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## Exploratory Factor Analysis of Service Quality Dimensions for Higher Educational Institutes: A Students Perspective

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EXPLORATORY FACTOR ANALYSIS OF SERVICE QUALITY DIMENSIONS FOR HIGHER EDUCATIONAL INSTITUTES A STUDENTS PERSPECTIVE

*Strictly as per the compliance and regulations of:*



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# Exploratory Factor Analysis of Service Quality Dimensions for Higher Educational Institutes: A Students Perspective

Gurbinder Singh <sup>α</sup> & ManEEK Kumar <sup>ο</sup>

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**Practical Implications:** The focus on higher education in the last two decades or so has led to the establishment of many public and private higher education institutes (HEI's) and universities in the country. The students, now-a-days, before joining any institute tend to look at, not only the type, but also quality of the services being offered by the institutes. This paper does provide an extensive block of thirty one items; split into four dimensions, for assessing the service quality of HEI's.

**Keywords:** service quality, I-SERVQUAL model, higher education, HEI's, universities, dimensions, exploratory factor analysis.

## I. INTRODUCTION

The term globalization, which has formed the backbone of an open market regime, signifies open competition among firms for customers in worldwide markets (P.N. Rastogi, 2002). The cornerstone of this competition is quality, cost and performance of their products and services. As globalization, implying free trade in products/services, offers a wide choice to customers across borderless world, it also exerts continuous pressure on competing companies to upgrade quality, reduce costs and develop superior products/services in terms of customer's need and expectations. Demand from

customers, technological development, change of value and globalization are some of the factors that drive the need to change and develop an organization (Bruzelius and Skarvad 2004). The changes in business environment have led to the development of new techniques for organizing and managing companies/organizations. These changes have been necessitated due to international competition and higher education is no exception.

Higher education in India, even if we look globally, is very costly and it has all come down to consumers wanting value for their money. They need quality education to go with the higher fee, which they have to shell out. They expect the universities, where they intend to study, to have the best infrastructure, highly qualified faculty and the best of facilities. Thus, universities too have been brought under the ambit of so called 'service' organizations, where most important characteristic separating them neatly from products is the sheer impossibility to separate production from consumption. In India we have approximately 480 universities in public and private sector. In the current scenario as it exists, the Indian Higher Education Sector is facing turbulent times. Entry barriers are being lowered, distance education is being expanded GNOU for example, has become world's largest university having 3 million students on roll with presence in 35 countries, private universities are mushrooming all over and foreign universities are all set to enter India in a big way. Those in the higher education sector are certainly in for a stiff competition and only those which provide the best of services at an affordable price will survive. This huge growth in student numbers, internationalization of education, government looking at reducing funding and increasing competitive pressures have prompted many universities and other education providers to focus on quality customer service.

## II. SERVICE QUALITY AND SERVICE MANAGEMENT

As the service sector grows and begins to play a very vital role in the global economy, the study of services and innovation are becoming increasingly important. As service products distributed regionally, nationally and globally have started contributing large

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amounts to company revenue streams; knowledge-intensive business services aimed at enhancing performance require reliable methods of measurement, assessment, and improvement (Spohrer & Maglio, 2008). As a result, accurate and reliable instruments that assess service quality are of great interest to companies whose revenues come from service delivery.

It is well known that service quality is based on multiple dimensions (Parasuraman et al, 1985). Gronroos (1982) identified two service quality dimensions, the functional and the technical aspect. The functional aspect concerns "how" service is provided while the technical aspect concerns "what" service is provided. The "what" is received by the customer as the outcome of the process in which the resources are used, i.e. the technical or outcome quality of the process, however, the customer also has become very much interested in as to how the process itself functions, i.e. the functional or process quality dimension. Lehtinen & Lehtinen (1982) view service quality in terms of physical, corporate (image) and interactive quality. Physical quality refers to the tangible aspects of the service. Corporate quality refers to how current and potential customers, as well as the other public, views (image) the service provider. Interactive quality concerns the interactive nature of the service provider and refers to a two-way flow that occurs between service provider and the customer, or her/his representative, including both animated and automated interactions.

Gronroos (2001) also presented, similar to what Lehtinen and Lehtinen (1982) proposed on service quality, the importance of corporate image and the experience of service quality. Customers often have contact with the same service firm, which implies that they bring their earlier experiences and overall perceptions of a service firm to each encounter. Hence, the image concept was introduced as yet another important attribute. Gronroos (2001) expressed that the image can be viewed as a filter in terms of a customer's perception of quality.

Parasuraman et al (1985) derived ten dimensions that influence service quality from what they suggested that quality evaluations are not made exclusively on the outcome of service. Moreover, they also involved evaluations of the service delivery process. The first dimension, when evaluation happens after service performance, focuses on "what" service is delivered and is called 'outcome quality'. The second

dimension, 'process quality', is when the evaluation occurs while the service is being performed. In 1988 they defined service quality as "the degree of discrepancy between customer's normative expectations for the service and their perceptions of the service performance" (Parasuraman et al, 1988). Brady and Cronin (2001) presented a three-factor model describing service quality, ambient conditions, facility design and social factors. They defined that service environment are elements of the service delivery process and it seems best to include them as components of the functional dimension.

Higher education has increasingly been recognized as a service industry and, as a sector, it must strive to identify the expectations and needs of its clients, who are the students (Mello et al, 2001). According to Lovelock (2001), education service is classified as a service with intangible actions, directed towards the minds of people, with continuous delivery, conducted through a partnership between the service organization and its client, and although it provides high personal contact, there is low customization.

Many scholars like Bemski (1991), Bill D. (1992), Chadwick and Ward (1987), Comesky et al (1991) and many others have attempted to measure service quality in higher education, but it is still a challenging job to find a suitable measuring tool. Ewell (1993) suggested that there may be a danger in a strict application of the tenets of consumer service to students if the only recognized bottom line is student's satisfaction. Astin (1975) expressed his view that students' perception of his/her experience may be one of the most critical elements of education.

One of the foundational approaches to identifying service quality parameters has come from the developers of SERVQUAL instrument and the creator of Gaps theory approach to Service quality (Parasuraman et al, 1991), who have identified six dimensions of service quality which are tabulated as below in Table 1. The present work is aimed at finding the reliability of the questionnaire developed for measuring the service quality of higher education providing universities. The questionnaire, I-SERVQUAL, has been developed by modifying the parameters ensconced in the SERVQUAL to suit the needs of the survey to be conducted for the purpose. The modified parameters have been put up alongside those identified by Parasuraman et al (1991) in Table 1.

Table 1 : Dimensions of Service Quality

SERVQUAL		I-SERVQUAL	
Parameter	Meaning	Modified Parameter	Meaning
Faculty	Specialization/Experience	Faculty	Quality of service provided by the faculty members of the university
Tangibles	Appearance/Physical facilities	Facilities	Availability of facilities for academic, Co and extra-curricular activities, sports etc.,

		Tangibles	Quality of facilities and infrastructures on campus
Reliability	Ability to perform promised services.	Reliability	Curriculum and Services as put-up in the prospectus/website are delivered or not
Responsiveness	Willingness to help customers	Delivery	Concerns whether equitable service is provided to all without bias.
Assurance	Trust & confidence		
Empathy	Caring attitude	Attitude	Concerns with the attitude of the administrative staff and faculty

### III. RESEARCH METHODOLOGY

For determining the dimensions affecting the service quality of the academic institutions, the original SERVQUAL Model of *Parasuraman et al (1991)* was modified completely, making it suitable for universities/educational institutes. The modified and refined model had 55 items tentatively distributed to cover the six main dimensions of Faculty, Facilities, Tangibles, Attitude, Reliability and Delivery. The service quality as perceived by the students was measured on a five point Likert Scale ranging from ‘Strongly disagree’ to ‘Strongly agree’ as a response to the statements in the questionnaire. In order to distinguish between the revised SERVQUAL and the version customized for this study, the latter has been referred to as I-SERVQUAL.

#### a) Sampling

As suggested by Deming consumers determine quality. Consequently service quality should be researched studying customers’ preferences and needs. Thus, the unit of analysis of the present study was the consumers, in this case, the PG students studying in various universities of Punjab. The PG students were chosen for the study, as they have already studied for their undergraduate program in the same or another institute and thus would be better

equipped to respond to the items of the questionnaire. The survey was conducted for the PG students, studying in various disciplines, on the campus of the three Universities of Punjab, each belonging to a different category. Of the participating universities considered, one was a full-fledged government university, the second one a deemed-to-be-university and the third participating university was a private university established under the state act.

A self-administered, structured questionnaire was used to collect the data from the respondents, who were the students studying in final year at the above-mentioned campuses in various PG courses. The combined student strength of the above three universities, enrolled in various PG courses, would be approximately 10,000, and for a population of 10,000 a sample size of 370 is appropriate according to *Krejcie & Morgan (1970)*. Thus, of the 10,000 students, the survey questionnaire responses were obtained from 600 students (200 students of each University). The questionnaire for the study had six items related to the respondent’s identification data, and included fifty items qualifying the proposed six dimensions of service quality. The specific items of the questionnaire are depicted in Table 2.

Table 2: Service Quality Dimensional Items

CODES	DIMENSIONAL ITEMS
V1	University faculty shows interest to solve students' problems
V2	University faculty is well qualified and knowledgeable
V3	University faculty gives confidence and motivation to students.
V4	The faculty provides correct answers to students' questions.
V5	Faculty is never too busy to attend to students' problems and is available beyond office timings i.e. easily accessible.
V6	University faculty inculcates interest in the subject among students.
V7	The faculty is immaculately dressed befitting their status.
V8	The faculty provides prompt and timely service to you
V9	Faculty communicates in a language that you understand.
V10	Examination papers are evaluated without bias and in time
V11	The university library is easily accessible to students
V12	The university library is modern and well stocked with access to print and e – journals
V13	University Hostels are comfortable to stay in with modern and appealing facilities
V14	Food/Beverages served in Hostels are as per students liking
V15	University hostels have internet connectivity and other facilities like Gymnasium, common room etc.
V16	The university has a proper arrangement to give medical aid to students in emergency
V17	University canteens are hygienic and have a wide range of servings of food and beverages.



V18	University genuinely helps students in placements and has a dedicated placement cell.
V19	University arranges recreational activities (Co and extra-curricular) for students around the year
V20	University arranges sports activities for students around the year
V21	The university has sufficient transportation facilities
V22	Accurate and secure student records are maintained
V23	Specific opportunities and support for you to attain your personal goals are provided in the form of finishing schools etc.
V24	Complete and accurate information is provided to you in good time.
V25	The university has a student counselling cell to cater to the needs of weak students
V26	The university has excellent infrastructure like buildings, roads etc.
V27	The university has excellent infrastructure for sports and games
V28	The university has excellent infrastructure for organizing cultural and technical festivals
V29	University classrooms are well lit and are modern with appealing fixtures
V30	University classrooms are well equipped with projection systems
V31	University laboratories are well lit and are modern and well equipped to handle classes
V32	The university has well equipped computer labs with requisite and licensed software
V33	A full range of up-to-date physical facilities and equipment are provided in the laboratories
V34	University academic staff is easily available to students for guidance
V35	The administrative staff is courteous to students and willing to solve their problems
V36	The university maintains cleanliness at the campus
V37	Teachers and students communicate well in the classroom
V38	Your complaints are constructively handled
V39	A flexible service is provided to meet your individual needs.
V40	Faculty/Staff reassures you in terms of your personal anxieties, concerns and problems.
V41	Staff are sympathetic to your individual needs, while respecting your privacy
V42	You feel safe under the care of the staff
V43	Staff respect your confidences and feelings
V44	The behavior of the staff makes you feel that you can trust them and have confidence in them.
V45	The teaching and learning process is up-to-date as promised by the university
V46	Students feel safe and secure in the university
V47	University curriculum is need based and useful for future job
V48	The behavior of the staff makes you feel that you can trust them and have confidence in them
V49	University shows interest in solving problems
V50	The required level of service is delivered, with clearly stated terms and conditions
V51	The full range of services is delivered to meet your changing needs.
V52	Appropriate services are delivered as promised
V53	A dependable service which does not vary over time is provided
V54	An equitable service is delivered to individual students, as well as groups of students
V55	The interpersonal skills are adequately addressed in the curriculum

The questionnaire was pre-tested with a sample of thirty seven PG students selected purposively. *Fink (2003b in Saunders, Lewis, Thornhill, 2007)* had suggested that a minimum of ten respondents was sufficient for pre-testing of the questionnaire, and the same was kept as the basis for the pre-testing size of the sample. After carrying out the pretesting, the questionnaire was provided to the respondent population of the three universities (200 PG students each) through personal contact by the research assistants.

*b) Method of analysis*

Factor Analysis (FA) is a data reduction technique that uses correlations between data variables. It assumes that some underlying factors exist that explain the correlations or the interrelationships among observed variables (*Chatfield and Collins 1992*). It had

been used extensively by various researchers in the varying fields of economics, marketing, sociology, and education (*Nimako et al, 2012; Bollen 1989; Doll et al 1994; Li et al 2002*). The statistical data analysis for the present study of FA followed the approach similar to the one used by *April & Pather (2008)*. The steps involved herein included Exploratory Factor Analysis (EFA) and subsequent regrouping of items on the basis of the analysis.

EFA is a method that aims at extracting maximum variance from the dataset within each factor (*Chatfield and Collins, 1992*). In the empirical work of *Costello and Osborne (2005)* on best practices in exploratory factor analysis, it was strongly recommended to use Principal Component Analysis (PCA) because of its potency of revealing the underlying structure of the latent variables with an appropriate

rotation method. In rotation methods, it has generally been seen that, ML (Maximum Likelihood) or PAF (Principal Axis Factoring) gave the best results, depending on whether the data are generally normally-distributed or significantly non-normal, respectively (2005: 2). Thus, for the present study ML extraction method with Promax with Kaiser Normalization rotation method was chosen for EFA. This was performed on all the fifty-five items (Table 2). On the criteria for selecting factor loading, generally factor loading above 0.6 is considered high while factor loading greater than or equal to 0.3 is considered moderately high (Klien, 2005). Therefore the cut-off for analysing factor loading was  $0.50 \pm 0.03$ .

#### IV. ANALYSIS OF DATA

The data pertaining to the respondents was examined for demographic and other academic details.

Table 3 : Characteristics of Respondents

		Frequency	Percentage
Gender	Male	325	58.67
	Female	275	41.33
Age	Less than or equal to 25 years	438	73.00
	More than 25 years	162	27.00
Postgraduate Course of study	Engineering	200	33.33
	Science	200	33.33
	Management	200	33.33
Academic performance (Marks)	Less than 60%	98	16.33
	Between 60 to 75%	307	51.17
	Between 75 to 85%	131	21.83
	More than 85%	64	10.67

From the point of view of the course of study undertaken by the respondents, an equal percentage of students (33.33%) were doing their post-graduation in engineering, science and management, respectively. In terms of the academic performance of the students, who were in the final year of their respective program, it can be observed that majority of them, 51.17% had an average percentage score till their pre-final year term. Only 16.33% of the respondents were having below average academic performance and more than 32% of the respondents had performed admirably in their respective academic discipline. This implies that the respondent's data is slightly skewed towards students with above average performance.

#### V. DISCUSSION OF RESULTS

The pre-testing analysis of the data, sample of thirty seven PG students selected purposively, showed a very high value, 0.958, for the Kaiser-Meyer-Olkin Measure, thereby indicating the suitability of the research data for structure detection, i.e. the proportion of variance in the items that might be caused by underlying factors. Thus, generally the data were found to be useful for factor analysis. This was confirmed further by the significance of the Bartlett's test of

The factor analysis and item/scale reliability were carried out for the responses to the dimensional items using SPSS22 software. The details are provided in the succeeding sub-sections.

##### a) Respondent Characteristics

The characteristics of the students who responded to the I-SERVQUAL questionnaire are presented in Table 3. In terms of the gender, 58.67% of the students who participated in the survey were males and remaining 41.33% were females.

73% of the respondents were less than 25 years of age, whereas, only 27% of them belonged to an age group of more than 25 years, implying that most of the respondents were fairly young.

sphericity tests ( $X^2: 5259.079$ ,  $df: 465.000$ ,  $Sig.: 0.000$ ) indicating that the variables were not unrelated and therefore suitable for structure detection.

After examining the suitability of the questionnaire through pre-testing, the responses to all the fifty five items were obtained from a total of 600 PG students spread across the three selected universities. Exploratory factor analysis was carried out for the data so obtained. The Tables 4 (a) and 4 (b), showing the pattern matrix and structure matrix, emerged after factor analysis. As can be observed from the tables, a total of four factors or components emerged and 24 items, out of the fifty-five measurement indicators, got eliminated. All the eliminated measurement indicators had a corrected item-total correlation below 0.50. As a result, 31 measurement indicators of service quality were retained for subsequent analysis. On careful examination of the data it could be seen that most of the items pertaining to faculty, tangibles and delivery were the least affected and thus, are the main components which affect the service quality being offered by higher education universities.

a) *Regrouping of items and discussion*

As can be observed from the Table 5, the emerged items could be conveniently grouped into four dimensions.

Looking at the regrouped items of the emerged Factor 1 after EFA, it was found safe to label 15 of the 31 retained items (V44, V42, V43, V1, V37, V5, V4, V8, V10, V9, V48, V3, V41, V39, V40) under the dimension of 'Faculty and Staff Behaviour', as all the items intrinsically related to that aspect only.

The emerged Factor 2 contained seven items (V26, V28, V27, V29, V36, V30, V31) which could be

categorized under the 'Tangibles' dimension of service quality.

On careful examination of the emerged Factor 3, which had six items (V53, V54, V52, V55, V51, V50), it was discovered that these items relate to the 'Delivery' aspect of service quality.

The emerged Factor 4 had only three items (V14, V13, V15), which clearly identified with the 'Facilities' aspect of the service quality of the HEI's.

Table 4 : (a) Pattern Matrix

Factor	1	2	3	4
<b>Cronbach's Alpha</b>	<b>0.95</b>	<b>0.888</b>	<b>0.925</b>	<b>0.841</b>
<b>Item Loading</b>				
V44	0.998			
V42	0.875			
V43	0.865			
V1	0.678			
V37	0.667			
V5	0.649			
V4	0.644			
V8	0.625			
V10	0.621			
V9	0.605			
V48	0.602			
V3	0.600			
V41	0.569			
V39	0.556			
V40	0.474			
V26		0.891		
V28		0.865		
V27		0.785		
V29		0.592		
V36		0.575		
V30		0.565		
V31		0.445		
V53			0.863	
V54			0.837	
V52			0.735	
V55			0.729	
V51			0.514	
V50			0.454	
V14				0.882
V13				0.788
V15				0.751

Extraction method: Maximum Likelihood. Rotation method: Promax with Kaiser Normalization Rotation converged In 7 iterations

Table 4 : (b) Factor Analysis

Structure Matrix									
Item Loading	Factor				Item Loading	Factor			
	1	2	3	4		1	2	3	4
V1	0.706*	0.500	0.548		V36	0.558	0.699*	0.525	
V3	0.719*	0.532	0.594	0.433	V37	0.747*	0.596	0.583	
V4	0.738*	0.530	0.616		V39	0.780*	0.531	0.716	0.541
V5	0.678*		0.564	0.439	V40	0.735*	0.480	0.720	0.518
V8	0.731*	0.508	0.599	0.489	V41	0.768*	0.519	0.705	0.496
V9	0.682*	0.646	0.462		V42	0.836*	0.584	0.496	0.489
V10	0.574*		0.439		V43	0.855*	0.574	0.645	0.500
V13	0.467		0.461	0.790*	V44	0.831*	0.503	0.579	0.413
V14	0.435		0.512	0.857*	V48	0.806*	0.617	0.709	0.458
V15	0.480	0.455	0.441	0.766*	V50	0.754	0.628	0.792*	0.573
V26	0.468	0.793*	0.401		V51	0.727	0.596	0.797*	0.581
V27	0.476	0.762*	0.491		V52	0.674	0.544	0.820*	0.483
V28	0.501	0.813*	0.482		V53	0.631	0.479	0.842*	0.520
V29	0.532	0.689*	0.487	0.492	V54	0.609	0.507	0.811*	0.453
V30	0.579	0.692*	0.464	0.405	V55	0.663	0.559	0.803*	0.432
V31	0.576	0.659*	0.602	0.446					

Extraction method: Maximum Likelihood. Rotation method: Promax with Kaiser Normalization

\* Retained factor loadings

Table 5 : Regrouping of the Components into Four Groups

Emerged Factor	Items retained	New Dimension
1 (15 items)	V44, V42, V43, V1, V37, V5, V4, V8, V10, V9, V48, V3, V41, V39, V40	Faculty and Staff behaviour
2 (7 items)	V26, V28, V27, V29, V36, V30, V31	Tangibles
3 (6 items)	V53, V54, V52, V55, V51, V50	Delivery
4 (3 items)	V14, V13, V15	Facilities

Emerged 'Factor 1' had a good mix of the items related to the behaviour and personality of the Faculty and Staff members, with whom the PG students interact very frequently. The behavioural aspects were very prominent in all the items of this dimension. It included items unequivocally associated to the day-to-day interactions faculty and staff members have with the students, like: How much the University faculty shows interest to solve student's problems (V1); How much confidence and motivation does the university faculty offers (V3); Does the faculty provide correct answers to student's questions (V4); Is the faculty easily accessible (V5); Does the faculty provide prompt and timely service (V8); Does the faculty communicates in a language that student's understand (V9); and Does the faculty evaluates the examination papers without bias and in time (V10). The remaining items were also found to mirror the behavioural aspects of the faculty and staff, which included: Do the teachers and students communicate well in classroom (V37); Are the faculty and staff members flexible in providing the service desired (V39); Do the faculty/staff members reassure student's in terms of their personal anxieties, concerns and problems (V40); Are the faculty and staff members

sympathetic to individual needs, while respecting privacy of students (V41); Do students feel safe under the care of faculty and staff (V42); Do the faculty/staff members respect confidence and feelings of students (V43) and Does the behaviour of staff makes students feel that they can trust them and have confidence in them (V44). The V48 item in this group was similar to the V44 item. As all these items correlated the behavioural aspects of the faculty and staff members, thus the most appropriate label for this was considered to be 'Faculty and Staff Behaviour'.

Emerged 'Factor 2' contained seven items which very well allied to the Tangibles dimension of service quality. These items referred to the infrastructure facilities on the university campuses like, buildings and roads (V26), infrastructure for sports and games (V27), infrastructure for organizing cultural and technical festivals (V28), well lit modern class rooms with appealing fixtures and equipped projection systems (V29 & V30), well lit and modern laboratories well equipped to handle classes (V31), and cleanliness on campus (V36).

Emerged 'Factor 3' had six items which relate to the 'Delivery' aspect of the services provided by the



university. This dimension included items like, Whether required level of service is delivered, with clearly stated terms and conditions (V50), Is a full range of service delivered to meet the changing needs (V51), Are appropriate services delivered as promised (V52), Is dependable service provided (V53), Is equitable service delivered to the students (V54), Are inter-personal skills adequately addressed in the curriculum (V55).

Emerged 'Factor 4' had only three items which belonged to the 'Facilities' dimension. This included items like, Whether university hostels are modern and have appealing facilities and are comfortable to stay in (V13), Are food and beverages served to students liking (V14), Do the university hostels have internet connectivity and other facilities like Gymnasium, common room etc. (V15).

Thus, from the above discussion, it could be concluded that, as perceived by the PG students, the

most important factor of service quality which emerged after EFA is the 'Faculty and Staff Behaviour', which has

b) *Goodness of fit and reliability of the model*

The advantage of using ML method of extraction was that it provided the goodness of fit statistics for the factor model, very similar to Confirmatory factor analysis. As could be observed from the Chi-square, goodness of fit test was non-significant, indicating that there was a difference in perception amongst the groups included in this study. The alternate measure for evaluating the goodness of the fit was CMIN/Df value which is the ratio of Chi-Square statistics and degree of freedom. The value of CMIN/Df should lie between 1 and 3, and lower the value, better the model is. The calculated CMIN/Df value for the model was 1.59 which exhibits adequate factor model fit, as could be observed from the statistic given in Table 6.

Table 6 : Goodness-of-Fit Test

Chi-Square	df	Sig.	CMIN/Df	Recommended
552.260	347	.000	1.59	Between 1 and 3

Table 7: Reliability Statistics

Factor Label	Cronbach's Alpha	Specification
Faculty and Staff behaviour	0.950	Reflective
Tangibles	0.888	Reflective
Delivery	0.925	Reflective
Facilities	0.841	Reflective

Reliability refers to the ability of the instrument used to deliver consistent results every time it is applied. Statistically, a Cronbach alpha measurement could be used to determine the reliability of the instrument used. A Cronbach alpha value of more than or equal to 0.7 (Hair et al., 2010), if achieved signifies a very high level of reliability. The Cronbach's alphas for the extracted factors are shown in the Table 7, along with their labels and specification. All the alphas were above 0.85, which was an indicator of a very high level of reliability. The factors were all reflective because their indicators were highly correlated and are largely interchangeable (Jarvis et al. 2003).

Thus, the four factors, which have emerged from the EFA were Faculty and staff behaviour, Tangibles, Delivery and Facilities. These are very much in line with the earlier studies which have been carried out for evaluating the service quality dimensions in higher education institutes. Palli & Mamilla (2012), found out that students at SV University, Tirupati, were satisfied with services in terms of their reliability, assurance, tangibility, and empathy but not much satisfied with responsiveness. The study revealed that the respondents who had studied self-supporting course

were more satisfied than the respondents who had studied different courses. Sproule (2000), also found that teachers' ability, excellence, coordination and reasonability greatly influenced students' class performance, and these items too form a major component of the service quality dimensions of HEI's as had also been found in the present study. Navarro et al. (2005) also mentioned that students evaluate the quality of organization on the basis of tangibility (teachers), reliability and responsiveness (methods of teaching) and management of the institution and these factors have direct influence on the level of students' satisfaction (opinions).

VI. CONCLUSIONS

It is well known that service quality is based on multiple dimensions and most of the studies on service quality are based on SERVQUAL developed by Parasuraman et al (1985), and little attention has been given to the use of alternative models of service quality. Nimako et al (2012), in one such study, had proposed a framework of latent factors that were critical for understanding the service quality in mobile telephony industry in Ghana. They modified the SERVQUAL model to fit the mobile telephony context and used EFA

approach to identify the dimensions that best define the service quality.

This research paper, herein, is an attempt to identify the service quality dimensions that are best suited to the service provided by the HEI's in Punjab state of India, as perceived by the post-graduate students.

The four emerged dimensions with thirty one items, being Faculty and Staff Behaviour, Tangibles, Delivery and Facilities could be used by the higher educational institutes as critical factors in evaluating their service quality. It is also concluded that alternative SQ models, like the one proposed in the paper (I-SERVQUAL), aside the popular SERVQUAL model could be useful in determining the SQ dimensions relevant to the HEI's. The results of the study have found out four major dimensions, which are necessary for maintaining a high level of service quality in HEI's. These are similar to the results of the earlier studies carried out by Palli & Mamilla (2012), Sproule (2000), Navarro et al. (2005) etc. Thus, as a major outcome, in context with the higher educational institutes in the country, this paper does provide an extensive block of thirty one items; split into four dimensions, for assessing the service quality of HEI's.

## VII. LIMITATIONS OF THE STUDY

There are a number of limitations to this research. First, the constraint of our data collection, which has been gathered from only three universities of Punjab, limits the scope of validity and reliability of data beyond the specific circumstance that is the subject of our analysis. Second, the findings are limited to India and about Indian Higher Education System, so may not be generalizable to other forms of courses offered and/or in other countries. However, we do believe that the outcomes of this research can be applied to other countries and it will be helpful for those countries as well.

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