

Factor Analysis of SERVQUAL Model in Technical and Vocational Education and Training Environment of Pakistan

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Abstract

Technical and Vocational Education and Training (TVET) sector offers quality education to their students. Various scales are present in literature to quantify service quality of any service sector organization. TVET sector of Pakistan has not been explored yet and no suitable scale is defined for measuring service quality of TVET Pakistan. The purpose of this study is to examine validity of existing scale of Parasuraman for TVET sector of Pakistan. The data was collected and analyzed through Structural Equation Modeling (SEM). Results of the analysis indicate that SERVQUAL is reliable scale for measuring service quality of TVET sector of Pakistan.

Keywords: *SERVQUAL, TVET Pakistan, Services quality, Parasuraman, and Structural Equation Modeling.*

Introduction

In Human resource development of a nation, Technical & Vocational Education and Training (TVET) plays major role by producing skilled manpower. It is also involved in the improvement of quality of life and enhancing industrial productivity by providing youth with opportunity to earn sustainable livelihood in current economy through the provision of Knowledge, Hand-driven skills, and understanding of service in desired trade, occupation or groups of occupation (Alexandris, Dimitriadis, & Markata, 2002; Ernest). UNESCO defines TVET as “those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of economic life” (Hollander & Mar, 2009). TVET system provides hand on skills along with key concepts associated with specific technology/trade/course to the trainees. On the other hand industry provides appropriate platform for trainees to show off their acquired expertise from corresponding technical and vocational institutes. Keeping these facts in view, multiple terminologies have been used to represent TVET sector (Atchoarena & Delluc, 2001); these are enlisted in Table I.

Table I Terminologies to Represent TVET Sector

AT	Apprenticeship-Training
TVE	Technical-Vocational Education
CTE	Career & Technical Education
VE	Vocational-Education
TE	Technical-Education
OE	Occupational-Education
VET	Vocational Education and Training
WE	Workforce Education
WE	Workplace Education

There is a significant role of trained manpower in manufacturing and service industry. Under a specific environment, skilled man power is productive and capable of handling new challenges (Audu, Igwe, & Onoh, 2013). This workforce always catches the attention of foreign stakeholders. It is also a great fact that in parallel to formal education, the level of training capacity of youth and their skill capacity contributes a similar role in economic development and further cater the rapidly fluctuating demands of job market (Organisation, 2010).

Technical and Vocational Education and Training Sector in Pakistan

Pakistan is a resource rich country which needs a reasonable and systematic policy action that connect the capabilities of skilled workforce of country with industry especially in specialized and technical field. Apart from the key striving efforts in this growing sector, a deficiency of trained man power for the industry is a great challenge for the country. That may be due to the variations in political policies and instability of the Government of Pakistan. Inadequate training programs are not only increasing unemployment ratio in Pakistan but also affects the productivity of our industrial sector. A demand supply gap between skilled man power and industry is badly shaking the economy of Pakistan (Memon*, 2007).

However, Federal Government of Pakistan is putting efforts for skill development / technical education and vocational training for youth in collaboration with provincial governments. Technical education refers Technician (4 year training) and Highly Skilled workers (3 year diploma). While Vocational training implies Skilled worker (2 year training course), Semi-skilled worker (1 year training), and Assistant & Helper (6 months & 3 Months introductory trainings) (Memon, 2007).

Skills Development Agencies in Pakistan

The main organization in Pakistan for setting up TVET standards is the National Vocational and Technical Training Commission (NAVTTTC). Supporting to this at provincial level, Technical Education and Vocational Training Authorities (TEVTA), Skills Development centers and Board of Technical Education (BTE's) are contributing in the production of skilled manpower in market at public and private level.

According to labor force survey as cited in NAVTTTC, the literacy rate in Pakistan is 58.5%. Out of total population, only 6% shows interest in Technical and Vocational Education and Training. While 2.5 % gets on job training and 72.6% acquire informal economy (National Vocational & Technical Training Commission (NAVTTTC), 2013).

NAVTTTC survey further reveals as cited by different authors in 'National Education Policy 2017' that the total numbers of TVET trainees across Pakistan are around 0.309 million out of which 33% are enrolled in private TVET institutes and there are 3581 institutes of TVET in Pakistan (Pakistan, 2017), while Punjab has a maximum share of 50.74% (National Vocational & Technical Training Commission (NAVTTTC), 2013).

Literature Review

According to many researchers it is difficult to define and measure service quality as it is intangible and indistinct construct (Alexandris et al., 2002; Bolton & Drew, 1991; Ernest; Hollander & Mar, 2009). Barron (2009) stated in his work that in comparison to “good quality”, service quality is conceptual in which technical features of quality are clear (Barron, 2009). Initially quality in terms of service is defined by Booms and Lewis as: how well an organization delivers its services to meet customers’ expectations (Bitner, Booms, & Tetreault, 1990).

Further modification in definition of service quality are made by Parasuraman (1985) as “service quality is the ability of an organization to meet or exceed customer expectations; it is the difference between customer expectations of services and perceived services”(Anantharathan Parasuraman, Zeithaml, & Berry, 1985). With reference to Parasuraman, Zeithaml and Berry (1988), service quality is defined as “customer’s overall judgment of the excellence of the service quality concept or the difference between one’s expectation and actual service performed”(Arun Parasuraman, Zeithaml, & Berry, 1988). In the viewpoint of different researchers there is no common consensus between definitions of service quality in academics, major confusion is related to perception and expectations of customers (Wahab & Al-Momani, 2010).

Measuring Service Quality

In early 1980’s product quality and customer satisfaction became a major concern in the area of academics and industry. In the same period, researchers started focusing on service quality. Their efforts resulted in the form of various books, presentations in conferences, and research articles.

Table II Summary of Service Quality Scales

Author Names	Service Quality Dimensions
Zeithaml et al (1990) , Parasuraman and Berry (1991) Service Quality Model (SERVQUAL)	Tangibles, Reliability, Responsiveness Assurance and, Empathy.
Cronin and Taylor (1992) , Performance only; service Quality Performance Model (SERVPERF)	Reliability, Assurance, Tangibles, Empathy and, Responsiveness.
Ho and Wearn (1996) , Higher Education TQM model of excellent (HETQMEX)	Leadership, Commitment, Total customer satisfaction, Total involvement, Training education, Ownership of problem, Reward and recognition, Error prevention and, Teamwork.
Sangeeta et al (2004)	Competence, Attitude, Content, Delivery and, Reliability.
Firdaus (2006) Higher Education Performance (HedPERF)	Non – Academic aspects, Academic aspects, Reputation, Access, Programme issues and, Understanding.
Pereda et al (2007)	Sufficient resources, Quality of faculty, Tangibility and, Reliability
Sultan and Wong (2010) Performance Based Higher education service Quality Model (PHed)	Dependability, Effectiveness, Capability, Efficiency, Competencies, Assurance, Unusual situation, management and, Semester and syllabus.
Annamderula and Bellamkonda (2012) Higher Education Service Quality (HiEdQUAL)	Teaching and course content, Administrative services, Academic facilities, Camus infrastructure and, Support services.

These efforts also affected different organizations as they started quantifying service quality of their organizations. For this purpose multiple models have been proposed by different scholars in last three decades to ensure the measurement of service quality in several service sectors (Abdullah, 2006; Cronin Jr & Taylor, 1994; Grönroos, 1984; Anantharathan Parasuraman et al., 1985). Disconfirmation and performance are the main approach for measuring service quality. Moreover, different other multi-attributed qualitative models were also proposed for measuring service quality such as; SERVQUAL model (Anantharathan Parasuraman et al., 1985), SERPERF approach, and HEdPERF approach for higher education (Abdullah, 2006). SERVQUAL model is the most frequently used model (Grönroos, 1984) and the development of SERVQUAL encourages the context specific measurement of service quality (Abdullah, 2006). Summary of service quality scales are given in Table II (Mohanty, 2010).

Selection of model for TVET sector

Dimensions of service quality and its items vary with instrument depend on the setting of service organization. Most service sector organizations deals with only one type of customer and for them satisfaction of their customers is of prime importance. Despite this, in case of education sector stakeholder ranges from students to recruiter. Managing service quality is difficult in educational sector because of wide range of stakeholders and their varying level of expectations. In this case it is important to determine all possible service items that go well with stakeholder before implementing quality initiatives. This facilitates in designing system of the organization and improving satisfaction level of customers. To select best fit model for measuring service quality in technical and vocational education and training sector a study was conducted in India in 2007. The results of the study proposed “Perception of Performance (P) minus Expectation of customers (E)” model as finest model to measure service quality of TVET sector. In this study input for P-E model was defined by using SERVQUAL-based gap (Khan, 2007).

SERVQUAL Model of Parasuraman

SERVQUAL model (Service Quality = Perception-Expectation) developed after the introduction of perceived service quality (Anantharathan Parasuraman et al., 1985). This model evolved when customer satisfaction became a prime importance for organizations. Model of disconfirmation is employed on the model of perceived service quality. In this situation service quality is quantify through comparing expectations of customers with services provided by the organization (Aldridge & Rowley, 1998).

Dimensions of SERVQUAL

To measure service quality ten dimensions of service quality were enlisted initially named as; responsiveness, reliability, courtesy, competence, credibility, access, security, communication, tangibles and understanding the customers. Afterward these dimensions reduced to five: responsiveness, tangibles, empathy, assurance, and reliability. Details of these dimensions are shown in Table III (Anantharathan Parasuraman et al., 1985).

Table III Dimensions of SERVQUAL Scale

Name of Dimension	Definition
Reliability	The ability to execute the promised services perfectly and reliably.
Responsiveness	Promptness to facilitate customers and deliver service according to promise.
Empathy	The thoughtful, individualized concentration the firm offers to their customers.
Assurance	The information and good manners of employees of the organization and their capability to motivate confidence and trust.
Tangibles	Physical services, appearance of personnel, and equipment.

Significance of SERVQUAL

According to Parasuraman for the measurement of perception of performance in service organizations SERVQUAL scale can be used. Further he declared SERVQUAL scale as best model to measure service quality gap between customer's expectations and the service perception (Goran, 2014). In 1999 Oliver stated that if service perceptions are higher than the customers' expectations then services of the organization is considered **Excellent**. On the other hand, if service perceptions are equal to expectations then the services are considered **Good** and if service perceptions are less than expected services then the service quality is considered **Bad** (Carlsson, 2010).

Proposed Methodology

This study was based on five dimensions of SERVQUAL scale. The targeted population of the study was the students of technical education and vocational training sector of Pakistan. The main purpose of this study is to find the measuring adaptability of SERVQUAL model in specific technical oriented education. Original questions of 'Performance Perceptions' of Parasuraman model were used which contain 5 dimensions based questions for the measurement of perception of customer as it reflects satisfaction level according to Cardona and Bravo (2012). Questions were abbreviated with special code (Table IV).

Table IV Dimensions and Items Id of Constituting the Developed Model of Parasuraman

Dim	Item	Code of Item
Tangibles	My institute has modern equipment.	P1T
	The physical facilities of my institute are visually appealing.	P2T
	Employees of my institute are well dressed and appear neat.	P3T
	The appearance of the physical facilities of my institute is in keeping with the type of service provided.	P4T
Reliability	When my institute promises to do something by a certain time, it does so.	P5RL
	When I have problems, my institute is sympathetic and reassuring.	P6RL
	My institute is dependable.	P7RL
	My institute provides its services at the time it promises to do so.	P8RL
	My institute keeps its records accurately.	P9RL
Responsiveness	My institute tells its students exactly when services will be performed.	P10R
	I receive prompt service from my institute's employees.	P11R
	Employees of my institute are always willing to help students.	P12R
	Employees of my institute are never too busy to respond to students' requests promptly.	P13R
Assurance	I can trust employees of my institute.	P14A
	I can feel safe in my transactions with my institute's employees.	P15A
	Employees of my institute are polite.	P16A
	Employees of my institute get adequate support from my institute to do their jobs well.	P17A
Empathy	My institute gives me individual attention.	P18E
	Employees of my institute give me personal attention.	P19E
	Employees of my institute know what my needs are.	P20E
	My institute has my best interests at heart.	P21E
	My institute has operating hours convenient to all its students.	P22E

The data was collected from various colleges, institutes and center of technical and vocational streams of Punjab Technical Education and Vocational Training Authority (TEVTA). This is the pioneer as well as leading Technical and Vocational Education and Training (TVET) sector in Pakistan consists of 400 institutes, colleges and centers where more than one hundred and sixty five thousand students are enrolled. The respondents of the study were different expert level students –i-e- technician, skilled worker, semi-skilled worker, helper and female vocational expert. Probability sampling was done and 3263 students were selected from population through Krejcie and Morgan formula (Krejcie & Morgan, 1970). While samples were distributed in nine divisions of Punjab province through stratified random sampling. Feedback of 2255 students of different regions was received. Demographics showed that 69.11% students participated in this research survey.

Data Analysis

CFA was carried out to ensure construct validity and uni-dimensionality of SERVQUAL scale for Technical and Vocational Education system. Ahmad et al. (2009), cited Anderson and Gerbing’s (1982) observation that CFA assumed to be a dependable tool for survey based on theoretical background (Melchor Cardona & Bravo, 2012).

For this, modeling was done through Amos 19 (SEM) and covariance matrix was developed. Results of first run of confirmatory factor analysis showed satisfactory goodness fit statistics and having good power Fig 1.

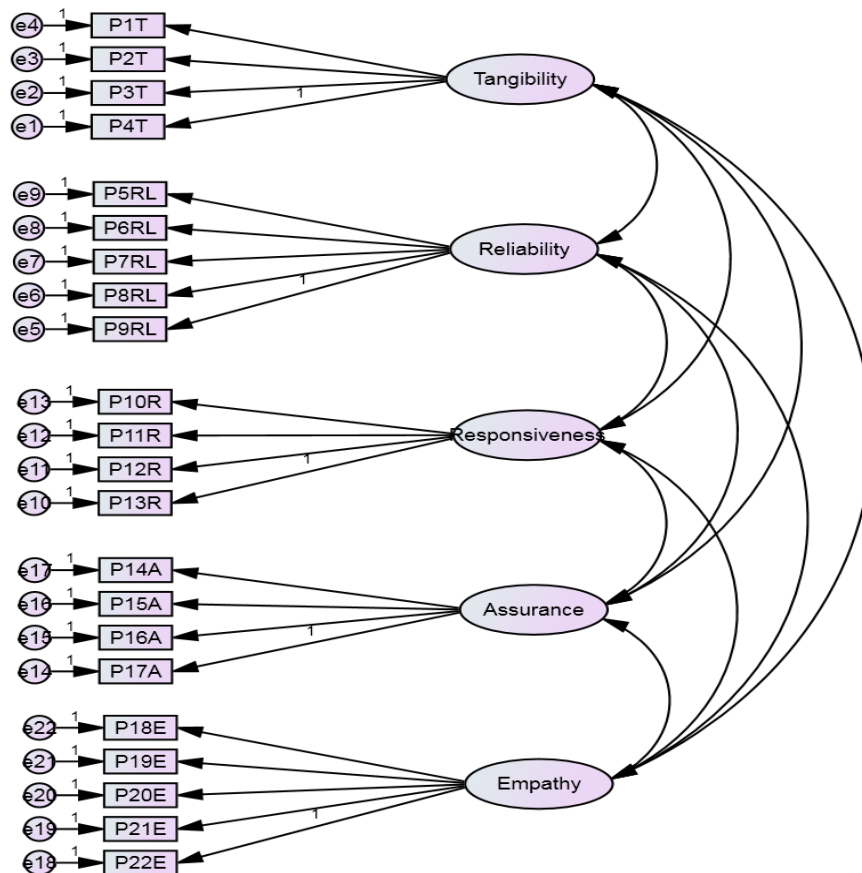


Fig 1: Theoretical Framework for Development of Service Quality Scale

In 2005 Sila suggested that major goodness fit statistics for confirmatory factor analysis were Root Mean squared Error of Approximation (RMSEA), Comparative Fitness Index (CFI), squared multiple correlation amount and significance of parameter estimates (Sila, 2005). In 1980 Bentler and Bonett stated that cut-off value for CFI is 0.90 (Bentler & Bonett, 1980). While in 1980 Hu and Bentler proposed that, for Best fit, CFI value must be close to 0.95 (Bentler & Bonett, 1980). Results of this study showed that value for CFI is 0.93, and RMSEA is 0.058. With reference to different authors cut-off value for factor loading must be equal to or greater than 0.50 ± 0.03 . On the other hand according to Kline (2005) factor is considered high if value is greater than 0.6 and if value is higher or equal to 0.3 then factor is considered as moderately high (Kline, 2005). If any factor loading dissatisfies the set criteria then these factors are considered as pointless and can easily be removed. Fig 2 showed that factor loadings for all constructs are significant at $p < 0.000$ and loadings of two items named P3T and P13R are considered as moderately high while factor loading of all other items are considered as high. Results of the analysis indicate that the constructs are uni-dimensional and CFA model is a best fit model and there is no need to remove any item as they satisfy the set criteria of factor loading.

Bagozzi, Yi and Phillips (1991) stated that to evaluate convergent validity, CFA is suitable analysis. Convergent validity on their respective construct could be established though the value of factor loading (Bagozzi, Yi, & Phillips, 1991). Table V indicates that the construct are statistically significant on their respective construct at $p < 0.000$. So, it is concluded that the scale has strong convergent validity.

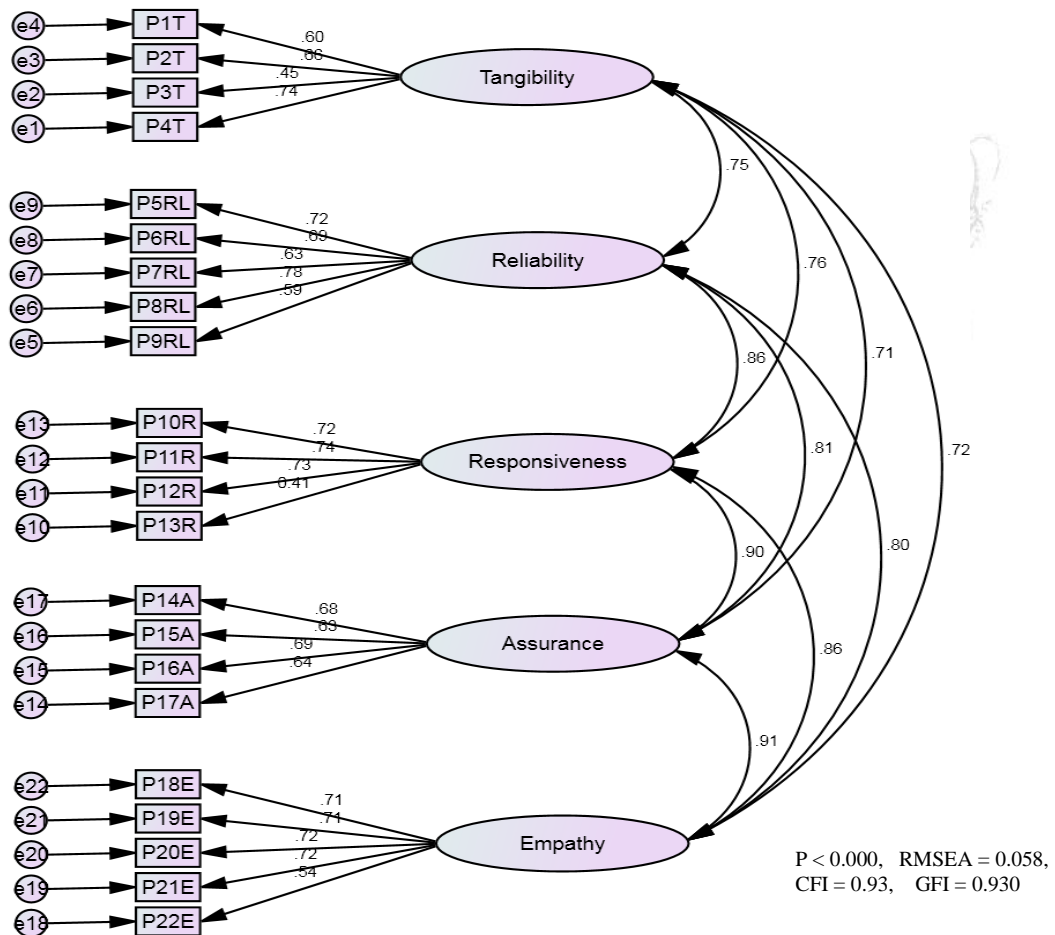


Fig 2: Confirmatory Factor Analysis for perception of the students of TEVTA.

Table V Correlation between variables of service quality.

	Tangibility	Reliability	Responsiveness	Assurance	Empathy
Tangibility	1				
Reliability	0.748	1			
Responsiveness	0.760	0.862	1		
Assurance	0.709	0.813	0.901	1	
Empathy	0.720	0.801	0.859	0.907	1

In 1991 Bagozzi stated that the degree to which a construct and its indicators are different from other construct and its indicators measures through discriminant validity (Bagozzi et al., 1991). However, In 1981 Ghiselli, Campbell and Zedeck disagree with statement and consider Cronbach's Alpha (CA) value with average score of correlation of construct (Ghiselli, Campbell, & Zedeck, 1981). Discriminant validity is indicated by significant difference. Table V and VI showed significant difference between scores of CA (confirmatory analysis) and average correlation of the construct with other construct in the scale.

Table VI Reliability of the Constructs for TVET Sector Service Quality

Item	Item ID	Factor Loading Estimate	Mean	Standard Deviation	Cronbach's Alpha (CA)
Tangibles	P1T	0.600	3.872	0.948	0.698
Tangibles	P2T	0.662			
Tangibles	P3T	0.446			
Tangibles	P4T	0.738			
Reliability	P5RL	0.724	4.168	0.934	0.814
Reliability	P6RL	0.69			
Reliability	P7RL	0.634			
Reliability	P8RL	0.783			
Reliability	P9RL	0.594			
Responsiveness	P10R	0.722	3.804	1.025	0.704
Responsiveness	P11R	0.74			
Responsiveness	P12R	0.73			
Responsiveness	P13R	0.41			
Assurance	P14A	0.678	4.169	0.911	0.755
Assurance	P15A	0.634			
Assurance	P16A	0.689			
Assurance	P17A	0.64			
Empathy	P18E	0.711	3.866	1.056	0.808
Empathy	P19E	0.71			
Empathy	P20E	0.722			
Empathy	P21E	0.723			
Empathy	P22E	0.541			

Conclusion

The purpose of the study is to check the reliability and validity of already developed scale of Parasuraman. The results appeared in the form of confirmation of SERVQUAL scale validity and reliability for technical and vocational education and training sector of Pakistan. With reference to the said discussion about Confirmatory Factor Analysis it is concluded that the data presented for measuring service quality in Technical Education and Vocational Training system is very good, model data is satisfactorily reliable and valid.

Pakistan being a developing country still lack in, industrial development, technological advancement, and capacity building of new generation. Current situation demands revitalization of industries. Pakistan falls in the list of those countries that are blessed with energetic youth. Through proper programs of skill development, workforce of Pakistan can become the productive assets for the industry. Government need to take drastic steps to cope up with the situation. A planned skilled based technical and vocational education training system is the only requirement for survival. Current TVET education system of Pakistan is moving from secondary level to tertiary level.

Regardless of well established TVET setup, large number of technical education and vocational training institutes of Pakistan still lack in many aspects such as weak pedagogical skills of trainers, non professional behavior of staff, out dated lab equipments, and poor infrastructure etc. These factors act as considerable obstruction toward delivering quality services in education system in general and specifically in vocational and engineering base studies. Hence, there is a need of precise instrument for measuring service quality of TVET sector of Pakistan. This will facilitate in the identification of concern areas of TVET sector, which helps management to adopt strategies and resolve these issue to sustain position in global market.

Future Directions

This study acts as a baseline for researcher and practitioner to measure and quantify satisfaction level of customer. Subsequent researches may use this model for measuring service quality of TVET sector of different cities of Pakistan with large sample size. This scale can also be use to compare the service quality of different institutes, and courses of TVET sector of Pakistan.

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