

Development of HiEdQUAL for Measuring Service Quality in Indian Higher Education Sector

Subrahmanyam Annamdevula and Raja Shekhar Bellamkonda

Abstract—This study identifies the determinants to evaluate the service quality in the higher education sector and develops a new instrument called HiEdQUAL with covering various service dimensions in the stand point of students as primary customer. The paper describes the methodology to develop the new measuring instrument of service quality through qualitative and quantitative studies that explores five dimensions: teaching and course content, administrative services, academic facilities, campus infrastructure and support services of service quality within the higher education sector. The proposed model empirically tested for validity, reliability and model fit indices using exploratory factor analysis and confirmatory factor analysis.

Index terms—Higher education, service quality, HiEdQUAL, structural equation model.

I. INTRODUCTION

Higher education plays a vital role in socio economic development of the nation. Indian education system has made a significant progress in higher education from past two decades. Governments at the state and central levels with various regulatory and accreditation bodies, monitor the higher educational institutions with a vision to ensure quality in educational services, yet, quality of higher education is struggling to attain the global level excellence in India. In addition, the expansion of institutions with lack of proper infrastructure and funds from government caused the mushrooming of private institutions in India. Therefore, quality has become an important drive for socio economic development and also, it becomes a competitive weapon for the institutions to attract and serve the student as primary customer.

Students are the primary customers in an educational setup and it is strongly supported by many researchers [1], [2]. Students involve in different roles: they are the product of the process, the internal customer for campus facilities, the laborers of the learning process and the internal customer of the delivery of the course material [3]. However, it is generally accepted that students are the primary customers and other prospective customers are such as alumni, parents, employers, employee, government, industry and society may be considered secondary customers [4].

Reference [4] conducted a survey and examined the view points of different professionals and experts on the quality in higher education and concluded that customer-orientation in higher education is a generally acceptable principle.

Hence, among all the stakeholders, students are to be considered as the primary stakeholder and their opinion plays an important role in evaluation of service quality in higher education. Consequently, it becomes necessary to identify the determinants of service quality from the stand point of students being the primary customer, but in spite of this, very few studies have been done in this area, particularly on exploring the dimensions to measure service quality in higher education in the perspective of students in the Indian context. As a result of this evidence it would seem rationale to develop a new instrument that integrates not only the academic components, but also the aspects of total environment as experienced by the students.

In this context, the present study attempted to provide an instrument covering all the aspects experienced by the students of central university of Hyderabad in India. The following sections present a review of relevant literature, methodology of developing a new proposed instrument, findings and conclusion.

II. BACKGROUND AND LITERATURE REVIEW

In higher education, there is an extensive literature on the causes and consequences of quality education [5], [6]. Nonetheless, many studies have been done by adopting generic service quality models: SERVQUAL, SERVPREF, Groonos etc., to evaluate students' experience on service quality of higher education. Within these models, the SERVQUAL instrument [7] has attracted the greatest attention to measure the perceived quality in higher education sector [8]. Parasuraman, Zeithaml, and Berry developed an instrument called "SERVQUAL" for quantifying customers' assessment of service quality performance. The SERVQUAL instrument has evolved to become the most commonly used service quality measurement instrument in education. It contains 22 items for measuring service quality along five dimensions, namely, reliability, accessibility, tangibility, assurance and responsiveness. SERVQUAL operationalizes service quality by subtracting customers' expectation score from perception score with respective to 22 items. Although globally accepted and adapted in various service organizations, the SERVQUAL instrument is not without criticism.

Reference [9] refute the framework of SERVQUAL and claimed that there is a little evidence to support the concept of the 'expectations minus perceptions' gap as a basis for measuring service quality and proposed a 'performance only' measure of service quality called SERVPREF. Another research work, [10] discusses the conceptual and operational difficulties of using 'expectations minus perceptions' approach and proposed a model called

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S. Annamdevula is with the School of Management Studies, University of Hyderabad, India (e-mail: asm.phd4@gmail.com)

R. S. Bellamkonda is with the Management Studies, University of Hyderabad.

Evaluated Performance (EP) instrument, which measures the gap between perceived performance and the ideal amount of a feature rather than the customer's expectations.

The argument regarding the gaps of SERVQUAL [11] SERVPERF and Evaluated Performance (EP) approaches to measuring service quality is still unresolved as there are valid issues and propositions. The general view appear to be that, although SERVQUAL, SERVPERF and EP were designed as standard measures of service quality which have cross-industry applicability, it is imperative to view the instruments as basic "framework" that often necessitate modification to fit into the specific application of context. Without doubt the use of these approaches as a means of measuring service quality throughout the marketing (service) sectors may have been tested with some degree of success, but this may not be the case for other service sectors, namely, higher education.

In addition to generic models, other unique features of higher education sector raise serious concerns to develop an exclusive measurement instrument to evaluate service quality in higher education. The higher education is the part of service sector, it can facilitate generalizing service quality dimensions, but still more attention is required concerning its complex characteristics. The higher education as a category of pure service [12] and complex combination of the factors that define services: Intangibility, inseparability, Variability, perishability, simultaneity and heterogeneity, evaluation of education service quality is a tough challenge for researchers.

Another difficulty in evaluating services is customers' prior experiences from particular service sector highly influences to predict the expectations from another service provider, with competing services in the same industry , or with the related services in different industries [13]. Similarly, there are other considerable issues on how to measure service quality and recent studies have raised many questions over the theory on existing generic instruments to adopt in higher education sector [14]. Likewise, review of literature shows that there are many areas of disagreement in the debate over how to measure service quality.

Therefore, with this account it is evident that evaluation of service quality in higher education sector is a challenging task which requires a clear understanding of conceptual and empirical issues. It is essential to develop an instrument that is exclusively designed for evaluating service quality in higher education, instead of continuing the evaluation under the shadow of a standard measurement scale that is applicable to a wide variety of services.

III. EMPIRICAL STUDY

A. Objective

The objective of this study is to develop and validate the new instrument called Higher Education Service Quality (HiEdQUAL) to measure service quality especially in higher education through usage of qualitative and quantitative studies.

B. Development of Research Instrument

The in-depth literature review together with five focused group interviews and expert opinion provided the basis for

generating the 68 distinct statements for inclusion of the draft questionnaire. The draft questionnaire consisted three sections A, B and C. Section A contained 54 statements related to services offered by the university. All the items are randomly placed and same rating scale was used throughout the questionnaire. The items were measured on a 7-point likert scale that varied from 1=strongly disagree to 7=strongly agree; whereas, section B contained 13 questions on overall rating of motivation, satisfaction level and loyalty of the students. Section C has 12 questions pertaining to respondent's profile including one open ended question on suggestions about the quality of services provided by university for further improvement.

C. Survey

For conducting an empirical study, data was collected from senior students who have completed at least one year of education in university during March 2012 with non-probability judgmental sampling technique. A total of 358 questionnaires were returned and found to be useful, which represents 87.3% of response rate. Out of 358 students, who responded to the questionnaire, more than half (69%) of the students were male. Respondents diversify from various departments/schools across the university.

D. Factor Analysis

Calculation of Cronbach's alpha coefficient and critical analysis of correlation of the data matrix are required to ensure the usage of factor analysis [15]. The value of coefficient alpha of all the items were above 0.90 and all the item- to- total correlations were more than 0.30, so, no items were deleted from list [16]. The other statistical bases to proceed with factor analysis are Bartlett test of sphericity, which provides the statistical probability that the correlation matrix has significant correlations among at least some of the variables. The result were significant at 0.05, $\chi^2 = 5089.720$ ($p = 0.000$) a clear indication of suitability of factor analysis. Finally, The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy computed indicates the proportion of variance in variables might be caused by underlying factors, and the result indicates an index of 0.883 which is sign for adequacy for factor analysis [17]. As for the sample adequacy, study has 5:1 ratio of observations to variables, which fulfills the minimum requirement for factor analysis [15].

The study used principal component analysis with 54 items from section A of the questionnaire, which was followed by Varimax rotation. Factor loadings more than ± 0.40 remained for further analysis in the study [15]. Reference [15] shows that factor loadings more than ± 0.40 considered as significant at $p=0.05$ with a sample size of 200 respondents ($n= 358$ in this study). Latent root criteria used to extract the factors, where factors having latent roots (eigenvalues) more than 1 are considered significant. Using the eigenvalue for establishing a cutoff is more reliable when the number of variables is between 20 and 50 [15]. A total of 34 items which grouped under six factors/constructs emerged from factor analysis.

TABLE I: RESULTS OF FACTOR ANALYSIS: SCALE ITEMS, FACTOR LOADINGS, CRONBACH'S ALPHA COEFFICIENTS AND EIGENVALUES.

Items	Factors					
	TC	AS	AF	CI	IN	SS
TC1	.694					
TC2	.689					
TC3	.683					
TC4	.636					
TC5	.634					
TC6	.622					
TC7	.595					
TC8	.568					
TC9	.560					
AS1		.780				
AS2		.771				
AS3		.762				
AS4		.701				
AS5		.679				
AS6		.583				
AF1			.762			
AF2			.758			
AF3			.644			
AF4			.629			
AF5			.542			
AF6			.523			
CI1				.719		
CI2				.656		
CI3				.655		
CI4				.575		
CI5				.557		
CI6				.513		
CI7				.493		
IN1					.855	
IN2					.699	
IN3					.676	
SS1						.686
SS2						.617
SS3						.603
Eigenvalue	4.304	3.691	3.328	3.186	2.168	1.855
Variance (%)	12.66	10.86	9.788	9.371	6.378	5.457
Cumulative % of variance explained	12.66	23.52	33.30	42.67	49.10	54.51
Cronbach's alpha	.853	.850	.839	.767	.758	.606

TC= Teaching and Course content; AS=Administrative Services; AF=Academic Facilities; CI= Campus Infrastructure; IN= Internationalization; SS= Support Services

The Cronbach's α value of six factors ranged from 0.606 to 0.853 indicates that the scale was internally consistent and reliable [18]. Table 1 show the final result of component factor analysis with remaining 34 variables with loadings, variance explained by the each factor and Cronbach's α value of each factor.

E. Confirmative Factor Analysis

Confirmative Factor Analysis (CFA) facilitates to test how the measured variables represent the construct. The study used AMOS 18 to run confirmative factor analysis for all the constructs by means of structural equation modeling which was used to evaluate the underlying six factor model where individual items in the model are examined to see how closely they represent the same construct.

The output of explorative factor analysis was considered as underlying measurement model for CFA which consists 34 items with six factors. In this process of purification,

three items of internationalization factor itself was deleted due to lack of strong enough factor loadings. In the same way one variable from teaching and course content and three items from campus infrastructure were deleted due to low factor loadings (<0.50). In the examination of standardized residuals it was found that the highest residual is 3.069, in fact it was the highest and ten residuals are between 0.2 and 0.3 the remaining are less than 0.2. Thus no items were deleted based on this criterion. Fig. I shows the final stage of confirmative factor analysis with regression weights. As a result, final HiEdQUAL scale, consisting of 27 items loaded into five factors emerged.

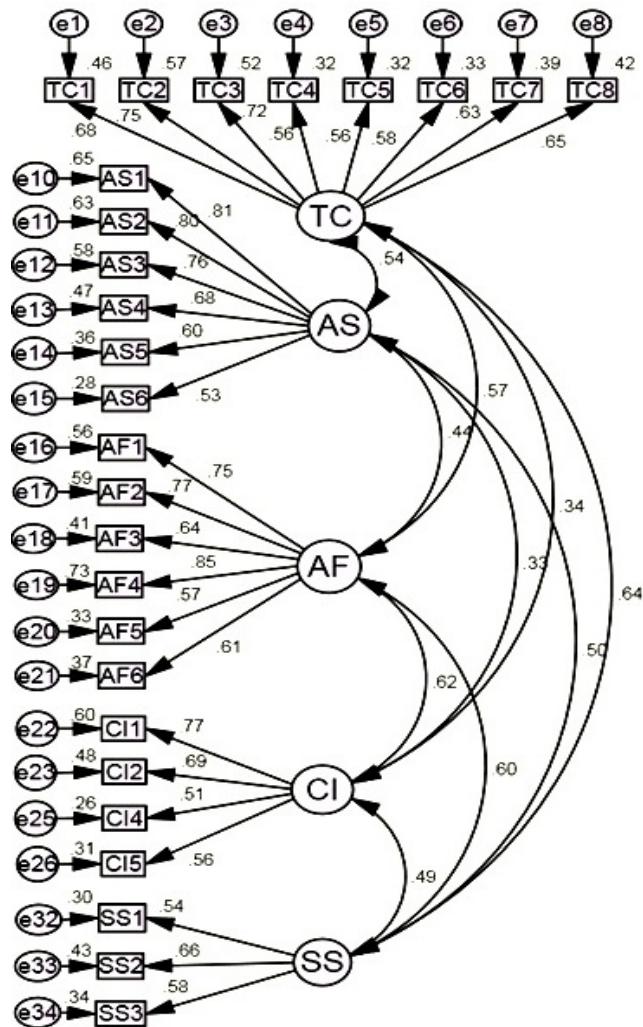


Fig. 1. The result of confirmative factor analysis.

F. Model Fit

In addition to the factor loadings, Amos 18 provides three typical indices namely Absolute Fit Measures, Incremental Fit Indices and parsimony Fit Indices. Table II shows the overall evaluation of model fit with significant values indicates that the five factor model fits well and represents a reasonably close approximation of the population.

G. Reliability of the HiEdQUAL Instrument

The Cronbach's alpha for the HiEdQUAL was 0.905 which shows the strong reliability of the instrument. The construct reliability of all the latent dimensions ranged from 0.622 to 0.854 which indicates the internal consistency of the statements (see table III).

TABLE II: THE CFA GOODNESS-OF-FIT STATISTICS OF HIEdQUAL SCALE

Absolute Fit Measures	
Value of the χ^2 and significance level	620.92 (p=.000)
Normed chi-square	1.970
Goodness-of-fit index (GFI)	0.883
Root mean square error of approximation (RMSEA)	0.052
Incremental Fit Indices	
Normed fit index (NFI)	0.844
Tucker Lewis Index (TLI)	0.906
Comparative fit index (CFI)	0.916
Relative fit index (RFI)	0.826
Parsimony Fit Indices	
Adjusted goodness-of-fit index (AGFI)	0.861
Parsimony normed fit index (PNFI)	0.755

TABLE III: CONSTRUCT RELIABILITY OF LATENT DIMENSIONS

	TC	AS	AF	CI	SS
Construct reliability	0.849	0.852	0.854	0.732	0.622

H. Validity Test

Validity is the extent to which a set of measured items actually reflects the theoretical latent construct [15]. The study conducted face validity, content validity, convergent validity, discriminant validity and nomological validity tests to validate the five service quality constructs. Face validity and content validity were examined in the stage of items generation from extensive literature and by adopting changes and suggestions from various experts.

All the variables with standardized loading estimates between 0.5 and 0.7 indicate an evidence of convergent validity [15]. CFA standardized factor loadings of each variable above 0.50 is evident that the model has convergent validity. Construct reliability also one of the indication for convergent validity.

Discriminant validity was checked with the comparison of variance extracted (VE) estimates for each factor with the squared inter-construct correlations (SIC) associated with that factor. The study identified that all the extracted variance estimates are greater than squared inter-construct correlations, it means that each construct is unique and capture some experience other measures do not. Finally, nomological validity was tested by examining whether the Pearson product-moment correlations among the constructs in a measurement theory make sense. The positive significant correlation between the constructs indicates that the constructs have nomological validity. Thus, the measurement model reflects good model fit, construct validity and reliability.

IV. CONCLUSION

The study provides an example of developing a measurement scale by using higher educational services. Final version of HiEdQUAL scale has 27 items under five factors, emerged, please see Appendix. The study measured the unidimensionality of the constructs and finds significant relationship between teaching and course content, administrative services, academic facilities, campus infrastructure and support services which are also having

significant positive influence on overall students' perceived service quality.

As a closing note, it is worthwhile to develop a measurement instrument to evaluate service quality from the perspective of all internal and external customers, more particularly internal customers: academicians, supporting staff and administration staff. Since students are the primary customer in higher education sector the study has concentrated on student customer only, but it is identified that education sector has other potential customers as a part of whole education process who must be satisfied.

APPENDIX

The HiEdQUAL scale items

- TC1. Teachers responsive and Accessible
- TC2. Teachers follow Curriculum strictly
- TC3. Teachers follow good Teaching Practices
- TC4. Relevance b/w Programme & Syllabus
- TC5. Course Content Develops students' Knowledge
- TC6. Department Informs schedules, exams, results etc.
- TC7. Teachers Complete Syllabus on time
- TC8. Department. has Sufficient Academic Staff
- AS1. Administrative Staff Provide Service without delay
- AS2. Administrative Staff are courteous and Willing to help
- AS3. Administrative Staff Provide Error free work
- AS4. Administration maintains accurate and Retrieval Records
- AS5. Administrative staff accessible during office hours
- AS6. University has safety and security measures
- AF1. Department has adequate facilities
- AF2. Classrooms equipped with teaching aids
- AF3. Department has sufficient class rooms
- AF4. University has adequate auditoriums, conference halls etc.
- AF5. Library has adequate academic resources
- AF6. Computer labs have adequate equipment and internet facilities
- CI1. University has adequate hostel facilities
- CI2. University has adequate medical facilities (Health Centers)
- CI3. University has adequate Amenities (Canteen, Shopping centre, Bank, ATM, Post office, etc.)
- CI4. Campus infrastructure is well maintained.
- SS1. University has sufficient sports and recreation facilities.
- SS2. University/department provides placement services
- SS3. University provides counseling services

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Subrahmanyam Annamdevula is a Doctoral Research Scholar in School of Management Studies, University of Hyderabad, India. He is a Post Graduate in Business Administration from Pondicherry University, India.



Raja Shekhar Bellamkonda is a Professor at School of Management Studies, University of Hyderabad. He did his PhD from Kakatiya University, India. He has published around 40 papers in national and international journals and conferences. He has authored 3 books.