Exploration of quality dimensions that influence customer perceptions of service performance: insights from higher education

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Abstract: This paper sets out to explore the quality dimensions that influence customer perceptions of service performance among different customer segments in higher education. A survey was conducted by administering a questionnaire with 26 items measuring quality dimensions to 434 customers in a higher education setting that has implemented total quality management. The survey yielded a return of 364 usable questionnaires and the 83.9% response rate deemed to be relatively good for further analysis. This paper found significant similarities and differences in the quality dimensions that influence customer perceptions of service performance in higher education. In particular, current students and student alumni reported similar expectations of human and non-human elements of service delivery, whereas employers from the industry had greater expectations on core services. Interestingly, the levels of satisfaction among these three customer groups were generally below their expectations, which indicate new possibilities that may benefit from additional exploration and validation.

Keywords: external customer; quality dimension; important index; expectation; perception.

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1 Introduction

Total quality management (TQM) has become a generally accepted management technique for the organisations to improve upon the quality of products and services to increase customer satisfaction to stay in business competitiveness (Yousuf and Wahab, 2017). The manufacturing industries mostly started the implementation in the 1980s, while the service institutions devoted considerable attention to the implementation of

TQM in the early 1990s (Eriksson and Hansson, 2003). Many organisations are now making good efforts to achieve quality products and services that will meet or exceed customers' expectations. Management of higher education institutions (HEIs) has also been compelled to demonstrate that their services are customer-focused through continuous improvement. HEIs in general, adopted the TQM approach to be more responsive to the changing needs of those who engage their graduates and also to be more students (primary customer) oriented. A growing number of universities are embracing TQM for the same reasons that led manufacturing and other service industries to embrace it. However, there have been reports on the high success and failure rate in the implementation of TQM (AbdulAzeez, 2016; Hasham, 2018). Previous empirical studies on the relationship between TQM practices and organisational performance have indicated strong and positive results. However, there have been numerous success and failure stories about TQM implementation (Andrade et al., 2017; Kaynak, 2003).

Institutions that implement TQM are consistent with the quality experts' principles in developing means for assessing their customers' wants and obtaining data about the numerous customers they have. Although systematic data are not available on the proportion of TQM institutions that directly assess customer preferences and satisfaction, TQM institutions used perception means to obtain customer data (Bhat, 2017; Chua, 2004). External customers are the final consumers of the education services since the universities have established or made deals with them. These customers, on one hand, form expectations before their encounter with the institutions, the service providers. On the other hand, the customers develop perceptions during the process of service delivery, and then, compare their perceptions to their expectations in evaluating the outcome of the services encountered.

Many attempt to define standard measurement instrument for the evaluation of TQM practises in any particular service context has resorted into the setting up of several methodologies (Sureshchandar et al., 2002). However, a total evaluation of TQM philosophy consists of three distinct but interrelated types of assessment (Hackman and Wageman, 1995; Hajjem, 2016). First is the TQM implementation itself, considering the organisational management awareness (knowledge and understand) of the TQM philosophy, which in turn informed the implementation strategy being adapted to operate. The operating system should be in line with the TQM principles laid down by the quality experts. The second assessment is on what has been the transformational change in organisation affairs (the process criteria). The internal customers are mostly the right participants to reveal the situation. The third part is the outcome criteria on how the TQM implementation ensures that the external customers (final consumers) expectations are met. This paper depicts one aspect that comes with the assessment of outcome criteria, the degree to which improvements in the institutional effectiveness are found to have an impact on the diverse external customers. The question is, are the customers having different or similar views as far as their expectations and perceptions are concerned? Do the institution external customers place similar importance to the service quality dimensions? Which of the dimensions are the most influential to their perception? Do the external customers have similar satisfaction for the education service received?

It appears that the Higher Education Institutions (HEIs) have lacked systematic tools to analyse the quality of services rendering to their customers and quality dimensions that influences the customers' expectations and perceptions. This is remiss since university institutions in developing countries are facing the demand for high accountability from their external customer groups who constitute the final consumes of their products. The

perceived service quality from external customers' perspective tends to play a significant role in the quality management system (Angur et al., 1999).

The purpose of the paper is to explore feedback on the outcome of the TQM implementation in educational institutions with an emphasis on the expectations and perceptions among the university external customers in the content of service quality performance. To achieve the research purpose, the study was guided by the following research objectives:

1 to explore the external customers' expectations and perceptions of service quality dimensions from a TQM institution

2 to explore the external customers' level of importance and satisfaction on service quality dimensions.

In support, a statistical hypothesis was tested:

H_0 there are no statistically significant differences among the external customer sub-groups' perceptions on service quality dimensions.

2 Literature review

2.1 Total quality management

TQM is the quality approach and is refers to as the process of integrating all activities, functions, and processes within an organisation to achieve continuous improvement in the delivery of goods and services for customer satisfaction (Sallis, 2014). TQM is also defined as the application of quality principles to the overall process and all the management functions in order to ensure total customer satisfaction (Irani et al., 2004). Parumasur and Govender, (2013) iterated that, total quality management is a set of management practices aimed at instilling an awareness of quality principles throughout the organisation and ensuring that the customer requirements are consistently met or exceeded. Rosa and Amaral (2007) argued that it is difficult to find a single definition for TQM, however, it is better to put forward the principles that underline TQM operations. Although there are countless definitions of TQM, what matters is for top management applying the fundamental concepts of TQM that are appropriate for particular institutional conditions. In this current study, TQM can be summarised as a management system for a customer-focused institution that involves all employees in continual improvement.

In study literature on quality, TQM is regarded as both a philosophy and a set of management guiding principles for managing an organisation (Ekiz et al., 2015). In this regard, two important aspects of TQM have been identified, namely: the tools and techniques, and principles (Psychogios and Priporas, 2007). The tools and techniques are what have been referred to as the 'hard side' of TQM, while the principles are the 'soft side' of TQM. This study is of the view that the TQM principles which focus on the human aspects are applicable to both manufacturing and service industries. Again, the TQM tools like Malcom Badrige Quality Award, ISO 9000 and newly developed

African Quality Rating Mechanism (AQRM) are all developed from the TQM principles. It is imperative to say that, any TQM institution that has not acquainted itself with the principles like top-management committed, teamwork, and employees empowerment could not get positive result from the tools. The term 'TQM' appeared in the 1980s when it was suggested to replace the word 'control' used by Feigenbaum in the 1950s with 'management' as it was believed that quality was not something to be controlled but to be managed. It refers to the application of quality principles and techniques to the overall process and all the management functions with continuous improvement to ensure customer satisfaction.

2.2 TQM principles identified from literature

The core values and principles of TQM need to be identified, as they play a major role in the development and implementation of a quality management system (Wiengarten et al., 2013). Quality practitioners and academics have devoted considerable efforts to identify those TQM principles that influence the level of product and service quality provided by institutions (Sila and Ebrahimpour, 2005). The quality experts, individually, have come out with many total quality management principles and concepts (Fonseca, 2015). The TQM framework has been be built upon a set of core values and concepts. These values and concepts provide the foundation for integrating the key performance requirements within the quality framework. Several studies have examined what constitutes TQM and what are the key principles for the success of TQM (Creech, 1994). There are different terminologies of TQM constructs that are considered so essential to the implementation of the TQM system. Many researchers (Demirbag et al., 2006; Fotopoulos and Psomas, 2009; Karuppusami and Gandhinathan, 2006; Salaheldin and Mukhalalati, 2009; Tort-Martorell et al., 2011) define the TQM principles in some format, as a set of core values or principles on which the institution is to operate. There are a set of fundamental core values and principles applicable to education and forming the building blocks of the TQM framework of which some previous researchers used in higher education investigation. In some studies, the TQM Principles are referred to as 'TQM constructs', 'TQM practices', 'TQM factors', 'TQM dimensions', 'critical success factors' and 'total quality services (TQS)' (Sureshchandar et al., 2002). Nevertheless, the meanings of these constructs remain the same.

2.3 TQM and service performance

Many researchers have examined how TQM principles and core concepts can be measured to provide a means of assessing the quality of education institutions on various aspects of their internal processes. It is worth noting that, how management implements these TQM principles affects the institution's service delivery and there is a correlation between the measurements of institutional service performance and TQM implementation (Gallear et al., 2012; Owlia and Aspinwall, 1996; Talib et al., 2013). These studies have produced mixed results and the failure to obtain consistent results could be attributed to the significant differences among studies in terms of research design issues. In some studies such as the one conducted by Douglas and Judge (2001), TQM is operationalised

as a single construct to analyse the relationship between TQM and firms' performance, while others, like Samson and Terziovski (1999), for instance, operationalise TQM as a multidimensional construct. Again, the levels of performance measured vary among the studies. Some studies operationalise performance only at operating levels as Samson and Terziovski did, while others like Douglas and Judge measured only financial performance. Das et al., (2000) measure performance at multiple levels. Another issue of inconsistency in results was the analytical framework used to investigate the relation between TQM and performance as differs among the studies. In other words, when the data analyses are based on a series of multiple regressions (Adam et al., 1997; Samson and Terziovski, 1999), correlations (Powell, 1995) or ranking indexes (Khanna, 2009; Sadikoglu and Olcay, 2014), the studies are likely to have different results.

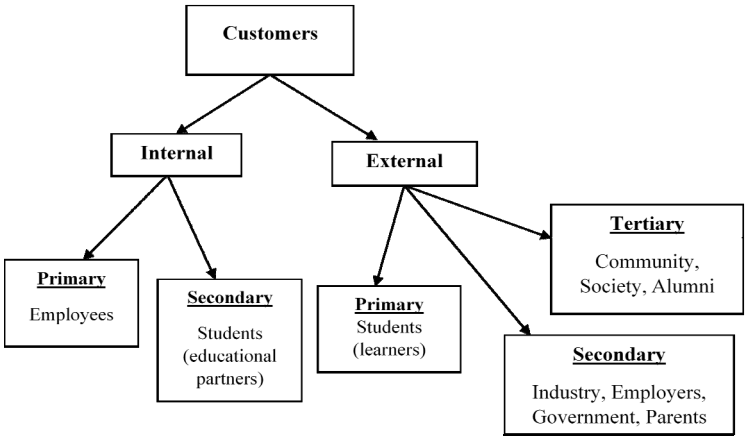
2.4 Institutional customer

Institutional customer is refers to an individual, group or unit that established relationship with an institution or that benefit directly or indirectly from an institution (Militaru and Drăgu, 2009). Thus, anyone who is directly or indirectly affected by the service or by the process used to provide the service is a customer being external or internal. The word 'customer' being used in this study has the equivalent meaning as institutional clients or stakeholders used by the previous researchers, of which the terms are at times used interchangeably (Sahney, 2016). University institutions have numerous customer groups and the customers of the education service are diverse with different needs and want. Higher education institutions have diverse customer-groups. They are diverse and have different expectations and perceptions among themselves (Owlia and Aspinwall, 1996). Ishikawa was the first among the quality experts of TQM who introduced the importance of internal customers (Saleem et al., 2012). According to Spanbauer (1995), there are two types of customers, external and internal. Spanbauer sees students as external customers and also considers employers, parents, communities, alumni, and government as external. The internal customers are the lecturers, administrators, the senior and junior staff of the university education (Militaru and Drăgu, 2009).

Kanji et al. (1999) argue that the customers of HEIs are divided into many different groups, of which they have links to the educational process. They classified the customers according to the location (internal or external within an institution) and also according to the frequency of interaction that the institution has with the customers (into primary, secondary, or tertiary) being internal or external customers. The classification made by the authors is shown in Figure 1.

According to them, the internal customers are those who work with management to the satisfaction of external customers. Kanji et al. (1999) concluded that the students are the only customer group that can be classified as internal or external, depending on the role developed. When students are regarded as educational partners, then they are the 'secondary internal customers' to the university with employees being the primary. On the other hand, students are classified as 'primary external customers' when they are regarded as learners of the university (Kanji et al., 1999). Robinson and Long (1987), also emphasised that the only primary external customers of an institution are the students, while the same students could also be seen as internal customers when referring to as educational partners.

Figure 1 Customers of HEIs



Source: Kanji et al. (1999)

2.5 Institutional customers' perspective

In defining quality, different customers' views must be taken into consideration as quality should be defined by the institutional customers (O'Neill and Palmer, 2004; Watty, 2005). Therefore, institutions' service provision should be based on their customers' specifications. According to Lagrosen et al. (2004), understanding quality from the customers' viewpoint is essential. Sureshchandar et al. (2002) and Chai et al. (2016) did research in banking services. They recommended the need for this kind of study to underpin how service institutions like banks perform in developing countries and what best practices need to be implemented to improve service quality. However, the above mentioned researchers used only management and quality managers as their participants. Many investigations have been conducted in education context on perceptions of how the efficiency and quality of classroom instructions be improved (Bayraktar et al., 2008; Chen et al., 2017; Kanji et al., 1999; Sakthivel et al., 2005; Zakuan et al., 2012). Again, many of these previous studies conducted, had their respondents to be institutional management and staff only. The researchers like, Abdullah (2006), Annamdevula and Bellamkonda (2012), Darawong and Sandmaung (2019) and Mattah et al. (2018), used student participants only in their perceptions of service quality from TQM institutions. The existing gap is the unavailability of valid and reliable research instruments for measuring the performance of TQM institutions from more than one institutional customer groups concurrently. The previous researchers on quality management and its relationship with service quality delivery mostly combined the internal and external customers in assessing service quality delivery from one angle (Martinović et al., 2017). Meanwhile, the diverse nature of institutional customers, being external or internal, as well as being primary, secondary, or tertiary needs strong consideration. The current study also comprehends that such an investigation is vital for educational institutions to enhance their service quality performance. It is worth noting that, the internal customers are more concerned about process quality, while their counterparts, the external customers are more of the outcome quality.

2.6 Education service

A service has been defined in many ways but with no general agreement as to what constitutes it. Services are those separately identified, and essentially intangible, activities that provide satisfaction to the recipient and are not necessarily tied to the sale of a product (Al-Marri et al., 2007; Stanton et al., 2002; Wang et al., 2016). Education is a service to the customer and an ongoing process of transforming the participants involved (Abdullah, 2006). It is a transforming process through which the customers' expectation is a change through the learning process. It is a lasting process meant to relatively iron out and enhance values, beliefs, customs, traditions, and practices that the education institutions share with their students (primary customers), and other customers. The transformation process considers the relationship between a particular institution and society. In the long run, quality has to be looked at as a practice, use, and experience.

2.7 Service quality dimension

When talking about the quality management system and its relationship with service quality performance, there is a need to determine the relevant aspects of service quality dimensions. Parasuraman et al. (1988) iterated that service quality can be defined as the difference between customers' expectations for service performed before their encounter and their perceptions of the service received from an institution. According to Oliver (1980) as cited in Asubonteng et al. (1996), service quality theory predicts that customers will judge the quality as low if performance does not meet their expectations and quality as high if performance exceeds expectations. Hence, customers' expectations serve as the foundation on which service quality will be evaluated by customers. The implication is that, as perception exceeds expectation, quality of service increases and satisfaction with the service also increases.

Owlia and Aspinwall (1996) pointed out that to measure quality performance, and consequently to improve quality, it is necessary to find out the quality dimensions concerning how TQM is being practiced in an institution (Njenge et al., 2015; Oduor, 2015). The quality dimensions used in determining the service quality performance in various organisations by previous researchers were identified in the literature review. They include Sasser et al. (1978), as they came up with seven quality dimension which they believe adequately embrace the concept of service quality; Lehtinen and Lehtinen (1991) came out with three forms of quality dimensions which affected the service quality level. Most investigators of service quality are familiar with the most popular service quality delivery model, HEdPERF SERVPERF and SERVQUAL, used to measure the quality performance by Abdullah (2006), Garvin (1987) and Parasuraman et al. (1985, 1988). However, the 22-item scale proposed by Parasuraman et al. (1988) in addressing the five dimensions of service quality has been revealed that they mainly focus on the human aspects of service delivery and the tangibles of service (Sureshchandar et al., 2002). The current research is in support of Sureshchandar et al. who criticised that, four of the five SERVQUAL's dimensions, namely, reliability, responsiveness, assurance, and empathy, correspond to the factor of the human element in the service delivery only. The fifth dimension, which is 'tangibles', relates to the

servicescapes. However, the highly subjective concept of service quality is not only confined to the realms of these two mentioned factors. Other three dimensions that most service institutions are liable to operate on and also identified by Sureshchandar et al. (2002), includes; the core service; systematisation of service delivery (non-human element), and the social responsibility.

3 Methodology

3.1 Identified quality dimensions and instrument developed

To identify the quality dimensions that educational institutions cover in their service delivery, an initial 39-item instrument was developed with the help from previous researchers' measurement instruments used to evaluate the manufacturing and other service industries performances (Sureshchandar et al., 2002). The developed instrument was pilot-tested in one of the TQM university institutions in Ghana with 123 useable returns. The data collected was subjected to Exploratory Factor Analysis (EFA) to determine the number of latent factors or constructs (quality dimensions) the items could be assigned to. However, the items used in this study were developed differently, not only from the Sureshchandar et al. (2002) measurement instrument, rather with the help from many others. The latent factors were comparable to the quality dimensions used by Sureshchandar et al. (2002) used in banking research in India, hence the names were adopted. The current study is of the view that these five service quality dimensions could be used to measure levels of external customer perception on service quality in education context. Thus, the items through exploratory factor analysis were grouped under the five constructs that are applicable to education institutions as well. With the SPSS version 21 software, the most common method of factor analysis used was principal component analysis (PCA), and the most common method of factor rotation adopted was the varimax rotation (Gray and Kinnear, 2012).

As a result of the piloting, the feedback was so relevant and called for modification and rewording of the remaining items of the developed instrument. Some of the items were too loaded for the respondents to complete at the scheduled time and were reworded. Some items ranged from four to six on respondents' background information were added to the 26 items. The current study is of the view that the five quality dimensions could be named same as Sureshchandar et al. (2002) ones used to evaluate service performance in the banking sector. They were found to be applicable. The mode adopted to determine the appropriateness of factor analysis in the pilot-tested results was examined on the correlation matrix. A statistical test for the presence of correlations among the variables was computed. Items with low correlations (less than 0.3) usually will not have high loadings on the same factor. Any correlation values found greater than 0.3 are considered to be significant loadings and there is the need to have at least 3 items being loaded to each of the identified quality dimensions (Suhr, 2006). The items were reduced to 26 and were loaded onto five quality dimensions while the 13 items deleted were having correlation values of less than 0.3 (see Table 1).

Table 1 Item reliabilities for the five service quality dimensions

No	*Quality dimension*	*Original number of items*	*Original alpha (reliability)*	*Items deleted*	*Final refined items*	*Final alpha (reliability)*
1	Core service or service product (A)	4	0.815	0	4	0.798
2	Human element of service delivery (B)	17	0.942	9	8	0.907
3	Systematisation of service delivery: non-human element (C)	5	0.828	1	4	0.854
4	Tangibles of service (servicescapes) (D)	6	0.944	1	5	0.854
5	Social responsibility (E)	7	0.942	2	5	0.858
	Total	*39*		*13*	*26*	

3.2 Population, sampling method and procedure

When undertaking quantitative data collection, it is important to consider the study population and the determination of the sample size (Collis and Hussey, 2013). The first public university in Ghana to operationalise TQM was purposively selected for the study. The external customers of a TQM institution over 18 years in quality management system, constituted the targeted population. The research is a phenomenological study that determines how the institution's external customers perceived the outcome of TQM practices being practised in the university institution. Multisampling procedures were used in this study, including purposively sampling of one out of nine public university institutions. The institutional external customers were stratified into subgroups without overlapping and that every element in the targeted population belongs to one and only one stratum (Ieva and Ziliani, 2018). This method was appropriate to collect sufficient information from the population to make statistical inferences. The construction of the list of sampling units, called a frame, is often one of the major practical complications which need to be addressed. Table 2 depicts the external customer subgroups placed under each of the three strata namely: primary, secondary, and tertiary customers. The external customers by the frequency of interaction has students' group as the only one in the primary category. One subgroup was randomly sampled from each stratum. The student group being the only primary external customer was taken, while the alumni and employers, were randomly selected from their secondary and tertiary categories.

Table 2 Sample frame for the targeted population (external customer sub-groups)

Primary	*Secondary*	*Tertiary*
Students	Parents	Government
	Employers/businesses	Local community
	Students family members	Alumni
	Suppliers (institutions)	Society

Source: Kanji et al. (1999) and Sallis (2014)

External customer by definition in this study refers to an individual, a group, or institution which is the final consumer(s) of education services. Typically they have a choice about where to do business, establish a relationship with the preferred institution and they are little known about the services provided. Students considering as learners, have paid for tuition, counselling, advice, accommodation, security and all are education service they are to be provided hence being part of the final consumer (external customers). The core mandate of every education institution is to satisfy their primary external customers, the students before other customers. An employer is an organisation, institution, government entity, agency, company, professional services firm, non-profit association, small business, store, or individual who employs or puts to work the graduate from institutions, to become an employee or a staff member. Alumni on the other hand are group of institution graduates who still have established a relationship with the institution. The study utilised different groups of participants (external customer sub-groups) who differ in the variable of interest (customer perceptions) but share other characteristics such as socioeconomic status, educational background, and ethnicity.

The total students' population of the conventional system at the TQM institution selected as of 2018/2019 academic year was 17,865, while the registered alumni for the last five years as of the period for investigation (2015–2019) was 2,620. In the case of employers/businesses group, according to figures from the Registered General Department (RGD), Ghana, as at 2019, 50 organisations with many branches all over the country were engaging the graduates between 2015 and 2019. The study considered the regular students' group at the expense of their sandwich and distance learners because they are the only group that has experienced all the five quality dimensions used in measuring the institution performances.

From each of the customer sub-groups (strata), probability proportional to size allocation was used in the selection of the total participants for each sub-group. Krejcie and Morgan's (1970) table for determining the minimum sample size for categorical data with support from (Cohen, 1988) was used to arrive at an accurate sample size of 370 for the two subgroups (students and Alumni). However, taking into consideration the avoidance of high non-response rate, the sample sizes allocated was increased by small margins to 384. Finally, all the 50 Employer/Business organisations which have engaged the products of the University within the last five years were added to the two external customer sub-groups to give a total of 434 as shown in Table 3.

Table 3 The sampled participants of the subgroup targeted for the survey

External customer sub-group	*Male*	*Female*	*Total*
Student (regular)	214	120	334
Alumni (Last 5 years: 2012-2016)	38	12	50
Sub-total sampled	*252*	*132*	*384*
Employers (last 5 years: 2012-2016)			50
Grand total			*434*

Source: Field data (2019)

The instrument was in three parts, concerning the service quality performances of the institution. The first part has items ranged from four to six, for each customer sub-group on the respondents' background information. The second and third parts with 26 items each focus on the customers' expectations and perceptions on service performances respectively. Options to the items on expectations part were made on 5-point Likert-scales ranged from 1 (highly unimportant) to 5 (very important), while those on perceptions ranged from 1 (very unsatisfactory) to 5 (very satisfactory). The ordinal measurement scale which is a ranking of rating data that normally use integers in ascending order, has been used in this study. The numbers assigned to the agreement scale (1, 2, 3, 4, 5) do not indicate that the intervals between the scales are equal, nor do they indicate absolute quantities (Naoum, 2012).

3.3 Data analysis procedures

The following analysis was developed to meet the research purpose and find possible explanations for the investigated relationships among variables (Al-Marri et al., 2007; Salaheldin, 2009; Sila and Ebrahimpour, 2005).

a validity and reliability of the quality dimensions measurement instrument

b differences among the expectations and perceptions of the respondent subgroups

c relative importance of quality dimensions that influence the respondents' perception.

Institutional external subgroups developed expectations before the establishment of a relationship with the institution. The customers' satisfaction is determined through the perception after experiencing the outcome that fulfilled their expectations (Hasan et al., 2008). Service quality is about customer's perception of specific dimensions of services, while satisfaction is about the perception of service quality (Ogunnaike and Olaleke, 2010; Shekhar et al., 2010).

4 Findings

4.1 Profile of respondents

A total of 434 questionnaires were administered personally with assistance from two enumerators. In all 364 questionnaires out of 434 were returned, of which 361 were usable, while three questionnaires were either incomplete or ineligible. According to Bryman and Bell (2007) and Saunders et al. (2003), the overall response rate of 83.9%, is considered high and adequate to carry out the data analysis. Table 4 depicts the characteristics of respondents; alumni, students, and employers showing statistics in the frequencies and percentages.

Table 4 Characteristics of external customer respondents

Alumni respondents (48)												
	Gender		*Employment status*		*Org'al status*			*Years of exp.*		*H/degree*		
	M	*Fe*	*Tc/P*	*Ad.*	*Qu*	*Pr.*	*Pu*	*2–5 yrs*	*<2 yrs*	*Bac.*	*M/Mp*	*PhD*
F	37	11	21	27	5	11	32	17	31	42	4	2
%	77	23	44	56	10	23	67	35	65	88	8	4

Student respondents (268)									
	Gender		*Sponsorship status*		*Current level*			*Programme offered*	
	M	*Fe*	*Parent/G*	*Self/Sp*	*L400*	*L300*	*L200*	*Sc.*	*Hum.*
F	169	99	246	22	74	126	68	127	141
%	63	37	92	8	28	47	25	47	53

Employer/business (45)									
	Organisational status				*Years of contract established*				
	Qu	*Pr*	*Pu*	*Total*	*Above 30 years*	*21–30 years*	*11–20 years*	*Below 11 years*	*Total*
F	3	11	31	45	2	15	19	9	45
%	7	24	69	100	4.4	33.4	42.3	19.9	100

Notes: F – frequency; M – male; Fe – female; Qu – quasi-private; Pr – private; Pu – public; Ad – administration; Tc/P – professional/technical; Bac – bachelor; M/Mp – masters/Mphil; Sc – science; Hum– humanities; Self/p – self-sponsored; Parent/G – parent/guardian; Org'al status – organisational status.

4.2 Measurement instrument evaluation

Analysing the validity and reliability of the measurement instrument is very necessary with two reasons. First, the analysis assured of the responses and findings that they were truthful, credible, and therefore convincing (Neuman and Kreuger, 2003). Secondly, the valid and reliable instrument allowed others to replicate the use of the instrument for other comparative studies and with other populations (Flynn et al., 1994). Validity is the extent to which an instrument measures what it is supposed to measure and performs as it is designed to perform (Denzin and Lincoln, 2005). In assessing the validity of instrument developed in this paper, content validity and construct validity with the later consists of discriminant and convergent validity were assessed. The five quality dimensions for measuring the institutions service quality performances had content validity since the development of these measurement items was based mainly on an extensive literature review and detailed evaluations by the researchers and quality expertise contacted, as well as pilot-tested results. Construct validity measures the extent to which the items in a factor (construct or quality dimension in this paper) all measure the same construct (Flynn et al., 1994), and can be evaluated by the use of factor analysis. The exploratory factor analysis (EFA) was used to determine the discriminant validity and is indicated by results showing that indicators of theoretically distinct constructs are not highly intercorrelated. Convergent validity is about the extent to which there is consistency in measurements across multiple operationalisations. The results of

confirmatory factor analysis (CFA) also provided compelling evidence of the convergent validity of theoretical constructs.

The test-statistics indicated the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) values of 0.96 and 0.97 for expectations and perceptions instruments respectively (see Table 5).

Table 5 The test-statistics for measure of sampling adequacy

External customers' expectation: KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		0.955
Bartlett's test of sphericity	Approx. chi-square	5,607.366
	df	325
	Sig.	.000
External customers' perception: KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		0.966
Bartlett's test of sphericity	Approx. chi-square	7,151.414
	df	325
	Sig.	.000

Source: Field work (2018)

In support, Bartlett's test of sphericity computed was statistically significant at 0.00 which was less than $\alpha = 0.1$, with chi-square values of 5,607.37 and 7,151.41 for the expectations and perceptions respectively. The implication was that there was the appropriateness of the items assigned to the five service quality dimensions and therefore, the .quality dimensions instrument is considered valid and reliable

4.3 Main analysis

4.3.1 General expectations and perceptions of the service quality

In developing the ranges, the difference between the upper limit and lower limit values was divided by five, the total options [(5 –1)/5 = 0.80]. The dividend (0.80) was added to each of the coded figures (1, 2, 3, 4, 5) to form the upper limit of each range except the maximum (5). Again, a value of 0.01 is added to each of the upper limit value to form the next lower limit for each range. The levels of importance and satisfaction ranges and their interpretations are shown in Table 6.

Table 6 Summary of the range of scales and their interpretation

Options	*Expectation*	*Perception*	*Scale range*
Value	*Level of important*	*Level of satisfaction*	*Means*
1	Highly unimportant	Very unsatisfactory	1 to 1.80
2	Not important	Unsatisfactory	1.81 to 2.60
3	Moderate important	Satisfactory	2.61 to 3.40
4	Important	Good	3.41 to 4.20
5	Highly important	Very good	4.21 to 5

Source: Field work (2018)

4.3.2 Homogeneity test of the views of external customer subgroups

The homogeneity test of external customer-perceived service quality using chi-square distribution was conducted to test if there were any differences in perceptions among the various external sub-groups. The chi-square test computed is depicted in Table 7. The test statistic was found statistically to be significant, with chi-square (χ^2), value of 271.85[a], degree of freedom (2) and p-value = 0.00 < α(0.01).

Table 7 Test Statistics output of external customer sub-groups

External customer	*Observed N*	*Expected N*	*Residual*
Employer/business	45	120.3	–75.3
Student	268	120.3	147.7
Alumni	48	120.3	–72.3
Total	361		
	Test statistics		
Chi-square		271.850[a]	
Df		2	
Asymp. Sig.		.000	

Notes: [a]0 cells (0.0%) have expected frequencies less than 5.
The minimum expected cell frequency is 120.3.

Therefore, the null hypothesis was rejected and the conclusion was that there are statistically significant differences in the external customer sub-groups' perceptions on service quality dimensions.

4.3.3 Hypothesis testing: paired samples t-test

A hypothesis test was conducted to determine if differences exist between the respondents' expectations and perceptions. To test the difference between service quality expectation and perceived service quality delivered, a paired sample t-test was used to determine if there was any significant difference. In all the five dimensions at the 99% (0.01) confidence level, there was a significant difference between what external customers expected from the University and their perceptions of the services offered. Table 8 shows the overall customers' results of mean differences in expectations and perceptions.

Table 8 Paired samples t-test of all external customers

Dimension	*Paired differences*					*t*	*Sig. (2-tailed)*
	Mean	*Std. dev.*	*Std. error mean*	*99% confidence interval of the difference*			
				Lower	*Upper*		
PA-EA	–2.81	4.035	0.212	–3.356	–2.256	–13.21	0.00
PB-EB	–10.18	8.573	0.451	–11.343	–9.006	–22.55	0.00
PC-EC	–4.95	4.810	0.253	–5.608	–4.297	–19.57	0.00
PD-ED	–4.76	5.644	0.297	–5.531	–3.993	–16.03	0.00
PE-EE	–4.33	5.837	0.307	–5.122	–3.531	–14.09	0.00

Note: Degree of freedom (df) = 360; P – perception E – Expectation

It is evident from the results that the mean differences for the service quality range from –10.18 to –2.81 on the five dimensions. The t-test results with the significance values (p-values = 0.00) for the service quality dimensions among the three selected external customers are statistically significant.

4.3.4 Hypothesis testing: analysis of variance

The paired sample t-test will tell you if there is a significant variation between groups. However, as the groups grow in number, you may end up with a *lot* of pair comparisons that you need to run. A paired sample t-test compares means, while the analysis of variance (ANOVA) compares variances between populations. ANOVA will give you a single number (the F-statistic) and one p-value to help you support or reject the null hypothesis (see Table 9).

Table 9 Analysis of variance for customer expectations and perceptions

ANOVA					
	Sum of squares	*df*	*Mean square*	*F*	*Sig.*
E. grand mean of expectations					
Between groups	1.438	2	0.719	2.12	0.12
Within groups	121.603	358	0.340		
Total	123.041	360			
P. grand mean of perceptions					
Between groups	0.342	2	0.171	0.25	0.78
Within groups	241.339	358	0.674		
Total	241.681	360			

Note: with alpha (α) level of 0.05.

From the computed ANOVA test with $\alpha = 0.05$. We can see that the F-values of 2.12 and 0.25 for customers expectations and perceptions respectively is greater than the F-critical value for the alpha level selected (0.05). Therefore, there is much evidence to reject the null hypothesis and say that at least one of the three customer subgroups has statistically significant different view point on the quality dimensions. Again, the p-value (significance level) is another measure for ANOVA. If the p-value is greater than the alpha level selected (which it is, in our case), we cannot reject the null hypothesis. This means that the three subgroups belong to the same population, the external customer. The difference between the individual means and grand mean is therefore significant.

4.3.5 Sub-group expectation and perception of service quality

After validity and reliability of the external customers' instruments have been established, the grand mean scores of the three sub-groups computed with their interpretations of the level of importance and satisfaction are depicted in Table 10. Thus, the individual subgroups' expectations and how they perceived the strengths and weaknesses of the institutional performance on each of the five quality dimensions has been computed.

Table 10 Grand mean scores of the sub-groups expectation and perception

Dim	*Scores/interpretation*	*Employers (45)*		*Students (268)*		*Alumni (48)*	
		Exp. mean	*Pecp. mean*	*Exp. mean*	*Pecp. mean*	*Exp. mean*	*Pecp. mean*
A	Grand mean	4.77	2.26	4.17	3.46	4.12	3.38
	Level of importance/ satisfaction	H/Imp	Unsatis	Impor	Good	Impor	Satis.
B	Grand mean	4.64	2.29	4.33	3.13	4.21	3.15
	Level of importance/ satisfaction	H/Imp	Unsatis	H/Imp	Satis	H/Imp	Satis
C	Grand mean	4.55	2.24	4.34	3.17	4.23	3.38
	Level of importance/ satisfaction	H/Imp	Unsatis	H/Imp	Satis	H/Imp	Satis
D	Grand mean	4.54	2.28	4.12	3.24	4.19	3.15
	Level of importance/ satisfaction	H/Imp	Unsatis	Impor	Satis	Impor	Satis
E	Grand mean	4.71	2.00	4.05	3.19	4.07	3.17
	Level of importance/ satisfaction	H/Imp	Unsatis	Impor	Satis	Impor	Satis

Notes: Exp. – expectation; Pecp. – perception; H/Imp – highly important; Impor – important; Satis – satisfactory; Unsatis – unsatisfactory. Dim – dimension; A – core service or service product; B – human element of service delivery; C – systematisation of service delivery: non-human element; D – tangibles of service (servicescapes); E – Social responsibility.

Source: Field work (2018)

4.3.5.1 Core service or service product (A)

The first of service quality dimension assessed was the core services (A) with four items. The core services portrayed the content of service or the essence of a service being provided by the institution. The employers' expectation and perception means for the dimension was 4.77 and 2.26 respectively. To the employers, the core services is highly important, while their level of satisfaction is indicated 'unsatisfactory'. The grand means scored with the core services from the students and alumni groups indicate 'important'. Students perception indicated good while alumni perceived it as 'satisfactory'.

4.3.5.2 The human element of service delivery (B)

The second service quality dimension is the human element of service delivery, of which the dimension had eight items in defining it. The employer respondents' had their expectation to be 'highly important' and their perception to be 'unsatisfactory' rating. Students and alumni's overall expectation was 'highly important'. The two groups were satisfied the university human element of service delivery.

4.3.5.3 Systematisation of service delivery: non-human element (C)

In the case of the systematisation of service delivery, four items were assigned to it and the employer group considered the dimension as 'highly important'. However they were not satisfied with the university performance in that area. Both Students and Alumni also considered it as 'highly important' and they are satisfied with the delivery from the university.

4.3.5.4 Tangibles of service (servicescapes) (D)

The tangibles of service had five items with the employers' expectation and perception indicating highly important and unsatisfied respectively. The implication is that the quality dimension, the Tangibles of service is, while they perceived not satisfied with the delivery. Students and the Alumni considered this dimension as 'highly important' and also satisfied with it delivery.

4.3.5.5 Social responsibility (E)

The fifth and the final service quality dimension used was Social responsibility with five items. The employer's means for expectation (4.71) and perception (2.00) defined the dimension to be highly important to them, while their experiences with the university allowed them perceived the dimension as 'unsatisfactory'. Students and Alumni indicated that the dimension is important to them and they are satisfied with the University performance.

4.3.6 Relative important indices of the quality dimensions

Fowler (1995) defines ranking as a comparison among given options, within pairs of options, by the cardinality of importance (first, second, third), or those score items one at a time using a common scale, which also determines the importance of that factor. In this study, important indices was used to rank the variables for service quality dimensions. The important index (I.I) of determination of the significance of factors was adapted because, Enshassi et al., (2007), emphasised that to analyse data on an ordinal scale like the 5-point Likert scale used in the study, the application of Important Index is necessary and suitable for interpretation of the findings. It is defined as follows:

$$\text{Important Index (I.I)} = \frac{(5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1)}{5(n_5 + n_4 + n_3 + n_2 + n_1)} * 100$$

where

n_1 – number of respondent who answered '1'

n_2 – number of respondent who answered '2'

n_3 – number of respondent who answered '3'

n_4 – number of respondent who answered '4'

n_5 – number of respondent who answered '5'.

The level of significance of the service quality dimensions was measured in two major parts which portrayed how they influenced the respondents' expectations and perceptions. Table 11 depicts the external customer sub-groups indexes for the service quality dimension ranking.

Table 11 Computation of importance indexes for external customers

Service quality dimension	*Customer-group Indexes*		
	Students	*Alumni*	*Employer*
		Expectation	
Core service or service product (A)	83.3 (3rd)	82.5 (4th)	95.3 (1st)
The human element of service delivery (B)	84.9 (2nd)	84.2 (2nd)	92.7 (2nd)
Systematisation of service delivery (C)	86.8 (1st)	84.7 (1st)	91.0 (3rd)
Tangibles of service (servicescapes) (D)	82.4 (4th)	83.8 (3rd)	90.8 (4th)
Social responsibility (E)	81.0 (5th)	81.5 (5th)	90.3 (5th)
		Perception	
Core service or service product (A)	69.2 (1st)	67.6 (1st)	70.1 (3rd)
Human element of service delivery (B)	62.6 (5th)	63.0 (4th)	75.9 (1st)
Systematisation of service delivery (C)	63.4 (4th)	67.6 (1st)	74.7 (2nd)
Tangibles of service (servicescapes) (D)	64.8 (2nd)	63.1 (3rd)	69.7 (4th)
Social responsibility (E)	63.8 (3rd)	63.4 (2nd)	64.0 (5th)

4.3.6.1 Important indices for expectations

The student group considered the 'systematisation of service delivery: the non-human element' as the most significant quality dimension with a score of 86.8%. The implication is that students focus on this dimension before they enter into the university to acquire knowledge. The students rated the social responsibility (81%) as the less significant dimension. In the case of the Alumni group, which has passed through the teaching and learning enterprise and other services had similar impression as the current students. They rated the 'systematisation of service delivery' as the most significant dimension with 85% and social responsibility as less with 81.5% rating. Employers/businesses were of different views as they ranked the core service or service product (95%) as the most significant service quality dimension expected. This could probably be associated with the fact that they need the graduates with knowledgeable skills who could fit for the job. Nevertheless, they also ranked 'social responsibility (90.3%)' as the least significant dimensions.

4.3.6.2 Important indices for perception

In the case of the customers' perception, as indicated in the same Table 10, it shows the ranking of the quality dimensions through the perceived services provided by the university. The relevancy of the quality dimensions was determined by the external customer sub-groups through their experiences gained after receiving service from the University for a certain period. Students after their experiences with the university considered the core service or service product as the most influential quality dimension

with a 69% scores. They also considered the Human element of service delivery (62.6%) as the least dimension.

The alumni group also perceived the core service or service product and Systematisation of service delivery as their most influential quality dimension with 68% score. However, they also ranked the human element of service delivery (63%) as the lowest quality dimension. The employers considered the human element of service delivery (76%) as the quality dimension that mostly influenced their perception, with social responsibility perceived to be the least influential dimension.

5 Discussions

In general, the research on measuring service quality has focused primarily on how to meet or exceed the external customer's expectations, and considered the perceived service quality as a measure of how the delivered service level matches customers' expectations (Kang et al., 2002). The current study with the help of measurement instrument from previous researches on other service institutions and assistance received from other experts colleagues was able to developed an instrument with 39 items, pilot-tested and the result was subject to exploratory factor analysis (EFA).

The EFA was computed to define the latent constructs which gave five of them and the items reduced to 26, which constituted the final instrument for the main survey conducted. The quality dimension instrument developed was found to be valid and reliable. The five quality dimensions (constructs) were named similar to that of Sureshchandar et al. (2002), because the mentioned dimensions were found to be applicable to education and any other service industries.

The homogeneity test was computed and depicted that the views on service performance depends largely on the particular customer subgroups, the paired-sampled t-test depicted statistically significant differences between the customers' expectations and perceptions. The calculated expectation and perception means from the external customers view point, was to explore the levels of importance (from expectations) and levels of satisfactions (from perceptions). Apart from that, a relative important index was computed to determine also the most influential of the quality dimensions that influence customer perceptions of service performance in higher education.

The results indicated that there were high expectations among customer sub-groups. However, the three subgroups have varied expectations and perceptions as well. The student and alumni groups were expecting more on both human and non-human aspects of service delivery. However, they were satisfied with the core service more than anything else after being with the university for some period. This has portrayed the true picture on the ground for students of tertiary education that they consider to be in university institutions with good human relations and systematisation of service delivery.

The employers and businesses that need the services of the institutional graduates considered the 'core service' or 'service product', the most expected dimension and their experience depicted the low level of satisfaction for it. It is also found that there were differences in perceptions among the customer subgroups as far as the order of relevancy is concerned. The diversity in the perception of the customers could be attributed to the relevance of the education service to the various customer-groups, students, being primary customers; employers, secondary customers, and alumni being the tertiary customer-group.

6 Conclusions

Service quality and customer satisfaction are important concepts for academic researchers studying consumer evaluations. Information on customers' perceptions is relevant to institutional management decision making. In this current study, the five service quality dimensions have vividly revealed the assessment of service performances of TQM education institution with over 18 years experiences in quality management. Relative Important Index facilitates the level of significance of the quality dimensions contributing to service quality delivery in the university. To improve service quality, it is necessary to listen to the voices of institutional customers regularly and assess their experiences gained in the service provision. This situation can be addressed by involving the institutional customers in the assessment of outcome criteria from TQM implementation. By identifying, the strengths, and weaknesses of the service quality dimensions, the institutional management should be able to allocate the available resources based on the information acquired to provide better service to their external customers.

7 Limitation of the study

The study literature has reviewed that different researchers have used different indicators to measure institutional service performances and for that matter, there are no uniformly accepted measurable instruments (Fening et al., 2008; Zakuan et al., 2010).

The study after developing its own instrument and subjected the pilot-tested results into factor analysis decided to name the five constructs acquired same as what the Sureshchandar et al. (2002) used. They could also be named differently by different researchers provided the names given are applicable to education service activities.

The survey instruments were based on the general opinion of the selected staff of the university and the three randomly selected subgroups of the external customers as against the census survey, which is not verifiable to some extent and hence could limit the findings of the research.

The total evaluation of TQM implementation comprises three distinct but interrelated assessments namely: TQM implementation itself, assessment of process criteria and assessment of outcome criteria. However, the study focused on the third assessment that talks about service quality performance, hence having limited literature studies on other two.

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