DEVELOPING A MEASUREMENT SCALE FOR PERCEIVED SERVICE QUALITY IN HIGHER EDUCATION: AN EMPIRICAL STUDY

De Silva R. D.

Department of Management, ATI – Dehiwala, Sri Lanka Institute of Advanced Technological Education (SLIATE)

romitadesilva4@gmail.com

ABSTRACT

Education plays a pivotal role in the peace and economic growth of the nation. Consequently, it is essential to provide every student with a high-quality education. A person's life is significantly impacted by the level of education. As a result, students are highly concerned about the quality of education especially when selecting a higher educational institute. The purpose of the study is to develop a measurement scale to evaluate the service quality provided by higher education. The study applied a positivism research philosophy by adopting a deductive research approach. The quantitative research method was applied, and data were collected through a questionnaire from 225 respondents who are pursuing a Higher National Diploma in Management (HNDM) and Business Administration (HNDBA) courses in SLIATE, ATI - Dehiwala. A stratified random sampling technique was adopted to select the respondents from each course. The researcher applied the SERVQUAL model using its five dimensions tangibility, reliability, responsiveness, assurance, and empathy to evaluate the level of service quality in higher education. Cronbach Alpha was used to measure the reliability and the value of 0.816 indicates that the questionnaire used to gather data on the service quality construct is highly reliable. Based on the result, composite reliability (CR) values for all constructs are above 0.70 and the AVE values are within 0.523 and 0.935 which confirmed the internal consistency in scale items. The validity of the measurements was performed through convergent and discriminant validity using the Fornell and Larcker (1981) test. The finding of the test shows that the average variance extracted (AVE) value of all the constructs is higher than 0.5 and the AVE square root in the diagonal was greater than the squared correlation with other constructs in off-diagonal which confirmed convergent and discriminant validity. Initially, 20 items were developed using five dimensions of the SERVQUAL model. After conducting the test, 20 items were reduced to 14 items, and 6 items that didn't meet the necessary criteria were removed. Finally, a new scale was developed to measure the service quality with 5 dimensions responsiveness, reliability, tangible, assurance, and empathy for higher education.

Keywords: *ATI- Dehiwala, Higher education, SERVQUAL model, Service quality, SLIATE*

1. INTRODUCTION

The primary objective of higher education is to equip students with knowledge, skills, and expertise to enhance their abilities to succeed in the future. Most governments believe education is the most important pillar holding the country together and leading the state towards ultimate success (Rashid, 2019). In addition to improving career prospects, higher education plays a vital role in an individual's life in financial security, growth opportunities, creation, and innovation, raising standards of living. With rising enrollment, student mobility, diversity of offerings, research dynamism, and technology, higher education has seen significant transformation during the past few decades. Nowadays, competition among higher educational institutions has increased in Sri Lanka due to rising numbers of private and degree-offering foreign institutions over the past few decades. Premarathne, De Silva, and Kithsiri (2016) stated higher educational institutions must operate in a similar method as business corporations to attract a greater number of incoming students. Trullas and Enache (2011) defined marketing for higher education as a process of investigations devoted to identifying social needs and developing and implementing programs that fulfill them through commercial or non-commercial interchanges for the ultimate purpose of enhancing the well-being of individuals, communities, and countries. Higher education institutions must therefore come to understand how important it is to offer high-quality services to draw in students and ensure the survival of the institution. Therefore, measuring the perceived service quality of higher educational institutions is vital which will help to determine the areas to be improved.

Providing quality service involves a balance between what customers expect and what customers receive from the service. Therefore, service quality in education can be measured by comparing the service performance provided by institutions and students' expectations. It is a measure of how well the service level delivered matches customer expectations (Wijesekera and Fernando, 2016). To make the institution progressive and sustainable, it is extremely important to consider the service quality of education which will help to build brand image. According to the Lis education network report (January 23, 2022), higher education is the backbone of any society as it decides the quality of human resources in a country. It is mandatory to be concerned about the service quality of education and find strategies to enhance the quality of education when running a higher educational institution. SERVQUAL is one of the most widely adopted and accepted models to measure service quality. Students perceive service quality based on how well the institution performs its services.

Accordingly, the purpose of this study is to develop a measurement scale to examine students' perceptions of service quality in higher education. Therefore, the objectives of the study are:

- To develop items for measuring the service quality of higher education
- To test the reliability and validity of the service quality construct

1.1 Research Problem

Although the purpose of education remains the same, there are changes in the methods of delivery, learning system, quality, and outcomes of education when compared to decades ago. Higher education makes a person more marketable, and career advancement makes life more joyful as well as the economic development of the country. Therefore, students are highly concerned about the service quality of education when choosing a higher education because it has a significant impact on how their lives will turn out. Malik, et al. (2010) highlighted that students who are at a higher academic level seek out higher quality education and system perfection at their place of study because it boosts their self-esteem and equips them with all the skills and abilities necessary to be successful learners. As per Budget brief: education sector report (2021), Sri Lanka allocated LKR 158.4 billion to the education sector in 2021. The higher education sector in Sri Lanka is steadily becoming a competitive market due to the increased number of government and privately owned higher educational institutions. A few years ago, lower student enrollment in Sri Lanka as many students went abroad for higher study due to a smaller number of higher educational institutions in the country. However, today there are more than 50 higher educational institutions in Sri Lanka and the enrollment of students in tertiary education is about 12.06% in private institutions.

Sri Lanka Institute of Advanced Technological Education (SLIATE) is one of the well-known higher educational institutions in Sri Lanka which has 11 Advanced Technological Institutes (ATIs) in each province and 7 ATI Sections for technological education in the island. SLIATE (ATIs) revises curricula regularly to increase the focus on Outcome Based Education (OBE) and Student-Centered Learning (SCL) approaches for all courses as strategies to increase the employability of students. However, it has been observed that an increasing number of students drop out in the middle of 1st year and 2nd year, especially for management and business administration courses at ATI-Dehiwala. Some of the reasons why students left the course could be choice of admission, poor teaching and learning experience, lack of facilities, and lack of engagement in professional career development. Liyanage (2014) mentioned that poor quality, mismatch of the curriculum with existing labor market demands, lack of training instructors, and inefficient administration are major challenges in the education system in Sri Lanka. Therefore, it is questionable about the provided service quality of education as there is no proper mechanism to gauge the service quality of education at the institution. Consequently, it is necessary to understand how students perceive, think, and react to the provided quality of education.

Furthermore, even though there are several research on the quality of education in Sri Lanka, it has been noted from the literature that only a few studies have used the SERVQUAL model to gauge the level of service quality in higher education. In addition, as per researcher knowledge, despite extending studies on service quality of higher education, there is no empirical research has been carried out regarding service quality in ATI-Dehiwala.

2. LITERATURE REVIEW

Haseena & Mohammed (2015) stated quality in education can be experienced but it is difficult to define. However, scholars mentioned that quality is seen as a relative concept satisfying priorities of different interest groups of beneficiaries such as students, instructors, technical and administrative staff, parents, funding agencies, and society. Further, revealed that examination results, students' employment after graduation, facilities available, extra-curricular activities, and the reputation of the institution based on external reports are some of the quality parameters to measure the performance of institutions. Allam (2018) mentioned that teaching and learning experience, institutional factors, curriculum content, outcome and assessment, and resources as the main components of quality of education. The researcher added that students' outcomes and grades depend on the teaching style of the faculty and materials. Razinkina et al. (2018) revealed the systemic development of facilities and equipment are significant components of the educational process which enhances the quality of education. The study conducted by Gunawardena (2017) on improving the quality of university education in Sri Lanka found that curriculum design and content have received very few unsatisfactory grades. The author also suggests that academic skills such as communication, planning, organizing, problem-solving, and decision-making skills need to be developed through university education, especially for arts-oriented faculties. Sivesan (2013) mentioned that it is still worth noting several distinct conceptualizations of service quality although increasing research findings concerning service quality. The SERVQUAL model is the most widely used and acceptable model to measure and assess service quality. The purpose of the SERVQUAL model of service quality developed by Parasuraman et al., (1985; 1988) is to measure the quality of service experienced by customers. Originally the model was developed using 10 dimensions which were reduced to 5 dimensions tangibility, reliability, responsiveness, assurance, and empathy in their subsequent paper (1988). The model has been applied in many sectors such as hotel, retail, banking, and education sector etc.

2.1 Service Quality and its Dimensions

Service Quality

Service quality generally refers to how well an organization meets the expectations of its customers. It helps to measure how an organization delivers its services compared to the expectations of its customers. According to Zeithaml (1988), perceived quality is conceptualized as the consumer's judgment about a service's overall excellence or superiority. It is also defined as results from the comparison of consumer expectations with the actual performance of a service or product (Gronroos, 1984; Snoj et al., 2014).

Reliability

Every customer has certain expectations of reliability when purchasing a product or service. Service reliability means the ability to perform the promised service dependably and accurately. It is defined as an organization's consistency and accuracy in performing a certain service in a way that satisfies its customers' needs

(Parasuraman et al., 1988). Providing promised service, being on time, solving problems, convenient accessibility, an exhibition of information, responding emphatically, mistake-free administrations, and responsibility were identified as determinants of reliability (Zygiaris et al., 2022; Krsmanovic et al. 2014; Ibrahim et al., 2013). Hoque et al. (2023) reveal that providing on-time service is the main factor of reliability. Reliability not only affects customer satisfaction but also builds a long-term relationship with the customer (Cronin et al., 2000).

Responsiveness

Responsiveness refers to the willingness and ability of service providers to assist customers promptly and address their needs (Parasuraman et al.,1988). It is about an organization's dedication and willingness to help customers by providing prompt service. It is necessary to minimize waiting time for all interactions between customers and service providers (Nambisan et al., 2016). It implies receiving, assessing, and swiftly replying to customer requests, feedback, questions, and issues. Based on the findings of the study conducted by Krsmanovic et al. (2014), students consider reliability and responsiveness as the most important factors for service quality.

Assurance

Customers may view a service as being beyond their capacity to comprehend and fully evaluate, so there must be some level of trust when a company provides a service. Assurance is about the knowledge and courtesy of staff and their ability to convey trust and confidence to the customers. It is the competence, courtesy, credibility, and ability to inspire confidence exhibited by service providers (Parasuraman et al., 1988). Hoque et al. (2023) found that students considered lecturers' proficiency in teaching and research as the main factor of assurance.

Empathy

Empathy is the process through which an organization provides its services in a way that makes it appear empathetic to its customer's desires and demands. Parasuraman et al., (1988) define empathy as understanding and caring for customers' individual needs and concerns. It is about the caring, individualized attention that the service provider offers its customers. Zygiaris et al., (2022) suggest that knowledge about the customers' views can be used as a tool to enhance service quality.

Tangible

Tangible is the physical elements offered by an organization when providing a service. It is significant in creating customers' initial perceptions of service quality. Zygiaris et al. (2022) highlight that the tangible aspects of service significantly influence the perception of quality of service. It includes the appearance of the physical facilities, tools and equipment, personnel, communication materials, and other physical features used to provide the service to customers. A comfortable study hall is the main element of tangibility (Hoque et al.,2023).

Table 2.1 represents the operationalization of the study which was developed based on SERVQUAL five dimensions namely reliability, responsiveness, assurance, empathy, and tangible.

2.2 Operationalization of the study

Table 1: Operationalization

Variable	Dimension	Indicator
Service quality (Ibrahim et al., 2013)	Reliability	Fair and consistent assessment of students' work
		Fulfilling students' requirements at the right time such as exam results, workshops, seminars
		Concern and solve students' problems on time
		Fulfilling commitments or promises to students
	Responsiveness	Delivery of accurate information such as timetables, meetings, and events
		Provision of prompt response/feedback to students
		Willingness to provide academic and non-academic assistance to student
		Willingness to help students improve their personal and communication skills
	Assurance	Professional skills and competency of faculty
		Knowledge of instructors towards their subject
		Assurance of student confidence in getting a job
		Faculty knowledge of research and students' development activities
	Empathy	Understanding of students' challenges and issues
		Provision of various support services to students
		Flexible system when a requirement
		Counselling and advising students
	Tangibles	Provide necessary hygiene facilities such as sanitation, water, electricity, etc.
		Provide a computer lab and free Wi-Fi access facility
		Canteen, parking, and playground facilities
		Modern classroom equipment, library, and IT facilities

3. RESEARCH METHODOLOGY

This study applied a positivism research philosophy where factual knowledge was obtained through the examination of facts and the generalization of findings is based on data and statistics. According to Crowther and Lancaster (2008), positivist studies usually adopt a deductive research approach. Therefore, a deductive research approach was chosen for this study. The cross-sectional time horizon was adopted because the current study fulfilled the research objectives at only one point in time by collecting data from the selected sample units of the population.

3.1 Population and Sampling

The population is the entire group of individuals or events for a research study. The target population of the study was 1st year, 2nd year, and 3rd-year students pursuing a higher National diploma in management (HNDM) and business administration (HNDBA) courses in ATI-Dehiwala. The population of the study is 525 of which 269 are from management and 256 are from business administration. Sampling is the

process of selecting a statistically representative sample of individuals from the population of interest to provide an adequate description and inferences of the population. The sample is the selection of a smaller set of data from the target population using an appropriate sampling technique. It is the subset of the entire population that represents the study population. In most cases, the selection of the entire population in the study is either impossible or expensive and time-consuming. Therefore, the selection of the sample provides insights that the researcher can apply to the entire population. With this regard, as per the Morgan table, the sample size of the study is 225 where115 from management and 110 from business administration which were selected through stratified random sampling method.

3.2 Data Collection and Analysis Techniques

In creating a new measurement, Churchill (1979) emphasized the need for stages as the framework for scale development. After identifying the domain of the construct, preliminary data were collected from 20 respondents through informal interviews to check the applicability of the study as a pilot test. However, the findings of the study were generalized based on the main primary data. Primary data were collected from the respondents who are following management and business administration courses through questionnaires. The questionnaire was divided into three sections where 1st part measured the demographic factors of the respondents, 2nd part measured the perceived service quality of education, and 3rd part was an open-ended question where respondents shared their suggestions and thoughts regarding the improvement of the quality of education. A questionnaire was designed to gauge the perceived service quality of higher education. Researchers developed 20 distinctive statements using the SERVQUAL model which has 4 items in each dimension. The seven-point Likert scale was used to measure perceived service quality of education. All the indicators of variables were measured using a seven-point Likert scale where 1 represents "lowest value", 4 represents "neutral", and 7 represents "highest value". Collected data were analyzed using factor analysis. Further, the reliability of the measurement scale was assessed using a composite reliability test, and convergent and discriminant validity were used to confirm the validity of the measurement.

4. DATA ANALYSIS AND DISCUSSION

4.1 General information of Respondents

Based on the 225 participants in the study, the data were examined and interpreted. Based on the result, 72 % of respondents were females and only 28 % were males. In terms of age, the dominant age group was between 21- 24 years which is 63% and only 12 % are between 25-28 years old. It also shows that 51% of respondents are following management courses and 49% are following business administrative courses. In terms of the year of the study, the highest number of respondents were from the first year which is 44%, followed by 30 % from the third year and 25 % from the second year.

4.2 Measurement Validity

The measurement validity of the study was conducted through face validity and content validity. Face validity is about whether a test appears to measure what it's

supposed to measure (Bhandari, 2022). Face validity of the study was conducted by showing the questions developed based on the SERVQUAL service quality model to the senior lecturer and experts in the field of internal quality assurance committee. Content validity evaluates how well an instrument captures all relevant parts of the construct it aims to measure (Nikolopoulou, 2023). It was tested by showing the questionnaire to the experts, and a pilot test with 20 respondents using a model questionnaire.

4.3 Reliability of the Study

Table 2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.816	0.815	20

The internal consistency of the questionnaire was evaluated using Cronbach's alpha test. Parasuraman et al. (1988) proposed that the computation of Cronbach's alpha coefficient, item-to-total correlation, and exploratory factor analysis (EFA) should come first in the validation of an instrument. 0.61 is considered the minimum acceptable Alpha value (Konting et al.,). Cronbach alpha value was calculated based on the 20 items. The high value of Cronbach Alpha 0.816 suggests that the questionnaire used for collecting data on service quality is highly reliable. It indicates a high level of internal consistency in the questionnaire used. Table 3 shows the alpha value of each item.

Table 3: Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FCA	112.95	22.663	.300	.812
FSR	114.38	126.790	.206	.816
CSP	113.60	111.617	.497	.801
FCP	112.90	117.374	.443	.805
DAI	112.85	112.867	.574	.797
PRF	113.17	117.561	.458	.804
WPA	113.17	115.939	.499	.801
WHS	113.10	119.744	.404	.807
PSC	112.81	123.075	.370	.809
KIS	112.92	121.542	.477	.805
AGJ	113.21	118557	.327	.813
RDA	113.44	120.381	.430	.806
USC	113.25	119.732	.420	.806
PVS	113.11	123.926	.262	.814
FSY	112,90	122.324	.349	.810
CAS	112.79	125.115	.236	.815
PHF	112.95	127.663	.314	.812
PLW	113.38	125.790	.205	.816
CPP	113.69	112.224	.489	.802
ELI	112.88	118.561	.410	.807

Corrected Item-Total Correlation is the correlation between each item and the total score from the questionnaire. In a reliable scale, all items should correlate with the

total. If any of these values are lower than 0.3, there may be an issue, as it indicates that the item in question does not correlate well with the scale. In the first stage, a total of 20 items were developed and 4 items were deleted. Therefore, the remaining 16 items are represented in table 4.

Table 4: Rotated Component Matrix

	Component				
	1	**2**	**3**	**4**	**5**
FCA	-0.053	0.009	0.902	0.251	0.027
CSP	0.114	0.677	0.564	-0.100	0.024
FCP	0.953	-0.004	-0.054	0.093	0.109
DAI	0.742	0.400	0.008	0.048	0.164
PRF	0.065	0.577	-0.096	0.113	0.475
WPA	0.043	0.764	0.079	0.312	0.091
WHS	0.057	0.777	-0.142	0.204	0.016
PSC	0.148	0.057	0.167	0.811	0.015
KIS	0.205	0.117	0.115	0.851	0.061
AGJ	-0.070	0.206	0.125	0.667	0.177
RDA	0.481	0.059	0.139	0.106	0.407
USC	0.226	0.15	-0.114	0.187	0.717
FSY	0.088	0.001	0.121	-0.003	0.741
CPP	0.116	0.671	0.524	-0.091	0.024
ELI	0.942	-0.020	-0.063	0.092	0.080
PHF	-0.053	0.009	0.927	0.251	0.027

Table 4 represents the rotated component matrix. The factors were tested, and the low-performing items were eliminated using the factor loadings that had been obtained. Awang (2014) recommended that factors that have 0.6 or greater should be considered in factor loading for established items. Therefore, items PRF (Prompt response and feedback) and RDA (Research and development activities) were deleted, and Table 5 indicates the summary of 14 items which loaded to five factors.

Table 5: Summary of Factor Loading

Sl. No.	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1	FCP	.953				
2	DAI	.742				
3	ELI	.942				
4	CSP		.677			
5	WPA		.764			
6	WHS		.777			
7	CPP		.671			
8	FCA			.902		
9	PHF			.927		
10	PSC				.811	
11	KIS				.851	
12	AGJ				.667	
13	USC					.717
14	FSY					.741

Factor 1

Table 6: Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FCP	12.42	5.700	0.903	0.969	0.771
DAI	12.37	6.546	0.648	0.448	0.991
ELI	12.40	5.937	0.879	0.967	0.795

Three items were loaded in factor 1. The Cronbach's Alpha value of .901 of the three items shows internal consistency in the questionnaire. There was no item to be deleted as the Alpha value is above the recommended value of 0.7 and the values in the column labeled Corrected Item-Total Correlation are above 0.3.

Table 7: Summary of Factor 1

No. of items		Item	Absolute loading
1	FCP	The institution fulfills commitments or promises to us	.970
2	DAI	We received accurate academic-related activity information on time.	.815
3	ELI	We get modern classroom equipment, library, and IT facilities	.960

All the items had strong loadings on the construct, which were supposed to measure indicating unidimensional and construct validity. The total variance explained 84.26% which is above the acceptable level of 60%.

Factor 2

Table 8: Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
CSP	17.26	10.373	0.739	0.785	0.682
WPA	16.84	13.635	0.581	0.446	0.767
WHS	16.77	15.339	0.450	0.362	0.819
CPP	17.36	10.739	0.714	0.774	0.697

Based on the analysis, four items were loaded in factor 2. A total of four items with Cronbach's Alpha value of .800 show internal consistency in the questionnaire. There was no item to be deleted as the Alpha value is above the recommended value of 0.7 and the values in the column labeled Corrected Item-Total are above the recommended value of 0.3.

Table 9: Summary of Factor 2

No. of items		Item	Absolute loading
1	CSP	Concern and solve students' problems on time	0.87
2	WPA	Willingness to provide academic and non-academic assistance to student	0.76
3	WHS	Willingness to help students improve their personal and communication skills	0.65
4	CPP	Canteen, parking, and playground facilities	0.85

Results revealed that all the items had strong loadings on the construct, which were supposed to measure indicating unidimensional and construct validity. The total variance explained 62.61% which is above the acceptable level of 60%.

Factor 3

Table 10: Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FCA	6.05	1.404	0.894	0.799	0.927
PHF	6.05	1.417	0.832	0.799	0.842

Table 10 shows that only two items were loaded in factor 3. The Cronbach's Alpha value of .944 shows internal consistency in the questionnaire. There was no item to be deleted as the Alpha value is above the recommended value of 0.7 and the values in the column labeled Corrected Item-Total are above the recommended value of 0.3.

Table 11: Summary of Factor 3

No. Of items		Item	Absolute loading
1	FCA	Received fair and consistent assessment of students' work	0.97
2	PHF	Provide necessary hygiene facilities such as sanitation, water, electricity, etc.	0.94

Results revealed that all the items had strong loadings on the construct, which were supposed to measure indicating unidimensional and construct validity. The total variance explained 94.69% which is above the acceptable level of 60%.

Factor 4

Table 12: Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PSC	12.03	4.526	0.577	0.515	0.607
KIS	12.13	4.348	0.694	0.576	0.609
AGJ	12.43	2.790	0.481	0.258	0.835

Based on Table 12, three items were loaded in factor 3. The Cronbach's Alpha value of .714 shows internal consistency in the questionnaire. There was no item to be deleted as the Alpha value is above the recommended value of 0.7 and the values in the column labeled Corrected Item-Total are above the recommended value of 0.3.

Table 13: Summary of Factor 4

No. of items		Item	Absolute loading
1	PSC	Professional skills and competency of faculty	0.87
2	KIS	Knowledge of instructors towards their subject	0.94
3	AGJ	Assurance of student confidence in getting the job	0.72

According to the result of analysis found that all the items had strong loadings on the construct, which were supposed to measure indicating unidimensional and construct validity. The total variance was 69.55%, which is above the acceptable level of 60%.

Factor 5

Table 14: Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
USC	6.18	1.102	0.357	0.066	0.625
FSY	5.83	1.305	0.457	0.066	0.552

Only two items were loaded in factor 3. The Cronbach's Alpha value of .673 shows acceptable internal consistency in the questionnaire. There was no item to be deleted as the Alpha value is very close to the recommended value of 0.7 and the values in the column labeled Corrected Item-Total are above the recommended value of 0.3, which is good.

Table 15: Summary of Factor 5

No. of items		Item	Absolute loading
1	USC	Understanding of students' challenges and issues	0.74
2	FSY	Flexible system when the requirement	0.71

The result stated that two items were loaded in factor 5 and both the items had strong loadings on the construct, which were supposed to measure indicating unidimensional and construct validity. The total variance explained 58.47% which is close to the recommended level of 60%.

4.4 Reliability and Validity Test of the Instrument

Table 16: AVE & CR Values

Factor	Average Variance Extracted (AVE)	Composite Reliability (CR)
F1	0.935	0.972
F2	0.523	0.814
F3	0.836	0.910
F4	0.608	0.822
F5	0.531	0.704

The validity and reliability of developed instruments were tested through average variance extracted (AVE) and CR (composite reliability). The model has run after deleting the unacceptable items. Based on the result, CR (composite reliability) in the measurement model shows that the values of five latent variables are greater than 0.7 which confirms the internal consistency of reliability. The validity of the measurement was determined by construct validity to measure how well the items selected for the construct were measured. It validates in the form of convergent and discriminant validity. Convergent validity indicates how much of the indicators' variance can be explained by the latent unobserved variable and it was measured by the average variance extracted (AVE). According to Fornell and Larcker (1981), AVE > 0.5 is required for every construct. Further, confirm the discriminant validity through the Fornell and Larcker (1981) criterion.

Table 17 represents the composite reliability (CR), the square root of the average variance extracted (AVE) in bold, and correlations between constructs (off-diagonal).

Based on the Table, the CR for all constructs is above 0.70 and the AVE values are within 0.523 and 0.935.

Table 17: Discriminant validity

Latent Constructs	CR	AVE	F1	F2	F3	F4	F5
F1	0.972	0.935	**0.966**				
F2	0.814	0.523	0.451	**0.723**			
F3	0.910	0.836	0.584	0.623	**0.914**		
F4	0.822	0.608	0.543	0.539	0.552	**0.779**	
F5	0.704	0.531	0.625	0.314	0.441	0.338	**0.728**

The discriminant validity was assessed using Fornell and Larcker (1981) by comparing the square root of each AVE in the diagonal with the correlation coefficients (off-diagonal) for each construct in the relevant rows and columns. According to the Fornell and Larcker criterion, the square root of the average variance extracted by a construct must be greater than the correlation between the constructs. The table shows that correlation values are less than the AVE square root for each construct. Hence, it confirmed the discriminant validity.

Finally, developed a new scale for measuring service quality for higher education using SERVQUAL five dimensions.

Table 18: New Questionnaire for Measuring Service Quality in Higher Education

Sl. No.			Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
			1	2	3	4	5	6	7
F1- Responsiveness									
1	FCP	Institutions fulfill commitments or promises to us.							
2	DAI	We received accurate academic-related activity information on time.							
3	ELI	We get modern classroom equipment, library, and IT facilities							
F2 – Reliability									
4	CSP	Concern and solve students' problems on time							
5	WPA	Academic and non-academic staff willingly assist us.							
6	WHS	Academic staff willingness to help and support us in improving our interpersonal skills							
7	CPP	We get the necessary facilities such as a canteen, parking, and playground, etc.							
F3 - Tangible									
8	FCA	Received fair and consistent assessment of students' work.							

9	PHF	Provide necessary hygiene facilities such as sanitation, water, electricity, etc.
F4 - Assurance		
10	PSC	We have professional skills and competency faculty.
11	KIS	The knowledge of instructors towards their subjects is highly commendable.
12	AGJ	Institute assures student confidence in getting a job.
F5 - Empathy		
13	USC	The institute understands students' challenges and issues.
14	FSY	The institute implements a flexible work system when it is necessary.

5. CONCLUSION

Education is a systematic process of learning, developing, teaching, and imparting knowledge for the benefit of various stakeholders. Oprah Winfrey said, "Education is the key to unlocking the world, a passport to freedom". Therefore, the study aimed to develop a measurement scale to measure students' perceived services in higher education. The findings of the study were based on the primary data which were collected through questionnaires from 225 students who are following management and business administration courses in SLIATE, ATI - Dehiwala. The researcher applied Parasuraman et al., (1988) SERVQUAL model to measure the perceived service quality.

Dimensions of the model such as responsiveness, reliability, tangible, assurance, and empathy were used to develop the measurement scale of service quality provided by higher education. In the initial stage, a pilot test was carried out to check the applicability of the study. Considering the applicability, a total of 20 distinctive items were developed which have 4 items in each dimension. However, in the next step, which is purification, 4 items were deleted as corrected item-total correlation values were less than 0.3. In the third stage, factor analysis was carried out using the remaining 16 items. Based on the rotated component matrix, items are loaded into 5 main factors. Factors that have 0.6 or greater should be considered in factor loading for established items (Awang, 2015). Therefore, 2 items PRF (Prompt response and feedback) and RDA (Research and development activities) were deleted from the list. Finally, 14 relevant items with 5 dimensions were identified to measure perceived service quality. The internal consistency of reliability of the developed measurement scale of five latent variables was tested through composite reliability and the validity of the study was tested through convergent and discriminant validity. This study adds conceptual, methodological, empirical, and contextual advancement in the measuring of perceived service quality, particularly in the field of higher education.

5.1 Limitation and Future Research Directions

This study was conducted based on SLIATE, ATI-Dehiwala considering only management and business administration students even though SLIATE has its

institutions all over the Island due to time constraints. This might affect the generalizability of the results. The study adopted the quantitative research method due to time and cost constraints. It is suggested that more intensive and flexible qualitative research can be employed to further probe student insights which can add more specific content to quantitative research. The more accurate result might be if the study was comparative by comparing before and after using the service. Further, the sample size of the study is 225 considering only one institution. Studies can be recommended with a large sample size that covers all the SLIATE institutions on the island to generalize the results more confidently. There is no assurance that the respondents have revealed accurate data. Sometimes, respondents might be reluctant to express their true feelings due to some constraints. Finally, it suggests that a developed measurement scale may be appropriate to conduct a study for different sectors even though the scale was developed based on the educational sector.

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