Reliability And Validity Analysis Of The Extended SERVQUAL In Higher Educational Institution

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Abstract
The present study is focuses on the reliability testing of the instrument used in the data collection using the calculation of Cronbach's Alpha. Individual reliability of each construct was measured using the SPSS. The tool used to check the validity of the scale is done by the content validity ratio. The descriptive statistics was performed to measure the gap between the perceived quality and student expectation. This was the pilot study performed for the development of the measurement and structural model in the future research. The finding of the present study is the seven dimensions of extended SERVQUAL was measured i.e., reliability, responsiveness, Assurance, Empathy, tangibility, teaching quality and learning outcome. The study found that the value of cronbach alpha was more than the threshold limit i.e., 0.70 and Content Validity ratio(CVR) was found to be more than the threshold limit. Different parameter where used to evaluate the student satisfaction. The seven dimension were taken as the extended SERVQUAL in which highest gap was found to be learning outcome and minimum gap found in the teaching quality. The co-relation between the dimensions was studied, there is the positive correlation in the items of one variable.

Keywords: Student Satisfaction, Expectation, Perception, Service Quality, HEI's

1.Introduction

Service industry is one of the major sectors covering the huge part of countries economy. Delivery the quality education in HEI's plays a vital role for gaining the competitive advantage and also act as strategic tool in developing competency in the industry. There are various models tried and tested to measure the service quality, but their validity and reliability is still questioned [1] By reviewing the literature the most reliable and valid model which was used to measure the service quality of every industry is SERVQUAL (Parasuraman et al 1985). By investigating the important dimension of the service quality help in building the marketing approach in the higher education. Higher educational Institute has becoming huge marketplace and higher education is a marketable service and students act as a customer.[2] The various studies carried out to test the comparative reliability and validity of e.g. SERVPERF, SERVQUAL and HEdPERF were available.[3].After India has become a global marketplace the survival of the educational institution depends on the service quality dimensions. [5] There was a pressing need to identify and enhance the various dynamic service quality dimensions to achieve the student satisfaction. To serve the overall quality to the student in the higher educational institutions is the combine and coordinated efforts of the management, employees and all physical settings available.[6] For the greater understanding of the service quality, the perceived and expected service quality plays a significant role.[7] Sustainable and regular improvement carried out for the holistic development of the higher educational institutes.[8] Various studies were conducted by manipulating the variables of SERVQUAL to design the most reliable and valid model to evaluated the service quality of higher education, but there was still the need of rigorous and robust research needs to be done.[10]

The present study was carried out in the educational setting of Government College affiliated under Pandit Ravi Shankar Shukla University in the District of Raipur, Chhattisgarh. After the pandemic of 2020 the technological involvement in the teaching methodology was increase to somewhat extent. The digital learning of the education incorporates the massive use of desktop, laptop ,computer, tablet and smartphone etc.with the help of internet. The main focus on today's education system is blended mode of learning to enhance the quality education.[12]

The main aspect to deliver the higher education is the faculty members, to strengthen, empower and enrich the faculty needs to be done continuously because they are the main pillar of the quality construct. If there problems are not resolved than the maintaining and managing the quality has become a difficult task.[13] There are various parameter though which service quality can be measured, but the present study focuses on the student aspect to measure the service quality.[14]

2. Literature Review

The literature review serves as the view of various dimensions of the past study that influences the students satisfaction with reference to the higher education sector. Based on the dimension of the study, the emphirical review of the past researchers are as follows:-

2.1 Students Satisfaction

The student satisfaction was influenced by number of the service quality dimensions. The perceived quality by the student affects their level of satisfaction. [14] Student act as a customer in the higher educational institute, it is very difficult to define the quality requirement of the individual student, because they may be different.[15] The students satisfaction is meet by fulfilling their expectation.[17] From the students point of view the service, pay for the service, a administrative function and the supportive service act as the important in the students point of view.[20]

2.2 Service Quality

The service quality is measured using different measurement, but it is very difficult to measure the service quality in higher education sector. The quality management and improvement need to be focus in the higher education sector.[15] The most frequently used model used to measure the service quality is SERVQUAL model(Parasuraman et al 1985). Quality is defined as the conformance to the specific need of the student[16] The SERVQUAL scale was used to measure the service quality of the different higher education institution.

2.3 Higher Educational Institutions

The higher education is one of the growing sectors of the economy in our developing country like India. One of the prominent youth building sectors is higher education. It is the main responsibility of the higher education is to provide the quality education to the youth for their overall holistic development. The

The perceived quality also plays an important role in boasting the students satisfaction. The student how there perceived the delivered service impacted the behavior and level of their satisfaction.

Research Gap

As the various researches was performed for the measurement of service quality and its relationship with students satisfaction using SERVQUAL model in higher education institutions. The present study focuses on analyzing the service quality of higher educational institution using some new dimensions in the SERVQUAL model which caters the special need of the higher education sector. After the extensive literature review study there was a significant gap exist measurement of service quality in the private higher education institutions. But no study focusing on the measurement of service quality of the government higher education institutes. The present research based on measuring the service quality of the government higher education institutions. There were several researches conduct in India and western context, but there was lack of research measuring the dynamics within diverse educational and cultural setting such as government higher education institute in the Raipur District of Chhattisgarh state India. Therefore , there is a intense need to carry such researches continuously as the dynamic nature and changing the behavior pattern of the students.

3. Validation and Scale development

3.1 Formulation of Initial Questionnaire

By the extensive literature review, a comprehensive 105 items questionnaire was initially framed to measure the service quality and its impact on students satisfaction of Government higher education institutions. The content validity testing study was conducted to evaluate relevance of each item through expert opinion using a 1–4 scale, where 1 and 2 indicated low relevance, and 3 and 4 indicated high relevance. Afterward Content Validity Ratio (CVR) formula was calculated to measure the item relevance [9].

Where:

$$CVR = \frac{n_e - \frac{N}{2}}{\frac{N}{2}}$$

Ne = Number of experts indicating “3” or “4” (items rated as highly relevant), and

N = Total number of experts.

Items having CVR value equal to or greater than threshold value 0.5 were retained, ensuring that items relevant by the expert remained in the questionnaire.

This process leads to the retention of 86 items, reflecting both theoretical relevance and expert consensus.

4. Research Methodology

4.1 Research Design

The research design is descriptive in nature. The study is based on the Raipur district in State Chhattisgarh. The students of various private as well as government higher educational institution were taken as a population of the study. Out of this population sample is selected.The sampling techniques used in the study is probability sampling, were respondent

having an equal chance of being selected as a sample. The sample size is 38 students, google form link is shared to collect primary data. The questionnaire is being design using the Structured closed ended questions having 20 items. 5 point likert scale is used to measure satisfaction level of the students.

4.2 Population and Sampling

The population considered in the present study is the total number of students studying in the Government HEI's affiliated i.e. 17 in which 11 urban and 6 rural under Ravi Shankar Shukla University in the Raipur district of Chhattisgarh state. The population in the present study in unknown.The sample size is calculated using the Cochran formula [4] which is expressed in the equation below

$$n^0 = \frac{Z^2 pq}{e^2}$$

The above formula, represented as Eq. (2), denoted as 95% confidence level, related to a standard normal deviation(z) of 1.96, as 5% margin of error (e = 0.05), and a degree of population variability (p) set at 0.5 to cove maximum variability. The complementary probability, q, is calculated as 0.5 (1–p). Putting all the specified values into Cochran's formula, derived the minimum number of sample required is 384.The sampling technique used in the study is probability sampling to cover the true representative of the population among college students in college in Raipur district, Chhattisgarh State. By implementing this method, the study focuses on increasing generalizability and minimizes biases associated in sample of a selection.

4.3 Data Collection

The data collection was done using the Google form from the period of July 2024. The google form provide the flexibility to the respondent for the data collection and minimum error and was the user friendly interface. The sample size of the present study was 45 as it is a pilot study.

4.4 Data Analysis

5. Result and Discussion

5.1 Demographic Profile of the Respondent

Table No. 1 Demographic Data of respondent

Demographic Variable	Category	Frequency	Percentage(%)
1. Area of Residence	Urban	36	80
	Rural	9	20
2.Age	Below 18 Yrs	3	6.7
	19-23 yrs	32	71.1
	24-28 yrs	6	13.3
	Above 28 yrs	4	8.9
3.Gender	Male	18	40
	Female	27	60
4. Course of Study	Diploma	1	2.2
	Graduation	36	80
	Post Graduation	6	13.3
	Phd	2	4.4
5.Studying Year	1st	11	24.4
	2nd	12	26.7
	3rd	18	40
	4th	1	2.2
	5th	3	6.7
6.Stream	Mathematics	3	6.7
	Science	3	6.7
	Commerce	26	57.8
	Arts	9	20
	Others	4	8.9
7.Marital Status	Single	40	88.9
	Married	4	8.9
	Others	1	2.2
8.Parents Occupation	Government Job	9	20
	Private Job	8	17.8
	Businessman	10	22.2
	Professional	1	2.2
	Others	17	37.8

9.Annual Family Income	Upto 200000	28	62.2
	200001-400000	5	11.1
	400001-600000	7	15.6
	Above 600000	5	11.1

There were nine parameter was taken to analyze the demographic profile of the students. The area of residence was found to be urban 80% and rural 20%, the maximum respondent belong to the age group of 19 to 23 years of age, as far as gender is concern the female were more than a male respondents, more data were collected from the graduate students, final year respondents were more that post graduate research scholar. Commerce students were more than any other stream. The marital status of the student were single as the data collected from students who parent occupation were business.The maximum student belong to the annual family income of upto 200000.

5.2 Internal Consistency and Reliability testing

Table No.2

Construct	N of items	Cronbach's Alpha	Interpretation
Student Satisfaction	24	0.977	Excellent

The result of Student Satisfaction revealed that scale with 24 items (α=0.977) which is more than the threshold limit found to be excellent.

Table No.3

Service Quality Dimensions(Expectation Side)			
Construct	**N of items**	**Cronbach's Alpha**	**Interpretation**
Teaching Outcome	7	0.920	Excellent
Learning outcome	7	0.958	Excellent
Reliability	5	0.951	Excellent
Responsiveness	4	0.814	Good
Assurance	4	0.824	Good
Empathy	4	0.782	Acceptable
Tangibility	5	0.890	Good

Reliability is the measure of internal consistency of the constructs in the study. A construct is reliable if the Alpha(α) value is greater than 0.70 (Hair et al., 2013). Construct reliability was assessed using cronbach's alpha. The result of expectation dimension of service quality revealed that Teaching Outcome scale with 7 items (α=0.920), Learning outcome scale with 7 items (α=0.958), Reliability scale with 5 items (α=0.951), Responsiveness scale with 4 items (α=0.814), Responsiveness scale with 4 items (α=0.814), Assurance scale with 4 items (α=0.824), Empathy scale with 4 items (α=0.782), Tangibility scale with 4 items (α=0.890) all the seven dimension is found to be reliable because the value of cronbach's alpha is greater than 0.70.

Table No.4

Service Quality Dimensions(Perception Side)			
Construct	**N of items**	**Cronbach's Alpha**	**Interpretation**
Teaching Outcome	7	0.917	Excellent
Learning outcome	7	0.942	Excellent
Reliability	5	0.865	Good
Responsiveness	4	0.929	Excellent
Assurance	4	0.765	Acceptable
Empathy	4	0.713	Acceptable
Tangibility	5	0.885	Good

Similarly perception dimension of service quality revealed that Teaching Outcome scale with 7 items (α=0.917), Learning outcome scale with 7 items (α=0.942), Reliability scale with 5 items (α=0.865), Responsiveness scale with 4 items (α=0.814), Responsiveness scale with 4 items (α=0.929), Assurance scale with 4 items (α=0.765), Empathy scale with 4 items (α=0.713), Tangibility scale with 4 items (α=0.885) all the seven dimension is found to be reliable because the value of cronbach's alpha is greater than 0.70.

5.3 Descriptive Analysis of Construct

Table No.6

Construct	Items	Mean	Std.Deviation	Skewness	Kurtosis
Student Satisfaction(SS)	SS1	2.31	0.973	1.027	1.201
	SS2	2.4	0.986	1.035	1.435
	SS3	1.98	0.941	1.073	1.372
	SS4	3.16	1.147	-0.35	-0.811
	SS5	2.38	1.093	1.147	0.978
	SS6	2.36	0.981	1.182	1.758
	SS7	2.229	0.991	1.28	1.974
	SS8	2.36	0.933	0.969	1.427
	SS9	2.8	1.16	0.501	-0.611
	SS10	2.78	1.085	0.019	-0.217
	SS11	3.16	1.313	-0.048	-1.143
	SS12	2.42	1.011	0.981	1.058
	SS13	2.42	0.965	0.786	0.796
	SS14	2.44	0.943	1.019	1.006
	SS15	2.33	1.066	1.165	0.94
	SS16	2.18	0.936	1.193	2.184
	SS17	2.6	1.136	0.666	-0.184
	SS18	2.49	0.968	0.583	0.542
	SS19	2.67	1.022	0.727	0.01
	SS20	2.56	0.99	0.575	0.171
	SS21	2.6	1.074	0.649	-0.124
	SS22	2.62	0.984	0.692	0.608
	SS23	2.53	0.894	0.693	1.172
	SS24	2.64	1.004	0.642	0.341
Expected Teaching (ET)	ET1	2.67	1.108	0.397	-0.437
	ET2	1.96	0.706	0.875	1.83
	ET3	2	0.853	0.69	0.133
	ET4	2	0.707	0.404	0.327
	ET5	2.4	0.751	0.526	0.069
	ET6	1.84	0.706	0.636	0.738
	ET7	2	0.674	0.466	0.819
Expected Outcome (EO)	EO1	1.84	0.638	0.689	1.981
	EO2	1.93	0.72	0.865	1.981
	EO3	1.91	0.821	0.685	0.127
	EO4	1.96	0.796	0.646	0.287
	EO5	1.96	0.796	0.364	-0.559
	EO6	2	0.853	0.69	0.133
	EO7	2.07	0.889	0.677	-0.021
Expected Reliability (ERB)	ERB1	2.04	0.706	0.343	0.234
	ERB2	2.13	0.842	0.694	0.274
	ERB3	2.02	0.69	0.405	0.502
	ERB4	2.11	0.745	0.505	0.437
	ERB5	2.07	0.72	0.665	1.015
Expected Responsiveness(ERP)	ERP1	2.13	0.726	0.535	0.618
	ERP2	2.16	0.737	0.455	0.377
	ERP3	2.62	0.886	0.266	-0.834
	ERP4	2.18	0.716	0.11	-0.202
Expected Assurance(EA)	EA1	2.11	0.647	0.946	2.244
	EA2	2.18	0.747	0.72	0.817
	EA3	2.16	0.767	0.67	0.695
	EA4	2	0.707	0.404	0.327
Expected Empathy(EE)	EE1	2.11	0.775	0.415	0.06
	EE2	2.6	0.863	0.231	-0.715
	EE3	2.67	0.977	0.119	-1.138
	EE4	2.2	0.726	0.417	0.343
Expected Tangibility(ETA)	ETA1	2.24	0.83	0.504	-0.25
	ETA2	2.16	0.796	0.273	-0.283
	ETA3	2.16	0.767	0.355	0.015
	ETA4	2.09	0.793	0.411	-0.73
	ETA5	2.18	0.806	0.477	0.61

Perceived Teaching (PT)	PT1	2.16	0.706	0.176	-0.47
	PT2	2.07	0.688	0.792	1.628
	PT3	2.22	0.704	0.477	0.53
	PT4	2.22	0.704	0.477	0.53
	PT5	2.69	0.9	0.086	-0.908
	PT6	2.02	0.723	0.345	0.074
	PT7	2.42	0.892	0.447	-0.508
Perceived Outcome (PO)	PO1	2.16	0.706	0.582	0.822
	PO2	2.18	0.747	0.378	0.171
	PO3	2.33	0.853	0.435	-0.261
	PO4	2.38	0.777	0.428	-0.35
	PO5	2.4	0.837	0.331	-0.33
	PO6	2.53	0.968	0.295	-0.957
	PO7	2.47	0.842	0.348	-0.43
Perceived Reliability (PRB)	PRB1	2.36	0.773	0.201	-0.174
	PRB2	2.53	0.842	0.13	-0.513
	PRB3	2.29	0.757	0.768	0.569
	PRB4	2.56	0.841	0.537	-0.65
	PRB5	2.4	0.751	0.526	0.69
Perceived Responsiveness(PRP)	PRP1	2.44	0.785	0.487	-0.162
	PRP2	2.47	0.757	0.282	-0.172
	PRP3	2.58	0.892	0.359	-0.816
	PRP4	2.29	0.695	0.815	0.891
Perceived Assurance(PA)	PA1	2.36	0.773	0.818	0.331
	PA2	2.36	0.712	0.934	0.653
	PA3	2.42	0.753	0.777	0.119
	PA4	2.4	0.78	0.648	0.041
Perceived Empathy(PE)	PE1	2.22	0.636	0.894	1.578
	PE2	2.44	0.867	0.506	-0.443
	PE3	2.33	0.674	0.88	0.819
	PE4	2.51	0.869	0.29	-0.595
Perceived Tangibility(PTA)	PTA1	2.51	0.843	0.202	0.695
	PTA2	2.51	0.895	0.562	0.695
	PTA3	2.47	0.757	0.282	0.695
	PTA4	2.38	0.777	0.732	0.695
	PTA5	2.42	0.753	0.443	0.695

The mean, standard deviation, skewness and kurtosis of all the 36 items in the seven variables in both the expectation and perception was calculated

Table No.7

Construct	**Expected Quality(EQ)**		**Perceived Quality(PQ)**		**Gap Score**
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**	**G=PQ-EQ**
Teaching	2.1238	0.57676	2.2571	0.58157	0.1333
Learning	1.9524	0.66659	2.3492	0.68617	0.3968
Reliability	2.0756	0.65267	2.4267	0.66003	0.3511
Responsiveness	2.2722	0.61658	2.4444	0.62588	0.1722
Assurance	2.1111	0.58279	2.3833	0.64315	0.2722
Empathy	2.3944	0.60886	2.3944	0.60886	0
Tangibility	2.1644	0.69189	2.4578	0.61292	0.2934

The gap analysis of all the seven variable was performed. The maximum gap was found in the learning outcome and minimum gap was found in the teaching quality, it means that the result and placement was not meeting the students expectation and teaching quality was good enough. The zero gap was found in the empathy variable this means that the student expectation is meet with their perception. It means the individual attention will be provided to the students in the government higher education institution.

Table No.8

Construct	**Range**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Student Satisfaction	4	1	5	2.5194	0.83071

The mean and standard deviation of the student satisfaction were calculated with the minimum, maximum and range. 24 items were taken in the student satisfaction as a latent variable in which the mean is found to be 2.5194 and standard deviation of 0.83071.

Table No.9

Correlations between the Construct	Expected teaching	Expected Outcome	Expected Reliability	Expected Responsiveness	Expected Assurance	Expected Empathy	Expected Tangibility
Expected teaching	1	.863**	.853**	.850**	.881**	.746**	.869**
Expected Outcome	.863**	1	.892**	.777**	.802**	.676**	.857**
Expected Reliability	.853**	.892**	1	.841**	.858**	.782**	.936**
Expected Responsiveness	.850**	.777**	.841**	1	.894**	.876**	.822**
Expected Assurance	.881**	.802**	.858**	.894**	1	.767**	.823**
Expected Empathy	.746**	.676**	.782**	.876**	.767**	1	.795**
Expected Tangibility	.869**	.857**	.936**	.822**	.823**	.795**	1

**. Correlation is significant at the 0.01 level (2-tailed).

There was strong co relation found in the expectation side in all the dimension of service quality.

Table No.10

Correlations between the construct	Perceived Teaching	Perceived Outcome	Perceived Reliabiity	Perceived Responsiveness	Perceived Empathy	Perceived Assurance	Perceived Tangibility
Perceived Teaching	1	.875**	.655**	.836**	.678**	.753**	.688**
Perceived Outcome	.875**	1	.496**	.777**	.756**	.668**	.759**
Perceived reliabiity	.655**	.496**	1	.576**	.562**	.936**	.474**
Perceived responsiveness	.836**	.777**	.576**	1	.737**	.616**	.719**
Perceived empathy	.678**	.756**	.562**	.737**	1	.639**	.871**
Perceived Assurance	.753**	.668**	.936**	.616**	.639**	1	.587**
Perceived tangibility	.688**	.759**	.474**	.719**	.871**	.587**	1

**. Correlation is significant at the 0.01 level (2-tailed).

There was strong co relation found in the perception side in all the dimension of service quality. It means the dimension were inter related to each other and convergent validity was established.

8. Conclusion

Limitation and future research recommendation

Only the reliability and validity testing of the instrument was measured using SPSS by one test, it can be checked using different test in the future study. The respondents were not reluctant to fill the google form and the sample size is small, it can be used for the large sample as well. The government HEI's students were taken as a sample in the present study in the Raipur district of Chhattisgarh. The geographical location can be change and study will be expanded in the private HEI's also. The geographical area can be increased by collecting data of the wide range of the students with the HEI's

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