



## Performance-Based Service Quality Model in Postgraduate Education

Journal:	<i>International Journal of Quality &amp; Reliability Management</i>
Manuscript ID	IJQRM-04-2015-0059.R1
Manuscript Type:	Quality Paper
Keywords:	Egypt, Postgraduate Studies, Service Quality
Abstract:	

SCHOLARONE™  
Manuscripts

View Only

## Abstract

**Purpose** – This paper aims to promote and analytically verify an advanced assessment design to evaluate service quality especially in postgraduate higher education.

**Design/methodology/approach** – This research adopts a quantitative approach through a survey method. A structured questionnaire was designed as a means for collecting data. Data was collected from 182 postgraduate students in an Egyptian higher education university. Data was examined by Exploratory Factor Analysis to pinpoint the main irregularities explained by the extracted factors. Then, Confirmatory Factor Analysis was carried out to filter the ratios and empirically test the assessment efficiency of the developed model.

**Findings** – The final model consists of 33 items loaded into eight dimensions for measuring performance-based service quality of the postgraduate higher education. The results are satisfactory in terms of unidimensionality, trustworthiness and validity tests.

**Research limitations/implications** – Although the empirical results are significant, a comparative study can identify relative strengths and weaknesses of this model.

**Practical implications** – For improving postgraduate higher education institutions' quality; this paper highlights some dimensions and attributes that they should consider.

**Originality/value** – The literature proposes that there is an opportunity to handle service quality from the point of postgraduate students covering different contexts to further build a more comprehensive structure specifically for postgraduate higher education service quality. This paper deals with this research gap with analytical confirmation within the context of postgraduate programs in an Egyptian university.

**Keywords** – Egypt, Postgraduate Studies, Service Quality

**Paper type** – Research paper

## 1. Introduction

Quality and specifically the quality or trait of service, are known to be complicated with many dimensions (Galloway and Ho, 1996; Behara et al., 2002). From the 1990s, service divisions have employed more strict measures to enhance their performance and efficiency in search of obtaining “contrast” in the market and their quality consciousness is improved due to globalization and liberalization (Rodrigues et al., 2011). According to Carrillat et al. (2007), researchers agree that a key issue in service research is service quality (SQ), which is a critical factor of service success as well as firms' long-term growth. This is mainly because SQ strengthens customer's approval, which in turn has an affirmative influence on Beneficial's word-of-mouth, attitudinal loyalty, and leads to increased market share and financial achievement (Al-Hawari et al., 2009).

1  
2  
3 However, quality of service is always non-objective and hard for customers to assess (Maddern  
4 et al., 2007) due to the changeability, instability, decomposability, and concurrent production and  
5 utilization traits of services (Lam et al., 2012); that leads to be one of the most disputed subjects  
6 in the services literature (Ooi et al., 2011). As a result, as the quality awareness among the  
7 service divisions increased, the urge to assess the quality of service also increased and raised the  
8 level of development of metrics for the assessment of service quality (Rodrigues et al., 2011).  
9  
10

11  
12 As will be discussed in the following section, SERVQUAL has been widely used in evaluating  
13 services quality in different service sectors (Gupta et al., 2005), yet there is still little harmony as  
14 to which design is most suitable in a more comprehensive way. In this regard, Al-Hawari et al.  
15 (2009) argued that there are no infinite perfect designs for measuring service quality. It is also  
16 noteworthy that the larger part of the advanced instruments including; HEdPERF (Abdullah,  
17 2004); HEdPERF-SERVPERF (Abdullah, 2005); SQM-HEI (Senthilkumar and Arulraj, 2011);  
18 HiEdQUAL (Annamdevula and Bellamkonda, 2012) has been limited to undergraduate students  
19 (e.g. Oldfield and Baron, 2000; Abdullah, 2005; 2006; Senthilkumar and Arulraj, 2011;  
20 Annamdevula and Bellamkonda, 2012). While only few studies (e.g. Angell et al., 2008;  
21 Shekarchizadeh et al., 2011) have focused on examining the perspective of postgraduate students  
22 or considered both undergraduate and postgraduate students (Sultan and Wong, 2010).  
23 Moreover, the dimensions of higher education service quality differ in the context of culture,  
24 university and even school or department (Sultan and Wong, 2012). This reveals that the  
25 generalisability of the extracted dimensions and measures in a wider context is still challenging.  
26 Endorsing this view, a number of recent studies (e.g. Abdullah, 2005; 2006; Angell et al., 2008;  
27 Sultan and Wong, 2010; 2012; Shekarchizadeh et al., 2011) recommended that future studies  
28 should be extended to other academic disciplines with different kinds of higher education  
29 institutions in different countries with the ultimate aim of promoting a more universal design of  
30 service quality in higher education.  
31  
32

33  
34 The lines above examine the idea that there is a field to study service quality from the viewpoint  
35 of postgraduate students covering a larger variety of subjects in other countries to further build a  
36 more universal structure specifically for postgraduate higher education service quality. The  
37 present literature addresses this research gap with analytical evidence in the context of a  
38 postgraduate program in an Egyptian university.  
39  
40

## 41 42 43 44 45 46 47 **2. Literature Review**

### 48 49 50 **2.1 Service Quality**

51  
52 Service quality has since come to light as a common strategic force and a main strategic point on  
53 management's timetable (Maddern et al., 2007). It is no surprise that both academics and  
54 students are interested in precisely assessing service quality with the intention of understanding  
55 its crucial backgrounds and sequences, and finally, establish methods for enhancing quality to  
56 achieve more points of strength and build customer loyalty (Abdullah, 2005). There was an  
57  
58  
59  
60

1  
2  
3 interest in the field of service quality through the past three decades, focusing on the areas of  
4 service marketing and service (Sigala, 2004).  
5  
6

7 As the quality apprehension among the service sectors enhanced, the need to assess the quality of  
8 service also advanced and this called for the development of metrics for the assessment of  
9 service quality (Rodrigues et al., 2011). However, the concept of service quality has been  
10 considered one of the most disputed subjects in the services literature (Ooi et al., 2011). This is  
11 due to the reason that it lacks the consensus with regard to defining it as well as measuring it  
12 (Gupta et al., 2005). Endorsing this perspective, Morales and Ladhari (2011) claimed that  
13 customers' viewpoints of service quality are influenced by different aspects such as; cultural  
14 dimensions, education and income.  
15  
16  
17

18 In this regard, there have been several pursuits made by a group of researchers who have  
19 pinpointed the different variables that assess service quality (Rodrigues et al., 2011). Among the  
20 various attempts to conceptualize service quality, the most valuable and widely accepted  
21 approaches for measuring service quality are (Grönroos, 2001; Samat et al., 2006; Ooi et al.,  
22 2011; Lam et al., 2012); the gap model or SERVQUAL proposed by Parasuraman et al. (1988)  
23 and the two-factor model or the Technical/Functional Quality framework proposed by Grönroos  
24 (1983, 1990).  
25  
26  
27

28 The gap model, built on the customer satisfaction theory, signifies that service quality is  
29 seriously identified by the distinction between customer's expectation and customer's perception  
30 of actual service performance received from the service providers (Lassar et al., 2000; Behara et  
31 al., 2002; Gupta et al., 2005; Rosenbaum and Wong, 2009; Lam et al., 2012). The model  
32 measures both consumers' perceptions and expectations regarding five dimensions; reliability,  
33 responsiveness, assurance, empathy, and tangibles (Behara et al., 2002) which mirrors how the  
34 customers shape data on service quality (Cook and Verma, 2002). Based on this model, a  
35 validated instrument, which is often referred to as SERVQUAL, was promoted by Parasuraman  
36 et al. (1988) (Lam et al., 2012). The SERVQUAL instrument included two sections (one assesses  
37 expectations and the other assesses perceptions) each of them consists of 22 items (Lassar et al.,  
38 2000) representing the five identified dimensions.  
39  
40  
41  
42  
43  
44

45 On the other hand, the two-factor model defended that service quality could be classified into  
46 two quality forms; technical quality and functional quality (Ooi et al., 2011). The technical  
47 quality is associated with what the consumer receives after the service delivery (De Keyser and  
48 Lariviere, 2014) and considers issues such as the end result of service provision (Kang, 2006).  
49 Whereas functional quality takes into account how the technical quality gets transferred to the  
50 customer as it relates to the customer perception toward the process or experience of receiving  
51 the service (De Keyser and Lariviere, 2014). It studies concerns such as the attitude of customer-  
52 contact staff and the rapidity of service (Kang, 2006). In other words, the technical quality entails  
53 the service quality outcomes, while the functional quality refers to the service interaction quality  
54 (Lam et al., 2012). Therefore, Samat et al. (2006) emphasized that **functional quality** will refund  
55  
56  
57  
58  
59  
60

1  
2  
3 for temporary glitches with technical quality but will not compose of an overall lower quality  
4 level.  
5

6  
7 While, SERVQUAL has been widely used in evaluating services quality in different service  
8 sectors (Yang et al., 2004), it has been exposed to criticism in several respects – including its use  
9 of the “difference score”, its dimensionality, its suitability, and so on (Yang et al., 2004; Kang,  
10 2006; Maddern et al., 2007; Lam et al., 2012).  
11

12  
13 The SERVQUAL has been criticized as it only concentrates on the service delivery process, but  
14 rejects the service-encounter results (Kang, 2006; De Keyser and Lariviere, 2014) despite the  
15 general agreement that service quality is a multidimensional or multi-attribute construct (Behara  
16 et al., 2002; Kang and James, 2004). However, Samat et al. (2006) argues that functional quality  
17 (the service delivery process) is the key element of consumers’ viewpoints since technical  
18 quality (the service-encounter results) is almost very similar among firms. Thus, functional  
19 quality is considered the key means to differentiate between firms. This is all the more reason to  
20 make use of an appropriate means such as SERVQUAL to concentrate on mirroring the  
21 functional forms of quality management in service firms (Gupta et al., 2005).  
22  
23

24  
25  
26 Moreover, the SERVQUAL has also been criticized on its restrained scope of quality  
27 dimensions, that lead to the omission of vital determinants of SERVQUAL for instance the  
28 service product and the non-human element of service delivery (Sureshchandar et al., 2002) that  
29 are essentially context-specific (Law, 2010). To address these limitations, recent researchers,  
30 according to Lassar et al. (2000), unified new designs and means of assessment with the  
31 SERVQUAL factors with the aim to extend and enhance the explanatory power of this design.  
32 Endorsing with this view, Lam et al. (2012) declared that SERVQUAL model has been  
33 extensively implemented in its entirety, or part of it, or changed its scale items to assess  
34 perceived service quality through numerous service situations.  
35  
36  
37

38  
39 Concerning its conceptualization and technique, the employment of the expectation-perception  
40 disconfirmation approach has been questioned in various researches (such as; Cronin and Taylor,  
41 1992; 1994; Buttle, 1996; Brady et al., 2002; Silvestro, 2005; Guo et al., 2008). Customers’  
42 expectations are the component of the SERVQUAL model that has elevated critics, mostly lie in  
43 the challenge facing customers in assessing the extent to which their actual viewpoints vary from  
44 their expectations (Rosenbaum and Wong, 2009). Actually, apprehending the expectations of  
45 customers is not an easy mission, for either not telling straight what they want, or they do not  
46 actually know what they want (Lim and Tang, 2000; Gupta et al., 2005). Moreover, it is claimed  
47 that expectations are influenced by viewpoints that are formed throughout the service delivery  
48 process (Calvo-Porrall et al., 2013).  
49  
50  
51

52  
53  
54 In correspondence, these unsettled issues of expectations as a key element that determines the  
55 perceived service quality have produced an alternative paradigm of service quality, called the  
56  
57  
58  
59  
60

1  
2  
3 perception paradigm, that sustains only the perceptions of service quality (Nejati and Nejati,  
4 2008; Calvo-Porrall et al., 2013).

7 Cronin and Taylor (1992) argued that current performance best reflects a customer's perception  
8 of service quality while expectations are not part of this concept. Consequently, Cronin and  
9 Taylor (1992) introduced the performance-only scale and dubbed SERVPERF. The SERVPERF  
10 scale consists of only the 22 perception items of the SERVQUAL scale while excludes any  
11 consideration of expectation items (Brandon-Jones and Silvestro, 2010). Empirically, Cronin and  
12 Taylor (1992) indicated that the SERVPERF appears to have a better ability in explaining  
13 variation in customer satisfaction and a greater predictive power than SERVQUAL in different  
14 industrial contexts.  
15  
16  
17

18  
19 Many analytical research papers on service quality tried to examine the corresponding  
20 superiority between the SERVQUAL scale and the SERVPERF scale. However, this issue has  
21 not resolved yet (Rodrigues et al., 2011) since the effectiveness of the SERVQUAL and the  
22 SERVPERF scales are often dependent upon the nature and goal of a study (Sultan and Wong,  
23 2012). Impartial of the crucial difference between these two models, academics and practitioners  
24 similarly are mostly restrained to reconciliation that SERVQUAL and SERVPERF are the most  
25 suitable frameworks for assessing service quality across an extensive diversity of industries and  
26 disciplines (Angell et al., 2008). Meantime, Carrillat et al. (2007) declared that both scales have  
27 established more than 46 per cent of total citations in service quality research papers between  
28 2002 and 2007 and advocated that both scales were adequate and equally valid predictors of  
29 overall service quality. Despite the arguments in relation to superiority of these services quality  
30 measures, Sultan and Wong (2012) stated that the SERVPERF assessment means is more  
31 appropriate to use in advancing a complete design and explaining causal relationships. Yet there  
32 is still little agreement as to which method is comprehensively most appropriate and it  
33 consequently remains in the judgment of the individual researcher to choose the most suitable  
34 framework for a given situation (Angell et al., 2008). **In the context of this paper, service quality  
35 can be seen as the students' perception towards the services they received during their  
36 postgraduate studies. This definition is adopted from the Cronin and Taylor (1992) view of  
37 service quality.**  
38  
39  
40  
41  
42  
43  
44

## 45 **2.2 Service Quality in Higher Education**

46  
47 Service quality research in the higher education sector is recent, at least, in comparison with that  
48 of commercial division. Mainly, the quality designs utilized in the business **sector** have been  
49 modified and utilized in the education **sector** (Sultan and Wong, 2013). However, Senthilkumar  
50 and Arulraj (2011) contends that SERVQUAL and SERVPERF were designed as universal  
51 assessments of service quality that should serve as basic "pillars" that regularly need amendment  
52 to fit the exact application condition and additional context-specific items. Consequently, various  
53 efforts have been done to design explicit service quality assessment instruments for higher  
54 educational institutions (Yildiz and Kara, 2009). In an early research, Oldfield and Baron (2000)  
55  
56  
57  
58  
59  
60

1  
2  
3 modified the SERVPERF scale based on undergraduate business and management students'  
4 viewpoints and enhanced a new instrument to assess service quality in higher education context.  
5 The new instrument includes 21 items structured of three dimensions; requisite elements,  
6 acceptable elements, and functional elements.  
7  
8

9  
10 After the performance-only approach, the higher education performance (HEdPERF) scale was  
11 proposed by Abdullah (2004) as a recent and more universal performance-based measuring scale  
12 that attempts to embrace the notable aspects of service quality within the higher education sector  
13 (Abdullah, 2005). The HEdPERF scale consists of 41 items categorized under six dimensions,  
14 namely non-academic aspects, academic aspects, reputation, access, program issues and  
15 understanding (Law, 2010). **The HEdPERF scale was empirically tested for unidimensionality,**  
16 **reliability and validity using both exploratory and confirmatory factor analysis within the**  
17 **Malaysian higher education context (Abdullah, 2004).** Abdullah (2005) fused the items from the  
18 SERVPERF and HEdPERF scales in an attempt to enhance a new industry-specific scale. By  
19 using factor analysis to specify a new dimensional structure of service quality, a 4-factors scale,  
20 named merged HEdPERF-SERVPERF scale, were constructed comprising 35 items (Abdullah,  
21 2005). However, in a comparative study, Abdullah (2006) empirically examined the three  
22 alternative scales; the HEdPERF, the SERVPERF, and the combined HEdPERF-SERVPERF  
23 scales with the main aim to evaluate the parallel strengths and weaknesses of each instrument in  
24 order to specify which instrument has the superior assessment capability. The results  
25 demonstrated the superiority of the HEdPERF over the SERVPERF and the HEdPERF-  
26 SERVPERF scales in terms of unidimensionality, reliability, validity and explained variance of  
27 service quality (Abdullah, 2006). In another study, Brochado (2009) compares five alternative  
28 instruments to assess service quality in higher education; SERVQUAL, SERVPERF,  
29 importance-weighted SERVQUAL, importance-weighted SERVPERF and HEdPERF scales.  
30 The author concluded that both SERVPERF and HEdPERF present the best assessment ability,  
31 but the parallel value between these two instruments is still indecisive (Brochado, 2009). Despite  
32 that the HEdPERF scale contributes significantly in literature, (Sultan and Wong, 2010) claimed  
33 that the scale can further be strengthened by ensuring content and face validity of some of the  
34 items.  
35  
36  
37  
38  
39  
40  
41  
42  
43

44 Senthilkumar and Arulraj (2011) proposed a 30-item instrument specifically for measuring  
45 service quality in higher education in India (SQM-HEI). The proposed instrument has been  
46 examined analytically for unidimensionality, reliability and effectiveness using both exploratory  
47 and confirmatory factor analysis. The authors contended that such effective and reliable  
48 measuring scale would be a tool that higher educational institutions could use to improve service  
49 performance within the increased competition with the enhancement of universal education  
50 markets (Senthilkumar and Arulraj, 2011).  
51  
52  
53

54  
55 In more recent studies such as Annamdevula and Bellamkonda (2012), the authors have  
56 pinpointed the determinants to assess the service quality in the higher education **sector** and  
57 promoted a new instrument, called HiEdQUAL, covering several service dimensions in the view  
58  
59  
60

1  
2  
3 point of students as a main customer. The advanced instrument explores five dimensions of  
4 service quality within the higher education division. These factors are; teaching and course  
5 content, administrative services, academic facilities, campus infrastructure, and support services.  
6 The proposed model analytically examined for validity, reliability and model fit indices using  
7 exploratory factor analysis and confirmatory factor analysis.  
8  
9

10  
11 There are other attempts to assess service quality shedding light on sub-areas of higher education  
12 only rather than the entire field of higher education. For example, Nejati and Nejati (2008) made  
13 use of a modified version of SERVPERF consisting of 20 items to assess both satisfaction and  
14 importance of service quality from users' viewpoint of an academic library in Iran. While Smith  
15 et al. (2007) utilised the SERVQUAL scale to assess the quality of a service department (IT  
16 department) in one university in the United Kingdom (UK). Moreover, there was another study  
17 written by Yildiz and Kara (2009) and dealt with specific traits of higher education through the  
18 development of an instrument, named PESPERF, for assessing service quality in the field of  
19 physical education and sports sciences. Based on SERVPERF approach, the PESPERF scale  
20 includes 30 items under three factors; academic aspects, empathy, and entree.  
21  
22  
23  
24

25  
26 It is also of great importance to notice that the majority of the advanced instruments has been  
27 limited to undergraduate students while only few studies (e.g. Angell et al., 2008;  
28 Shekarchizadeh et al., 2011) have concentrated on examining the perspective of postgraduate  
29 students or considered both undergraduate and postgraduate students (Sultan and Wong, 2010).  
30 Based on the disconfirmation paradigm, Angell et al. (2008) presented an 18-item importance-  
31 performance analysis (IPA) scale that precisely targeted taught postgraduate students in a "social  
32 science and business" faculty within UK institution. The advanced scale is categorized under  
33 four service quality dimensions; academic, leisure, industry links, and cost. Shekarchizadeh et al.  
34 (2011) resolved to assess international postgraduate students' perceptions of education service  
35 quality in Malaysian universities. For this reason, they promoted a modified SERVQUAL  
36 questionnaire consisting of 35 items distributed into five varying factors namely;  
37 professionalism, reliability, hospitality, tangibles, and commitment. From the perspective of both  
38 international undergraduate and postgraduate students of various Japanese universities, Sultan  
39 and Wong (2010) promoted a performance-based higher education service quality model (PHed  
40 model) which consists of eight dimensions and 67 items and examined analytically for  
41 unidimensionality, reliability and validity using exploratory factor analysis (EFA). However,  
42 each of these studies only studied the respective utilities of advanced instruments in only one  
43 national setting (i.e. UK, Malaysia, and Japan respectively).  
44  
45  
46  
47  
48  
49  
50

51 It is worthy of noting that dimensions of higher education service quality differ broadly in  
52 different cultures, universities and even schools or departments (Sultan and Wong, 2012). This  
53 reveals that the generalization of the extracted dimensions and pillars in a wider context is still  
54 challenging. Endorsing this view, a number of new studies (e.g. Abdullah, 2005; 2006; Angell et  
55 al., 2008; Sultan and Wong, 2010; 2012; Shekarchizadeh et al., 2011) claimed that next studies  
56 should be extended to other academic education with different kinds of higher education  
57  
58  
59  
60



1  
2  
3 institutions in different countries with the ultimate aim of advancing a comprehensive model of  
4 service quality in higher education.  
5  
6

7 As higher education has become more globalized, the geographical horizon of traditional  
8 rankings has also expanded in order to satisfy the greater need and demand for access (Blanco-  
9 Ramírez and Berger, 2014). Nevertheless, although worldwide university rankings are achieving  
10 ever greater penetration and significance, many individual countries are developing their own  
11 rankings. This is because biases and obstacles arise when comparing universities from different  
12 countries (Berbegal-Mirabent and Ribeiro-Soriano, 2015). As, countries differ in their history,  
13 culture, educational traditions, and perspectives (Blanco-Ramírez and Berger, 2014).  
14  
15

16  
17 The above lines suggest that there is a field to assess service quality from the perspective of  
18 postgraduate students covering a larger variety of courses in other countries to further build a  
19 more comprehensive structure specifically for postgraduate higher education service quality. The  
20 present study addresses this research gap with analytical evidence in the context of postgraduate  
21 programs within Egyptian university.  
22  
23

### 24 **3. Research Objective**

25  
26 As discussed above, several studies have focused merely on the perception of undergraduate  
27 students concerning service quality of higher education. In accordance, Barnes (2007) claimed  
28 that only limited evidence exists with respect to understanding the service quality delivered to  
29 postgraduate students. Thus, the present research proposes to promote and analytically validate a  
30 new performance-based measurement model to evaluate service quality especially in  
31 postgraduate higher education (PG-SQ model).  
32  
33

34  
35 To achieve this research objective, postgraduate students were surveyed to identify the main  
36 dimensions that reflect their perception about the service quality of the postgraduate programs  
37 they attend. Following this, Exploratory Factor Analysis was conducted to describe the underline  
38 structure of the service quality measures. In addition, Confirmatory Factor Analysis was adopted  
39 to purify the developed model and assess its fit. Moreover, this research aims to assess the  
40 assessment capability of the developed model in terms of unidimensionality, reliability and  
41 validity.  
42  
43  
44  
45

### 46 **4. Research Methodology**

47  
48 This paper begins with a detailed review of service quality management paper to understand  
49 different approaches and models employed in research papers to assess service quality within  
50 different service sectors and within different contexts. This is followed by reviewing previous  
51 researches that focus on the higher education service quality. The research employs the concept  
52 of systematic literature review while reviewing the extant research papers (Tranfield et al.,  
53 2003).  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 Specific management data sources, such as Emerald Insight and Science Direct, were analyzed to  
4 identify articles dealing with service quality assessment. Abstract and citation search was written  
5 according to some inclusion and exclusion rules. Because this research has a particular interest in  
6 assessing service quality in postgraduate higher education, analytical studies have concentrated  
7 on other pillars of service quality such as; banking, marketing, healthcare, food supplier-retailers,  
8 local government community facilities, call center are excluded. Papers written in other  
9 languages rather than English are also excluded.

10  
11  
12  
13  
14 As the purpose of this research is to promote a new measurement model for postgraduate service  
15 quality, this research could be categorized as an exploratory and deductive research. The  
16 research unit of analysis is the postgraduate student as they are considered the major source of  
17 information to achieve the research purpose. Survey research was selected for analytical  
18 validation out of the exploratory nature of this research.

#### 21 4.1 Survey Instrument

22  
23 To achieve the purpose of the current research, higher education service quality literature (e.g.  
24 Oldfield and Baron, 2000; Abdullah, 2005; 2006; Smith et al., 2007; Nejati and Nejati, 2008;  
25 Brochado, 2009; Yildiz and Kara, 2009; Law, 2010; Sultan and Wong, 2013; Senthilkumar and  
26 Arulraj, 2011; Annamdevula and Bellamkonda, 2012), generally speaking, and **that concerning**  
27 **postgraduate education (Angell et al., 2008; Sultan and Wong, 2010; Shekarchizadeh et al.,**  
28 **2011)**, specifically speaking were reviewed with the purpose of specifying the underlying service  
29 factors for postgraduates education. Accordingly, a self-supervised structured instrument  
30 (questionnaire) was promoted. The items utilized in the aforementioned studies showed  
31 considerably accepted validity and reliability in assessing service quality within the educational  
32 field. Consequently, a total of 43 items were modified to assess postgraduate students'  
33 perspective towards the quality of the services offered to them (Appendix A).

34  
35  
36  
37  
38  
39 In order to judge the advanced questionnaire, it was reviewed by a group of experts who have  
40 good experience in managing and delivering postgraduate educational programs. They  
41 recommended some modifications that were examined and resulted in the final version of the  
42 questionnaire. This questionnaire is utilized to identify the extent to which participants  
43 correspond with each of the statements representing service quality attributes using a five-point  
44 Likert-type scale ranging from 1 to 5. The scale is interpreted as: 1 = Strongly Disagree, 2 =  
45 Disagree, 3 = Neither Agree nor Disagree, 4 = Agree and 5 = Strongly Agree. **This Likert scale is**  
46 **comparable to that used in similar studies (Angell et al., 2008; Shekarchizadeh et al., 2011).**

#### 51 4.2 Sampling and Collecting Data

52  
53 To achieve the objective of this paper, postgraduate students were considered as targeted  
54 respondents since the same type of informants was selected in similar studies (e.g. Angell et al.,  
55 2008; Shekarchizadeh et al., 2011). For conducting the empirical study, data was chosen from  
56 postgraduate students who are studying in two postgraduate programs within an Egyptian higher  
57  
58  
59  
60

1  
2  
3 education university. Both personal interview technique and electronic mail are utilized for  
4 collecting data from 440 postgraduate students during the period from September to November  
5 2014. An e-mail was sent to non-respondents at the beginning of November as a reminder.  
6 Finally, a total of 182 questionnaires were returned and found to be fit and in handy, representing  
7 41.4 percent response rate. Out of 182 respondents, 136 were male (74.7%) and 46 were female  
8 (25.3%). More than half of respondents (55.8%) have managed to finish at least two semesters of  
9 education in their program.  
10  
11  
12

13  
14 Non-response bias was examined by contrasting and comparing the answers for each of the  
15 survey items between early and late respondents (respondents after the reminder e-mail). The t-  
16 test procedure under the assumptions of both equal and unequal group variances was conducted  
17 (Samat et al., 2006). The results of the t-test analysis identified that there is no significant  
18 between-group mean differences at the 0.05 level for any of the questionnaire items.  
19 Accordingly, it is evident that non-response bias was not a problem in this research.  
20  
21  
22

23 The two approaches (personal interview and electronic mail) were used to distribute the same  
24 questionnaire with the aim to increase response rate within short period of time. Thus, personal  
25 interview technique as well as e-mail was used only to deliver and receive the questionnaire.  
26 Researchers do not attend intentionally during filling the questionnaire to avoid exerting any bias  
27 with the aim to avoid any differences in responses as a result of the data collection method.  
28 However, t-test analysis was conducted for each of the survey items and results identified that  
29 there is no significant differences at the 0.05 level in responses between both interviewed and e-  
30 mailed respondents for most of the items.  
31  
32  
33

## 34 **5. Results and Discussion**

### 35 **5.1 The Results of Descriptive Statistics and Exploratory Factor Analysis**

36  
37 After gathering the data, the detailed statistics for each item are calculated to give an overview  
38 on the collected data and give basic ideas of how well the coding and entering of data have been  
39 conducted (see Table I).  
40  
41  
42

43 Before carrying out Exploratory Factor Analysis (EFA), the suitability of the data should be  
44 assessed. First specification is utilizing an interruption scale assessment (Hair et al., 2010) which  
45 is successfully employed in this paper through utilizing a 5-point Likert scale survey  
46 questionnaire.  
47  
48  
49

50 Regarding the sample size appropriateness, MacKenzie et al. (2011) declared that the minimum  
51 sample size for EFA was recommended to range from 100-500 and the minimum ratio of sample  
52 size to the number of items was recommended to range from 3:1 to 10:1. Both conditions are  
53 achieved in the current research with a sample size of 182 and a ratio of 4.2:1 (182 respondents  
54 to 43 items).  
55  
56  
57  
58  
59  
60

1  
2  
3 Strong relationship between the items is another specification for going further with factor  
4 analysis. Cronbach's alpha ( $\alpha$ ) coefficient of all items and the item-to-total correlation  
5 coefficients are utilized to assess the relationships between the items (Annamdevula and  
6 Bellamkonda, 2012). The value of Cronbach's alpha coefficient is 0.897 and the item-to-total  
7 correlations for most of the items are more than 0.30 and significant at 0.05 level. Accordingly,  
8 no items are deleted from list.  
9  
10

11  
12 Furthermore, the Kaiser-Meyer-Olkin (KMO) measure of sampling efficiency is calculated. The  
13 KMO test provides an index of the proportion of common variance among the variables resulting  
14 from the underlying factors (Mukhopadhyay, 2009). The results of KMO test show an index of  
15 0.803 which exceeds the minimum recommended value 0.8 (Mukhopadhyay, 2009).  
16  
17

18  
19 Finally, Bartlett's Test of Sphericity is conducted to examine the statistical probability that the  
20 inter-item correlation matrix has significant correlations among at least some of the variables  
21 (Mukhopadhyay, 2009). Bartlett's Test of Sphericity is statistically significance at 0.05 (p-value  
22 = 0.000) with  $\chi^2 = 3782.155$  which implies that data is appropriate for conducting factor analysis.  
23  
24

25 After reviewing the suitability of data, EFA is carried out by the SPSS version 20 through using  
26 the principal component analysis followed by varimax rotation method to identify the key  
27 variables and variances explained by the extracted factors. Items identified with factor loadings  
28 higher than 0.40 are continuing for further analysis as it considered significant at 0.05 level (Hair  
29 et al., 2010). Consequently, only one item out of the 43 items has to be rejected. The results  
30 declared that the remaining 42 items are gathered under nine factors/dimensions which can  
31 explain 62.36 percent of the entire variations. Table I demonstrates the factor loadings and the  
32 Cronbach's alpha coefficient for each dimension.  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Table 1: Descriptive statistics, EFA and reliability test results

Items No.	Description	ASC 1	SRR 2	PDA 3	Fac 4	SA 5	SE 6	IR 7	IIA 8	TM 9	Mean	Mode	SD	Cronbach's alpha ( $\alpha$ )
34	Academic staff make subjects understandable to you	0.843									3.44	4	0.96	0.881
30	Academic staff are competent for their academic backgrounds	0.834									3.45	3	1.01	
32	Academic staff are competent for having research experience	0.827									3.45	4	1.01	
35	Academic staff evaluate you correctly	0.751									3.48	4	0.99	
31	Academic staff are competent for having teaching experience	0.733									3.49	3	0.99	
33	Academic staff are consistently courteous	0.652									3.69	4	0.97	
14	Staff are helpful to provide services to you		0.856								3.65	4	0.88	0.826
2	Staff performed service right first time		0.810								3.57	4	0.95	
3	Staff maintained error free records		0.737								3.62	4	0.89	
15	You get satisfactory answer even if you use electronic media		0.621								3.48	4	0.94	
13	Staff inform you regarding any change, if any		0.536								3.39	4	1.06	
4	Staff gave prompt services to you		0.414								3.59	4	0.86	
24	The course design is effective for you			0.743							3.67	4	0.74	0.826
23	Operating hours were convenient for you			0.704							3.62	4	0.89	
26	Number of classes for each course are satisfactory to you for learning			0.678							3.41	4	1.01	

Items No.	Description	ASC 1	SRR 2	PDA 3	Fac 4	SA 5	SE 6	IR 7	IIA 8	TM 9	Mean	Mode	SD	Cronbach's alpha (α)
25	The program enrich your practical skills			0.649							3.62	4	0.93	
22	Feeling safe in your learning environment			0.629							3.55	4	1.05	
27	Your class time is convenient and well suited			0.582							3.64	4	0.87	
21	Your institute is placed at a suitable location			0.535						0.403	3.69	4	0.89	
20	Cafes and social meeting places are adequate				0.770						3.47	4	0.98	0.751
19	Variety of library books and journals				0.678						3.29	4	0.98	
17	Physical facilities visually appealing				0.676						3.46	4	0.91	
16	Modern equipment and technology are used				0.583						3.46	4	0.96	
18	Materials visually appealing				0.556	0.470					3.45	4	0.89	
8	Staff show honest interest solving your problem					0.743					3.68	4	0.89	0.730
7	Staff had knowledge to answer your questions					0.735					3.66	4	0.91	
6	Staff behavior instilled confidence in you					0.686					3.54	4	0.81	
1	Staff provided services at time promised		0.404			0.411					3.47	4	1.00	
11	Staff are consistently courteous						0.816				3.69	4	0.78	0.802
12	Staff effectively inform you about the programs						0.791				3.49	4	0.88	
9	Staff gave you individual attention						0.728				3.53	4	0.82	
10	Staff understood your specific needs		0.448				0.567				3.56	4	0.88	
39	Institute staff informed you about this program							0.761			3.45	4	1.09	0.732

Table 1: Descriptive statistics, EFA and reliability test results (cont.)

Items	Description	ASC	SRR	PDA	Fac	SA	SE	IR	IIA	TM	Mean	Mode	SD	Cronbach's alpha ( $\alpha$ )
No.	Items	1	2	3	4	5	6	7	8	9				
40	Enrolled students informed you about this program							0.737			3.45	4	1.16	
42	You are encouraged to spread the name of the institute							0.663			3.68	4	1.04	
41	You have selected this program because of its goodwill							0.629			3.69	4	1.04	
36	You have regular access to academic staff								0.801		3.22	3	1.07	0.710
5	Staff responded to requests promptly								0.722		3.44	4	1.10	
38	Web site of your institute has convinced you much								0.576		3.14	3	1.14	
37	Brochures of your institute has convinced you much								0.465		3.20	3	0.99	
43	You are satisfied compared with the tuition fees										3.49	4	1.08	
28	Semester starts at the right time									0.773	3.53	4	0.94	0.672
29	Examinations are held at the right time									0.770	3.64	4	0.82	

Table 1: Descriptive statistics, EFA and reliability test results (cont.)

1  
2  
3 Based on the overall loaded items, the nine dimensions are named as follows; Academic Staff  
4 Competency (ASC), Staff Reliability & Responsiveness (SRR), Program Design &  
5 Arrangements (PDA), Facilities/Tangibles (Fac), Staff Assurance (SA), Staff Empathy (SE),  
6 Institute Reputation (IR), Institute (Information) Access (IIA), and Time Management (TM).  
7  
8

9  
10 Academic Staff Competency: refers to the academic staff backgrounds' expertise, their  
11 competent for having teaching and research experience, their characteristics to make subjects  
12 understandable, their abilities to be consistently attentive and assess candidates correctly. This  
13 dimension can explain 9.66 percent of the entire variations and six items are loaded on this  
14 dimension. The numbers of these items are 30, 31, 32, 33, 34, and 35. The detailed statistics  
15 demonstrate that students have generally agreed to all of the items loaded on this dimension.  
16  
17

18  
19 Staff Reliability & Responsiveness: refers to those experiences of the students that they believe  
20 that the services of the university are accurate and purposeful by keeping records free from  
21 errors, by performing service right first time, by informing candidates by any change if any,  
22 being helpful to provide services, and giving satisfactory answer even in using electronic media.  
23 This dimension can explain 9.15 percent of the total variance. The items that are loaded on this  
24 dimension are: item number 2, 3, 4, 13, 14, and 15. The detailed statistics state that students have  
25 generally agreed to all of the items loaded on this dimension. However, the detailed statistics  
26 state that candidates are concerned about giving prompt services to them.  
27  
28  
29

30  
31 Program Design and Arrangements: refers to course design, performing hours, number of classes  
32 for each course, granting candidates the practical skills, providing them with safe learning  
33 environment, convenient class time, and institution location. There are 7 items/factors that are  
34 loaded on this dimension. This dimension can explain 8.52 percent of the total variance. The  
35 items that are loaded on this dimension are: item numbers 21, 22, 23, 24, 25, 26, and 27. The  
36 detailed statistics state that students have agreed, in general, to all of the items loaded on this  
37 dimension.  
38  
39

40  
41 Facilities (Tangibles): refers to the quality of being capable to perform services. It requires that  
42 physical facilities visually appealing, modern equipment and technology are used, and materials  
43 visually appealing. There are five items/factors that are loaded on this dimension. This  
44 dimension can explain 6.5 percent of the total variance. The items that are loaded on this  
45 dimension are: item numbers 16, 17, 18, 19, and 20. The detailed statistics state that students  
46 have generally agreed to all of the items loaded on this dimension.  
47  
48

49  
50 Staff Assurance: refers to those service qualities that build trust among service customers by  
51 showing staff their honest interest at solving students' problems, having knowledge to answer  
52 students' questions, and staff behavior instilled confidence in students. There are four  
53 items/factors that are loaded on this dimension. This dimension can explain 6.3 percent of the  
54 entire variation and it includes four items. The items are 1, 6, 7, and 8. The detailed statistics  
55  
56  
57  
58  
59  
60



1  
2  
3 state that students have agreed, in general, to all of the items loaded on this dimension. However,  
4 on an average, the students do not agree that staff provided services at time promised.  
5  
6

7 Staff Empathy: is being able to apprehend and help students with compassion or sensitivity by  
8 showing that staff is consistently courteous, staff effectively informs students about the  
9 programs, staff gave students individual attention, and staff understood students' specific needs.  
10 There are four items/factors that are loaded on this dimension. This dimension can explain 6.2  
11 percent of the entire variation. The items that are loaded on this dimension are: item numbers 9,  
12 10, 11 and 12. The detailed statistics state that students have generally agreed to all of the items  
13 loaded on this dimension.  
14  
15

16  
17 Institution Reputation: signifies the experiences of the students that they believe that the services  
18 of the university are efficient that they are encouraged to spread the name of the institute, or they  
19 have been selected this program because of its goodwill. There are four items/factors that are  
20 loaded on this dimension. This dimension can explain 5.95 percent of the entire variation and it  
21 includes four items. The items are 39, 40, 41 and 42. The eloquent statistics declare that students  
22 have generally agreed to all of the items loaded on this dimension. However, regarding the  
23 average, the students do not generally agree that enrolled students told them about this program.  
24  
25  
26

27  
28 Institution (Information) Access: refers to those experiences of the students that they believe that  
29 the services of the university can be easily granted by having regular access to academic staff,  
30 staff reacted to requests rapidly, and convince web site. There are four items/factors that are  
31 loaded on this dimension. This dimension can explain 5.69 percent of the total variance and it  
32 includes four items. The items are 36, 37, 38 and 5. The detailed statistics state that students have  
33 generally agreed to all of the items loaded on this dimension. However, regarding the average,  
34 the students do not generally agree that brochures of their institution institute have convinced  
35 them.  
36  
37  
38

39 Time Management: refers to those experiences of the students that they believe that the services  
40 of the university are sufficient without wasting time or efforts or expenses. There are two  
41 items/factors that are loaded on this dimension. This dimension can explain 4.4 percent of the  
42 total variance. The items that are loaded on this dimension are: item numbers 28 and 29. The  
43 descriptive statistics state that students are concerned about starting the semester at the right time  
44 and taking tests at the right time.  
45  
46  
47

## 48 **5.2 The Results of Confirmatory Factor Analysis**

49  
50 The nine-dimension model (including 42 items) extracted from EFA is used as the underlying  
51 measurement model for conducting Confirmative Factor Analysis (CFA) by means of Structural  
52 Equation Modeling (SEM) technique within AMOS 19 framework. The CFA framework tests all  
53 the latent variables and their various indicators at one time with the aim to demonstrate how  
54 constructs are operationalized by sets of assessed variations (Hair et al., 2010). The observed  
55 variables are the 42 items while the latent variables are the nine dimensions extracted through  
56  
57  
58  
59  
60

1  
2  
3 EFA namely; Academic Staff Competency (ASC), Staff Reliability & Responsiveness (SRR),  
4 Program Design & Arrangements (PDA), Facilities/Tangibles (Fac), Staff Assurance (SA), Staff  
5 Empathy (SE), Institute Reputation (IR), Institute (Information) Access (IIA), and Time  
6 Management (TM).  
7  
8

9  
10 Regarding the sample size appropriateness, Hair et al. (2010) pointed out that opinions regarding  
11 sample size for SEM have varied and they suggested that minimum sample size to ensure stable  
12 solutions ranges from 100 to 400. Further, Kline (2011) mentioned that there were attempts have  
13 been made to adopt SEM techniques to smaller sample sizes. In this regard, Nevitt & Hancock  
14 (2004) emphasized that potential problems or improper solutions can be avoided even with small  
15 samples (less than 100) when using the maximum likelihood estimation procedure which is used  
16 in this study. Thus, the sample size of 182 for this research is considered appropriate. In addition,  
17 the set of goodness-of-fit measures (including; Normed Chi-Square, SRMR, RMSEA, GFI, and  
18 CFI) adopted by the current study were proposed in previous researches (e.g. Abdullah, 2005;  
19 Hair et al., 2010; MacKenzie et al., 2011; Sultan and Wang, 2012) to eliminate or reduce the  
20 dependence on sample size.  
21  
22  
23  
24

25  
26 The measurement model developed by EFA is purified through reviewing standardized factor  
27 loadings and standardized residuals. At first, standardized factor loadings are reviewed and any  
28 item that has low factor loadings ( $< 0.50$ ) is deleted (Annamdevula and Bellamkonda, 2012).  
29 Consequently, three items are deleted, one from each of the following dimensions; Staff  
30 Reliability & Responsiveness (SRR), Institute Reputation (IR), and Institute (Information)  
31 Access (IIA). Through reviewing the standardized residuals, only few residuals are found to have  
32 infinite values higher than 2.58. Based on this criterion, the two items of Time Management  
33 (TM) dimension are deleted and, in turn, the dimension itself is deleted. Similarly, two items  
34 from Facilities/Tangibles (Fac) dimension, one item from Staff Reliability & Responsiveness  
35 (SRR) dimension and one item from Institute (Information) Access (IIA) dimension are deleted.  
36 In conclusion, the final model (PG-SQ model) consists of 33 items loaded into eight dimensions  
37 as shown in Figure 1.  
38  
39  
40  
41

42  
43 After clarifying the model, the measurement capability of the final (33-item) design has been  
44 assessed through testing its characteristics concerning unidimensionality, reliability and validity  
45 (Abdullah, 2006).  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

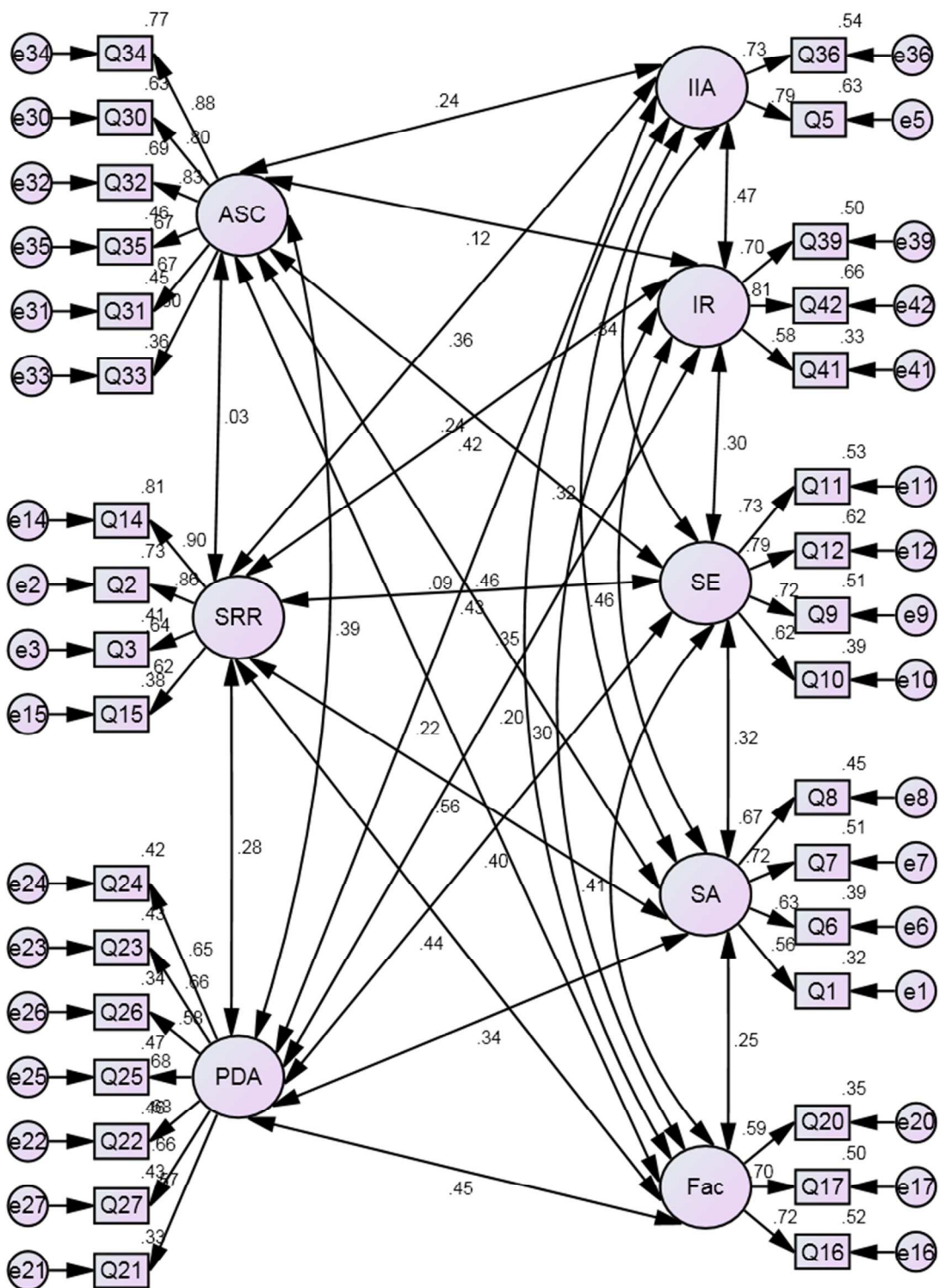


Figure 1: The PG-SQ model CFA results

### 5.3 The Results of the Unidimensionality Test and Model Fit

The test for unidimensionality is a highly obligatory condition for construct validity and reliability (Abdullah, 2006). Unidimensionality refers to the existence of a single construct or trait identifying a set of measures (Sultan and Wong, 2010). In order to test unidimensionality, CFA is carried out to assess the model fit indicators with the aim of determining whether the developed model and dimensions conform to what is expected on the basis of pre-established theory (Brochado, 2009). To assess the PG-SQ model goodness-of-fit, chi-square ( $\chi^2$ ), root mean squared error of approximation (RMSEA), goodness-of-fit index (GFI) and comparative fit index (CFI) are utilized as indicators of the unidimensionality test (Brochado, 2009; Sultan and Wang, 2010; MacKenzie et al., 2011). Table II presents the measures of model fit for the PG-SQ model.

Table II. The PG-SQ model unidimensionality test results

Measures of Fit	The Developed Model
Chi-Square ( $\chi^2$ )	824.004
<i>p</i> -value	0.000
df	467
Normed Chi-Square ( $\chi^2$ /df)	1.764
Standardized Root Mean-Square Residual (SRMR)	0.071
Root Mean Squared Error of Approximation (RMSEA)	0.065
Goodness-of-Fit Index (GFI)	0.796
Comparative Fit Index (CFI)	0.853

The chi-square ( $\chi^2$ ) statistic is utilized to test whether the model efficiently clarifies the sample data. The non-significant ( $p$ -value > 0.05)  $\chi^2$  statistic value indicates a good fit because it signifies that the covariance predicted by the design are not significantly different than the sample covariance (MacKenzie et al., 2011). The significant  $\chi^2$  test statistic value (shown in Table II) implies that there is efficient significant evidence that the developed model is not unidimensional. However, it is generally recognized that significant ( $\chi^2$ ) can take place due to large samples as the ( $\chi^2$ ) test is reactive to sample size and complex models (Hair et al., 2010). Accordingly, the normed chi-square and the Standardized Root Mean-Square Residual (SRMR) are utilized as alternative measures to the ( $\chi^2$ ) to reduce the dependence on sample size (Abdullah, 2005; Sultan and Wang, 2012). The normed chi-square is the ratio between ( $\chi^2$ ) and degrees of freedom (df). A ratio ( $\chi^2$ /df) of approximately three or less is considered an indicator of acceptable fit (Hair et al., 2010). As shown in table II, the normed ( $\chi^2$ ) of the developed model is 1.764 which signifies a reasonable model fit. Moreover, The SRMR value of the developed model is 0.071 which is less than the acceptable value (0.08) for model fit (MacKenzie et al., 2011). These two alternative measures provide evidence for the model fit and justify that the significance of the ( $\chi^2$ ) value may be due to the sample size (Sultan and Wang, 2012).

The root mean squared error of approximation (RMSEA) stands for an assessment measure of the difference per degree of freedom. Values of the RMSEA lower than 0.05 signify a close fit, from 0.05 to 0.08 a fair fit and from 0.08 to 1 a poor fit (Brochado, 2009). As illustrated in Table II, the RMSEA value of the developed model is 0.065 which indicates a fair fit to the data (Hair et al., 2010) and represents a reasonably close approximation to the population. The goodness-of-fit index (GFI) is an indicator of the sufficient amount of variances and covariance accounted for by the model. The GFI, which is considered the most reliable measure of the most sufficient fit in most circumstances, ranges between zero and one; and it is generally accepted that higher values (close to one) signify a more efficient fit (Abdullah, 2005). The GFI for the developed model (see Table II) is 0.796 signifying a sufficient fit. At the end, the comparative fit index (CFI) assesses the model fit relative to a comparison design that is mainly suitably framed (MacKenzie et al., 2011). The CFI is appropriate measure of model fit as it is considered one of the least sensitive indicators to sample size (Kang, 2006). As a rule of thumb, the higher values of CFI (close to one) signify a better fit (Abdullah, 2005). The CFI of the developed model (see Table II) is 0.853, which is close to one and resembles a good fit. Finally, all these fit indicators are within the recommended cut-off points (Hair et al., 2010; MacKenzie et al., 2011) which pillar the unidimensionality and the fit of the PG-SQ model.

#### 5.4 The Results of the Reliability Analysis

As mentioned by Abdullah (2005), unidimensionality is not enough evidence on the efficiency of an assessment scale. Therefore, the reliability of the established dimensions should be measured. Reliability is the assessment instrument property that assures producing consistent results if assessment measures are repeated (Brochado, 2009). Reliability analysis is accomplished through the internal consistent reliability concept which is assessed by calculating both Cronbach's alpha ( $\alpha$ ) and composite reliability (CR) for each of the established service quality dimensions. Table III presents the results of reliability analysis for the eight-dimension PG-SQ model.

Table III. The PG-SQ model reliability test results

Service Quality Dimensions			Cronbach's alpha ( $\alpha$ )	Composite Reliability (CR)
No.	Dimensions			
1	Academic Staff Competency	(ASC)	0.881	0.883
2	Staff Reliability & Responsiveness	(SRR)	0.833	0.844
3	Program Design & Arrangements	(PDA)	0.826	0.830
4	Facilities (Tangibles)	(Fac)	0.711	0.712
5	Staff Assurance	(SA)	0.730	0.742
6	Staff Empathy	(SE)	0.802	0.808
7	Institute Reputation	(IR)	0.735	0.744
8	Institute (Information) Access	(IIA)	0.734	0.735

1  
2  
3 According to Sekaran (2003), the Cronbach's alpha ( $\alpha$ ) of 0.60 or higher explains a reasonable  
4 degree of internal consistency of dimensions. The reliability analysis (see Table III) shows that  
5 the Cronbach's alpha ( $\alpha$ ) coefficients for the eight dimensions range from 0.711 to 0.881  
6 indicating acceptable internal consistencies. On the other hand, it is well established that CR  
7 coefficients higher than a value of 0.5 confirm the internal reliability of the construct (Calvo-  
8 Porral et al., 2013). As explained in Table III, the CR scores range between 0.712 and 0.883, all  
9 go above the recommended 0.5 cut-off point which also helps the internal consistency of the PG-  
10 SQ model.  
11  
12  
13  
14

### 15 **5.5 The Results of the Validity Analysis**

16  
17 While the reliability test shows the internal consistency of the scale, the validity test shows the  
18 extent to which a measure or a group of assessment means represents the concept of the study  
19 well (Abdullah, 2005). The content validity is ensured through experts' opinion which leads to  
20 removing inappropriate and unsuitable questions, and asking only those questions that are  
21 applicable to the objective of this study. In addition, two validity tests are conducted; Convergent  
22 validity and Discriminant validity.  
23  
24  
25

26 The convergent validity examines whether the items constituting each dimension are uniquely  
27 measuring their relevant dimension. There are two approaches employed in this study to examine  
28 convergent validity. The first means of approaching this issue is the examination of the  
29 standardized factor loadings of the individual items for their respective dimensions. It is clear  
30 that all regulated factor loadings are higher than 0.5 which indicates the convergent validity of  
31 the PG-SQ design (Hair et al., 2010). The second method is by calculating the average variance  
32 extracted (AVE) for each of the dimensions as the square root of total variance explained (Sultan  
33 and Wang, 2012). This approach explains that the calculated AVE for each dimension (see Table  
34 IV) is greater than 0.5 which also signifies good convergent validity (Hair et al., 2010).  
35  
36  
37  
38

39 The discriminant validity examines whether each dimension in the developed model is different  
40 from other dimensions. There are two approaches adopted in this study to examine discriminant  
41 validity. The first approach is comparing the AVE for each dimension against the squared inter-  
42 construct correlations (SIC) associated with that dimension (Annamdevula and Bellamkonda,  
43 2012). This comparison (see Table IV) signifies that, for each dimension, the AVE is greater  
44 than the SIC which supports the discriminant validity of the model. The second approach is  
45 performing EFA for all pairs of the dimensions to examine the number of components extracted  
46 (Wong and Merrilees, 2007). By carrying out EFA utilizing principal components with varimax  
47 rotation for all of the 28 pairs of dimensions in this paper, there are always two components for  
48 each pair of dimensions which also demonstrates discriminant validity of the PG-SQ model.  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Table IV. The PG-SQ model convergent and discriminant validity test results

Service Quality Dimensions			AVE	(ASC)	(SRR)	(PDA)	(Fac)	(SA)	(SE)	(IR)	(IIA)
No.	Dimensions										
1	Academic Staff Competency	(ASC)	0.794	-							
2	Staff Reliability & Responsiveness	(SRR)	0.819	0.026	-						
3	Program Design & Arrangements	(PDA)	0.704	0.386	0.283	-					
4	Facilities (Tangibles)	(Fac)	0.797	0.219	0.438	0.447	-				
5	Staff Assurance	(SA)	0.748	0.089	0.555	0.336	0.253	-			
6	Staff Empathy	(SE)	0.794	0.237	0.430	0.399	0.410	0.325	-		
7	Institute Reputation	(IR)	0.809	0.117	0.416	0.200	0.300	0.461	0.302	-	
8	Institute (Information) Access	(IIA)	0.889	0.241	0.364	0.463	0.348	0.316	0.343	0.473	-

**Note:** The lower diagonals show the correlation coefficients between the variables

## 6. Conclusion and Implications

This study has left a few points unexamined in dealing with service quality from the viewpoint of postgraduate students from a larger variety of fields within different countries. It takes a step forward to fill gaps in these theories by enhancing and analytically verifying a performance-based service quality model (PG-SQ model) within the postgraduate education in Egypt. The PG-SQ consists of eight dimensions and 33 items. This model affirmed the importance of academic staff competency as the highest influential dimension in the students' perception of service quality. This result is in harmony with earlier researches (such as; Angell et al., 2008; Sultan and Wong, 2010; and Abdullah, 2005) who considered that academic staff are the main pillar in the entire higher education service. Moreover, the results shed lights on other dimensions of service quality that were not explicitly mentioned in previous studies. The established PG-SQ model emphasized the institute reputation as a determinant of the perceived service quality of postgraduate programs. In addition, the students' access to information was considered one of the essential dimensions of postgraduate service quality.

It could be also noticed that there are some differences between the PG-SQ model dimensions and previously developed models for undergraduate students. On one hand, the PG-SQ model highlights the importance of program design and arrangements as a major dimension of postgraduate students' perception while this dimension was not explicitly mentioned in most of undergraduate models. This may be attributed to the level of knowledge of postgraduate students which help them to give specific attention to the program design to ensure its appropriateness to their working field. In addition, postgraduate students focus on program arrangements (such as; class time and institution location) to make sure that it is convenient with their working conditions.

On the other hand, the PG-SQ model did not put emphasis on some dimensions which appear in undergraduate models, such as; support services (Annamdevula and Bellamkonda, 2012) and placement (Senthilkumar and Arulraj, 2011). The interest of undergraduate students in support services may be attributed to the study nature that requires students to spend more time in campus and receive support services such as sports. Moreover, placement, or immediate employability, is considered the primary concern of undergraduate students and their Parents (Senthilkumar and Arulraj, 2011).

In conclusion, the PG-SQ model dimensions and measures are somewhat different from previously established models that concerning higher education (such as; Oldfield and Baron, 2000; Abdullah, 2005; Senthilkumar and Arulraj, 2011; Annamdevula and Bellamkonda, 2012), in general, or even that specifically focused on postgraduate education (such as; Angell et al., 2008; Sultan and Wong, 2010; Shekarchizadeh et al., 2011). These differences may be attributed to differences between cultures and universities within different studies since the current study was limited to two postgraduate programs specialized in fields of business administration and quality management within an Egyptian higher education university. These results support Sultan



1  
2  
3 and Wong (2012) idea who claimed that service quality dimensions could be different for  
4 different cultures and universities.  
5

6  
7 Moreover, several authors (Jöns and Hoyler, 2013; Berbegal-Mirabent and Ribeiro-Soriano,  
8 2015) stated that countries differ in their history, culture, educational traditions, and perspectives.  
9 As a result, comparing universities from different countries can be problematic because  
10 university quality is affected by sociocultural and politico-economic forces. Additionally, a  
11 university's educational may also be conditioned by the characteristics of the region where the  
12 university is located (Berbegal-Mirabent and Ribeiro-Soriano, 2015). Another critical issue  
13 regarding international rankings is that they ignore the vast differences of institutional missions  
14 and traditions and establish comparisons among very different institutional types (Berbegal-  
15 Mirabent and Ribeiro-Soriano, 2015). Also, international rankings often compare only reputation  
16 and ignore what really matters in higher education quality (Hazelkorn, 2011; Blanco-Ramírez  
17 and Berger, 2014). Hence, all these critical issues should be taken into account when assessing  
18 university quality.  
19

20  
21  
22 The theoretical value of the PG-SQ model promoted in this research is three forms. First, this  
23 study developed a performance-based postgraduate service quality model (PG-SQ model) which  
24 gives attention to the specific aspects of the postgraduate higher education services. Second, it  
25 could be the first to capture the real experience of postgraduate students at an Egyptian  
26 university. Third, this research is considered an important step in enhancing a more universal  
27 assessment design to reflect the postgraduate students' perception in regard with service quality.  
28

29  
30 Practically speaking, the PG-SQ model could be used by higher education institutions to assess  
31 the quality level of their postgraduate programs from the students' viewpoints. Consequently,  
32 this will help these institutions to put the quality dimensions and aspects at their higher priority  
33 and subsequently, pay specific attention to the aspects that will enhance their services quality  
34 with the ultimate goal of enhancing students' satisfaction and increasing the university rank.  
35

36  
37 In addition, this study results provides new insights about the postgraduate education in Egypt.  
38 The PG-SQ model clarifies that postgraduate service quality in Egypt could not be enhanced as a  
39 result of hiring competent academic and administrative staff only unless the institution  
40 management concentrate their efforts on improving other aspects such as program design and  
41 arrangements, facilities, institute reputation, and information accessibility. It could be helpful for  
42 Egyptian higher education institutions to give a particular emphasize to their programs' design as  
43 well as other arrangements (including; learning environment, operating hours, and class time) to  
44 enhance the students' perceived quality.  
45

46  
47 Moreover, Egyptian higher education institutions should exert more efforts in improving their  
48 ways of communication with current and potential students with the aim to provide adequate  
49 information about the institution and programs. This will help institutions to provide good  
50 impression and encourage students to spread their name through word-of-mouth.  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## 7. Limitations and Future Research

This research paper had gone through some obstacles related to the research methods and final results. One of these limitations is that it is based on two postgraduate programs within an Egyptian higher education university. Therefore, any generalization of its final results to other universities is disputable. Subsequently, future researches may have to imitate the same methodology within other universities and other programs in order to examine whether the results analyzed are general and even across the various examples and to further build the developed model. Another limitation is related to the type of respondents as the current research focused only on one type of customers, students while it is well identified that education services has other customers who must be satisfied. Thus, it is worthwhile to promote an assessment means to assess service quality from the viewpoint of all internal and external customers, more specifically internal customers including; academic members, assistant staff members and administration members **and external customers including future employers.**

Moreover, there is another chance for researches in the near future to write a comparative study among the PG-SQ model and other models such as; the merged HEdPERF-SERVPERF scale (Abdullah, 2005), the PHEd model (Sultan and Wong, 2010), the HiEdQUAL model (Annamdevula and Bellamkonda, 2012) and the SQM-HEI model (Senthilkumar and Arulraj, 2011). These studies can help to pinpoint the powerful points and the weak ones of the PG-SQ model developed in this research.

### References

Abdullah, F. (2004), "The development of HEdPERF: a new measuring instrument of service quality for higher education sector", paper presented at the Third Annual Discourse Power Resistance Conference: Global Issues Local Solutions, University of Plymouth, Plymouth, 5-7 April.

Abdullah, F. (2005), "HEdPERF versus SERVPERF: The quest for ideal measuring instrument of service quality in higher education sector", *Quality Assurance in Education*, Vol. 13 No. 4, pp. 305-328.

Abdullah, F. (2006), "Measuring service quality in higher education: HEdPERF versus SERVPERF", *Marketing Intelligence and Planning*, Vol. 24 No. 1, pp. 31-47.

Al-Hawari, M., Ward, T. and Newby, L. (2009), "The relationship between service quality and retention within the automated and traditional contexts of retail banking", *Journal of Service Management*, Vol. 20 No. 4, pp. 455-472.

Angell, R.J., Heffernan, T.W. and Megicks, P. (2008), "Service quality in postgraduate education", *Quality Assurance in Education*, Vol. 16 No. 3, pp. 236-254.

1  
2  
3 Annamdevula, S. and Bellamkonda, R.S. (2012), "Development of HiEdQUAL for Measuring  
4 Service Quality in Indian Higher Education Sector", *International Journal of Innovation,*  
5 *Management and Technology*, Vol. 3 No. 4, pp. 412-416.

6  
7  
8 Barnes, B.R. (2007), "Analysing Service Quality: The Case of Post-Graduate Chinese Students",  
9 *Total Quality Management*, Vol. 18 No. 3, pp. 313-331.

10  
11 Behara, R.S., Fisher, W.W.J. and Lemmink, G.A.M. (2002), "Modelling and evaluating service  
12 quality measurement using neural networks", *International Journal of Operations & Production*  
13 *Management*, Vol. 22 No. 10, pp. 1162-1185.

14  
15  
16  
17 Berbegal-Mirabent, J. and Ribeiro-Soriano, D. E., (2015), "Behind league tables and ranking  
18 systems", *Journal of Service Theory and Practice*, Vol. 25, Iss 3 pp. 242 – 266.

19  
20  
21 Blanco-Ramírez, G. and Berger, J. (2014), "Rankings, accreditation, and the international quest  
22 for quality", *Quality Assurance in Education*, Vol. 22, Iss 1, pp. 88 – 104.

23  
24  
25 Brady, M.K., Cronin, J.J. and Brand, R.R. (2002), "Performance-only measurement of service  
26 quality: a replication and extension", *Journal of Business Research*, Vol. 55 No. 1, p. 17-31.

27  
28 Brandon-Jones, A. and Silvestro, R. (2010), "Measuring internal service quality: comparing the  
29 gap-based and perceptions-only approaches", *International Journal of Operations & Production*  
30 *Management*, Vol. 30 No. 12, pp. 1291-1318.

31  
32  
33 Brochado, A. (2009), "Comparing alternative instruments to measure service quality in higher  
34 education", *Quality Assurance in Education*, Vol. 17 No. 2, pp. 174-190.

35  
36  
37 Buttle, F. (1996), "SERVQUAL: review, critique, research agenda", *European Journal of*  
38 *Marketing*, Vol. 30 No. 1, pp. 8-32.

39  
40  
41 Calvo-Porrá, C., Lévy-Mangin, J-P. and Novo-Corti, I. (2013), "Perceived quality in higher  
42 education: an empirical study", *Marketing Intelligence & Planning*, Vol. 31 No. 6, pp. 601-619.

43  
44  
45 Carrillat, F.A., Jaramillo, F. and Mulki, J.P. (2007), "The validity of the SERVQUAL and  
46 SERVPERF scales – a meta-analytic view of 17 years of research across five continents",  
47 *International Journal of Service Industry Management*, Vol. 18 No. 5, pp. 472-90.

48  
49  
50 Cook, L.S. and Verma, R. (2002), "Exploring the linkages between quality system, service  
51 quality, and performance excellence: service providers' perspectives", *Quality Management*  
52 *Journal*, Vol. 9 No. 2, available at: [http://asq.org/pub/qmj/past/vol9\\_issue2/cookverma.html](http://asq.org/pub/qmj/past/vol9_issue2/cookverma.html)

53  
54  
55 Cronin, J.J. Jr. and Taylor, S.A. (1992), "Measuring Service Quality: A Reexamination and  
56 Extension", *Journal of Marketing*, Vol. 56 No. 3, pp. 55-68.

1  
2  
3 Cronin, J.J. Jr. and Taylor, S.A. (1994), "SERVPERF versus SERVQUAL: Reconciling  
4 Performance-Based and Perceptions-Minus-Expectations Measurement of Service Quality",  
5 Journal of Marketing, Vol. 58 No. 1, pp. 125-131.  
6  
7

8 De Keyser, A. and Lariviere, B. (2014), "How technical and functional service quality drive  
9 consumer happiness: Moderating influences of channel usage", Journal of Service Management,  
10 Vol. 25 No. 1, pp. 30-48.  
11

12 Galloway, L. and Ho, S. (1996), "A model of service quality for training", Training for Quality,  
13 Vol. 4 No. 1, pp. 20-6.  
14

15 Grönroos, C. (1983). *Strategic Management and Marketing in the Service Sector*. Marketing  
16 Science Institute. Boston, MA.  
17

18 Grönroos, C. (1990), "Service management and marketing: Managing the moments of truth in  
19 service competition", Lexington Books Lexington, MA.  
20

21 Grönroos, C. (2001), "Guru's view: the perceived service quality concept – a mistake?",  
22 Managing Service Quality, Vol. 11 No. 3, pp. 150-152.  
23

24 Guo, X. and Duff, A. and Hair, M. (2008), "Service quality measurement in the Chinese  
25 corporate banking market", International Journal of Bank Marketing, Vol. 26 No. 5, pp. 305-327.  
26

27 Gupta, A., McDaniel, J.C. and Herath, S.K. (2005), "Quality management in service firms:  
28 sustaining structures of total quality service", Managing Service Quality, Vol. 15 No. 4, pp. 389-  
29 402.  
30

31 Hair, J. F., Black, W. C., Babin, B. J. and Anderson, R. E. (2010), "Multivariate Data Analysis",  
32 Seventh Edition, Pearson Prentice Hall.  
33

34 Hazelkorn, E. (2011), *Rankings and the Reshaping of Higher Education: The Battle for World-  
35 Class Excellence*, Palgrave MacMillan, New York, NY.  
36

37 Jöns, H. and Hoyler, M. (2013), "Global geographies of higher education: the perspective of  
38 world university rankings", Geoforum, Vol. 46, May, pp. 45-59.  
39

40 Kang, G-D. (2006), "The hierarchical structure of service quality: integration of technical and  
41 functional quality", Managing Service Quality, Vol. 16 No. 1, pp. 37-50.  
42

43 Kang, G-D. and James, J. (2004), "Service quality dimensions: an examination of Grönroos's  
44 service quality model", Managing Service Quality, Vol. 14 No. 4, pp. 266-277.  
45

46 Kline, R.B. (2011), "Principles and Practice of Structural Equation Modeling", third edition, The  
47 Guilford Press, New York.  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 Lam, S-Y., Lee, V-H., Ooi, K-B. and Phusavat, K. (2012), "A structural equation model of  
4 TQM, market orientation and service quality: Evidence from a developing nation", *Managing*  
5 *Service Quality*, Vol. 22 No. 3, pp. 281-309.

6  
7  
8 Lassar, W.M., Manolis, C. and Winsor, R.D. (2000), "Service quality perspective and  
9 satisfaction in private banking", *Journal of Services Marketing*, Vol. 14 No. 3, pp. 244-71.

10  
11 Law, D.C.S. (2010), "Quality assurance in post-secondary education: the student experience",  
12 *Quality Assurance in Education*, Vol. 18 No. 4, pp. 250-270.

13  
14  
15 Lim, P.C. and Tang, N.K.H. (2000), "The development of a model for total quality healthcare",  
16 *Managing Service Quality*, Vol. 10 No. 2, pp. 103-111.

17  
18  
19 MacKenzie, S.B., Podsakoff, P.M. and Podsakoff, N.P. (2011), "Construct measurement and  
20 validation procedures in MIS and behavioral research: integrating new and existing techniques",  
21 *MIS Quarterly*, Vol. 35 No. 2, pp. 293-334.

22  
23  
24 Maddern, H., Maull, R., Smart, A. and Baker, P. (2007), "Customer satisfaction and service  
25 quality in UK financial services", *International Journal of Operations & Production*  
26 *Management*, Vol. 27 No. 9, pp. 999-1019.

27  
28  
29 Morales, M. and Ladhari, R. (2011), "Comparative cross-cultural service quality: an assessment  
30 of research methodology", *Journal of Service Management*, Vol. 22 No. 2, pp. 241-265.

31  
32 Mukhopadhyay, P. (2009), "Multivariate Statistical Analysis", World Scientific.

33  
34  
35 Nejati, M. and Nejati, M. (2008), "Service quality at University of Tehran Central Library",  
36 *Library Management*, Vol. 29 No. 6/7, pp. 571-582.

37  
38 Nevitt, J. and Hancock, G.R. (2004), "Evaluating small sample approaches for model test  
39 statistics in structural equation modeling", *Multivariate Behavioral Research*, Vol. 39 No. 3, pp.  
40 439-478.

41  
42  
43 Oldfield, B.M. and Baron, S. (2000), "Student perceptions of service quality in a UK university  
44 business and management faculty", *Quality Assurance in Education*, Vol. 8 No. 2, pp. 85-95.

45  
46  
47 Ooi, K-B., Lin, B., Tan, B-I. and Chong, A.Y-L. (2011), "Are TQM practices supporting  
48 customer satisfaction and service quality?", *Journal of Services Marketing*, Vol. 25 No. 6, pp.  
49 410-419.

50  
51  
52 Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988), "SERVQUAL: a multiple-item scale  
53 for measuring consumer perceptions of service quality", *Journal of Retailing*, Vol. 64 No. 1, pp.  
54 12-40.

Rodrigues, L.L.R., Barkur, G., Varambally, K.V.M. and Motlagh, F.G. (2011), "Comparison of SERVQUAL and SERVPERF metrics: an empirical study", *The TQM Journal*, Vol. 23 No. 6, pp. 629-643.

Rosenbaum, M.S. and Wong, I.A. (2009), "Modeling customer equity, SERVQUAL, and ethnocentrism: a Vietnamese case study", *Journal of Service Management*, Vol. 20 No. 5, pp. 544-560.

Samat, N., Ramayah, T. and Saad, N.M. (2006), "TQM practices, service quality, and market orientation: some empirical evidence from a developing country", *Management Research News*, Vol. 29 No. 11, pp. 713-728.

Sekaran, U. (2003), "Research Methods for Business: A Skill Building Approach", Fourth Edition, John Wiley and Sons.

Senthilkumar, N. and Arulraj, A. (2011), "SQM-HEI – determination of service quality measurement of higher education in India", *Journal of Modelling in Management*, Vol. 6 No. 1, pp. 60-78.

Shekarchizadeh, A., Rasli, A. and Hon-Tat, H. (2011), "SERVQUAL in Malaysian universities: perspectives of international students", *Business Process Management Journal*, Vol. 17 No. 1, pp. 67-81.

Sigala, M. (2004), "The ASP-Qual model: measuring ASP service quality in Greece", *Managing Service Quality*, Vol. 14 No. 1, pp. 103-114.

Silvestro, R. (2005), "Applying gap analysis in the health service to inform the service improvement agenda", *International Journal of Quality & Reliability Management*, Vol. 22 No. 3, pp. 215-233.

Smith, G., Smith, A. and Clarke, A. (2007), "Evaluating service quality in universities: a service department perspective", *Quality Assurance in Education*, Vol. 15 No. 3, pp. 334-51.

Sultan, P. and Wong, H.Y. (2010), "Performance-based service quality model: an empirical study on Japanese universities", *Quality Assurance in Education*, Vol. 18 No. 2, pp. 126-143.

Sultan, P. and Wong, H.Y. (2012), "Service quality in a higher education context: an integrated model", *Asia Pacific Journal of Marketing and Logistics*, Vol. 24 No. 5, pp. 755-784.

Sultan, P. and Wong, H.Y. (2013), "Antecedents and consequences of service quality in a higher education context: A qualitative research approach", *Quality Assurance in Education*, Vol. 21 No. 1, pp. 70-95.

Sureshchandar, G.S., Rajendran, C. and Anantharaman, R.N. (2002), "Determinants of customer-perceived service quality: a confirmatory factor analysis approach", *Journal of Services Marketing*, Vol. 16 No. 1, pp. 9-32.

Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222

Wong, H.Y. and Merrilees, B. (2007), "Multiple roles for branding in international marketing", *International Marketing Review*, Vol. 24 No. 4, pp. 384-408.

Yang, Z., Jun, M. and Peterson, R.T. (2004), "Measuring customer perceived online service quality", *International Journal of Operations & Production Management*, Vol. 24 No. 11, pp. 1149-1174.

Yildiz, S.M. and Kara, A. (2009), "The PESPERF scale: an instrument for measuring service quality in the School of Physical Education and Sports Sciences (PESS)", *Quality Assurance in Education*, Vol. 17 No. 4, pp. 393-415.

## Appendix A

Items of Questionnaire	Reference	Its relation with models
1. Staff provided services at time promised	Shekarchizadeh et al., 2011	Modified SERVQUAL
2. Staff performed service right first time	Shekarchizadeh et al., 2011	Modified SERVQUAL
3. Staff maintained error free records	Shekarchizadeh et al., 2011	Modified SERVQUAL
4. Staff gave prompt services to you	Shekarchizadeh et al., 2011	Modified SERVQUAL
5. Staff responded to requests promptly	Shekarchizadeh et al., 2011	Modified SERVQUAL
6. Staff behaviour instilled confidence in you	Shekarchizadeh et al., 2011	Modified SERVQUAL
7. Staff had knowledge to answer your questions	Shekarchizadeh et al., 2011	Modified SERVQUAL
8. Staff show honest interest solving your problem	Shekarchizadeh et al., 2011	Modified SERVQUAL
9. Staff gave you individual attention	Shekarchizadeh et al., 2011	Modified SERVQUAL
10. Staff understood your specific needs	Shekarchizadeh et al., 2011	Modified SERVQUAL
11. Staff are consistently courteous	Sultan and Wong, 2010	PHed model
12. Staff effectively inform you about the programs	Sultan and Wong, 2010	PHed model
13. Staff inform you regarding any change, if any	Sultan and Wong, 2010	PHed model
14. Staff are helpful to provide services to you	Sultan and Wong, 2010	PHed model
15. You get satisfactory answer even if you use electronic media (e.g. e-mail ... etc)	Sultan and Wong, 2010	PHed model
16. Modern equipment and technology are used	Shekarchizadeh et al., 2011	Modified SERVQUAL
17. Physical facilities visually appealing	Shekarchizadeh et al., 2011	Modified SERVQUAL
18. Materials visually appealing	Shekarchizadeh et al., 2011	Modified SERVQUAL
19. Variety of library books and journals	Sultan and Wong, 2010	PHed model
20. Cafes and social meeting places are adequate	Sultan and Wong, 2010	PHed model
21. Your institute is placed at a suitable location	Sultan and Wong, 2010	PHed model
22. Feeling safe in your learning environment (e.g. lighting, air conditions, ... etc)	Shekarchizadeh et al., 2011	Modified SERVQUAL
23. Operating hours were convenient for you	Shekarchizadeh et al., 2011	Modified SERVQUAL

Items of Questionnaire	Reference	Its relation with models
24. The course design is effective for you	Sultan and Wong, 2010	PHed model
25. The program enrich your practical skills	Angell et al., 2008	IPA scale
26. Number of classes for each course are satisfactory to you for learning	Sultan and Wong, 2010	PHed model
27. Your class time is convenient and well suited	Sultan and Wong, 2010	PHed model
28. Semester starts at the right time	Sultan and Wong, 2010	PHed model
29. Examinations are held at the right time	Sultan and Wong, 2010	PHed model
30. Academic staff are competent for their academic backgrounds	Sultan and Wong, 2010	PHed model
31. Academic staff are competent for having teaching experience	Sultan and Wong, 2010	PHed model
32. Academic staff are competent for having research experience	Sultan and Wong, 2010	PHed model
33. Academic staff are consistently courteous	Sultan and Wong, 2010	PHed model
34. Academic staff make subjects understandable to you	Sultan and Wong, 2010	PHed model
35. Academic staff evaluate you correctly	Sultan and Wong, 2010	PHed model
36. You have Regular access to academic staff	Angell et al., 2008	IPA scale
37. Brochures of your institute has convinced you much	Sultan and Wong, 2010	PHed model
38. Web site of your institute has convinced you much	Sultan and Wong, 2010	PHed model
39. Institute staff informed you about this program	Sultan and Wong, 2010	PHed model
40. Enrolled students informed you about this program	Sultan and Wong, 2010	PHed model
41. You have selected this program because of its goodwill	Sultan and Wong, 2010	PHed model
42. You are encouraged to spread the name of the institute	Sultan and Wong, 2010	PHed model
43. You are satisfied compared with the tuition fees	Sultan and Wong, 2010	PHed model



**Reviewer: 1**

Recommendation: Minor Revision

Comments:

This research will help administrators better understand graduate student experiences. Although the paper is written for researchers, the practitioner can gain insights into how graduate students experience service.

Additional Questions:

**1. Originality:** Does the paper contain new and significant information adequate to justify publication?: The paper has originality concerning a service quality model specifically designed to measure post graduate student experiences.

**2. Relationship to Literature:** Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The author presents a good literature review and demonstrates an adequate understanding of the important literature in the discipline as well as anchoring the statistical analysis to the literature. It would be helpful to add a table that summarizes where the 43 survey items originated from and the relationship between the 43 items and the questionnaires, such as the SERVPERF, SERVQUAL, PESPERF, etc., discussed in section 2.

**Table is added in Appendix A**

**3. Methodology:** Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: The author utilizes several statistical techniques to including exploratory factor analysis, confirmatory factor analysis validity and reliability tests. The analysis is appropriate to design the specific service quality model

**4. Results:** Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: The results section focuses on the statistical analysis. The purpose should be expanded since the factor analysis identifies eight dimensions in addition to analytically verifying the assessment survey.

**The following statement was added "To achieve this research objective, postgraduate students were surveyed to identify the main dimensions that reflect their perception about the service quality of the postgraduate programs they attend. Following this, Exploratory Factor Analysis was conducted to describe the underline structure of the service quality measures. In addition, Confirmatory Factor Analysis was adopted to purify the developed model and assess its fit."**

**5. Implications for research, practice and/or society:** Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing

to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: The author stated, "These results support Sultan and Wong (2012) idea who claimed that service quality dimensions could be different for different cultures and universities." I don't see how this can be extracted from the study since the sample is limited to two postgraduate programs within one Egyptian higher education university. It would be helpful to know the two program disciplines.

The following paragraph is added "In conclusion, the PG-SQ model dimensions and measures are somewhat different from previously established models that concerning higher education (such as; Oldfield and Baron, 2000; Abdullah, 2005; Senthilkumar and Arulraj, 2011; Annamdevula and Bellamkonda, 2012), in general, or even that specifically focused on postgraduate education (such as; Angell et al., 2008; Sultan and Wong, 2010; Shekarchizadeh et al., 2011). These differences may be attributed to differences between cultures and universities within different studies since the current study was limited to two postgraduate programs specialized in fields of business administration and quality management within an Egyptian higher education university."

**6. Quality of Communication:** Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: The quality of the communication of the paper is average at best. There are many instances where verb tense changes especially in section 5. The author could rewrite some of the paragraphs for clarity. For example, there is no need to state "needed data" or "exact overview" – the words "needed" and "exact" are implied.

Verb tenses are reviewed and unified.

#### Reviewer: 2

Recommendation: Minor Revision

Comments:

Page 2 line 12 reference to Parasuraman, Arun, Valarie A. Zeithaml, and Leonard L. Berry. "Servqual." Journal of retailing 64.1 (1988): 12-40.

Reference is added

Page 2 line 18 a list of the "advanced instruments" and a reference to the mentioned undergraduate students would be use full for the reader

The following statement is added "(including; HEdPERF (Abdullah, 2004); HEdPERF-SERVPERF (Abdullah, 2005); SQM-HEI (Senthilkumar and Arulraj, 2011); HiEdQUAL (Annamdevula and Bellamkonda, 2012))"

The following references are added (e.g. Oldfield and Baron, 2000; Abdullah, 2005; 2006; Senthilkumar and Arulraj, 2011; Annamdevula and Bellamkonda, 2012)

Page 2 section 2.1 a definition of service quality used for this research would be useful.

The following statement is added at the end of section 2.1 "In the context of this paper, service quality can be seen as the students' perception towards the services they

1  
2  
3 received during their postgraduate studies. This definition is adopted from the Cronin and  
4 Taylor (1992) view of service quality.”  
5  
6

7 Page 2 line 53, is it "customer reliability"?  
8 Changed to “customer loyalty”  
9

10 Page 3 line 20 reference to Parasuraman et. al. and Gronroos 1983 missing from  
11 reference section.  
12 Both references are added  
13  
14

15 Page 3 line 53 "functional\_quality" appears to have an underscore  
16 Underscore is omitted  
17  
18

19 page 4 line 14 consider rewording

20 The statement is reworded as follows “However, Samat et al. (2006) argues that  
21 functional quality (the service delivery process) is the key element of consumers’  
22 viewpoints since technical quality (the service-encounter results) is almost very similar  
23 among firms. Thus, functional quality is considered the key means to differentiate  
24 between firms.”  
25  
26

27 page 4 line 34 references needed for "various researchers"

28 The following statement is added (such as; Cronin and Taylor, 1992; 1994; Buttle, 1996;  
29 Brady et al., 2002; Silvestro, 2005; Guo et al., 2008).  
30 References are added to the reference list.  
31  
32

33 Page 5 line 5 introduction of "SERVPERF" scale would be useful

34 The following paragraph is added “Cronin and Taylor (1992) argued that current  
35 performance best reflects a customer’s perception of service quality while expectations  
36 are not part of this concept. Consequently, Cronin and Taylor (1992) introduced the  
37 performance-only scale and dubbed SERVPERF. The SERVPERF scale consists of only  
38 the 22 perception items of the SERVQUAL scale while excludes any consideration of  
39 expectation items (Brandon-Jones and Silvestro, 2010). Empirically, Cronin and Taylor  
40 (1992) indicated that the SERVPERF appears to have a better ability in explaining  
41 variation in customer satisfaction and a greater predictive power than SERVQUAL in  
42 different industrial contexts.”  
43  
44  
45

46 Page 5 line 31 consider replacing division with sector  
47 Done  
48

49 Page 6 more detail on HEdPERf could be interesting

50 The following paragraph is added “The HEdPERF scale was empirically tested for  
51 unidimensionality, reliability and validity using both exploratory and confirmatory factor  
52 analysis within the Malaysian higher education context (Abdullah, 2004).”  
53  
54  
55  
56  
57  
58  
59  
60

Page 7 line 29 it might be worth to mention the standardization methods used in university rankings and how there might be a parallel to measurements of service quality. The following paragraphs are added at:

## SECTION 2.2

As higher education has become more globalized, the geographical horizon of traditional rankings has also expanded in order to satisfy the greater need and demand for access (Blanco-Ramírez and Berger, 2014). Nevertheless, although worldwide university rankings are achieving ever greater penetration and significance, many individual countries are developing their own rankings. This is because biases and obstacles arise when comparing universities from different countries (Berbegal-Mirabent and Ribeiro-Soriano, 2015). As, countries differ in their history, culture, educational traditions, and perspectives (Blanco-Ramírez and Berger, 2014).

## SECTION 6

Moreover, several authors (Jöns and Hoyler, 2013; Berbegal-Mirabent and Ribeiro-Soriano, 2015) stated that countries differ in their history, culture, educational traditions, and perspectives. As a result, comparing universities from different countries can be problematic because university quality is affected by sociocultural and politico-economic forces. Additionally, a university's educational may also be conditioned by the characteristics of the region where the university is located (Berbegal-Mirabent and Ribeiro-Soriano, 2015). Another critical issue regarding international rankings is that they ignore the vast differences of institutional missions and traditions and establish comparisons among very different institutional types (Berbegal-Mirabent and Ribeiro-Soriano, 2015). Also, international rankings often compare only reputation and ignore what really matters in higher education quality (Hazelkorn, 2011; Blanco-Ramírez and Berger, 2014). Hence, all these critical issues should be taken into account when assessing university quality.

Page 9 reference needed for Likert-type scale

The following statement is added "This Likert scale is comparable to that used in similar studies (Angell et al., 2008; Shekarchizadeh et al., 2011)."

Page 9 section 4.2 links to questioner and data would be desirable

This link is clear at section 4.2 because the selection of target respondents (postgraduate students) is linked to the questionnaire items which intended to investigate postgraduate students' perception about service quality as mentioned in section 4.1.

Page 10 line 28 was there a difference in responses between the interviewed respondents and the emailed?

The following paragraph is added "The two approaches (personal interview and electronic mail) were used to distribute the same questionnaire with the aim to increase response rate within short period of time. Thus, personal interview technique as well as e-mail was used only to deliver and receive the questionnaire. Researchers do not attend intentionally during filling the questionnaire to avoid exerting any bias with the aim to avoid any differences in responses as a result of the data collection method.

1  
2  
3 However, t-test analysis was conducted for each of the survey items and results identified  
4 that there is no significant differences at the 0.05 level in responses between both  
5 interviewed and e-mailed respondents for most of the items.”  
6  
7

8 Page 10 line 32, consider rewriting

9 This paragraph is rewritten as follows “Furthermore, the Kaiser-Meyer-Olkin (KMO)  
10 measure of sampling efficiency was calculated. The KMO test provides an index of the  
11 proportion of common variance among the variables resulting from the underlying factors  
12 (Mukhopadhyay, 2009).”  
13  
14

15 Page 10 line

16  
17 Page 10 section 4.1 for readability it might be worth mentioning that the survey was sent  
18 to 440 recipients.

19 The following statement is added “from 440 postgraduate students”  
20  
21

22 Page 13 capitalization (item 36)

23 Done  
24

25 Page 13 layout issue with Table caption

26 Wrong caption is deleted  
27  
28

29 Page 18 table II, p-value is it 0.467?

30 The following corrections to the table are made:

31  $p$ -value = 0.000

32  $df$  = 467  
33  
34

35 Page 18 A validation of the sample size appropriateness for the tools applied might be  
36 beneficial

37 The following paragraph is added at section 5.1 “Regarding the sample size  
38 appropriateness, MacKenzie et al. (2011) declared that the minimum sample size for EFA  
39 was recommended to range from 100-500 and the minimum ratio of sample size to the  
40 number of items was recommended to range from 3:1 to 10:1. Both conditions are  
41 achieved in the current research with a sample size of 182 and a ratio of 4.2:1 (182  
42 respondents to 43 items).”  
43  
44

45 The following paragraph is added at section 5.2 “Regarding the sample size  
46 appropriateness, Hair et al. (2010) pointed out that opinions regarding sample size for  
47 SEM have varied and they suggested that minimum sample size to ensure stable solutions  
48 ranges from 100 to 400. Further, Kline (2011) mentioned that there were attempts have  
49 been made to adopt SEM techniques to smaller sample sizes. In this regard, Nevitt &  
50 Hancock (2004) emphasized that potential problems or improper solutions can be  
51 avoided even with small samples (less than 100) when using the maximum likelihood  
52 estimation procedure which is used in this study. Thus, the sample size of 182 for this  
53 research is considered appropriate. In addition, the set of goodness-of-fit measures  
54 (including; Normed Chi-Square, SRMR, RMSEA, GFI, and CFI) adopted by the current  
55  
56  
57  
58  
59  
60

study were proposed in previous researches (e.g. Abdullah, 2005; Hair et al., 2010; MacKenzie et al., 2011; Sultan and Wang, 2012) to eliminate or reduce the dependence on sample size.”

Page 22 section 6 it would be interesting to compare the results to graduate studies

The following paragraphs are added “It could be also noticed that there are some differences between the PG-SQ model dimensions and previously developed models for undergraduate students. On one hand, the PG-SQ model highlights the importance of program design and arrangements as a major dimension of postgraduate students’ perception while this dimension was not explicitly mentioned in most of undergraduate models. This may be attributed to the level of knowledge of postgraduate students which help them to give specific attention to the program design to ensure its appropriateness to their working field. In addition, postgraduate students focus on program arrangements (such as; class time and institution location) to make sure that it is convenient with their working conditions.

On the other hand, the PG-SQ model did not put emphasis on some dimensions which appear in undergraduate models, such as; support services (Annamdevula and Bellamkonda, 2012) and placement (Senthilkumar and Arulraj, 2011). The interest of undergraduate students in support services may be attributed to the study nature that requires students to spend more time in campus and receive support services such as sports. Moreover, placement, or immediate employability, is considered the primary concern of undergraduate students and their Parents (Senthilkumar and Arulraj, 2011).”

Page 23 line 3 customers in this context could also include future employers

The following statement is added “and external customers including future employers.”

General comment: the contribution of the paper could be increased with a more elaborate discussion of the implications of the findings for post graduate education in Egypt or in general.

The following paragraphs are added “In addition, this study results provides new insights about the postgraduate education in Egypt. The PG-SQ model clarifies that postgraduate service quality in Egypt could not be enhanced as a result of hiring competent academic and administrative staff only unless the institution management concentrate their efforts on improving other aspects such as program design and arrangements, facilities, institute reputation, and information accessibility. It could be helpful for Egyptian higher education institutions to give a particular emphasize to their programs’ design as well as other arrangements (including; learning environment, operating hours, and class time) to enhance the students’ perceived quality.

Moreover, Egyptian higher education institutions should exert more efforts in improving their ways of communication with current and potential students with the aim to provide adequate information about the institution and programs. This will help institutions to provide good impression and encourage students to spread their name through word-of-mouth.”

As a reader I am interested in learning more about the authors view on the relationship between service quality and university rankings.

The following paragraphs are added at:

## SECTION 2.2

As higher education has become more globalized, the geographical horizon of traditional rankings has also expanded in order to satisfy the greater need and demand for access (Blanco-Ramírez and Berger, 2014). Nevertheless, although worldwide university rankings are achieving ever greater penetration and significance, many individual countries are developing their own rankings. This is because biases and obstacles arise when comparing universities from different countries (Berbegal-Mirabent and Ribeiro-Soriano, 2015). As, countries differ in their history, culture, educational traditions, and perspectives (Blanco-Ramírez and Berger, 2014).

## SECTION 6

Moreover, several authors (Jöns and Hoyler, 2013; Berbegal-Mirabent and Ribeiro-Soriano, 2015) stated that countries differ in their history, culture, educational traditions, and perspectives. As a result, comparing universities from different countries can be problematic because university quality is affected by sociocultural and politico-economic forces. Additionally, a university's educational may also be conditioned by the characteristics of the region where the university is located (Berbegal-Mirabent and Ribeiro-Soriano, 2015). Another critical issue regarding international rankings is that they ignore the vast differences of institutional missions and traditions and establish comparisons among very different institutional types (Berbegal-Mirabent and Ribeiro-Soriano, 2015). Also, international rankings often compare only reputation and ignore what really matters in higher education quality (Hazelkorn, 2011; Blanco-Ramírez and Berger, 2014). Hence, all these critical issues should be taken into account when assessing university quality.

Additional Questions:

**1. Originality:** Does the paper contain new and significant information adequate to justify publication?: The paper uses a survey to validate known assumptions regarding quality in post graduate education.

**2. Relationship to Literature:** Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: there is a good use of literature, however a few of the reference are missing in the reference list.

Missing references were added to the reference list

**3. Methodology:** Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: the paper follows the appropriate structure

**4. Results:** Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: yes

1  
2  
3  
4  
5 <b>5. Implications for research, practice and/or society: </b>Does the paper identify  
6 clearly any implications for research, practice and/or society? Does the paper bridge the  
7 gap between theory and practice? How can the research be used in practice (economic  
8 and commercial impact), in teaching, to influence public policy, in research (contributing  
9 to the body of knowledge)? What is the impact upon society (influencing public attitudes,  
10 affecting quality of life)? Are these implications consistent with the findings and  
11 conclusions of the paper?: more emphasis can be put on how this paper will help  
12 university administrators improve service quality in post graduate education

13  
14 The following paragraphs are added “In addition, this study results provides new insights  
15 about the postgraduate education in Egypt. The PG-SQ model clarifies that postgraduate  
16 service quality in Egypt could not be enhanced as a result of hiring competent academic  
17 and administrative staff only unless the institution management concentrate their efforts  
18 on improving other aspects such as program design and arrangements, facilities, institute  
19 reputation, and information accessibility. It could be helpful for Egyptian higher  
20 education institutions to give a particular emphasize to their programs’ design as well as  
21 other arrangements (including; learning environment, operating hours, and class time) to  
22 enhance the students’ perceived quality.  
23

24 Moreover, Egyptian higher education institutions should exert more efforts in improving  
25 their ways of communication with current and potential students with the aim to provide  
26 adequate information about the institution and programs. This will help institutions to  
27 provide good impression and encourage students to spread their name through word-of-  
28 mouth.”  
29

30  
31 <b>6. Quality of Communication: </b> Does the paper clearly express its case, measured  
32 against the technical language of the field and the expected knowledge of the journal's  
33 readership? Has attention been paid to the clarity of expression and readability, such as  
34 sentence structure, jargon use, acronyms, etc.: further proof reading by an external is  
35 recommended  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60