.224
Sat <-> Res	0.179	0.179	0.077	0.284
Sec <-> As	0.038	0.069	0.036	0.135
Sec <-> Emp	0.047	0.07	0.039	0.13
Sec <-> MP	0.042	0.067	0.03	0.147
Sec <-> PSQ	0.116	0.122	0.044	0.223
Sec <-> Rel	0.055	0.08	0.049	0.138
Sec <-> Res	0.053	0.076	0.037	0.153
Sec <-> Sat	0.053	0.073	0.036	0.15
Tan <-> As	0.056	0.079	0.043	0.151
Tan <-> Emp	0.037	0.069	0.038	0.129
Tan <-> MP	0.043	0.072	0.042	0.136
Tan <-> PSQ	0.198	0.2	0.108	0.296
Tan <-> Rel	0.036	0.068	0.036	0.138
Tan <-> Res	0.053	0.077	0.035	0.161
Tan <-> Sat	0.089	0.102	0.051	0.185
Tan <-> Sec	0.043	0.069	0.039	0.129
Tru <-> As	0.069	0.087	0.053	0.145
Tru <-> Emp	0.058	0.076	0.03	0.168
Tru <-> MP	0.294	0.295	0.188	0.4
Tru <-> PSQ	0.375	0.375	0.272	0.472
Tru <-> Rel	0.113	0.12	0.048	0.22
Tru <-> Res	0.124	0.126	0.043	0.233

Tru <-> Sat	0.492	0.492	0.405	0.575
Tru <-> Sec	0.049	0.073	0.038	0.146
Tru <-> Tan	0.067	0.082	0.035	0.17
Us <-> As	0.049	0.074	0.037	0.155
Us <-> Emp	0.038	0.069	0.035	0.137
Us <-> MP	0.119	0.124	0.047	0.224
Us <-> PSQ	0.21	0.211	0.11	0.312
Us <-> Rel	0.045	0.07	0.037	0.135
Us <-> Res	0.048	0.071	0.038	0.139
Us <-> Sat	0.149	0.153	0.06	0.255
Us <-> Sec	0.031	0.064	0.033	0.134
Us <-> Tan	0.048	0.073	0.042	0.135
Us <-> Tru	0.031	0.063	0.033	0.133

A more modern and reliable way is the Heterotrait-Monotrait Ratio (HTMT) that determines whether the constructs in the model are empirically distinct or not (Dirgiatmo, 2023). According to accepted PLS-SEM policies, adequate discriminant validity is represented by a value of HTMT that is less than the conservative threshold of 0.85 or the lenient threshold of 0.90 (Ellen Roemer, 2021). The discriminant validity is also supported by the existence of confidence intervals that do not have 1.00.

Based on the results, all HTMT values fall well within acceptable limits, with estimates generally ranging from 0.026 to 0.529, and none approaching the 0.85-0.90 thresholds. The 2.5% and 97.5% confidence intervals also remain below 1.00 for all construct pairs, confirming that no constructs exhibit overlap or measurement ambiguity. These results indicate that each construction in the model is empirically distinct, and discriminant validity is fully established according to HTMT criteria.

Table 17: R-Square

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
MP	0.249	0.254	0.039	6.386	0
PSQ	0.328	0.346	0.037	8.925	0
Sat	0.214	0.216	0.039	5.531	0
Tru	0.124	0.127	0.034	3.699	0

R-squared (R^2) is the percentage of change in an endogenous construct that is accounted by its predictors. The common understanding of 0.25, 0.50 and 0.75 values in PLS-SEM include weak, moderate, and strong explanatory power (Gao, 2023). R^2 that is statistically significant, shows that the predictors are significant in explaining the outcome construct though the social science models usually involve complex human behaviors hence are most likely to have medium R^2.

It has been found that the model can account reasonably well in explaining all the endogenous constructs. The perceived service quality was explained by the measures of perceived service quality having a model of 0.328, which is assumed to have a moderate predictive power. Like in behavioral studies where attitudinal constructs are largely affected by multitude of unmeasurable factors, the explanation of satisfaction is 21.4 and trust is 12.4 both weak but significant. The R^2 of the behavior of mobile payments is also a weak to moderate outcome of 0.249 that indicates that the constructions of the model do not positively predict consumer behavior.

The R^2 values are all statistically significant (p 0.001), which proves that the variances discussed explained are not accidental. Altogether, the R^2 outcomes reveal that the model is relatively predictive and corresponds to what can be expected today in the sphere of consumer behavior and service quality research.

Table 18: Effect Size (f²)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As -> PSQ	0.083	0.089	0.032	2.629	0.009
Emp -> PSQ	0.036	0.04	0.021	1.725	0.085
PSQ -> MP	0	0.003	0.004	0.112	0.911
PSQ -> Tru	0.141	0.147	0.045	3.168	0.002
Rel -> PSQ	0.113	0.117	0.038	3.006	0.003
Res -> PSQ	0.115	0.12	0.038	3.053	0.002
Sat -> MP	0.276	0.285	0.063	4.357	0
Sec -> PSQ	0.015	0.019	0.013	1.127	0.26
Tan -> PSQ	0.051	0.056	0.024	2.132	0.033
Tru -> Sat	0.272	0.279	0.064	4.248	0
Us -> PSQ	0.049	0.053	0.023	2.14	0.032

The f^2 indicates the extent to which each exogenous measure contributes to the explanatory power (R^2) of an endogenous variable. Cohen thresholds are generally accepted to be f^2=0.02, 0.15 and 0.35 which would be considered small, medium and high impact sizes (Fey, 2023). The use of f^2 in PLS-SEM is a mandatory addition to the path coefficients because it demonstrates the significant value of a predictor in the model. The findings indicate that minor yet significant impacts of service quality on perceived service quality (PSQ) are within a few aspects of service quality. All of them are statistically significant, though Tangibility (f^2 = 0.051, p = 0.033) and Usability (f^2 = 0.049, p = 0.032) are both in the modest range of effects. Although Emphasis (f^2 = 0.036) and Security (f^2 = 0.015) are very small and insignificant, and indicate that they do not significantly affect PSQ, Reliability (f^2 = 0.113, p = 0.003) and Responsiveness (f^2 = 0.115, p = 0.002) have somewhat higher impacts, which are the somewhat greater contribution to PSQ.

Trust plays the medium role in the downstream relationship (f^2 = 0.272, p < 0.001) whereas PSQ plays the small-to-moderate role in the downstream relationship (f^2 = 0.141,

p = 0.002). The Satisfaction-Mobile Payment Adoption model has the strongest impact (f^2= 0.276, p < 0.001) meaning that the need to adopt mobile payment services is greatly determined by the Satisfaction aspect. However, PSQ is not a meaningful predictor in this direction since the former does not affect MP (f^2 = 0.000).

In general, the f^2 outcomes reveal that all the dimensions of service quality play a different role in PSQ, but the constructs of assurance, responsiveness, and reliability are relatively more effective. The most practical impacts are observed to be between Trust and Satisfaction and Satisfaction and Mobile Payment implying that relational factors and user experience are the key determinants of the outcomes of the adoption process.

Table 19: Collinearity Statistics (VIF)

	VIF		VIF		VIF		VIF		VIF
As1	2.812	MP2	2.862	Rel3	2.76	Sat4	4.378	Tan5	2.922
As2	3.056	MP3	4.811	Rel4	2.922	Sat5	3.869	Tru1	2.874
As3	2.763	MP4	4.564	Rel5	2.813	Sec1	2.97	Tru2	4.68
As4	2.678	MP5	3.096	Res1	3.86	Sec2	4.429	Tru3	4.185
As5	2.707	PSQ1	2.847	Res2	2.96	Sec3	3.145	Tru4	3.184
Emp1	3.076	PSQ2	3.173	Res3	4.819	Sec4	4.607	Tru5	2.835
Emp2	3.024	PSQ3	3.982	Res4	4.416	Sec5	4.623	Us1	2.754
Emp3	4.058	PSQ4	2.886	Res5	3.257	Tan1	2.832	Us2	3.005
Emp4	4.361	PSQ5	2.757	Sat1	3.222	Tan2	2.712	Us3	4.312
Emp5	2.944	Rel1	2.673	Sat2	2.875	Tan3	2.886	Us4	4.195
MP1	2.855	Rel2	2.801	Sat3	2.946	Tan4	2.951	Us5	3.201

Collinearity statistics determine the extent to which the level of correlation between indicators in the construct is too high and thus distort estimation of PLS-SEM. VIF, which is the most popular diagnostic tool, shows the extent to which the variance of an item was overstepped by multicollinearity. To prevent the bias of the common techniques, values less than 5.0 are considered as non-critical multicollinearity and less than 3.3 as perfect, as per the generally accepted norms (Umm-e Laila, 2022).

The findings indicate that all the indicator VIF values are far below the allowable value of 5.0 with the values being between 2.67 and 4.82. It shows that the collinearity of the measuring items is not problematic. Although some of the indicators, including Res3 (4.819), MP3 (4.811), Sec4 (4.607), and Tru2 (4.680) do have larger values of VIF, however, they are considered within the acceptable range, which means they can be easily handled in terms of common variation. The remaining indicators show well-healthy and forecasted correlations of items of reflective constructs with moderate VIFs of between 2.7 and 3.5.

The presence of collinearity usually indicates that there is no multicollinearity problem in the measurement model, the loadings of the indicators are stable and the structural model is able to estimate the construct relationships.

Table 20: Average Variance Extracted (AVE)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As	0.764	0.762	0.015	50.046	0
Emp	0.804	0.798	0.037	21.912	0
MP	0.805	0.804	0.013	61.76	0
PSQ	0.786	0.785	0.014	55.84	0
Rel	0.764	0.764	0.015	51.578	0
Res	0.822	0.822	0.012	70.241	0
Sat	0.803	0.803	0.013	62.894	0
Sec	0.821	0.798	0.091	9.049	0
Tan	0.764	0.761	0.022	35.189	0
Tru	0.804	0.804	0.013	63.82	0
Us	0.803	0.802	0.014	57.3	0

Convergent validity is evaluated by average variance extracted (AVE) which is a measure of the proportion of variance that a construct of indicators captures and not error measurement. The identified PLS-SEM parameters define an AVE of 0.50 or greater to

mean that the latent variable convergent validity is satisfactory, as it will be able to account for at least half of the variation of the indicators (Ab Hamid, 2017).

The convergent validity of the results of AVE in this model is incredibly high, with all constructions having a range of between 0.764 and 0.822 which is much higher than the minimum value. Very high variance explanation values are found in the constructs of Responsiveness (AVE = 0.822), Security (AVE = 0.821), and Mobile Payment Adoption (AVE = 0.805), which implies a very coherent and effective assessment item. The constructions all have large proportions of the indicator variance as demonstrated by the lowest values of AVE of Assurance, Reliability and Tangibility (=0.764 each) which, however, are significantly beyond the respective acceptable norm.

Further, the t-statistics are very significant (mostly the t-statistics are greater than 50 and all the p-values are greater than 0.000), which is the other indication that the estimations of the AVE are consistent and significant. The overall results confirm high level of convergent validity, which denotes that the indicators can measure the same quality service construct.

Table 21: Composite Reliability (rho_c)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As	0.942	0.941	0.005	200.82	0
Emp	0.953	0.951	0.024	40.506	0
MP	0.954	0.954	0.004	258.769	0
PSQ	0.948	0.948	0.004	230.12	0
Rel	0.942	0.942	0.005	208.291	0
Res	0.959	0.958	0.003	299.889	0
Sat	0.953	0.953	0.004	263.363	0
Sec	0.958	0.945	0.08	11.91	0
Tan	0.942	0.94	0.016	58.622	0
Tru	0.954	0.953	0.004	267.434	0

Us	0.953	0.953	0.004	231.484	0

Since it considers the actual loading of indicators, Composite Reliability (rho_c), which also evaluates internal consistency of constructs used in PLS-SEM is a more reliable measure of reliability compared to Cronbachs alpha. Methodology states that a rho_c value of 0.70 and above is satisfactory internal consistency, and a rho_c value of 0.90 and above is excellent dependability without being interpreted as redundancy (Hair et al., 2019).

The composite reliability scores of all the constructs used in the model are very high with values ranging between 0.942 and 0.959 which is way beyond the level that is required. The constructions that have the highest internal consistency are Responsiveness (0.959), Security (0.958), and Mobile Payment Adoption (0.954) which means that they are having a similar underlying concept. Some of the constructions such as Assurance (0.942) and Reliability (0.942) that are marginally lower yet very high are within the ideal range of high-quality measurement.

Also, t-statistics and p-values of 0.000 are extremely high, which indicates that the dependency coefficients are coherent and have a statistical significance. Taken together, the findings serve to confirm that all service quality constructions possess excellent internal consistency, and this gives a good outlook to further research on structural models.

Table 22: Composite Reliability (rho_a)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As	0.943	0.955	0.029	32.643	0
Emp	0.958	0.958	0.29	3.301	0.001
MP	0.942	0.944	0.005	200.554	0
PSQ	0.932	0.933	0.006	163.614	0
Rel	0.923	0.93	0.009	107.502	0

Res	0.948	0.953	0.007	140.422	0
Sat	0.94	0.94	0.005	192.035	0
Sec	0.982	0.877	0.741	1.324	0.185
Tan	0.948	0.961	0.104	9.08	0
Tru	0.94	0.942	0.005	193.983	0
Us	0.947	0.959	0.036	26.127	0

One of the inner consistency measures of PLS-SEM is Composite Reliability (rho_a) that determines the extent to which indicators have a good representation of the latent variables. As Rhoa considers the actual pattern of loading the construct, it is more precise in estimating dependability than the Cronbach alpha. Based on the standards of recommended technique a value of rho_a exceeding 0.70 will mean sufficient reliability but exceeding 0.90 will be a result of exceptional measurement accuracy (Hair et al., 2019).

The findings indicate that nearly all the types of constructs have extremely high composite reliability with rho_a values of 0.923 to 0.958 which mean good internal consistency. The high dependability of the constructs Empathy (0.958), Responsiveness (0.948), Tangibility (0.948), and Security (0.982) is very high because they are coherently measured and thus have the same dependability. An additional aspect that helps to justify the measurement model strength is that all measurements that include Quality of Perception of the Service, Assurance, Reliability, Trust, and Usability are above the recommended threshold.

Since it has a variability of measurements that can be improved, Security construct is the only construct with a slightly unstable estimate (0.741), a larger level of standard deviation (0.741), and a non-significant t-value (p = 0.185). Nevertheless, the rest of the constructs have t-statistics and p-values of 0.000 that are very significant, meaning that they are also stable in terms of statistics and possess good indicators.

Overall, the rho_a findings confirm that the measurement items are adequate and have internal consistency to capture the constructs to justify the reliability to do further structural model analysis.

Table 23: Model Fit Evaluation

	Saturated model	Estimated model
SRMR	0.035	0.054
d_ULS	1.837	4.476
d_G	0.99	1.024
Chi-square	2109.731	2170.937
NFI	0.889	0.886

The important indices of fit that are used to evaluate the overall reproduction of the structural model using the data are model fit indices. Model fit is not the most important indicator of model evaluation in PLS-SEM, though such model's adequacy indices as SRMR, dULS, dG, Chi-square and NFI provide supportive evidence. The most widespread fit measure in PLS-SEM is the Standardized Root Mean Square Residual (SRMR); a value under 0.08 is considered to be an acceptable fit (Hair et al., 2019).

The model has a reasonable fit since the SRMR of the saturated model (0.035) and the estimated model (0.054) in the present result is significantly lower than the recommended value. The fact that both measures of discrepancy, dULS and dG are both at acceptable levels implies that there is no statistical difference between empirical covariance matrix and the model implied covariance matrix. The Chi-square values of the saturated (2109.731) and the estimated models (2170.937) in PLS-SEM are sensitive to the sample size, are characteristic of complex SEM models.

The Normed Fit Index of 0.889 (saturated model) and 0.886 (estimated model) are also near the acceptable level of 0.90 which shows a decent fit. Although these values are quite large compared to the ideal cutoff, they are quite reasonable considering the complexity of the model and the capabilities of PLS-SEM.

The overall model fits the data well and satisfactorily based on all the model fit measures which reinforce the validity and reliability previously established in the previous analysis.

3.2.3: Mediation Analysis

Table 24: Total Indirect Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As -> MP	0.015	0.015	0.012	1.196	0.232
As -> Sat	0.039	0.039	0.01	3.701	0
As -> Tru	0.084	0.084	0.019	4.377	0
Emp -> MP	0.01	0.01	0.008	1.129	0.259
Emp -> Sat	0.025	0.026	0.009	2.889	0.004
Emp -> Tru	0.055	0.056	0.017	3.189	0.001
PSQ -> MP	0.083	0.084	0.019	4.398	0
PSQ -> Sat	0.163	0.164	0.031	5.335	0
Rel -> MP	0.017	0.017	0.014	1.247	0.212
Rel -> Sat	0.045	0.045	0.011	4.216	0
Rel -> Tru	0.097	0.097	0.02	4.944	0
Res -> MP	0.017	0.017	0.014	1.242	0.214
Res -> Sat	0.045	0.046	0.011	4.112	0
Res -> Tru	0.098	0.099	0.021	4.762	0
Sec -> MP	0.006	0.006	0.006	0.987	0.324
Sec -> Sat	0.016	0.017	0.008	2.039	0.042
Sec -> Tru	0.035	0.037	0.016	2.169	0.03
Tan -> MP	0.011	0.012	0.01	1.169	0.243
Tan -> Sat	0.03	0.031	0.009	3.356	0.001
Tan -> Tru	0.066	0.067	0.017	3.814	0
Tru -> MP	0.235	0.237	0.032	7.264	0
Us -> MP	0.011	0.011	0.009	1.174	0.24
Us -> Sat	0.03	0.03	0.009	3.458	0.001
Us -> Tru	0.064	0.065	0.016	3.909	0

The total indirect effects are the combined effects of an independent variable on a dependent variable, which use one or more mediators. Bootstrapping is normally applied to evaluate the importance of these indirect effects in PLS-SEM. An indirect impact is determined using a t-value of more than 1.96 and a p-value of less than 0.05 (Hair et al., 2019). The latter are the indirect effects that assist in identifying the existence of mediation and the extent to which each of the constructs influences another using intermediary methods.

The results revealed that a few of the indirect effects are statistically significant. E.g. As - Sat (b = 0.039, p < 0.001) and As - Tru (b = 0.084, p < 0.001) show that Assurance has significant effect on Satisfaction and Trust with the mediating variables. On the same note, Emp-Tru (b = 0.055, p = 0.001) and Emp-Sat (b = 0.025, p = 0.004) indicate that Empathy indirectly increases Trust and Satisfaction. The role of PSQ based on its indirect effects is significant and the core mediating effect on MP (b = 0.083, p < 0.001) and Sat (b = 0.163, p < 0.001) are both significant.

Moreover, Rel-Sat (b = 0.045, p < 0.001) and Res-Tru (b = 0.098, p < 0.001) have strong indirect relationships with Satisfaction and Trust. Security is less mediated except in the case of Sec-Sat (b = 0.016, p = 0.042) and the case of Sec-Tru (b = 0.035, p = 0.030). Since usability and tangibility influence satisfaction and trust indirectly and little on MP, their trends are comparable as well.

It is interesting to mention that the role of trust plays a significant mediating role, particularly in Tru-MP (b = 0.235, p < 0.001). This shows that trust is a strong power capable of articulating the influence of the rest of the variables on Mobile Payment intention or usage. An overall trend in the outcomes shows that a high number of significant indirect relationships are present indicating that PSQ, satisfaction and trust have a mediation ability in its structural equation.

Table 25: Hypotheses Acceptation/Rejection Table

Hypotheses	Decision	Rationale
Hypothesis-1 (H₁): Reliability is positively related to Perceived Service Quality of Educational Services.	Accepted	The correlation between Reliability and Perceived Service Quality is a positive statistical correlation (b = 0.276, t = 6.649, p = 0.000). The confidence interval does not contain zero which proves that the greater the reliability the better the perceived quality of service.
Hypothesis-2 (H₂): Responsiveness is positively related to Perceived Service Quality of Educational Services.	Accepted	Perceived Service Quality has a positive significant and high impact on responsiveness (b = 0.279, t = 6.674, p = 0.001). The hypothesis is proved by the fact that the effect is not negligent but supported by statistics.
Hypothesis-3 (H₃): Assurance is positively related to Perceived Service Quality of Educational Services.	Accepted	Assurance is a great predictor of Perceived Service Quality (b = 0.237, t = 5.798, p < 0.001). The confidence interval is purely positive which implies that increased assurance will lead to increased perceived service quality.
Hypothesis-4 (H₄): Empathy is positively related to Perceived Service Quality of Educational Services.	Accepted	The coefficient is positive (b = 0.156) but also, it is weak and does not achieve strong statistical significance (t = 3.693, p < 0.001). The effect size (f2 = 0.036) is very small compared to other predictors, however, and makes less contribution to PSQ. The prediction contribution is weak, which results in the slighter acceptance of the hypothesis.

Hypothesis-5 (H$_5$): Tangibles/Website Design is positively related to Perceived Service Quality of Educational Services.	Accepted	Tangibles/Website Design influences Perceived Service Quality significantly in a positive way (b = 0.186, t = 4.535, p < 0.001). The findings affirm that the quality of visual layout and the quality of interface complements the perceived quality of service.
Hypothesis-6 (H$_6$): Usability/Ease of Use is positively related to Perceived Service Quality of Educational Services.	Accepted	Usability exhibits strong positive impact on the Perceived Service Quality (b =0.182, t=4.573, p < 0.001). The statistically justified correlation indicates that the perceived service quality is enhanced with the easier usage of systems.
Hypothesis-7 (H$_7$): Security & Privacy is positively related to Perceived Service Quality of Educational Services.	Accepted	The coefficient is positive (b = 0.100), but this effect is not strong and has only a small significance (t = 2.269, p = 0.023). The low effect size (f2 = 0.015) shows that the contribution to PSQ is also low and thus the hypothesis is slightly acc because of the lack of the predictive power.
Hypothesis-8 (H$_8$): Perceived Service Quality of Educational Services is positively related to Trust.	Accepted	The two variables, Perceived Service Quality and Trust, have a strong positive relationship (b = 0.352, t = 7.387, p < 0.001). The large coefficient verifies the fact that the increased quality of services can significantly raise the level of user confidence.

Hypothesis-9 (H$_9$): Trust is positively related to Satisfaction	Accepted	Trust demonstrates a high and very significant influence on the Satisfaction (b = 0.462, t = 11.059, p < 0.001). This validates the fact that the more the trust, the more the satisfaction among users.
Hypothesis-10 (H$_{10}$): Perceived Service Quality of Educational Services is positively related to Mode Preferences.	Rejected	There is no significance in the relationship between Perceived Service Quality and Mode Preferences (b = -0.021, t = 0.433, p = 0.665). Given that the effect is negative, very small and statistically not significant, the hypothesis is rejected.
Hypothesis-11 (H$_{11}$): Satisfaction is positively related to Mode Preferences of Students.	Accepted	Mode Preferences are significantly and strongly affected by Satisfaction (b = 0.508, t = 11.166, p < 0.001). The findings clearly indicate that provided the user is satisfied, he/she is more likely to prefer and use the mode (service/technology) under investigation.
Hypothesis-12 (H$_{12}$): Perceived Service Quality of Educational Services mediates the relationship between Human and Technological Factors and Mode Preferences of Students	Rejected	No meaningful mediation can exist because Perceived Service Quality does not predict Mode Preferences in any significant way (b = -0.021, p = 0.665). The indirect effects of PSQ- MP are not significant and this proves the non-support of mediation.
Hypothesis-12a (H$_{12a}$): Perceived Service Quality of Educational Services	Rejected	Mode Preferences is not significantly influenced by Perceived Service Quality (b = -0.021, p = 0.665), so the

mediates the relationship between Reliability and Mode Preferences of Students.		mediation can not be effective. The non-supporting of mediation is ensured due to the insignificant indirect effect of Reliability on Mode Preferences by use of PSQ.
Hypothesis-12b (H$_{12b}$): Perceived Service Quality of Educational Services mediates the relationship between Responsiveness and Mode Preferences of Students.	Rejected	Mode Preferences is not significantly influenced by Perceived Service Quality (b = -0.021, p = 0.665), so the mediation can not be effective. Through PSQ, the substantial indirect impact of responsiveness on preference of mode is ignored and therefore does not support the mediation.
Hypothesis-12c (H$_{12c}$): Perceived Service Quality of Educational Services mediates the relationship between Assurance and Mode Preferences of Students.	Rejected	Mode Preferences is not significantly influenced by Perceived Service Quality (b = -0.021, p = 0.665), so the mediation can not be effective. The no-evidence of mediation is verified by the fact that Assurance has a small indirect effect on Mode Preferences using PSQ.
Hypothesis-12d (H$_{12d}$): Perceived Service Quality of Educational Services mediates the relationship between Empathy and Mode Preferences of Students.	Rejected	Mode Preferences is not significantly influenced by Perceived Service Quality (b = -0.021, p = 0.665), so the mediation can not be effective. The insufficient support of mediation is proved by the insufficiency of the indirect effect of empathy on mode preferences via PSQ.
Hypothesis-12e (H$_{12e}$): Perceived Service Quality of	Rejected	Mode Preferences is not significantly influenced by Perceived Service

Educational Services mediates the relationship between Tangibility/Website Design and Mode Preferences of Students.		Quality (b = -0.021, p = 0.665), so the mediation can not be effective. The absence of influence on the mediation is validated by a low influence of Tangibles/Website Design on the Mode Preferences indirectly by PSQ.
Hypothesis-12f (H$_{12f}$): Perceived Service Quality of Educational Services mediates the relationship between Usability/Ease of Use and Mode Preferences of Students.	Rejected	Mode Preferences is not significantly influenced by Perceived Service Quality (b = -0.021, p = 0.665), so the mediation can not be effective. Mode Preferences indirectly affected by Usability/Ease of Use is not significant by PSQ which confirms that it is not mediated.
Hypothesis-12g (H$_{12g}$): Perceived Service Quality of Educational Services mediates the relationship between Security & Privacy and Mode Preferences of Students.	Rejected	Mode Preferences is not significantly influenced by Perceived Service Quality (b = -0.021, p = 0.665), so the mediation can not be effective. The negative result of the mediation support is validated by the insignificant indirect effect of Security and Privacy of Use on Mode Preferences by PSQ.
Hypothesis-13 (H$_{13}$): Trust mediates the relationship between Perceived Service Quality of Educational Services and Satisfaction	Accepted	Trust has a strong correlation with PSQ (b = 0.352, p < 0.001) and Satisfaction (b = 0.462, p < 0.001). There are important indirect effects (b = 0.163, t = 5.335, p < 0.001) when the Trust is effective in transmitting the service quality effect to satisfaction, indicating that the mediation is effective.

3.3: Findings and Discussion

This part entails the most important findings of the study which are based on analysis of the responses of students on the service quality in higher education in physical mode of learning, hybrid, and online mode of learning. The discussion incorporates the result of descriptive, model evaluation of measurement, and model results of structural components, the explanation of the connections between the constructs, and implications. The PLS-SEM methodology provided the opportunity to achieve both assessments of the measurement properties and structural relationships, which ensured reliable and valid interpretation.

3.3.1: Findings

3.3.1.1: Descriptive Findings

- The average service quality remained moderate and high with most of the mean scores ranging between 3.3 and 4.1.

- Responsiveness, Empathy, as well as Reliability, are human service factors that were rated higher, indicating the significance of communication and instructor support.

- Other technological factors such as Tangibles/Website Design and Usability had a positive rating but was more variable reflecting ambivalent digital experiences.

- Security & Privacy was rated relatively lower which indicates that there is concern or ambiguity regarding the protection of data.

- Generally, the positive values of Perceived Service Quality, Trust, Satisfaction, and Mode Preference demonstrated a positive attitude of students to human and technological services.

3.3.1.2: Measurement Model Findings

- There was a high degree of reliability in all constructs with the values of Cronbach alpha of more than 0.92.

- The values of composite reliability were also more than the needed 0.70, which proves the measure values to be stable.

- The values of AVE were more than 0.76 and so there was excellent convergent validity.

- Fornell-Larcker and HTMT criteria were used to check the discriminant validity so that every construct was statistically different.

- The measurement model as a whole was found strong and can be used to further analyze the structure.

3.3.1.3: Structural Model Findings

- The level of explanatory power of perceived Service Quality was moderate with Reliability, Responsiveness, Assurance, Tangibles, and Usability playing a significant role.

- The variables Empathy and Security and Privacy did not have a great impact on PSQ meaning it has less influence in mixed learning environments.

- There was a positive significant influence of PSQ on Trust, and the high impact of Trust to Satisfaction, which is relevant to institutional credibility.

- Mode Preferences were strongly predicted by satisfaction and no impact was made by PSQ, which demonstrated that mode choice was influenced by emotional experience and not service evaluation.

3.3.1.4: Mediation Findings

- Trust effectively mediated the connection between Perceived Service Quality and Satisfaction showing its key roles in the creation of good student experiences.

- There was no mediation effect of the relationship between service factors and Mode Preference by Perceived Service Quality which proves that overall student satisfaction, rather than service quality measures, influences the mode choice.

- In general, the results of the mediation focus on the psychological mechanisms by which students convert service experiences into preferences.

3.3.2: Discussion

The primary research aim of this study was to investigate the relationship between human and technological factors of service quality and perceived service quality (PSQ) and the relationship between PSQ, and students preferred learning style, trust, and satisfaction in contemporary higher education academic institutions. This research provides a detailed description of the psychological and behavioral processes that underlie the assessments and decisions of students by integrating the SERVQUAL model with Stimulus-Organism-Response (S-O-R) framework and empirically testing the associations by means of the Partial Least Squares Structural Equation Modelling (PLS-SEM). The discussion afterwards is well found on empirical findings and compares them with past studies.

The results demonstrate that perceived service quality is enhanced by the tangibles/website design, usability, responsiveness, assurance, and dependability, which are significant. These findings confirm the fact that human-based and technology-based features of educational services play a huge role in the cognitive evaluation of quality of the services adopted by students. The predictors of PSQ include reliability and responsiveness, which can be deemed as in line with conventional SERVQUAL theory. This implies that prompt feedback, punctuality and reliable academic processes continue to be key required standards in offering higher education services (Zhou & Suh, 2025). According to the significant role that reliability plays, students attach a lot of importance to regularity of teaching schedules, testing schedules, and services on institutions. It aligns with previous studies in the field of higher education that established reliability as one of the factors by which perceived quality is determined in digitally and physically supported learning environments (Rahman and Nasrin, 2024; Wong and Chapman, 2023). Similarly, the high effect of responsiveness highlights the importance of the high speed of issues resolution, the availability of academic/administrative support, and the timely teacher response. It was noted in the previous studies that responsiveness reduces uncertainty and enhances the sense of institutional commitment among students, particularly in mixed and technology-mediated contexts (Alfoudari and Durugbo, 2025).

Moreover, the assurance is found to be positively correlated with PSQ, and it can be proposed that the views of students about the quality of education continue to be dependent on the competency of teachers, the impartiality of assessment, and professionalism. This finding supports the earlier studies that propose the institutional trustworthiness and academic credibility to continue to play a significant role in traditional and innovative learning settings (Rolo et al., 2023; Ajmal et al., 2024). The perception of the quality of education still largely depends on the trust of the learners in the knowledge and integrity and the institution, even though technology is increasingly becoming part of providing education.

It is shown that the influence of the tangibles/website design and usability on PSQ are significant, along with human considerations. These findings suggest that technological interfaces are now considered to be a crucial part of high-quality services of education instead of a supplementary tool. High quality rating of students is directly influenced by

the properly designed platforms, good navigation and systems. As per the latest studies, online spaces are the main service providers within the higher education sector, particularly within those regions where online and hybrid learning models are prevalent (Celik and Ayaz, 2022; Kim et al., 2023). The role of usability justifies the fact that the perceptions of students concerning the quality of provided services also highly depend on the accessibility and ease of use (Mogaji et al., 2024).

Unlike the traditional SERVQUAL assumptions, empathy and security/privacy have no significant influence on the perceived service quality. Since the existence of empathy as a dominating predictor of service quality in a learning setting was often reported in prior studies (Zhai et al., 2025), the finding is an important empirical addition. However, the current results show that variations in security/privacy and empathy do not have any significant impact on the overall ratings of service quality of the students under the circumstances of the study.

Empathy and security/privacy can be considered a base or a threshold characteristic, not an (distinct) one, according to one hypothesis that was also supported by previous studies (Halaweh and Salameh, 2023; Chua and Yu, 2024). Innovative education environments may subconsciously require the students to expect a low level of faculty attention and data protection. Thus, these factors may not enhance perceived service quality unless there are some flaws. Instead of providing active quality improvement, security and privacy concerns become highly visible whenever a breach or failure happens, as has been shown by the similar results, which were reported in the recent research (Ramzi et al., 2022).

More importantly, the insignificant outcomes do not imply the insignificance of security/privacy and empathy. Rather, the findings suggest that such traits may have a different role in the context of service quality and serve as prerequisites to participation and not as the cause of perceived excellence. This view is consistent with recent studies which highlight the aspect of service quality parameters in technology-intensive service setting as constantly evolving (Seitova, 2024).

The results also indicate that the trust is greatly positively influenced by the perception of the quality of services, that is, students with a more positive attitude towards the educational services have a higher risk of developing trust towards the institution. This

finding is consistent with previous studies indicating that the perceptions of service quality enhance institutional credibility and dependability (Istrefi et al., 2025). However, the results show that PSQ does not have a direct influence on satisfaction. Instead, trust is a complete mediator between PSQ and satisfaction.

This is a significant theoretical realization of this entire mediation. According to the new findings, trust emerges as a vital psychological process in which cognitive evaluations of the quality of a service are converted into affective reactions, unlike in the past when numerous studies often model trust as an outcome or an independent variable to satisfaction (Li et al., 2024). The S-O-R model explains that trust is an effective stabilizing psychological state that allows satisfaction to ensue, whereas perceived service quality is a cognitive organismic state.

The findings of the present research are clear in that perceived service quality (PSQ) does not predict student happiness directly. Guo et al. (2024) and Linus et al. (2025) state that the relationship between PSQ and satisfaction is statistically non-significant, which is why it is appropriate to clarify inconsistent results of previous studies in which service quality has produced weak or fluctuating effects on satisfaction. In this research, institutional trust completely mediates the PSQ-satisfaction relationship and influences student satisfaction and not the direct influence by cognitive measures of service quality. This implies that the students enjoy not only assessing the features of service quality but also the guarantee and confidence such assessment offers concerning the reliability and fairness of the institution.

Consequently, given that the students have varying levels of trust towards the institution, the same perceived service quality can produce varying satisfaction levels. Although service quality alone is not enough to generate happiness when there is no trust, increased trust translates service quality perceptions to emotional satisfaction (Tessema et al., 2025). This finding validates the argument that contentment in higher education is not a direct consequence of the perceived service performance, but is largely an affective consequence founded on psychological security.

The findings of the research confirm that student satisfaction has a direct and statistically significant impact on the learning mode preference. This observation means that the preference of students towards face-to-face, online, or hybrid learning cases depends

largely on the levels of satisfaction that they had in their previous experiences of learning. Even though the level of perceived service quality has a major impact on students in evaluating educational services, or learning mode choice is not directly dependent on it, or indirectly affected by perceived satisfaction.

The insignificance of the significant correlation between the choice of the learning mode and the perceived quality of the service indicates that students are not relying on cognitive assessments of service characteristics to make their decision on what learning mode to use. Instead, behavior choices appear to be more strongly shaped by affective outcomes, in particular, feelings of satisfaction, comfort, and confidence that are generated because of previous experience. Consequently, satisfaction emerges as a definite and independent predictor of the choice of learning mode, an important fact that highlights the significance of satisfaction in understanding behavioral choices of students in higher education.

By and large, the findings provide good empirical support to SERVQUAL-S-O-R paradigm. Perceived service quality is a cognitive organismic response, the human and technology service characteristics serve as environmental stimuli, trust as a key psychological mediator and satisfaction as the driving element in the behavioral response. The research extends past fragmented models of service quality research and offers a more detailed explanation of the role of service quality in higher education by validating this causal relationship using PLS-SEM.

The implications of the results are also that SERVQUAL cannot be applied in technologically advanced learning environments in the same way. Though the traditional aspect of interpersonal might remain important, new features of technology such as usability and interface design now equally hold importance in the evaluation of the extent of service perception. This supports the existing debates regarding the adaptability of SERVQUAL to digitally mediated services settings (Khan and Gul, 2022).

Conclusively, this discussion demonstrates that human reliability, responsiveness, assurance, and those aspects of technology that touch on tangibles and usability are some factors that determine the level of satisfaction with higher education services. Although the preferences of students towards learning modes are determined by their level of satisfaction and not perceived quality, the judgment of quality of service, which

influences satisfaction, forms the main psychological process by which service quality can be determined. These findings highlight the importance of the psychological processes in understanding behavior of students and the need by universities to focus not only on service provision but the satisfaction and trust which accrue because of this provision.

CONCLUSIONS, SUGGESTIONS AND PRACTICAL IMPLICATIONS OF THE STUDY DEPENDING ON THE ANALYSIS OF RESEARCHED FACTORS

Summary of the Findings of the Research of the Factors to be Analyzed

The main aim of this study was to explore the influence of human and technological factors of service quality on students preferred learning mode in higher education and the perceived service quality, trust and satisfaction. Using PLS-SEM, the study will provide empirical evidence on the psychological mechanisms through which behavioral consequences are transformed in service quality evaluation through the integration of SERVQUAL framework with Stimulus-Organism-Response (S-O-R) model.

The outcomes indicate that both human-related (reliability, responsiveness, assurance, and empathy) and technological (usability, website design, tangibles, and security and privacy) factors play a significant role in shaping the perceptions of students regarding the quality of service. This demonstrates that students consider educational services, and they combine both the role of the digital service operation and human interaction instead of just paying attention to the instructional delivery or the work of technology. These results coincide with previous studies that point to the complex nature of service quality in higher education (Teeroovengadum et al., 2019; Khan and Gul, 2022).

The descriptive findings also indicate that the opinion of students regarding the quality of service is moderate to high, particularly responsiveness, dependability and empathy. At the same time, the technological aspects had greater variability and indicated the differences in how students approached both blended and online courses. That means that the quality of technology services can be more prone to the work of systems, their design, and their usability, yet human interaction remains relatively stable in any learning setting (Sumi & Kabir, 2021; Halaweh and Salameh, 2023).

The student satisfaction is one of the most significant conclusions made in the study since perceived service quality is only a powerful predictor of institutional trust but not a direct predictor. It has been identified that the main psychological process through which customer satisfaction is influenced by the quality of the services perceived is identified to be trusted. The finding corroborates the argument that psychological assurance and confidence, and not necessarily logical service appraisals, drive higher education

satisfaction and can explain some inconsistencies between the findings of previous studies where service quality has been found to have weak or unsteady impacts on satisfaction (Guo et al., 2024; Linus et al., 2025).

It is also revealed by the study that perceived service quality does not directly or indirectly affect the preferences of the students between the in-person, online, or mixed learning; however, student satisfaction is the most crucial predictor of the choice of the learning mode. It means that instead of being identified by the discrete assessment of the features of services, the choice of the learning mode is mostly dependent on welcome accumulation of emotional experiences, comfort, and confidence. These findings are in line with affect-based decision-making theories and demonstrate that students prefer learning styles that provide them with a feeling of safety and satisfaction compared to those which are objectively believed to be of superior quality.

Finally, the mediation analysis demonstrates that perceived service quality has no mediation effects on service quality characteristics and learning mode preference but trust fully mediates the relationship between perceived service quality and satisfaction. It proves that behavioral consequences of higher education are more influenced by psychological and emotional processes than by cognitive evaluations of the quality of service alone.

Limitations of the Research and Areas of Future Research

This research has its limitations despite its contribution. First, the methodology was a cross-sectional study, which restricts the ability to capture changes in the happiness, trust and perceptions of students about time. Longitudinal research should be employed in future studies to explore the changes in learning experiences and preferences across the different levels of study.

Second, only a few of the psychological factors were covered in the study. To have a deeper explanation on learning mode preference, future studies can further increase the proposed framework with the incorporation of additional features such as motivation, emotional involvement, perceived control and academic stress.

Third, the findings cannot be as generalizable since they are founded on a specific institutional and contextual framework. The external validity of the model would be enhanced by studies comparing various institutions, regions, or countries, which would provide cross-cultural insights into the measurement of service quality in higher education.

Managerial implications

To begin with, responsiveness and dependability should be given top priority by the institutions as the pillars of service delivery. To achieve student trust, it is necessary to have routinely developed academic schedules, timely feedback, dependable appraisal methods, and easily accessible administrative support.

Second, the digital learning platforms should be delivered as core service environments as opposed to being supplemental tools. The perceived service quality and tangential confidence creation will probably be enhanced through investments in user-centered design, the ease of navigation, and the reliability of the system.

Third, organizations should recognize trust as a tactical benefit. To curb the perceptions of service quality into student happiness, there is a need to communicate openly, provide equal appraisal, and offer the same service delivery among the learning modalities.

Finally, decision-makers need to focus on overall student experience management due to the satisfaction as the most potent predictor of the choice of the learning mode. The positive effect on student engagement and retention caused by the improvement of isolated service attributes might not be as significant as the positive effect caused by the improvement of emotional comfort, reduction of uncertainty, and ensuring continuity in physical and digital learning environments.

REFERENCES

1. Ab Hamid, M. R., Sami, W., & Sidek, M. M. (2017, September). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. In Journal of physics: Conference series (Vol. 890, No. 1, p. 012163). IOP Publishing. DOI: https://doi.org/10.1088/1742-6596/890/1/012163

2. Abu Bakar, M. Y., Baharun, H., & Hasanah, M. (2021). Build public trust through excellent service in school. Al-Tanzim: Jurnal Manajemen Pendidikan Islam, 5(3), 106-117. Retrieved from: http://repository.uinsa.ac.id/id/eprint/2067

3. Adera, N. (2025). Innovative learning spaces and blended learning: Quest for 21st century competency teaching and learning approaches. Creating Dynamic Space in Higher Education: Modern Shifts in Policy, Competencies, and Governance, 139-174. DOI: https://doi.org/10.4018/979-8-3693-6930-2.ch006

4. Ahmed, M. R., & Sidiq, M. A. (2023). Evaluating online assessment strategies: A systematic review of reliability and validity in e-learning environments. North American Academic Research, 6(12), 1-18. DOI: https://doi.org/10.5281/zenodo.10407361

5. Ajmal, F., Kausar, H., & Maqsood, S. (2024). Ensuring Excellence: Quality Assurance Practices of Online Teaching and Learning at Higher Education Level in Pakistan. Pakistan Journal of Distance and Online Learning, 10(2), 20-33. Retrieved from: https://eric.ed.gov/?id=EJ1465032

6. Akram, M. W., Abbas, A., & Khan, I. A. (2022). Effects of perceived value, service quality and customer trust in home delivery service staff on customer satisfaction: evidence from Pakistan. International Journal of Management Research and Emerging Science, 12(4). DOI: https://doi.org/10.56536/ijmres.v12i4.351

7. Al Hassani, A. A., & Wilkins, S. (2022). Student retention in higher education: the influences of organizational identification and institution reputation on student satisfaction and behaviors. International Journal of Educational Management, 36(6), 1046-1064. DOI: https://doi.org/10.1108/IJEM-03-2022-0123

8. Alfoudari, A. M., & Durugbo, C. M. (2025). What determines university instructors' continuance intentions for smart classroom use: Examining the role of service quality, connectedness and technostress. British Journal of Educational Technology. DOI: https://doi.org/10.1111/bjet.70020

9. Almaiah, M. A., Al-Otaibi, S., Shishakly, R., Hassan, L., Lutfi, A., Alrawad, M., ... & Alghanam, O. A. (2023). Investigating the role of perceived risk, perceived security and perceived trust on smart m-banking application using SEM. Sustainability, 15(13), 9908. DOI: https://doi.org/10.3390/su15139908

10. Alnaim, A. F. (2022). Effects of individual (perceived identity theft, cognitive trust, and attitude) and situational (website quality, perceived reputation, social presence) factors on online purchase intention: moderating role of cyber security. International Journal of Cyber Criminology, 16(2), 131-148. Retrieved from: https://cybercrimejournal.com/menuscript/index.php/cybercrimejournal/article/view/113

11. Alordiah, C. O. (2025). REVISITING THE CONCEPT OF RELIABILITY: A THEORETICAL FRAMEWORK FOR UNDERSTANDING MEASUREMENT PRECISION IN EDUCATIONAL PSYCHOLOGY RESEARCH. African Journal of Social and Behavioural Sciences, 15(2). Retrieved from: https://journals.aphriapub.com/index.php/AJSBS/article/view/3092

12. Al-Refaei, A. A. A., Ali, H. B. M., Ateeq, A. A., & Alzoraiki, M. (2023). An integrated mediating and moderating model to improve service quality through job involvement, job satisfaction, and organizational commitment. Sustainability, 15(10), 7978. DOI: https://doi.org/10.3390/su15107978

13. Alyoussef, I. Y. (2022). Acceptance of a flipped classroom to improve university students' learning: An empirical study on the TAM model and the unified theory of acceptance and use of technology (UTAUT). Heliyon, 8(12). Retrieved from: https://www.cell.com/heliyon/fulltext/S2405-8440(22)03817-8

14. Atwa, H., Shehata, M. H., Al-Ansari, A., Kumar, A., Jaradat, A., Ahmed, J., & Deifalla, A. (2022). Online, face-to-face, or blended learning? Faculty and medical students' perceptions during the COVID-19 pandemic: a mixed-method study. Frontiers in medicine, 9, 791352. DOI: https://doi.org/10.3389/fmed.2022.791352

15. Ayada, W. M., & Hammad, M. A. E. E. (2023). Design quality criteria for smartphone applications interface and its impact on user experience and usability. International Design Journal, 13(4), 339-354. DOI: https://doi.org/10.21608/idj.2023.305364

16. Bahadur, W., Aziz, S., & Zulfiqar, S. (2018). Effect of employee empathy on customer satisfaction and loyalty during employee–customer interactions: The mediating role of

customer affective commitment and perceived service quality. Cogent business & management, 5(1), 1491780. DOI: https://doi.org/10.1080/23311975.2018.1491780

17. Bodó, B. (2021). Mediated trust: A theoretical framework to address the trustworthiness of technological trust mediators. New Media & Society, 23(9), 2668-2690. DOI: https://doi.org/10.1177/1461444820939922

18. Bove, L. L. (2019). Empathy for service: benefits, unintended consequences, and future research agenda. Journal of Services Marketing, 33(1), 31-43. DOI: https://doi.org/10.1108/JSM-10-2018-0289

19. Banerjee, S., Shaikh, A., & Sharma, A. (2024). The role of online retail website experience on brand happiness and willingness to share personal information: an SOR perspective. Marketing Intelligence & Planning, 42(3), 553-575. DOI: https://doi.org/10.1108/MIP-08-2023-0413

20. Camilleri, M. A. (2021). Evaluating service quality and performance of higher education institutions: a systematic review and a post-COVID-19 outlook. *International Journal of Quality and Service Sciences*, *13*(2), 268-281. DOI: https://doi.org/10.1108/IJQSS-03-2020-0034

21. Cartee, J. (2021). Strategic empathy in virtual learning and instruction: A contemplative essay about teacher-student rapport during times of crisis. Journal of Instructional Research, 10, 12-19. Retrieved from: https://eric.ed.gov/?id=EJ1314158

22. Çelik, K. and Ayaz, A., 2022. Validation of the Delone and McLean information systems success model: a study on student information system. Education and Information Technologies, 27(4), pp.4709-4727. Retrieved from: https://link.springer.com/article/10.1007/S10639-021-10798-4

23. Chen, T., & Chen, J. (2025). Exploring college Students' perceptions of privacy and security in online learning: A comprehensive questionnaire-based study. International Journal of Human–Computer Interaction, 41(10), 6481-6494. DOI: https://doi.org/10.1080/10447318.2024.2379722

24. Chiou, E. K., & Lee, J. D. (2023). Trusting automation: Designing for responsivity and resilience. Human factors, 65(1), 137-165. DOI: https://doi.org/10.1177/0018720821100999

25. Chua, H. W., & Yu, Z. (2024). A systematic literature review of the acceptability of the use of Metaverse in education over 16 years. Journal of Computers in Education, 11(2), 615-665. Retrieved from: https://link.springer.com/article/10.1007/s40692-023-00273-z

26. Dangaiso, P., Makudza, F., & Hogo, H. (2022). Modelling perceived e-learning service quality, student satisfaction and loyalty. A higher education perspective. Cogent Education, 9(1), 2145805. DOI: https://doi.org/10.1080/2331186X.2022.2145805

27. de Jager, J., & Gbadamosi, G. (2013). Predicting students' satisfaction through service quality in higher education. The international journal of management education, 11(3), 107-118. DOI: https://doi.org/10.1016/j.ijme.2013.09.001

28. Demir, A., Maroof, L., Sabbah Khan, N. U., & Ali, B. J. (2021). The role of E-service quality in shaping online meeting platforms: a case study from higher education sector. Journal of Applied Research in Higher Education, 13(5), 1436-1463. DOI: https://doi.org/10.1108/JARHE-08-2020-0253

29. Dirgiatmo, Y. (2023). Testing the discriminant validity and heterotrait–monotrait ratio of correlation (HTMT): A case in Indonesian SMEs. In Macroeconomic Risk and Growth in the Southeast Asian Countries: Insight from Indonesia (pp. 157-170). Emerald Publishing Limited. DOI: https://doi.org/10.1108/S1571-03862023000033A011

30. Dzimińska, M., Fijałkowska, J., & Sułkowski, Ł. (2018). Trust-based quality culture conceptual model for higher education institutions. Sustainability, 10(8), 2599. DOI: https://doi.org/10.3390/su10082599

31. Er, E., Akçapınar, G., Bayazıt, A., Noroozi, O., & Banihashem, S. K. (2025). Assessing student perceptions and use of instructor versus AI-generated feedback. British Journal of Educational Technology, 56(3), 1074-1091. DOI: https://doi.org/10.1111/bjet.13558

32. El Saghier, N. M. Students Satisfactions with E-Learning Mediating the E-Service Quality-Behavioral Intention Link: The Case of Public Universities in Egypt. DOI: https://doi.org/10.21608/zcom.2021.148240

33. Elshami, W., Taha, M. H., Abuzaid, M., Saravanan, C., Al Kawas, S., & Abdalla, M. E. (2021). Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. Medical education online, 26(1), 1920090. DOI: https://doi.org/10.1080/10872981.2021.1920090

34. Fauzi, M. A. (2022). Partial Least Square Structural Equation Modelling (PLS-SEM) in Knowledge Management Studies: Knowledge Sharing in Virtual Communities. Knowledge Management & E-Learning, 14(1), 103-124. Retrieved from: https://eric.ed.gov/?id=EJ1348242

35. Fey, C. F., Hu, T., & Delios, A. (2023). The measurement and communication of effect sizes in management research. Management and Organization Review, 19(1), 176-197. DOI: https://doi.org/10.1017/mor.2022.2

36. Flick, L., Dawes, M., Brian, A., Monsma, E., & De Meester, A. (2024). Relationships among peer-relatedness, self-confidence, peer victimization, social anxiety and school satisfaction in American high school students. Physical Education and Sport Pedagogy, 29(6), 573-587. DOI: https://doi.org/10.1080/17408989.2022.2135692

37. Gao, J. (2024). R-Squared (R2)–How much variation is explained?. Research Methods in Medicine & Health Sciences, 5(4), 104-109. DOI: https://doi.org/10.1177/26320843231186398

38. Ginting, D., Sabudu, D., Barella, Y., Madkur, A., Woods, R., & Sari, M. K. (2024). Student-centered learning in the digital age: In-class adaptive instruction and best practices. International Journal of Evaluation and Research in Education (IJERE), 13(3), 2006-2019. DOI: https://doi.org/10.11591/ijere.v13i3.27497

39. Główczewski, M., & Burdziej, S. (2023). (In) justice in academia: procedural fairness, students' academic identification, and perceived legitimacy of university authorities. Higher Education, 86(1), 163-184. Retrieved from: https://link.springer.com/article/10.1007/s10734-022-00907-8

40. Goncharuk, A. G., & Cirella, G. T. (2022). Effectiveness of academic institutional models in Europe: University instructor perception case research from Bosnia and Herzegovina and France. International Journal of Educational Management, 36(5), 836-853. DOI: https://doi.org/10.1108/IJEM-06-2021-0241

41. Guo, T., Li, T., & Qi, Z. (2024). Perceived school service quality and vocational students' learning satisfaction: Mediating role of conceptions of vocational education. PloS one, 19(8), e0307392. DOI: https://doi.org/10.1371/journal.pone.0307392

42. Grace, S. C., Mejia, J. M., Inhofe Rapert, M., & Thyroff, A. (2021). Emotional awareness in time of disruption: The impact of tolerance for ambiguity, worry, perceived stress, helpful

communication, and past experience on student satisfaction. Marketing Education Review, 31(3), 226-240. DOI: https://doi.org/10.1080/10528008.2021.1944812

43. Granić, A. (2022). Educational technology adoption: A systematic review. Education and Information Technologies, 27(7), 9725-9744. Retrieved from: https://link.springer.com/article/10.1007/s10639-022-10951-7

44. Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. Research Methods in Applied Linguistics, 1(3), 100027. DOI: https://doi.org/10.1016/j.rmal.2022.100027

45. Haji-Othman, Y., & Yusuff, M. S. S. (2022). Assessing reliability and validity of attitude construct using partial least squares structural equation modeling. Int J Acad Res Bus Soc Sci, 12(5), 378-385. DOI: http://dx.doi.org/10.6007/IJARBSS/v12-i5/13289

46. Halaweh, M., & Salameh, F. F. (2023). Using Social Media Data for Exploring Healthcare Service Quality. International Journal of Healthcare Information Systems and Informatics (IJHISI), 18(1), 1-13. Retrieved from: https://www.igi-global.com/article/using-social-media-data-for-exploring-healthcare-service-quality/325064

47. Han, J. H., & Sa, H. J. (2022). Acceptance of and satisfaction with online educational classes through the technology acceptance model (TAM): The COVID-19 situation in Korea. Asia Pacific Education Review, 23(3), 403-415. Retrieved from: https://link.springer.com/article/10.1007/s12564-021-09716-7

48. Hanaysha, J. R., Shriedeh, F. B., & In'airat, M. (2023). Impact of classroom environment, teacher competency, information and communication technology resources, and university facilities on student engagement and academic performance. International Journal of Information Management Data Insights, 3(2), 100188. DOI: https://doi.org/10.1016/j.jjimei.2023.100188

49. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the academy of marketing science, 43(1), 115-135. Retrieved from: https://link.springer.com/article/10.1007/s11747-014-0403-8

50. Herrera, F., Bailenson, J., Weisz, E., Ogle, E., & Zaki, J. (2018). Building long-term empathy: A large-scale comparison of traditional and virtual reality perspective-taking. PloS one, 13(10), e0204494. DOI: https://doi.org/10.1371/journal.pone.0204494

51. Hiatt, M. S., Lowman, G. H., Maloni, M., Swaim, J., & Veliyath, R. (2023). Ability, benevolence, and integrity: The strong link between student trust in their professors and satisfaction. The International Journal of Management Education, 21(2), 100768. DOI: https://doi.org/10.1016/j.ijme.2023.100768

52. Idayati, I., Kesuma, I. M., Aprianto, R., & Suwarno, S. (2020). The Effect of Service Quality on Citizen's Expectation through Dimension of Tangible, Emphaty, Reliability, Responsiveness and Assurance (TERRA). SRIWIJAYA International Journal of dynamic economics and business, 241-252. Retrieved from: https://philpapers.org/rec/ABURFA

53. Ilieva, G., & Lukanova, G. (2025). SERVICE BEYOND BORDERS: A CROSS-CULTURAL ANALYSIS OF QUALITY PERCEPTION IN HOSPITALITY. *Psychological Research (in the Balkans)*. Retrieved from: https://journalofpsychology.org/index.php/1/article/view/185

54. Ismail, I. J. (2022). I trust friends before I trust companies: The mediation of WOM and brand love on psychological contract fulfilment and repurchase intention. Management Matters, 19(2), 167-186. DOI: https://doi.org/10.1108/MANM-02-2022-0033

55. Ismail, S. M., & Heydarnejad, T. (2023). Probing into the influence of EFL learners' self-assessment and evaluation apprehension in predicting their personal best goals and self-efficacy skills: a structural equation modeling. Language Testing in Asia, 13(1), 8. Retrieved from: https://link.springer.com/article/10.1186/s40468-023-00219-3

56. Ismailova, R., & Inal, Y. (2018). Accessibility evaluation of top university websites: a comparative study of Kyrgyzstan, Azerbaijan, Kazakhstan and Turkey. Universal Access in the Information Society, 17(2), 437-445. Retrieved from: https://link.springer.com/article/10.1007/s10209-017-0541-0

57. Jafarkhani, F., Barani, F., Nawaser, K., Rashidi, H., & Gharleghi, B. (2024). Factors affecting the aesthetic experiences in educational games: A qualitative investigation. Journal of Economy and Technology, 2, 200-207. DOI: https://doi.org/10.1016/j.ject.2024.07.002

58. Jain, M., Dixit, S., & Shukla, A. (2023). Role of e-service quality, brand commitment and e-WOM trust on e-WOM intentions of millennials. *The International Review of Retail, Distribution and Consumer Research*, *33*(1), 23-43. DOI: https://doi.org/10.1080/09593969.2022.2070860

59. Jia, K., Kang, R., Wang, Y., Ma, L., & Liu, X. (2025). Constructing an empathy education system: Values, principles, and approaches. Journal of Moral Education, 1-29. DOI: https://doi.org/10.1080/03057240.2024.2416686

60. Kalmar, E., Aarts, T., Bosman, E., Ford, C., de Kluijver, L., Beets, J., ... & van der Sanden, M. (2022). The COVID-19 paradox of online collaborative education: when you cannot physically meet, you need more social interactions. Heliyon, 8(1). Retrieved from: https://www.cell.com/heliyon/fulltext/S2405-8440(22)00111-6

61. Khan, K., & Gul, M. (2022). The role of soft skills and organizational unfairness between leadership style and employee performance: A quantitative study in educational institutes of Pakistan. IRASD Journal of Management, 4(4), 537-549. DOI: https://doi.org/10.52131/jom.2022.0404.0097

62. Kim, S., Lee, J., Yoon, S. H., & Kim, H. W. (2023). How can we achieve better e-Learning success in the new normal?. Internet Research, 33(1), 410-441. DOI: https://doi.org/10.1108/INTR-05-2021-0310

63. Kobra, K. Unraveling the Complex Web of Student Anxiety: Strategies to Foster Confidence, Motivation, and Well-Being in Learning. International Journal of Research Publication and Reviews, 5(6), 1888-1892. Retrieved from: http://www.ijrpr.com/

64. Laila, U. E., Ahmed, N., Arfeen, A., Ali, A. Y., Khurram, M., & Khan, M. A. (2023). Mission-critical open-source software adoption model validation using Partial Least Square-Structural Equation Modeling. Journal of Software: Evolution and Process, 35(2), e2514. DOI: https://doi.org/10.1002/smr.2514

65. Latif, K. F., Bunce, L., & Ahmad, M. S. (2021). How can universities improve student loyalty? The roles of university social responsibility, service quality, and "customer" satisfaction and trust. International Journal of Educational Management, 35(4), 815-829. DOI: https://doi.org/10.1108/IJEM-11-2020-0524

66. Lee, G. G., & Lin, H. F. (2025). Customer perceptions of e-service quality in online shopping. *International journal of retail & distribution management*, *33*(2), 161-176. DOI: https://doi.org/10.1108/09590550510581485

67. Li, Y., Wu, B., Huang, Y., & Luan, S. (2024). Developing trustworthy artificial intelligence: insights from research on interpersonal, human-automation, and human-AI trust. Frontiers in psychology, 15, 1382693. DOI: https://doi.org/10.3389/fpsyg.2024.1382693

68. Lim, W. M. (2024). A typology of validity: content, face, convergent, discriminant, nomological and predictive validity. Journal of Trade Science, 12(3), 155-179. DOI: https://doi.org/10.1108/JTS-03-2024-0016

69. Linus, A. A., Aladesusi, G. A., Monsur, I. A., & Elizabeth, F. J. (2025). Perceived usefulness, ease of use, and intention to utilize online tools for learning among college of education students. Indonesian Journal of Multidiciplinary Research, 5(1), 41-52. DOI: https://doi.org/10.17509/ijomr.v5i1.81387

70. Lin, X., Mamun, A. A., Yang, Q., & Masukujjaman, M. (2023). Examining the effect of logistics service quality on customer satisfaction and re-use intention. PloS one, 18(5), e0286382. DOI: https://doi.org/10.1371/journal.pone.0286382

71. Liu, H. C., & Yen, J. R. (2014). Effects of distance learning on learning effectiveness. Eurasia journal of mathematics, science and technology education, 10(6), 575-580. DOI: https://doi.org/10.12973/eurasia.2014.1218a

72. Liu, R., Sucala, V. I., Luis, M., & Soliman Khaled, L. (2025). Systematic Review of Service Quality Models in Construction. Buildings, 15(13), 2331. DOI: https://doi.org/10.3390/buildings15132331

73. Ma, X., Khattak, A., Ghani, B., & Huo, M. (2024). Perceived overqualification in higher education institutions: Enhancing employee innovative behavior via creative self-confidence and harmonious workplace climate. Current Psychology, 43(11), 9826-9837. Retrieved from: https://link.springer.com/article/10.1007/s12144-023-05139-2

74. Mohammadi Zenouzagh, Z., Admiraal, W., & Saab, N. (2025). Empowering students' agentive engagement through formative assessment in online learning environment. International Journal of Educational Technology in Higher Education, 22(1), 9. Retrieved from: https://link.springer.com/article/10.1186/s41239-024-00498-7

75. Malik, A. S., Acharya, S., & Humane, S. (2024). Exploring the impact of security technologies on mental health: A comprehensive review. Cureus, 16(2). DOI: https://doi.org/10.7759/cureus.53664

76. Mojtahedzadeh, R., Hasanvand, S., Mohammadi, A., Malmir, S., & Vatankhah, M. (2024). Students' experience of interpersonal interactions quality in e-Learning: A qualitative research. PloS one, 19(3), e0298079. DOI: https://doi.org/10.1371/journal.pone.0298079

77. Malhotra, N., Frech, B., Leeflang, P., Kim, Y. A., & Higson, H. (2023). Understanding how satisfactory service relationships can be mutually beneficial in the higher education context. European Journal of Marketing, 57(2), 562-598. DOI: https://doi.org/10.1108/EJM-05-2021-0345

78. Mamakou, X. J., Zaharias, P., & Milesi, M. (2024). Measuring customer satisfaction in electronic commerce: The impact of e-service quality and user experience. International Journal of Quality & Reliability Management, 41(3), 915-943. DOI: https://doi.org/10.1108/IJQRM-07-2021-0215

79. Margolis, A. A., Sorokova, M. G., & Shvedovskaya, A. A. (2022). Face-to-face, Blended or Online: How do Students Prefer to Study?. Психологическая наука и образование, 27(5). DOI: https://doi.org/10.17759/pse.2022270501

80. Mogaji, E., Viglia, G., Srivastava, P., & Dwivedi, Y. K. (2024). Is it the end of the technology acceptance model in the era of generative artificial intelligence?. International Journal of Contemporary Hospitality Management, 36(10), 3324-3339. DOI: https://doi.org/10.1108/IJCHM-08-2023-1271

81. Murphy, M. P. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary security policy*, *41*(3), 492-505. DOI: https://doi.org/10.1080/13523260.2020.1761749

82. Musaigwa, M., & Netswera, F. (2025). Transforming Insurance: The Impact of Digital Technologies on Operations and Processes. International Journal of Applied Research in Business and Management, 6(1). DOI: https://doi.org/10.51137/wrp.ijarbm.2025.mmti.45818

83. Naidoo, A., Adam, J., & Akpa-Inyang, F. (2024). Enhancing Quality Customer Service Delivery in Higher Education: A Literature-Based Analysis on Student Perceptions and

Challenges within the Financial Aid Department. DOI: https://doi.org/10.46303/ressat.2024.26

84. Naylor, G. S. (2024). A half-century of SERVQUAL: Exploring its impact and future directions in service quality research. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *37*(2), 43-68. Retrieved from: https://jcsdcb.com/index.php/JCSDCB/article/view/1134

85. Nguyen, N. X., Tran, K., & Nguyen, T. A. (2021). Impact of service quality on in-patients' satisfaction, perceived value, and customer loyalty: A mixed-methods study from a developing country. Patient preference and adherence, 2523-2538. DOI: https://doi.org/10.2147/PPA.S333586

86. Nikolopoulou, K. (2022). Face-to-face, online and hybrid education: University students' opinions and preferences. Journal of Digital Educational Technology, 2(2), ep2206. DOI: https://doi.org/10.30935/jdet/12384

87. Nilson, L. B., & Stanny, C. J. (2023). Specifications grading: Restoring rigor, motivating students, and saving faculty time. Routledge. DOI: https://doi.org/10.4324/9781003447061

88. Niu, Z., Huang, L., He, H., Mei, S., Li, L., & Griffiths, M. D. (2024). The revised patient satisfaction questionnaire (PSQ-R): validity, reliability, equivalence, and network analysis among hospitalized patients in the Chinese population. BMC Health Services Research, 24(1), 1289. Retrieved from: https://link.springer.com/article/10.1186/s12913-024-11788-1

89. Nooh, M. N., & Nazri, F. N. (2025). The Impact of Service Quality on University Students' Satisfaction with Islamic Banks. Journal of Management & Marketing Review (JMMR), 10(1). DOI: https://doi.org/10.35609/jmmr.2025.10.1(3)

90. Nuryakin, N., Rakotoarizaka, N. L. P., & Musa, H. G. (2023). The effect of perceived usefulness and perceived easy to use on student satisfaction the mediating role of attitude to use online learning. APMBA (Asia Pacific Management and Business Application), 11(3), 323-336. DOI: https://doi.org/10.21776/ub.apmba.2023.011.03.5

91. Pan, M. P. (2025). Online Service Quality Assessment in Higher Education: Development, Validation, and Implementation of an e-Tool. South Asian Journal of Social Studies and Economics, 22(1), 38-52. DOI: https://doi.org/10.9734/sajsse/2025/v22i1943

92. Pruitt, V. R. M. (2025). FROM CLIMATE TO MOTIVATION: UNDERSTANDING THE IMPACT OF RACIAL CAMPUS ENVIRONMENTS ON BLACK GRADUATE STUDENTS (Doctoral dissertation, Purdue University Graduate School). DOI: https://doi.org/10.25394/PGS.30680765

93. Qing, W., Amin, M. B., Gazi, M. A. I., Khan, W., Al Masud, A., & Alam, M. N. (2023). Mediation effect of technology adaptation capabilities between the relationship of service quality attributes and customer satisfaction: an investigation on young customers perceptions toward e-commerce in China. Ieee Access, 11, 123904-123923. DOI: https://doi.org/10.1109/ACCESS.2023.3328775

94. Rahman, M. M., & Nasrin, S. (2024). Perceived service quality at higher education institutions: A study on the success factors of total quality management practices in Bangladesh. Social Sciences & Humanities Open, 10, 100997. DOI: https://doi.org/10.1016/j.ssaho.2024.100997

95. Ramzi, O. I., Subbarayalu, A. V., Al-Kahtani, N. K., Al Kuwaiti, A., Alanzi, T. M., Alaskar, A., ... & Alameri, N. S. (2022). Factors influencing service quality performance of a Saudi higher education institution: Public health program students' perspectives. Informatics in Medicine Unlocked, 28, 100841. DOI: https://doi.org/10.1016/j.imu.2021.100841

96. Roh, S., Haddoud, M. Y., Onjewu, A. K. E., Jang, H., & Thai, V. (2025). Revisiting the impact of container port service quality on customer satisfaction: A configuration approach. Transport Policy, 162, 221-231. DOI: https://doi.org/10.1016/j.tranpol.2024.12.008

97. Roemer, E., Schuberth, F., & Henseler, J. (2021). HTMT2–an improved criterion for assessing discriminant validity in structural equation modeling. Industrial management & data systems, 121(12), 2637-2650. DOI: https://doi.org/10.1108/IMDS-02-2021-0082

98. Rolo, A., Alves, R., Saraiva, M. and Leandro, G., 2023. The SERVQUAL instrument to measure service quality in higher education–A case study. In shs Web of Conferences (Vol. 160, p. 01011). EDP Sciences. DOI: https://doi.org/10.1051/shsconf/202316001011

99. ROMANOVSKA, L., & NOVAK, M. (2024). The role of teacher-student relationships in providing social and psychological support to participants of the educational process. Social work and education, 11(2), 308-319. DOI: https://doi.org/10.25128/2520-6230.24.2.11

100. Rong, Y., Leemann, T., Nguyen, T. T., Fiedler, L., Qian, P., Unhelkar, V., ... & Kasneci, E. (2023). Towards human-centered explainable ai: A survey of user studies for model explanations. IEEE transactions on pattern analysis and machine intelligence, 46(4), 2104-2122. DOI: https://doi.org/10.1109/TPAMI.2023.3331846

101. Roslan, R., Ayub, A. F. M., Ghazali, N., & Zulkifli, N. N. (2021). THE INFLUENCE OF PERCEIVED EASE OF USE, PERCEIVED USEFULNESS, SOCIAL INFLUENCE, AND PERCEIVED ENJOYMENT TOWARDS CONTINUANCE INTENTION IN USING A GAMIFIED E-QUIZ MOBILE APPLICATION. Journal of Institutional Research South East Asia, 19(2). Retrieved from: https://www.seaairweb.info/journal/articles/JIRSEA_v19_n02/JIRSEA_v19_n02_All.pdf#page=275

102. Samudro, A., Sumarwan, U., Simanjuntak, M., & Yusuf, E. Z. (2020). Assessing the effects of perceived quality and perceived value on customer satisfaction. *Management Science Letters*, *10*(5), 1077-1084. DOI: https://doi.org/10.5267/j.msl.2019.11.001

103. Sankalaite, S., Huizinga, M., Pollé, S., Xu, C., De Vries, N., Hens, E., & Baeyens, D. (2023). A qualitative study into teacher–student interaction strategies employed to support primary school children's working memory. Education Sciences, 13(11), 1149. DOI: https://doi.org/10.3390/educsci13111149

104. Sayaf, A. M., Alamri, M. M., Alqahtani, M. A., & Alrahmi, W. M. (2022). Factors influencing university students' adoption of digital learning technology in teaching and learning. Sustainability, 14(1), 493. DOI: https://doi.org/10.3390/su14010493

105. Schiavone, F., Pietronudo, M. C., Sabetta, A., & Ferretti, M. (2023). Total quality service in digital era. The TQM Journal, 35(5), 1170-1193. DOI: https://doi.org/10.1108/TQM-12-2021-0377

106. Selwyn, N., Hillman, T., Bergviken Rensfeldt, A., & Perrotta, C. (2023). Digital technologies and the automation of education—key questions and concerns. Postdigital Science and Education, 5(1), 15-24. Retrieved from: https://link.springer.com/article/10.1007/S42438-021-00263-3

107. Seo, Y. J., & Um, K. H. (2023). The role of service quality in fostering different types of perceived value for student blended learning satisfaction. *Journal of Computing in*

Higher Education, *35*(3), 521-549. Retrieved from: https://link.springer.com/article/10.1007/s12528-022-09336-z

108. Seow, C. W., & Hussain, T. (2024). Assessing institutional image's influence on student satisfaction and loyalty in Singapore's higher education: A study on higher learning institution students. Acta Psychologica, 248, 104412. DOI: https://doi.org/10.1016/j.actpsy.2024.104412

109. Seitova, V. (2024). Innovative technologies in education: A case study of implementation in Kazakhstan. Eurasian Science Review An International Peer-Reviewed Multidisciplinary Journal, 2(3), 187-200. DOI: https://doi.org/10.63034/esr-77

110. Setiono, B. A., & Hidayat, S. (2022). Influence of service quality with the dimensions of reliability, responsiveness, assurance, empathy and tangibles on customer satisfaction. International Journal of Economics, Business and Management Research, 6(09), 330-341. DOI: http://dx.doi.org/10.51505/ijebmr.2022.6924

111. Shang, H., & Sivaparthipan, C. B. (2022). Interactive teaching using human-machine interaction for higher education systems. Computers and Electrical Engineering, 100, 107811. DOI: https://doi.org/10.1016/j.compeleceng.2022.107811

112. Shela, V., Ramayah, T., Aravindan, K. L., Ahmad, N. H., & Alzahrani, A. I. (2023). Run! This road has no ending! A systematic review of PLS-SEM application in strategic management research among developing nations. Heliyon, 9(12). Retrieved from: https://www.cell.com/heliyon/fulltext/S2405-8440(23)09684-6

113. Sheng, W., Fan, Z., & Weng, S. (2025). Enhancing student satisfaction in educational management: A Bayesian analysis of influential factors and improvement strategies. *Journal of the Knowledge Economy*, *16*(2), 5793-5830. Retrieved from: https://link.springer.com/article/10.1007/s13132-023-01672-4

114. Shi, A., Huo, F., & Han, D. (2021). Role of interface design: A comparison of different online learning system designs. Frontiers in Psychology, 12, 681756. DOI: https://doi.org/10.3389/fpsyg.2021.681756

115. Singh, S., & Jasial, S. S. (2021). Moderating effect of perceived trust on service quality–student satisfaction relationship: evidence from Indian higher management education institutions. Journal of Marketing for Higher Education, 31(2), 280-304. DOI: https://doi.org/10.1080/08841241.2020.1825029

116.	Singh, V., Sharma, M. P., Jayapriya, K., Kumar, B. K., Chander, M. A. R. N., & Kumar, B. R. (2023). Service quality, customer satisfaction and customer loyalty: A comprehensive literature review. Journal of Survey in Fisheries Sciences, 10(4S), 3457-3464. Retrieved from: https://www.researchgate.net/profile/Vikas-Singh49/publication/371809524_Service_Quality_Customer_Satisfaction_And_Customer_Loyalty_A_Comprehensive_Literature_Review/links/64965cd18de7ed28ba5231c4/Service-Quality-Customer-Satisfaction-And-Customer-Loyalty-A-Comprehensive-Literature-Review.pdf

117.	Stribbell, H., & Duangekanong, S. (2022). Satisfaction as a key antecedent for word of mouth and an essential mediator for service quality and brand trust in international education. Humanities and Social Sciences Communications, 9(1), 1-11. Retrieved from: https://www.nature.com/articles/s41599-022-01459-z

118.	Sukhera, J., & Poleksic, J. (2021). Adapting compassion education through technology-enhanced learning: an exploratory study. Academic Medicine, 96(7), 1013-1020. DOI: https://doi.org/10.1097/ACM.0000000000003915

119.	Sureshchandar, G. S. (2023). Quality 4.0–a measurement model using the confirmatory factor analysis (CFA) approach. International Journal of Quality & Reliability Management, 40(1), 280-303. DOI: https://doi.org/10.1108/IJQRM-06-2021-0172

120.	Sumi, R. S., & Kabir, G. (2021). Satisfaction of e-learners with electronic learning service quality using the servqual model. Journal of Open Innovation: Technology, Market, and Complexity, 7(4), 227. DOI: https://doi.org/10.3390/joitmc7040227

121.	Tang, Y., & Hew, K. F. (2022). Effects of using mobile instant messaging on student behavioral, emotional, and cognitive engagement: a quasi-experimental study. International Journal of Educational Technology in Higher Education, 19(1), 3. Retrieved from: https://link.springer.com/article/10.1186/s41239-021-00306-6

122.	Teeroovengadum, V., Nunkoo, R., Gronroos, C., Kamalanabhan, T. J., & Seebaluck, A. K. (2019). Higher education service quality, student satisfaction and loyalty: Validating the HESQUAL scale and testing an improved structural model. Quality assurance in education, 27(4), 427-445. DOI: https://doi.org/10.1108/QAE-01-2019-0003

123.	TIME, P. R. (2024). Understanding the Relative Influence of Perceived Response Time and Perceived Visual Appeal on Satisfaction and Net Benefits From Self-service

Business Intelligence Systems (Doctoral dissertation, Alliance University). Retrieved from: https://www.proquest.com/openview/0e243fbf15de477066e2788b16ca728e/1?pq-origsite=gscholar&cbl=2026366&diss=y

124.   Trisnantya, Z. A., Wolor, C. W., & Swaramarinda, D. R. (2025, April). The Influence Of Responsiveness And Ease Of Access To Online Administrative Services On Student Satisfaction At The Faculty Of Economics, Jakarta State University. In International Student Conference on Business, Education, Economics, Accounting, and Management (ISC-BEAM) (Vol. 3, No. 1, pp. 1620-1627). DOI: https://doi.org/10.21009/ISC-BEAM.013.124

125.   Türkdemir, P., Yıldız, E., & Ateş, M. F. (2023). The acquirements of e-service quality in fashion e-storescapes: mediating effect in an SOR model. International Journal of Retail & Distribution Management, 51(6), 755-772. DOI: https://doi.org/10.1108/IJRDM-03-2022-0085

126.   Twum, K. K., Kwakwa, P. A., Hinson, R. E., Yeboah, C. O. A., & Korang-Yeboah, B. (2025). Emotional intelligence, student trust and student satisfaction in higher education institutions. SN Social Sciences, 5(7), 79. Retrieved from: https://link.springer.com/article/10.1007/s43545-025-01117-6

127.   Vlasenko, K. V., Volkov, S. V., Lovianova, I. V., Sitak, I. V., Chumak, O. O., & Bohdanova, N. H. (2023). Exploring usability principles for educational online courses: a case study on an open platform for online education. Educational Technology Quarterly, 2023(2), 173-187. DOI: https://doi.org/10.55056/etq.602

128.   Walia, S. B., & Kumar, H. (2022). Impact of perceived quality, perceived value and perceived price on satisfaction and purchase intention towards eco-friendly products. International Journal of Green Economics, 16(2), 101-114. DOI: https://doi.org/10.1504/IJGE.2022.127909

129.   Wang, M., Mehrotra, S., Wong, N., Parker, J. I., Roberts, S. C., Kim, W., ... & Horrey, W. J. (2024). Human-Machine interfaces and vehicle Automation: A review of the literature and recommendations for system Design, Feedback, and alerts. Transportation Research Part F: Traffic Psychology and Behaviour, 107, 549-561. DOI: https://doi.org/10.1016/j.trf.2024.08.014

130.   Wang, W., Wu, Q., Li, D., & Tian, X. (2025). An exploration of the influencing factors of privacy fatigue among mobile social media users from the configuration perspective. Scientific Reports, 15(1), 427. Retrieved from: https://www.nature.com/articles/s41598-024-84646-z

131.   Wang, Y. (2025). Pupil competence during the COVID-19-induced school closures: an analysis of the effect of distance learning and remediation policies using international assessment data in 30 countries (Doctoral dissertation, University of Southampton). Retrieved from: http://eprints.soton.ac.uk/id/eprint/504266

132.   White, E. S. (2021). Service-learning to develop responsiveness among preservice teachers. International Journal for the Scholarship of Teaching and Learning, 15(1), 9. DOI: https://doi.org/10.20429/ijsotl.2021.150109

133.   Widayanti, N. K. A., & Suarnajaya, I. W. (2021). Students challenges in learning English online classes. Jurnal Pendidikan Bahasa Inggris Undiksha, 9(1), 77-84. DOI: https://doi.org/10.23887/jpbi.v9i1.34465

134.   Yoda, F. S. (2025). *The influence of online survey design on data quality in social science and consumer behavior studies* (Doctoral dissertation, Universidade de São Paulo).DOI:
https://doi.org/10.11606/T.12.2025.tde-31102025-163025

135.   Yu, M., Wang, H., & Xia, G. (2022). The review on the role of ambiguity of tolerance and resilience on students' engagement. Frontiers in Psychology, 12, 828894. DOI: https://doi.org/10.3389/fpsyg.2021.828894

136.   Yusif, S., Hafeez-Baig, A., Soar, J., & Teik, D. O. L. (2020). PLS-SEM path analysis to determine the predictive relevance of e-Health readiness assessment model. Health and Technology, 10(6), 1497-1513. Retrieved from: https://link.springer.com/article/10.1007/s12553-020-00484-9

137.   Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. Journal of marketing, 60(2), 31-46. DOI: https://doi.org/10.1177/002224299606000203

138.   Zheng, Y., & Xiao, A. (2024). A structural equation model of online learning: investigating self-efficacy, informal digital learning, self-regulated learning, and course

satisfaction. Frontiers in Psychology, 14, 1276266. DOI: https://doi.org/10.3389/fpsyg.2023.1276266

139.   Zhou, S., & Kodama Muscente, K. (2023). Meta-analysis of volunteer motives using the volunteer functions inventory to predict volunteer satisfaction, commitment, and behavior. Nonprofit and Voluntary Sector Quarterly, 52(5), 1331-1356. DOI: https://doi.org/10.1177/08997640221129540

140.   Ziatdinov, R. and Cilliers, J., 2022. Generation Alpha: Understanding the next cohort of university students. arXiv preprint arXiv:2202.01422. DOI: https://doi.org/10.48550/arXiv.2202.01422

APPENDIX

Appendix-1

Part-1

Questionnaire-A: Survey Questionnaire for Factors' Influencing Perceived Service Quality in Physical and Online Educational Services

Dear Respondent,

I am a Master's student at *Vilnius University Business School* conducting academic research on **"Factors Influencing Perceived Service Quality in Physical and Online Educational Services."** The purpose of this study is to explore how students evaluate the quality of online educational services, including both human and technological aspects, and how these factors influence trust, satisfaction, and learning preferences.

You are kindly invited to participate in this research by answering a short survey about your experiences with online learning platforms or courses at your institution. Your responses will help identify key strengths and challenges that shape students' perceptions of online service quality. Your participation will contribute valuable insights to academic research and help universities enhance the effectiveness, trust, and satisfaction of digital education systems.

Thank you very much for your time and thoughtful contribution.

Scale:

1 – Strongly Disagree   2 – Disagree   3 – Neutral   4 – Agree   5 – Strongly Agree

1. Have you participated in any online courses or virtual classes during your current study program?

● Yes

● No

2. Do you have regular access to an internet connection and an online learning platform (e.g., Zoom, Google Classroom, Google Meet, MS Teams etc.)?

● Yes

● No

SECTION 1: STIMULUS (S) – HUMAN FACTORS

1. **Reliability: Please indicate how much you agree with each statement regarding reliability of your online vs physical learning experience from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
1	Classes are conducted more regularly and on time in physical mode than in online mode.					
2	Online platforms make it easier to access updated materials compared to physical classes.					
3	Assessment schedules are followed more strictly in physical education.					
4	Online learning faces more interruptions (e.g., connectivity, delays) than physical learning.					
5	My institution delivers promised course services more reliably in both modes.					

2. **Responsiveness: Please indicate how responsive your institution and instructors are during both online and physical learning activities from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5

6	Teachers respond more quickly to student queries in physical classes than in online platforms.					
7	Online communication tools (e.g., chat, email, forums) make responses faster than face-to-face discussions.					
8	Academic or administrative staff are more accessible in physical settings.					
9	Technical help is easier to get in online learning environments.					
10	I receive faster feedback and support in physical mode compared to the online mode.					

3. **Assurance: Please indicate how secure and confident you feel in your institution's online services and teaching quality from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
11	I have more confidence in the fairness of grading in physical assessments.					
12	Instructors maintain professionalism equally in both online and physical modes.					
13	Online platforms provide a secure and transparent system for exams and submissions.					
14	I trust the institution's policies and communication more in physical education.					

No	Statements	1	2	3	4	5
15	I feel more confident that my learning progress is accurately evaluated in both modes.					

4. **Empathy: Please rate how much care, understanding, and personal attention you receive from instructors and staff in online and physical classes from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
16	Teachers understand my learning challenges better in physical classes.					
17	Online instructors are supportive when students face personal or technical difficulties.					
18	I receive more personalized guidance in physical education than in online learning.					
19	Teachers show equal concern for student well-being in both learning modes.					
20	I feel emotionally more connected to my instructors in physical mode than online.					

SECTION 2: STIMULUS (S) – TECHNOLOGICAL FACTORS

1. **Environment/Tangibility: Please indicate how you perceive the visual appearance and structural design of your learning platform. Consider aspects such as clarity, organization, attractiveness, and ease of finding materials from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
21	The classroom environment supports concentration and participation better than the online environment.					

No	Statements					
22	The design and layout of online learning platforms make studying easier and more convenient.					
23	Physical facilities (e.g., labs, classrooms, libraries) provide a higher sense of quality than digital resources.					
24	I find learning materials more visually organized and accessible online than in printed or physical formats.					
25	Online learning environment offers a more professional and effective setup than physical.					

2. **Usability / Ease of Use: Please rate how easy or difficult it is to use your online and offline learning systems for study-related tasks from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
26	Online systems are easy to navigate and understand.					
27	Physical learning processes (attendance, materials, submissions) are simpler than online.					
28	I find online platforms more convenient for accessing study resources.					
29	The learning process feels smoother and less confusing in physical mode than online.					
30	I rarely face usability problems such as login errors, navigation issues, or confusion in either mode.					

3. **Security & Privacy: Please rate how secure and private you feel when using online learning systems from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
31	I feel safer sharing academic information in physical classes than in online platforms.					
32	Online platforms protect student data and privacy effectively.					
33	I trust my institution to maintain secure digital learning systems.					
34	Physical campuses ensure a safer environment for learning interactions.					
35	I believe physical learning mode provides higher security and privacy protection than online.					

SECTION 3: ORGANISM (O)

1. **Perceived Service Quality: Please indicate how satisfied you are with the overall quality of educational services provided by your institution. Consider aspects such as teaching effectiveness, consistency, reliability, and how well the institution meets your learning expectations from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
36	Teaching quality is higher in physical education than in online education.					
37	Online classes provide similar academic value as physical classes.					
38	My institution maintains consistent standards of education across both modes.					

No	Statements	1	2	3	4	5
39	I find learning outcomes easier to achieve in physical mode than online mode.					
40	The quality of educational services meets my expectations in both modes.					

2. **Trust: Please indicate how much you trust your institution and instructors from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
41	I trust my institution more in physical education than in online education.					
42	Online assessments are as fair and transparent as physical examinations.					
43	I feel confident in the honesty of grading in both modes.					
44	Institutional communication is more open and reliable in physical mode.					
45	I trust that both learning modes provide equal opportunities for all students.					

SECTION 4: RESPONSE (R)

1. **Satisfaction: Please indicate how satisfied you feel with your overall learning experience. Consider how well your expectations have been met, how enjoyable the process has been, and how pleased you are with the services and support provided by your institution from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
46	I am more satisfied with physical learning experiences than online ones.					

No	Statements	1	2	3	4	5
47	Online education provides better flexibility but less interaction.					
48	My overall learning satisfaction is influenced by the quality of teaching and communication.					
49	I am happy with how my institution manages both online and physical learning.					
50	I feel more academically fulfilled in physical mode than online mode.					

2. **Mode Preference: Please indicate your level of agreement with statements about your preferred mode of study based on your experience from 1 to 5, where 1 (strongly disagree) and 5 (strongly agree)**

No	Statements	1	2	3	4	5
51	I prefer physical learning because it enhances engagement and understanding.					
52	I prefer online learning because it offers convenience and flexibility.					
53	I would choose a hybrid learning model combining both formats.					
54	My satisfaction determines which mode I prefer for future studies.					
55	Based on experience, I believe one mode clearly provides better service quality overall.					

PART-2: Demographic Questions.

1. Gender: ☐ Male   ☐ Female   ☐ Prefer not to say

2. Age: ☐ Under 20   ☐ 21–25   ☐ 26–30   ☐ Above 30

3. Education Level: ☐ Undergraduate   ☐ Graduate   ☐ Post-Graduate   ☐ Doctorate

4. Mode of Study: ☐ Full-time   ☐ Part-time

5. Country of Study: _____

6. Duration of Enrollment: ☐ Less than 1 year   ☐ 1–2 years   ☐ More than 3 years

Appendix-2:

PLS-SEM Screenshots

1. *PLS-SEM Algorithm*

2. Outer-loading

	As	Emp	MP	PSQ	Rel	Res	Sat	Sec	Tan	Tru	Us
As1	0.894										
As2	0.887										
As3	0.873										
As4	0.865										
As5	0.850										
Emp1		0.872									
Emp2		0.879									
Emp3		0.911									
Emp4		0.933									
Emp5		0.887									
MP1			0.868								
MP2			0.870								
MP3			0.932								
MP4			0.929								
MP5			0.884								
PSQ1				0.878							
PSQ2				0.888							
PSQ3				0.917							
PSQ4				0.879							
PSQ5				0.869							
Rel1					0.864						
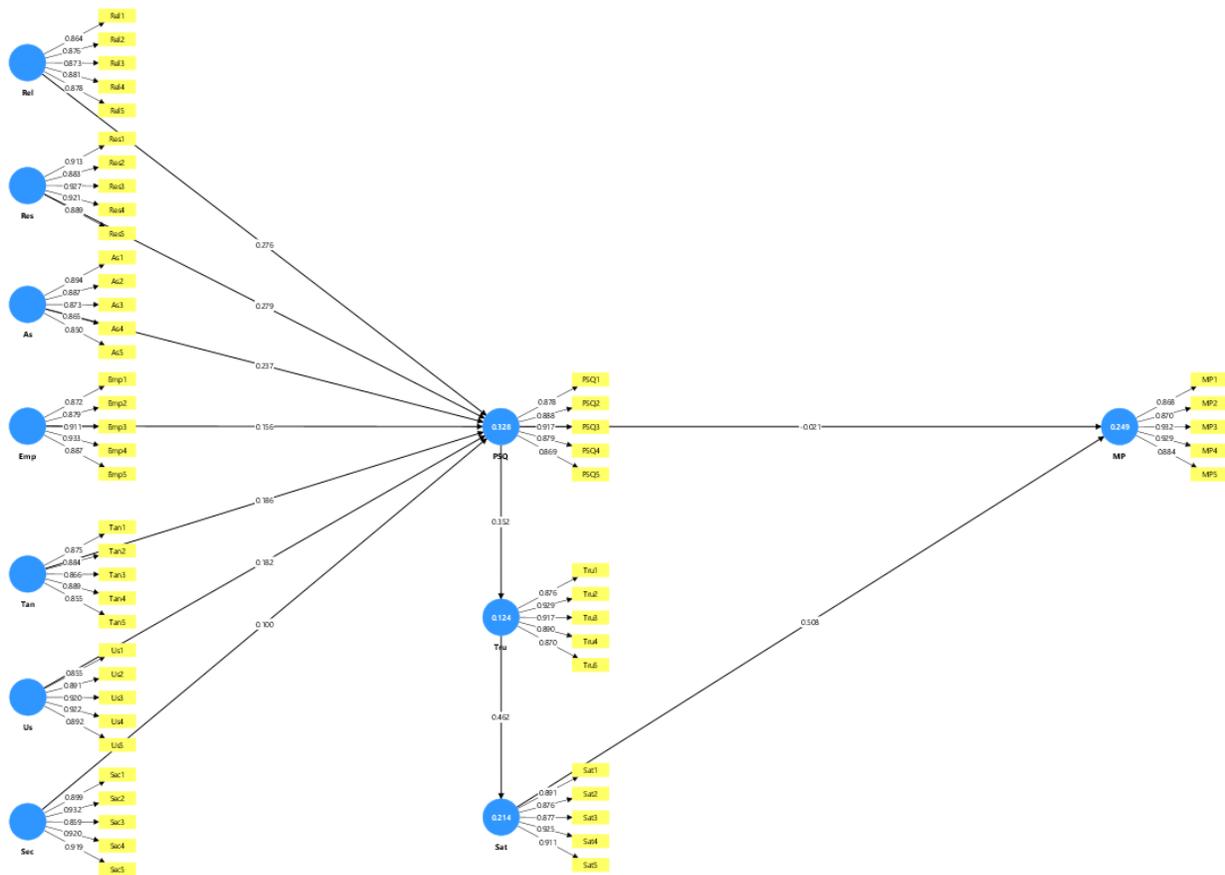
Outer loadings - Matrix

	As	Emp	MP	PSQ	Rel	Res	Sat	Sec	Tan	Tru	Us
Rel1					0.864						
Rel2					0.876						
Rel3					0.873						
Rel4					0.881						
Rel5					0.878						
Res1						0.913					
Res2						0.883					
Res3						0.927					
Res4						0.921					
Res5						0.889					
Sat1							0.891				
Sat2							0.876				
Sat3							0.877				
Sat4							0.925				
Sat5							0.911				
Sec1								0.899			
Sec2								0.932			
Sec3								0.859			
Sec4								0.920			
Sec5								0.919			
Tan1									0.875		
Tan2									0.884		
Tan3									0.866		
Tan4									0.889		
Tan5									0.855		
Tru1										0.876	
Tru2										0.929	
Tru3										0.917	
Tru4										0.890	
Tru5										0.870	
Us1											0.855
Us2											0.891
Us3											0.920
Us4											0.922
Us5											0.892

3. Collinearity Statistics (VIF)

	As	Emp	MP	PSQ	Rel	Res	Sat	Sec	Tan	Tru	Us
Collinearity statistics (VIF) - Inner model - Matrix											
As				1.004							
Emp				1.002							
MP											
PSQ			1.242							1.000	
Rel				1.003							
Res				1.007							
Sat			1.242								
Sec				1.003							
Tan				1.005							
Tru							1.000				
Us				1.004							

4. Construct Reliability and Validity

Construct reliability and validity - Overview   Copy to

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE) ▲
As	0.923	0.943	0.942	0.764
Rel	0.923	0.923	0.942	0.764
Tan	0.924	0.948	0.942	0.764
PSQ	0.932	0.932	0.948	0.786
Sat	0.939	0.940	0.953	0.803
Us	0.939	0.947	0.953	0.803
Emp	0.939	0.958	0.953	0.804
Tru	0.939	0.940	0.954	0.804
MP	0.939	0.942	0.954	0.805
Sec	0.947	0.982	0.958	0.821
Res	0.946	0.948	0.959	0.822

5. Discriminant Validity

Discriminant validity - Heterotrait-monotrait ratio (HTMT) - Matrix											
	As	Emp	MP	PSQ	Rel	Res	Sat	Sec	Tan	Tru	Us
As											
Emp	0.040										
MP	0.065	0.071									
PSQ	0.266	0.160	0.215								
Rel	0.039	0.026	0.056	0.294							
Res	0.034	0.032	0.057	0.320	0.035						
Sat	0.103	0.083	0.529	0.473	0.123	0.179					
Sec	0.038	0.047	0.042	0.116	0.055	0.053	0.053				
Tan	0.056	0.037	0.043	0.198	0.036	0.053	0.089	0.043			
Tru	0.069	0.058	0.294	0.375	0.113	0.124	0.492	0.049	0.067		
Us	0.049	0.038	0.119	0.210	0.045	0.048	0.149	0.031	0.048	0.031	

6. Path Coefficients

Path coefficients - Mean, STDEV, T values, p values					
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As -> PSQ	0.237	0.239	0.041	5.798	0.000
Emp -> PSQ	0.156	0.158	0.042	3.693	0.000
PSQ -> MP	-0.021	-0.023	0.050	0.433	0.665
PSQ -> Tru	0.352	0.353	0.048	7.387	0.000
Rel -> PSQ	0.276	0.275	0.041	6.649	0.000
Res -> PSQ	0.279	0.279	0.042	6.674	0.000
Sat -> MP	0.508	0.510	0.045	11.166	0.000
Sec -> PSQ	0.100	0.104	0.044	2.269	0.023
Tan -> PSQ	0.186	0.189	0.041	4.535	0.000
Tru -> Sat	0.462	0.463	0.042	11.059	0.000
Us -> PSQ	0.182	0.184	0.040	4.573	0.000

7. R-square

R-square - Mean, STDEV, T values, p values					
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
MP	0.249	0.254	0.039	6.386	0.000
PSQ	0.328	0.346	0.037	8.925	0.000
Sat	0.214	0.216	0.039	5.531	0.000
Tru	0.124	0.127	0.034	3.699	0.000

8. f-square

f-square - Mean, STDEV, T values, p values					Copy to Exce
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As -> PSQ	0.083	0.089	0.032	2.629	0.009
Emp -> PSQ	0.036	0.040	0.021	1.725	0.085
PSQ -> MP	0.000	0.003	0.004	0.112	0.911
PSQ -> Tru	0.141	0.147	0.045	3.168	0.002
Rel -> PSQ	0.113	0.117	0.038	3.006	0.003
Res -> PSQ	0.115	0.120	0.038	3.053	0.002
Sat -> MP	0.276	0.285	0.063	4.357	0.000
Sec -> PSQ	0.015	0.019	0.013	1.127	0.260
Tan -> PSQ	0.051	0.056	0.024	2.132	0.033
Tru -> Sat	0.272	0.279	0.064	4.248	0.000
Us -> PSQ	0.049	0.053	0.023	2.140	0.032

9. Average Variance Extracted (AVE)

Average variance extracted (AVE) - Mean, STDEV, T values, p values					Cop
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As	0.764	0.762	0.015	50.046	0.000
Emp	0.804	0.798	0.037	21.912	0.000
MP	0.805	0.804	0.013	61.760	0.000
PSQ	0.786	0.785	0.014	55.840	0.000
Rel	0.764	0.764	0.015	51.578	0.000
Res	0.822	0.822	0.012	70.241	0.000
Sat	0.803	0.803	0.013	62.894	0.000
Sec	0.821	0.798	0.091	9.049	0.000
Tan	0.764	0.761	0.022	35.189	0.000
Tru	0.804	0.804	0.013	63.820	0.000
Us	0.803	0.802	0.014	57.300	0.000

10. Composite Reliability (rho_c)

Composite reliability (rho_c) - Mean, STDEV, T values, p values					Copy
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As	0.942	0.941	0.005	200.820	0.000
Emp	0.953	0.951	0.024	40.506	0.000
MP	0.954	0.954	0.004	258.769	0.000
PSQ	0.948	0.948	0.004	230.120	0.000
Rel	0.942	0.942	0.005	208.291	0.000
Res	0.959	0.958	0.003	299.889	0.000
Sat	0.953	0.953	0.004	263.363	0.000
Sec	0.958	0.945	0.080	11.910	0.000
Tan	0.942	0.940	0.016	58.622	0.000
Tru	0.954	0.953	0.004	267.434	0.000
Us	0.953	0.953	0.004	231.484	0.000

11. Composite Reliability (rho_a)

Composite reliability (rho_a) - Mean, STDEV, T values, p values					Cop
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As	0.943	0.955	0.029	32.643	0.000
Emp	0.958	0.958	0.290	3.301	0.001
MP	0.942	0.944	0.005	200.554	0.000
PSQ	0.932	0.933	0.006	163.614	0.000
Rel	0.923	0.930	0.009	107.502	0.000
Res	0.948	0.953	0.007	140.422	0.000
Sat	0.940	0.940	0.005	192.035	0.000
Sec	0.982	0.877	0.741	1.324	0.185
Tan	0.948	0.961	0.104	9.080	0.000
Tru	0.940	0.942	0.005	193.983	0.000
Us	0.947	0.959	0.036	26.127	0.000

12. Cronbach's Alpha

Cronbach's alpha - Mean, STDEV, T values, p values					Copy
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As	0.923	0.923	0.006	149.102	0.000
Emp	0.939	0.939	0.005	187.743	0.000
MP	0.939	0.939	0.005	184.677	0.000
PSQ	0.932	0.931	0.006	162.079	0.000
Rel	0.923	0.923	0.006	146.041	0.000
Res	0.946	0.946	0.004	219.299	0.000
Sat	0.939	0.938	0.005	187.593	0.000
Sec	0.947	0.946	0.004	218.438	0.000
Tan	0.924	0.924	0.006	147.701	0.000
Tru	0.939	0.939	0.005	190.587	0.000
Us	0.939	0.939	0.005	185.087	0.000

13. Heterotrait-monotrait ratio (HTMT)

Heterotrait-monotrait ratio (HTMT) - Confidence intervals				
	Original sample (O)	Sample mean (M)	2.5%	97.5%
Emp <-> As	0.040	0.072	0.040	0.133
MP <-> As	0.065	0.084	0.041	0.164
MP <-> Emp	0.071	0.085	0.038	0.176
PSQ <-> As	0.266	0.266	0.160	0.371
PSQ <-> Emp	0.160	0.160	0.058	0.267
PSQ <-> MP	0.215	0.214	0.116	0.312
Rel <-> As	0.039	0.068	0.034	0.142
Rel <-> Emp	0.026	0.063	0.032	0.134
Rel <-> MP	0.056	0.081	0.048	0.142
Rel <-> PSQ	0.294	0.293	0.190	0.395
Res <-> As	0.034	0.066	0.034	0.133
Res <-> Emp	0.032	0.063	0.028	0.134
Res <-> MP	0.057	0.074	0.029	0.164
Res <-> PSQ	0.320	0.319	0.214	0.419
Res <-> Rel	0.035	0.064	0.036	0.121
Sat <-> As	0.103	0.115	0.059	0.202
Sat <-> Emp	0.083	0.098	0.045	0.195
Sat <-> MP	0.529	0.529	0.446	0.608
Sat <-> PSQ	0.473	0.473	0.382	0.558
Sat <-> Rel	0.123	0.128	0.055	0.224
Sat <-> Res	0.179	0.179	0.077	0.284

Heterotrait-monotrait ratio (HTMT) - Confidence intervals				
	Original sample (O)	Sample mean (M)	2.5%	97.5%
Sec <-> As	0.038	0.069	0.036	0.135
Sec <-> Emp	0.047	0.070	0.039	0.130
Sec <-> MP	0.042	0.067	0.030	0.147
Sec <-> PSQ	0.116	0.122	0.044	0.223
Sec <-> Rel	0.055	0.080	0.049	0.138
Sec <-> Res	0.053	0.076	0.037	0.153
Sec <-> Sat	0.053	0.073	0.036	0.150
Tan <-> As	0.056	0.079	0.043	0.151
Tan <-> Emp	0.037	0.069	0.038	0.129
Tan <-> MP	0.043	0.072	0.042	0.136
Tan <-> PSQ	0.198	0.200	0.108	0.296
Tan <-> Rel	0.036	0.068	0.036	0.138
Tan <-> Res	0.053	0.077	0.035	0.161
Tan <-> Sat	0.089	0.102	0.051	0.185
Tan <-> Sec	0.043	0.069	0.039	0.129
Tru <-> As	0.069	0.087	0.053	0.145
Tru <-> Emp	0.058	0.076	0.030	0.168
Tru <-> MP	0.294	0.295	0.188	0.400
Tru <-> PSQ	0.375	0.375	0.272	0.472
Tru <-> Rel	0.113	0.120	0.048	0.220
Tru <-> Res	0.124	0.126	0.043	0.233

Heterotrait-monotrait ratio (HTMT) - Confidence intervals

	Original sample (O)	Sample mean (M)	2.5%	97.5%
Tan <-> Sat	0.089	0.102	0.051	0.185
Tan <-> Sec	0.043	0.069	0.039	0.129
Tru <-> As	0.069	0.087	0.053	0.145
Tru <-> Emp	0.058	0.076	0.030	0.168
Tru <-> MP	0.294	0.295	0.188	0.400
Tru <-> PSQ	0.375	0.375	0.272	0.472
Tru <-> Rel	0.113	0.120	0.048	0.220
Tru <-> Res	0.124	0.126	0.043	0.233
Tru <-> Sat	0.492	0.492	0.405	0.575
Tru <-> Sec	0.049	0.073	0.038	0.146
Tru <-> Tan	0.067	0.082	0.035	0.170
Us <-> As	0.049	0.074	0.037	0.155
Us <-> Emp	0.038	0.069	0.035	0.137
Us <-> MP	0.119	0.124	0.047	0.224
Us <-> PSQ	0.210	0.211	0.110	0.312
Us <-> Rel	0.045	0.070	0.037	0.135
Us <-> Res	0.048	0.071	0.038	0.139
Us <-> Sat	0.149	0.153	0.060	0.255
Us <-> Sec	0.031	0.064	0.033	0.134
Us <-> Tan	0.048	0.073	0.042	0.135
Us <-> Tru	0.031	0.063	0.033	0.133

14. Total Indirect Effect

Total indirect effects - Mean, STDEV, T values, p values					Copy to Exce
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
As -> MP	0.015	0.015	0.012	1.196	0.232
As -> Sat	0.039	0.039	0.010	3.701	0.000
As -> Tru	0.084	0.084	0.019	4.377	0.000
Emp -> MP	0.010	0.010	0.008	1.129	0.259
Emp -> Sat	0.025	0.026	0.009	2.889	0.004
Emp -> Tru	0.055	0.056	0.017	3.189	0.001
PSQ -> MP	0.083	0.084	0.019	4.398	0.000
PSQ -> Sat	0.163	0.164	0.031	5.335	0.000
Rel -> MP	0.017	0.017	0.014	1.247	0.212
Rel -> Sat	0.045	0.045	0.011	4.216	0.000
Rel -> Tru	0.097	0.097	0.020	4.944	0.000
Res -> MP	0.017	0.017	0.014	1.242	0.214
Res -> Sat	0.045	0.046	0.011	4.112	0.000
Res -> Tru	0.098	0.099	0.021	4.762	0.000
Sec -> MP	0.006	0.006	0.006	0.987	0.324
Sec -> Sat	0.016	0.017	0.008	2.039	0.042
Sec -> Tru	0.035	0.037	0.016	2.169	0.030
Tan -> MP	0.011	0.012	0.010	1.169	0.243
Tan -> Sat	0.030	0.031	0.009	3.356	0.001
Tan -> Tru	0.066	0.067	0.017	3.814	0.000
Tru -> MP	0.235	0.237	0.032	7.264	0.000

Tru -> MP	0.235	0.237	0.032	7.264	0.000
Us -> MP	0.011	0.011	0.009	1.174	0.240
Us -> Sat	0.030	0.030	0.009	3.458	0.001
Us -> Tru	0.064	0.065	0.016	3.909	0.000

15. Model fit

Model fit		
	Saturated model	Estimated model
SRMR	0.035	0.054
d_ULS	1.837	4.476
d_G	0.990	1.024
Chi-square	2109.731	2170.937
NFI	0.889	0.886