

# DEVELOPING AND VALIDATING TOOLS TO ASSESS POSTGRADUATE SERVICE QUALITY AND THE POSTGRADUATE SERVICE EXPERIENCE

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## ABSTRACT

This paper reports on further attempts to develop and validate instruments to improve the measurement of higher education quality, more especially postgraduate research service. A 26-item postgraduate research service quality (PGSQUAL) instrument as well as a six-item postgraduate service experience (PGSERVEXP) instrument were developed and validated among recent postgraduates at a large research university in South Africa. From a response rate of almost 53%, after subjecting the data to factor analysis and, determining the Cronbach's alpha values, it was ascertained that the respective research instruments were found to be fairly reliable and valid measures of postgraduate research service quality and of the overall postgraduate research service experience.

**Keywords:** postgraduate research, service quality, postgraduate service experience, postgraduate research service quality

## 1. INTRODUCTION AND RATIONALE

Quality experts believe that 'measuring customer satisfaction at an educational establishment might be regarded by educators as one of the greatest challenges of the quality movement' (Quinn, Lemay, Larsen & Johnson 2009: 139). Furthermore, quality assurance of postgraduate (PG) education is becoming increasingly important and there is a worldwide push to encourage universities to be more accountable for PG learning. Governments are also asking higher education institutions (HEIs) to strengthen research, knowledge creation and uptake for our knowledge society, and to achieve this, universities need to ensure that they are providing high-quality PG education. In addition to academic (external) audits, internal PG service experience and satisfaction surveys can serve as appropriate quality assurance processes.

Education is essentially a service industry, and consequently its management practices are typically concerned with issues such as quality, which fall within the aegis of services marketing. According to Angell, Heffernan and Megicks (2008), given that education is a service and the student is a customer, the PG education environment has become increasingly competitive. Thus, Ritchie and Otto (1995: 167) assert that perhaps the most straightforward manner by which to apply a services marketing perspective to higher education (HE) is to borrow general marketing measurement instruments directly from the field and apply them to PG education.

The concept of student as customer is relatively new (Crawford, 1991; Yorke, 1999 as cited by Douglas, McClelland and Davies 2008). The conceptualization and measurement of service quality and service quality perceptions have also been widespread; however, measuring service quality in HE has received limited attention. While service quality in relation to undergraduates has been extensively measured, including undergraduate research (*inter alia*, Lopatto 2004), PGbased research has been negligible. This lack is surprising as there is intense competition for PG students, who not only generate greater income but also improve a university's ranking. Furthermore, while there has been sufficient consensus on the importance of service quality issues in HE, the identification and implementation of the right measurement instrument remains a challenge for practitioners who aim to gain a better understanding of the quality issues that have an impact on students' experiences (Oliveira-Brochado & Marques 2007, as cited by De Jager & Gbadamosi 2010: 251).

Although it is not without criticism (Alridge & Rowley 1998: 200), the most widely used and controversial tool and instrument for the measurement of service quality is the SERVQUAL instrument developed by Parasuraman, Zeithaml and Berry (1988). In order to address some of the criticisms inherent in using the SERVQUAL to assess PG service quality, this paper presents the outcome of the development of an instrument known as PGSQUAL.

Although the importance of quality has prompted researchers of services to study new concepts and approaches to services delivery, much of the emphasis has been on the social psychology perspective and the focus on the interaction between service personnel and customer during the service delivery, namely the service encounter (Bowen, Cummings & Chase 1990, as cited by Govender 1998). While this may be true, it encompasses only the 'technical' aspects and may not be telling the whole story. The other side of the story is the 'psychological' or subjective personal reactions and feelings experienced by consumers when they consume the service. This phenomenon has been called the 'service experience' and has recently been found to be an important part of consumer evaluation of and satisfaction with services (Ritchie & Otto 1995: 167). Thus, in addition to measuring PG service quality, it may also be valuable to assess the overall PG service experience (PGSERVEXP). Given the above, this paper thus also reports on an attempt to develop and validate the PGSERVEXP instrument.

## **2. MEASURING POSTGRADUATE SERVICE QUALITY: FROM SERVQUAL TO PGSQUAL**

According to Parasuraman *et al.* (1988), quality evaluations as perceived by customers stem from a comparison of customers' expectations of what the organization should offer and their perceptions of the services that the organization provides, also known as the GAPS model since service quality is conceptualized as the gap between customer expectations and perceptions. The SERVQUAL instrument presents the respondent with 22 service attributes

grouped into five dimensions (tangibles, reliability, responsiveness, assurance and empathy), which they rate using a Likert-type scale response format (Ford, Joseph & Joseph 1999: 172). According to Alridge and Rowley (1998: 200) some of the criticisms of the application of SERVQUAL in higher education include the need to ask the same questions twice, and the fact that the instrument captures a snapshot of perceptions at one point in time. To overcome some of the criticisms, Alridge and Rowley (1998) opted to survey perceptions only and exclude expectations.

In their quest to develop better research instruments that are also more appropriate to the nature of the service, some researchers (e.g. Drennan 2008) report on the PG Research Questionnaire (PREQ) that was introduced in Australia in 2002 against a background of increased attention on quality and accountability in the Australian higher education sector. PREQ is a multidimensional measure of graduate students' experience of research and research supervision, and is based on the principle that the students' perceptions of research supervision, infrastructural and other support, intellectual climate, goals and expectations will influence their evaluations of the outcomes achieved as a consequence of their research experience (ACER 2000, as cited by Drennan 2008: 490). Ginns, Marsh, Behnia, Cheng and Scalas (2009: 580) indicate that PREQ, which consists of 28 items expressed on a five-point Likert scale, ranging from 'Strongly Disagree' to 'Strongly Agree', as well as a 'Do not apply' category, has a clear factor structure and that the scales have acceptable internal consistency estimates of reliability. For the purpose of this study, the PG service quality (PGSQUAL) instrument (Table 1) was developed primarily by adapting the SERVQUAL instrument, which encapsulates the perceptionexpectations gap covering all five service quality dimension (tangibles, reliability, responsiveness, assurance and empathy) (Parasuraman *et al.* 1988), and incorporating certain elements from the PREQ as was done in previous studies (Dann 2008; Drennan 2008). The adaptation entailed making minor changes (Table 1) to the SERVQUAL statements to fit the context, and combining expectations and perceptions as was done previously (Govender 1998). The strategy followed in this study is in line with the recommendations of Hair (2006: 11), who argued that the work carried out so far using SERVQUAL in a higher education context would seem to suggest that the instrument can be used successfully, as long as the modifications are kept to a minimum.

For each of the service quality items (Table 1), the graduates were requested 'to indicate their rating' with respect to the overall service PG students received at the university, on a continuum where 1= Worse than expected and 5= Better than expected.

**Table 1. The Postgraduate Service Quality (PGSQUAL) Instrument**

Items	Label	Criteria
Accuracy of PG research student records	SQ1	Reliability
Ability of staff to understand PG research students' needs	SQ2	Empathy
Willingness of staff to assist PG research students	SQ3	Responsiveness
The courteousness of staff towards research PG students	SQ4	Responsiveness
The promptness of the service offered to PG research students	SQ5	Responsiveness
The convenience of operating hours for PG research students	SQ6	Responsiveness
The personal attention given by staff to PG research students	SQ7	Empathy
The confidentiality with which staff deal with PG research students' issues	SQ8	Empathy
The ability of staff to answer PG research students' queries	SQ9	Reliability
Delivering on promises to PG research students to do something by a certain time	SQ10	Reliability
Always having PG research students' best interests at heart	SQ11	Empathy
Sincerity of staff in solving PG research students' problems	SQ12	Responsiveness
Performing the PG research service correctly the first time	SQ13	Reliability
The personal attention PG research students received	SQ14	Empathy
Never being too busy to respond to PG research students' requests	SQ15	Responsiveness
Telling PG research students exactly when the services will be performed	SQ16	Reliability
Financial support for PG research activities	SQ17	Tangibility
Honouring promises made to PG research students	SQ18	Reliability
Research support services provided for PG research students	SQ19	Reliability
Opportunities provided for social contact with other PG research students	SQ20	Empathy
PG research ambience in the department/school/ faculty	SQ21	Tangibility
Modernness of library resources and services	SQ22	Tangibility
Efforts made to ensure that PG research students develop an understanding of the standard of work expected	SQ23	Empathy
Seminar programmes provided for PG research students	SQ24	Assurance
Freedom allowed to PG research students to discuss their research needs	SQ25	Assurance
Opportunities provided to PG research students to become integrated into the broader department/school/university research culture	SQ26	Assurance

### 3. THE POSTGRADUATE RESEARCH SERVICE EXPERIENCE AND SERVICE QUALITY

Service encounters are recognized within the service quality research field as a key concept (Zeithaml & Bitner 2000; Dale 2003), since what happens during the encounter is important in understanding what affects the customers' perception of service quality. It has been well articulated in the service quality literature that each encounter impacts on the service user's overall impression and evaluation of the service, and ultimately on their perception of service quality. Since in most services quality occurs during the service delivery, usually in an interaction between the customer and contact personnel, in PG research supervision, face-to-face interaction or personalization between the student and supervisor is vital to the outcome of the service experience. However, there are also many opportunities for things to go wrong when the student and research supervisor interact, when both parties experience and respond to each other's mannerisms, attitude, competence, mood, language etc. Thus 'incidents' occur each time there is interaction, and although some may be trivial, some may be important (or even critical) to a successful encounter. These 'critical' incidents according to Bitner, Booms and Mohr (1994) are interactions that are either 'satisfying or dissatisfying,' and that provide an opportunity for the customers to form an opinion of the service quality through the service experience.

According to Alridge and Rowley (1998: 198), approaches to the evaluation of the student experience can be divided into two general categories: methods that focus on assessing teaching and learning, and methods that assess the total student experience.

Some researchers (e.g. Ginns *et al.* 2009) further adapted the PREQ instrument to develop the Student Research Experience Questionnaire (SREQ). The SREQ instrument applies theory derived from studies of teaching and learning in higher education to the experiences of PG research students, focusing on the overall PG experience at the broad level of university and disciplines (faculties and departments) within a university, rather than at the effectiveness of the individual supervisor.

Given the above, the researcher was of the view that the overall PG student experience is also a useful perspective to adopt in student satisfaction in marketing terms, and based on principles underlying the SREQ instrument, developed the PGSERVEXP questionnaire (Table 2). The graduates were asked to rate each of the six items, with reference to their overall PG research experience, by indicating their level of agreement with each statement below on a five-point Likert scale where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

**Table 2. Postgraduate Service Experience (PGSERVEXP)**

OE1	I further developed my problem solving skills	1	2	3	4	5
OE2	I shaped my analytical skills	1	2	3	4	5
OE3	I feel confident to tackle unfamiliar problems	1	2	3	4	5
OE4	I have learned how to write and confidently present papers at a conference	1	2	3	4	5
OE5	I have learned to develop my ideas and present them in a logical and scientific way	1	2	3	4	5
OE6	I have learnt how to publish papers in scientific journals	1	2	3	4	5

#### 4. RESEARCH DESIGN

Since the primary objective of this study was to explore the development of better research instruments to assess the PG research students' perception of service quality and their overall PG service experience, following an in-depth literature study, two instruments, namely PGSQUAL and PGSERVEXP were developed and validated.

In order to assess the reliability and validity of the developed research instruments, a survey was conducted among 816 graduates at a large research university in South Africa. The name list and e-mail contact details of the graduates was obtained from the university graduations office, and two approaches were used to reach them. The questionnaire was uploaded onto an electronic survey instrument (Questionpro.com), and a request was sent to all the graduates to complete the questionnaire by following a link. This was supplemented by also distributing hard copies of the questionnaire, which were inserted in envelopes together with their degree certificates and handed out at the graduation venues. The graduates were asked to return the completed questionnaire or complete the electronic surveys within a month from the date of the graduation (April-May 2011).

Of the 816 graduates (population), 220 (26.96%) respondents viewed the questionnaire, 120 (54.55%) attempted it and only 117 (53%) completed the survey. It became evident from the data extracted via the electronic survey instrument (Questionpro.com), that the average time taken to complete the questionnaire was 17 minutes.

## 5. FINDINGS

### *Validity and Reliability*

#### **PGSQUAL Instrument**

Coakes and Steed (2003: 140) state that although there are a number of different reliability coefficients, one of the most commonly used is the Cronbach's alpha, which is based on the average correlation of items within a test, if the items are standardized. However, if the items are not standardized, it is based on the average covariance among the items. Cronbach's alpha was also calculated as part of the reliability test to assess how consistent the results were, and if similar results would be obtained to generalize, if the sample size were increased. The aforementioned researchers also propose that a value of 0.7 or higher is a very good value, and can lead one to conclude that the same results will be obtained if this survey were conducted among a larger sample of respondents.

The 26-item PGSQUAL instrument produced a Cronbach alpha value of 0.978, which validates the questions and the scales used, by revealing a good internal consistency.

Factor analysis was carried out to identify unique factors present in the data, and as such assess the discriminant validity of the measuring instruments. The Principal Components method was adopted with varimax rotation using the SPSS Version 18 software. The outcome of this process is reflected in Table 3.

**Table 3: Total Variance Explained (PGSQUAL)**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.957	65.221	65.221	16.957	65.221	65.221	11.288	43.415	43.415
2	1.810	6.960	72.180	1.810	6.960	72.180	7.479	28.765	72.180
3	.920	3.538	75.718						
4	.785	3.020	78.738						
5	.695	2.674	81.413						
6	.603	2.320	83.733						
7	.556	2.137	85.870						
8	.448	1.723	87.593						
9	.434	1.671	89.265						
10	.414	1.592	90.857						
11	.328	1.260	92.117						
12	.278	1.068	93.185						
13	.269	1.033	94.219						
14	.230	.883	95.102						
15	.220	.846	95.949						
16	.185	.712	96.661						
17	.159	.611	97.271						

It is evident from Table 3 that two factors explained 72.180% of the cumulative variance among the items. Furthermore, all of these factors had Eigenvalues exceeding one. The Scree plot (Figure 1) also confirms the existence of the two factors where the change in direction of the graph is noted after the second factor. It is also apparent that the first factor accounts for 65.221% of the variance.

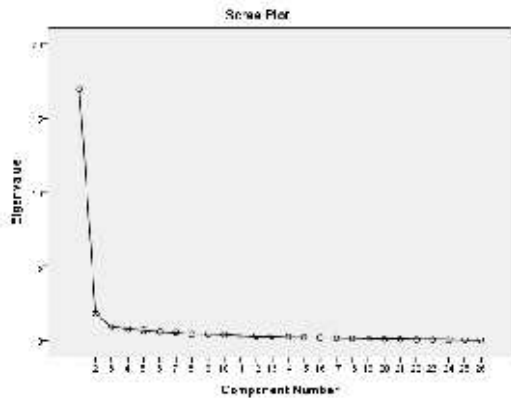


Figure 1: Scree plot of PGSQUAL Factors  
A further scrutiny of the rotated factor loadings table was undertaken to find out



which questions were not loading at all on the factors and could hence be eliminated. The factor analysis was then rerun. Although most literature (e.g. Kline 1994) suggests that a factor loading of 0.3 or greater can be considered to be significant, given the large number of items in the PGSQUAL instrument, it was advisable to adopt the principle of factor loadings of 0.4 or higher to be significant. Without doing this the number of items in the data set would not have been reduced and the key reason for conducting a factor analysis, which is to reduce the number of items to a comprehensible set of items, would have been defeated.

**Table 4: Rotated Component Matrix**

	Component			Component	
	1	2		1	2
SQ3	.868	.200	SQ8	.679	.462
SQ4	.861	.178	SQ23	.663	.500
SQ10	.833	.280	SQ1	.656	.352
SQ5	.817	.338	SQ18	.648	.574
SQ13	.813	.398	SQ6	.634	.390
SQ2	.797	.351	SQ17	.263	.798
SQ14	.794	.442	SQ19	.407	.796
SQ9	.780	.327	SQ26	.290	.795
SQ7	.768	.427	SQ20	.299	.736
SQ12	.763	.466	SQ22	.199	.706
SQ16	.747	.521	SQ25	.520	.699
SQ15	.735	.477	SQ21	.430	.688
SQ11	.689	.539	SQ24	.309	.685

It is further evident from Table 4 that all the items loaded onto two factors with all loadings above 0.4. Factor 1, which was labelled 'supervisor,' comprised the following PGSQUAL items: SQ1-SQ16, SQ18 and SQ23, and Factor 2, which was labelled 'institutional support,' comprised items SQ17, SQ19-25 and SQ26.

In order to add further integrity to the analysis, a reliability analysis was carried out on the actual factors themselves to assess the validity and internal consistency of the two factors. The outcome was that the two-factor PGSQUAL instrument revealed good internal consistency in that the 'supervisor' produced a Cronbach's alpha value of 0.978 and the 'institutional support' factor values was 0.910 (Nunnally and Bernstein 1994).

## PGSERVEXP Instrument

The six-item PGSERVEXP instrument produced a Cronbach's alpha value of 0.867, which implies that the PGSERVEXP instrument is valid. This was further interrogated, since a common practice in asserting the validity of an instrument is to check the individual contribution of the reliability of each question that makes up an instrument (Cortina 1993). The procedure is as follows: firstly, the overall reliability of all the items is calculated, and then if a question that contributes towards the overall reliability is removed, then the overall reliability of the remaining items should decrease when compared to the overall reliability of all the items. However, should the question not contribute to the overall reliability of the instrument and it is removed, then the overall reliability of the remaining items will increase. From the results summarized in Table 5, it can be inferred that the Cronbach's alpha values of all items decrease when compared to the overall reliability (0.867), except for question OE4, where there is a negligible increase in the alpha value (0.002). Hence, we conclude that all the items of the PGSERVEXP instrument are valid and have good internal consistency, and contribute towards the reliability of the PGSERVEXP research instrument.

**Table 5. Cronbach's Alpha When Each Question is Sequentially Deleted**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
OE1	20.3878	14.941	.729	.834
OE2	20.3367	14.968	.752	.831
OE3	20.5000	15.242	.675	.843
OE4	20.7347	15.310	.533	.869
OE5	20.4388	15.465	.717	.838
OE6	21.1224	13.263	.661	.852

## 6. CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

Although there is sufficient support in the literature for using the SERVQUAL instrument or adaptations of it to measure service quality across service organizations, including higher education (Hill 1995; Tan & Kek 2004; Fridaus 2006; Rajashekar, Muninatayanappa & Reddy 2009; Chung & Law 2010; Jackson, Helms & Ahmadi 2011), there is insufficient evidence of research involving PG research service quality. Moreover, research by Cronin and Taylor (1994) and Brady, Cronin and Brand (2001) suggests a move away from service quality to service performance, which may, when applied to the PG research environment, allude to the key role of the supervisor. The PGSQUAL instrument developed through this study also addresses this, as the majority of the items (Table 1) refer specifically to the research supervisor or related staff.

With regard to the research service experience, the PGSERVEEXP instrument developed and validated through this study is also a contribution to the research debate on the relationship between service experience and service satisfaction, as there is also little evidence of attempts by researchers to explore the service experience specifically.

Although the results of the PGSQUAL and PGSERVEEXP are collated at institutional level and not at the level of individual supervisors or departments, it nevertheless can be adapted for departments and supervisors. For example, departments or schools may wish to assess their students' experiences of departmental infrastructure and supervisors may wish to use relevant items from the questionnaire to inform their own supervision.

A common criticism in using surveys of graduates' experience at the time of graduation as performance indicators is the time lag between experience and report (Ginns *et. al.* 2009). Thus research into the service experience should be as immediate as possible; that is, interviews should be conducted as close to the consumption of an actual service as possible, so that evaluations remain fresh in the consumers' minds, and so that experiential benefits are not forgotten or replaced with more cognitively accessible functional benefits. This may be true for the current study as well.

The sample comprised a limited number of postgraduates from one HE institution. A national or international survey may increase support for our findings that the research instruments could be used to assess PG research service quality the PG research service experience.

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