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Research notes

Quality evaluation in post-graduate diploma courses from the students' perspective: An exploratory study in Brazil



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ABSTRACT

This article aims to evaluate the quality perceived, from the perspective of students, in post-graduate diploma courses in the Brazilian context. Post-graduate diploma courses in Brazil are called *lato sensu* courses as opposed to *stricto sensu* courses, which is a term used for Master's Degree and Doctorate courses. Based on the literature on quality in services, the main constructs regarding quality in this field were addressed, in addition to studies that investigated the quality of services in Higher Education Institutions. A questionnaire with 32 items was applied to 358 individuals at a major university in the northeast of Brazil. By means of exploratory factor analysis and confirmatory factor analysis, five dimensions relating to SERVQUAL attributes were formed: tangibles, reliability, responsiveness, assurance and empathy. As a contribution to the field, this study suggests the validity of quality perception indicators analyzed in the context of Higher Education Institutions (HEI) and their adaptation to the robust SERVQUAL methodology.

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1. Introduction

Changes in the social, political and economic environment have occurred recently in Brazil and have led to a marked increase in the number of higher education institutions and greater access to this type of education (Bueno, Rocha, Veiga, & Duclós, 2015). By the end of 2011, the country had 6.5 million university students. Of these, 6.3 million were undergraduate students, and 173,000 were in post-graduate courses, more than twice the number at the beginning of the decade (Brasil, 2014). Many of the changes that have occurred in the area of education are derived from new products offered by Higher Education Institutions (HEI), which have gained strength due to increasing investments by the federal government, changes to the legislation and programs such as PROUNI, FIES and REUNI (Bueno et al., 2015; Saraiva & Nunes, 2011).

Given that post-graduate diploma courses represent an important segment in higher education, generating greater knowledge, skills and competences than undergraduate courses, they have also become strategic to the institutions that

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operate in this field, being an important investment in methods that will promote greater learning and student satisfaction. A better understanding of the attributes of the quality of education that most influence this satisfaction has become an important source of information for HEI so that they can make better investments in the post-graduate segment.

In the literature, several studies have analyzed the quality perceived in higher education services (Arambewela & Hall, 2009; Mondini, Domingues, Correia, & Mondini, 2012; Zwierewicz, 2008). However, research in this field has established indicators and dimensions of quality from particular theoretical or methodological concepts, which in turn have limited its results. In this context, the present study evaluated the quality of services provided by HEI based on the dimensions of the SERVQUAL methodology, which is an established and respected model among academics and managers, as it was developed specifically for the context of services from a rigorous methodological process. This forms the research question: Which attributes of the SERVQUAL model have an influence on the quality of service as perceived by post-graduate diploma students?

The objective of this work is to evaluate which attributes of service quality are considered more important in the opinion of students on post-graduate diploma courses, using the SERVQUAL model. The results may serve as a basis for strategic decisions of HEI that intend to invest in improving their courses, and make theoretical contributions that improve knowledge regarding research on quality in services.

2. Literature review

2.1. Service quality

Good service provision can be considered a core competency for any organization, including those that are essentially service providing companies and those in trade and industry, whose products are only of interest to consumers if they are accompanied by diverse services that complement their main activity (Karpen, Bove, Lukas, & Zyphur, 2014). Thus, it can be said that there is hardly any economic activity without services to support its existence. The importance of this area may also be due to a growing share of the economy (Wirtz & Zeithaml, 2015; Lovelock, Wirtz, & Hemzo, 2011; Grönroos, 2009) and the constant need for improved management by dint of competitiveness and increasing demand, which are characteristics of the economic environment of this century.

Studies on services have always been present in the administration literature, especially marketing. In general, these studies, in addition to emphasizing the importance of services to the economy, also seek to investigate ways to ensure their quality, as in the works of Parasuraman, Zeithaml, and Berry (1985 and 1988) and Senff et al. (2015), with the authors questioning the methods for assessing the level of quality in services using the SERVQUAL model. With this model, the quality of a service is measured through a gap analysis between the customer's expectations and actual delivery. Studies that assess service quality using the method created by Cronin and Taylor (1992 and 1994), the SERVPERF, are also commonplace. With this method, the quality in services is measured by their own performance.

The study of quality in services took shape in the 1980s. One of the earliest scholars was Grönroos (1983), who drew up the model of the perceived quality of services, which considers the customer's perception in relation to services as a factor for measuring their quality. This was followed by the theories suggested by Parasuraman et al. (1985 and 1988), which developed into the SERVQUAL method, defined as a parameter for evaluating the comparison between the quality expected and the quality experienced through the dimensions of reliability, responsiveness, assurance, empathy and tangibles. Zeithaml, Berry, and Parasuraman (1993) also established the concept of a tolerance zone, an area (zone) between what the customer understands as the desired service and what he tolerates as the minimum acceptable service. The desired service is the level of quality that the customer wishes to receive, while the lowest acceptable level represents the minimum level that the customer accepts as tolerable (Jager & Gbadamosi, 2013).

Cronin and Taylor (1992 and 1994) criticized the SERVQUAL scale, arguing that evaluating expectations would not be the most appropriate method, and that it would be sufficient only to assess the perceived performance following delivery of the service. They developed the SERVPERF, although this scale uses the same attributes of assessment of SERVQUAL (Salomi, Miguel, & Abackerli, 2005). Fitzsimmons and Fitzsimmons (2005) also described five dimensions by which customers can evaluate the quality of the service received: reliability, responsiveness, assurance, empathy and tangibles.

Berry and Parasuraman (1991) argue that the essence of quality of service is performance. Grönroos (2009, p. 83) conceptualizes that "quality is perceived at all levels of the relationship structure and, thus, accumulates to form a general perception of quality at any particular moment." Berry (2010) conceptualizes that the tolerance zone grows due to the confidence that the organization builds with its customers, suggesting that reliability is an important attribute in the customer's perception of quality. The evaluation of service quality can thus be regarded as the result of customer experience after its implementation, since the heterogeneity of its execution prevents a prior assessment and the experience provided by good service transforms it into anticipation for the next occasion. This requires continuous improvement by the company.

2.2. Attributes of quality in higher education institutions

Other studies that deal with service quality and its attributes for satisfaction in higher education have contributed to this study. Mondini et al. (2012), analysing the satisfaction of students of HEI in the states of Santa Catarina and Parana in Brazil, point out that the main attributes that influence the choices of a post-graduate student are reputation, location, the concept

and image of the institution, the relationship with the faculty and the commitment and dedication of the professors. The same study also shows which factors cause dissatisfaction, including bad educational methodology and an overload of activities combined with tight deadlines for delivering work. Attributes related to virtually all the dimensions of quality in services are reliability, responsiveness, assurance, empathy and tangibles (Fitzsimmons & Fitzsimmons, 2005; Purcărea, Gheorghe, & Petrescu, 2013). Tontini and Walter (2011) conclude that the relationship between theory and practice had a significant influence on the satisfaction of the students who participated in his study.

In the search for the attributes of satisfaction in post-graduate programs in administration, Zwierewicz (2008) identified three main categories:

- i. Attributes that affect learner satisfaction, mainly related to: the qualifications of the teaching staff, course coordination, access to databases, technical visits, amount of reading and work, structuring of the disciplines and classrooms
- ii. Strengths and weaknesses of the HEI: qualification, didactics, competence, methodology, dedication and commitment of professors; relationship with the market, infrastructure in the classrooms, support and encouragement for scientific publication
- iii. Factors that attract new students: credibility and image of the institution, references of former students and proximity to residence.

Arambewela and Hall (2009) conclude in their study that, according to the perception of international post-graduate businesses students from different countries, the factors that have greater impact on their satisfaction are related to education (teaching quality), society, technology, economics, accommodation, security, prestige and image. Although the study by these authors also addressed factors beyond those that are directly related to educational services, after these were excluded, the ones remaining were quality in teaching, technology, accommodation, student safety, prestige and image of the institution, referring also to the dimensions of service quality mentioned above.

Eberle, Milan, and Lazzari (2010) researched dimensions of quality in post-graduate diploma courses by means of attributes that influence satisfaction, and identified six factors: teachers/teaching, structure/image, course planning and development, service, teaching environment and cost-benefit ratio.

The main works on the quality of services provided at HEI are summarized in Table 1.

The attributes of satisfaction and quality in services used as variables in various studies are similar when analyzed from the perspective of the SERVQUAL suggested by Parasuraman et al. (1985 and 1988). However, these studies use experimental models and, consequently, the results are limited. In this study, we evaluated the quality of services in HEI based on the dimensions of the SERVQUAL methodology.

It is understood that to investigate the attributes of service quality of an HEI for post-graduate diploma students, it is necessary to take previous studies into account. In addition to a consolidated SERVQUAL model regarding quality in services, these studies may serve as a theoretical framework for exploring the attributes of satisfaction through the formation of dimensions.

It is known that the SERVQUAL model is used to measure the quality and satisfaction of services by means of user perception in relation to their performance. Therefore, the five dimensions of the SERVQUAL model will be used as the basis for a possible identification of dimensions related to attributes that most influence the perceived quality of post-graduate diploma students (see Table 2).

A wide range of indicators in the service environment is related to the five dimensions in the SERVQUAL model (Parasuraman et al., 1985; 1988). The SERVQUAL model was chosen as a guideline for this study because, according to the authors, different items of quality and satisfaction in the service environment could be adapted, considering specific measurement items in different industries (Carman, 1990; Parasuraman, Zeithaml, & Berry, 1988). The indicators used in this study are shown in Table 3.

Table 1

Previous studies on service in Higher Education Institutions.

Author	Results
Zwierewicz (2008)	Qualification of the teaching body, coordination of course, access to databases, technical visits, amount of reading and work, structuring of the disciplines, classrooms, qualification, didactics, competence, methodology, dedication and commitment of teachers, relations with the market, infrastructure in the classrooms, support and encouragement for scientific publication, credibility and image of the institution, references of ex-students and proximity of residence.
Arambewela and Hall (2009)	Quality in teaching, technology, accommodation, student safety, prestige, image of the teaching institution.
Eberle et al. (2010)	Teachers/teaching, structure/image, planning and development of the course, service, teaching environment and cost-benefit ratio.
Tontini and Walter (2011)	Relationship between theory and practice, quality of the course, emotional commitment and general satisfaction.
Mondini et al. (2012)	Reputation, concept, image of the institution, location, relationship with the faculty, commitment and dedication of the professors.

Source: Summarized by the authors

Table 2
Dimensions and concepts of the SERVQUAL model.

Dimension	Concept
Tangibles	Related to the activity of the facilities, equipment and materials used by a service company, as well as the appearance of the staff providing the service.
Reliability	To provide customers with a quality service the first time, without making mistakes, and deliver what was promised within the stipulated period.
Responsiveness	Staff willing to help customers, meet their requirements, and inform them when the service will be provided and perform it with speed and agility.
Assurance	The behavior of the staff transmits to the customers a feeling of confidence in the company that makes them same feel safe. The staff are always courteous and have the necessary knowledge to answer questions from customers.
Empathy	The service company understands the customers' problems, performs the service in their best interests, gives them personal attention and conducts the work at convenient times.

Source: Adapted from Grönroos (2009, p.77)

Table 3
Descriptive statistics of the items of the scale and dimensions (DM).

Items	Average	SD	C.V. (%)	sk	ku	Dimensions (DM)		
						Average	C.V. (%)	N
q1: The professors have mastered the subject addressed in the classroom.	6.694	0.576	0.086	-1.852	2.944	6.543	0.67	10.38% 1
q2: The professors related the theoretical content to practice.	6.569	0.728	0.111	-1.713	2.382			
q3: The professors are skilled at arousing the interest of students in the subject	6.341	0.777	0.122	-1.027	0.765			
q4: The professors explain the subjects they address clearly	6.569	0.635	0.097	-1.274	0.874			
q5: The professors show that teaching satisfies them.	6.106	0.918	0.150	-0.853	0.189	6.087	0.89	14.76% 2
q6: The professors are interested in the student's learning.	6.267	0.798	0.127	-1.119	1.551			
q7: The professors are willing to engage in dialogue.	6.243	0.825	0.132	-0.729	-0.453			
q8: The professors are willing to speak to students outside of class time.	5.733	0.988	0.172	-0.527	-0.221			
q9: The professors treat the students politely and respectfully.	6.086	0.964	0.158	-1.361	2.865			
q10: The professors encourage the use of books and periodicals that are available.	5.902	0.977	0.165	-0.792	0.127	6.236	0.908	14.57% 3
q11: The professors prepare evaluations that are compatible with the course content.	6.239	0.965	0.154	-1.231	1.294			
q12: The professors are hard working.	6.416	0.869	0.135	-1.487	1.715			
q13: The professors begin and end their classes at the right time.	5.820	1.245	0.214	-1.250	1.665			
q14: The disciplines are useful for students in their professional lives.	6.408	0.859	0.134	-1.410	1.506			
q15: The disciplines relate theory to practice	6.561	0.707	0.107	-1.692	2.612			
q16: The disciplines are adequately divided in terms of theory and practice.	6.043	1.066	0.176	-1.181	1.228			
q17: The disciplines are integrated with the course.	6.141	0.937	0.152	-1.176	1.514			
q18: There is an updated, high quality bibliography.	6.337	0.756	0.119	-0.809	-0.245			
q19: The books in the library meet the requirements of the disciplines	6.494	0.704	0.108	-1.168	0.491			
q20: The university is close to the student's residence	4.220	1.624	0.384	-0.297	-0.331	5.904	1.081	18.30% 4
q21: There is adequate physical space in the library for study and consultation	6.067	1.094	0.180	-1.236	1.601			
q22: The classrooms are healthy environments (good lighting, temperature and acoustics).	6.659	0.751	0.113	-2.366	5.176			
q23: The chairs in the classroom are comfortable.	6.365	0.858	0.135	-1.336	1.251			
q24: The university premises have adequate levels of cleaning and conservation.	6.196	0.905	0.146	-0.842	-0.283			
q25: There is enough equipment available to satisfy demand	6.239	0.910	0.146	-0.991	0.025			
q26: Lunch is available in the canteen.	5.067	1.619	0.319	-0.649	-0.111			
q27: The campus is a safe place.	6.424	0.883	0.137	-1.449	1.253			
q28: The course coordinator is willing to help the students	6.478	0.827	0.127	-1.585	1.930	6.436	0.798	12.40% 5
q29: The course coordinator solves problems quickly and efficiently.	6.506	0.837	0.128	-1.818	2.773			
q30: The coordinator has a good relationship with the class.	6.365	0.816	0.128	-1.150	0.805			
q31: The coordinator is qualified in the field of the course.	6.302	0.808	0.128	-0.914	0.042			
q32: The coordinator innovates and improves the course.	6.529	0.703	0.107	-1.569	2.737			

Note: Dimensions (DM) 1: assurance; 2: empathy; 3: reliability; 4: tangibles; 5: responsiveness. C.V. = Coefficient of Variation and SD = Standard Deviation. Source: Prepared by the authors

There has been a perceived growth in the post-graduation segment in Brazil. In 2013, the country had 7300.000 students in 32,000 graduate courses at 2400 HEI, of which 85% were private (Brasil, 2014), representing a latent demand to be consolidated in the following years. To Guimarães, Gomes, Odelius, Zancan, and Corradi, 2009, in the post-graduation teaching network in management, a number of gaps remain, especially in aspects related to shared intellectual production, scientific events, exchange programs for students and professors and other factors.

Another element that corroborates the growing importance of post-graduate teaching in Brazil is the social impact perceived by society in general (Wood, Costa, Lima, Guimarães, 2016), which highlights the claim that post-graduation has grown, as has the number of students and courses on offer. This is also important to society and the study of management in Brazil. Gauging the perception of students regarding the dimensions of the quality of higher education services has thus

become necessary as a contribution not only to scientific knowledge on the theme but also to the business sector that offers the courses and requires data that can help to improve strategic decision-making.

3. Methodology

A basic assumption for this study is that the degree of the attributes of quality that are considered important differs from one respondent to the other. Therefore, an exploratory study was conducted that sought factorial suitability of the attributes of quality in post-graduate diploma studies at a Higher Education Institution (HEI), followed by its confirmatory validation. Based on this theoretical work tool, five factors were expected to be identified (tangibles, reliability, responsiveness, assurance and empathy), all related to the five dimensions of quality suggested by Parasuraman et al. (1985 and 1988).

This is an applied study with an exploratory and descriptive objective, using a survey, with an intentional scope, quantitative analysis and cross-section temporality, involving 358 post-graduate students, 61 of whom participated in the pre-test and 297 in the main test. The students completed a survey questionnaire, adapted from the questionnaire used by the Self-Evaluation Commission (CPA)¹, of the Federal University of Rio Grande (UFRG), in the year 2012, which was readapted following the pre-test analysis. It is shown in full in Table 3, where some descriptive aspects of the attributes in question are analyzed. The students who completed the questionnaire were regular students enrolled in post-graduate courses offered by a university in the northeast of Brazil, in the fields of management and business, communication and art, hospitality, health, engineering and natural sciences, education and law.

There are 430 post-graduate students at the university. The study involved a sample of 358 respondents, in two stages. An early version of the instrument, completed by 61 students, served as a pre-test to verify its adequacy for the respondents. A week after the pre-test, following adjustments, the final version of the questionnaire was applied. On this occasion, the researchers were authorized by the management of the university to visit all the classroom of all the post-graduate courses in a single morning. Only the students who had been involved in the pre-test did not complete the questionnaire, in addition to those who were not present and those who did not wish to participate. In the end, 297 questionnaires were complete. The questionnaire used in the survey assessed the perception of the respondents concerning the importance of each metric with the use of a 7-point Likert scale, ranging from 1 “no importance” to 7, “totally important”. This was followed by an exclusion process of questionnaires for reasons such as absence of answers, questionnaires where the respondents marked the same column for all the items and outliers. A total of 255 questionnaires (n = 255 students) were validated for the analysis. Of the respondents, 38.82% were men (99 cases) and 61.18% were women (156 cases).

With the aim of identifying the factor structure of the questionnaire, in order to synthesize and assemble items correlated together, Exploratory Factor Analysis (EFA) was performed on the data using the Statistical Package for Social Science IBM SPSS Statistics (v. 19, SPSS. An IBM Company, Chicago, IL). To check the latent structure of the model, seeking quality indicators of adjustment, Confirmatory Factor Analysis (CFA) was used, with the IBM SPSS AMOS (v. 22, SPSS An IBM Company, Chicago, IL) (Marôco, 2010; Kline, 2010; Fávero et al., 2009; Hair, Black, Babin, Anderson, & Tatham, 2009; Brown, 2015; Bentler, 2006; Byrne, 2001).

A minimum number of 5 observations per indicator is required for each stage of exploratory and confirmatory analysis to proceed (Hair et al., 2009). Considering that the research instrument contains 32 indicators, this stage would require at least 160 observations, i.e., 320 valid questionnaires. However, despite these limitations, it should be highlighted that an effort was made to include the entire population of students in the sample and that all the post-graduate groups at the university participated in the study, characterizing the aspect of a census of the population in question. Therefore, it was decided to proceed with the EFA and CFA without partitioning the population under observation.

4. Presentation and analysis of the results

Table 3 shows all the questions in the research instrument, with some descriptive statistics for the individual questions and the dimensions, and their adaptation to the dimensions considered in the theoretical model.

Table 3 shows that the dimension or construct with the greatest variability is **tangibles**, with approximately 18.30% of relative variation, while the one with the least relative variation was **assurance**, with a coefficient of variation of 10.38%.

On the other hand, the lowest values in terms of average perception among the items in the assurance construct are related to *The professors are skilled at arousing the interest of students in the subject*, with a value of 6.341, while the statement with the highest average perception is for *The professors have mastered the subject addressed in the classroom*, with a value of 6.694, which is very close to “totally important”.

Regarding the **tangibles** dimension, in terms of average perception, the statement with the lowest value was *The university is close to the student's residence*, with a value equal to 4.22. It should be highlighted that this dimension was the one with the greatest relative variability (C.V.). Conversely, the statement with the highest value in terms of average perception was *The classrooms are healthy environments (good lighting, temperature and acoustics)*, with a value of 6.659.

¹ Questionnaire for graduating students – Satisfaction of the Graduate Courses from the Federal University of the Rio Grande do Sul FURG, available at http://www.avaliacao.furg.br/institucional/bin/documentos/index.php?id_categoria=4 accessed on 30/09/2012.

The absence of multivariate normality verified by the tests is common in large samples using the Likert scale, as it is not an interval scale. According to [Marôco \(2010\)](#), these adjustment tests are highly sensitive to small deviations from normality, increasing the possibility of a Type I error (concluding that the variable is not close to normal distribution when the distribution is in fact normal). According to [Marôco \(2010\)](#), values of $|sk| < 2$ and $|ku| < 3$ do not present a severe violation of normal distribution. Therefore, they are appropriate for the use of the Maximum Likelihood (ML) method. Only Item Q22 lay outside of these intervals.

4.1. Exploratory factor analysis

There are several methods of extraction for EFA. The one that is most used is Principal Component Analysis (PCA), which seeks to evaluate the one-dimensionality of the dimensions by means of variance extracted. The 32 items in the questionnaire encompass five theoretical dimensions, as shown in [Table 3](#), related to the five dimensions of the SERVQUAL of [Parasuraman et al. \(1985 and 1988\)](#).

It should be highlighted that to adapt the items observed here to the SERVQUAL model in the context of Brazilian post-graduate courses, with their respective dimensions, it is essential that the dimensions be validated individually, in accordance with [Hair et al. \(2009\)](#) and [Kline \(2010\)](#), with their convergent and discriminant validity.

To gauge the adaptability of the data to the application of the Exploratory Factor Analysis (EFA), an attempt was made to identify the internal consistency of the indicators of quality in post-graduate teaching (*lato sensu*), with 32 variables by means of Cronbach's Alpha, which in turn measures the internal consistency based on the average correlation between the variables.

The most common method for analyzing the reliability of data was considered, with the main idea being that the individual indicators should measure the same construct and be intercorrelated ([Kline, 2010; Lee & Hooley, 2005](#)).

In this sense, the dimensions were extracted and a factor structure composed of five dimensions was obtained, with their own values higher than 1.3, taking into account the criterion used by Kaiser. Together, they were capable of explaining 52.64% of the total variance.

The adaptation to the use of the EFA technique was done based on the KMO test. A value equal to 0.869 was found. In Bartlett's sphericity test, the probability value was <0.0001 for all the dimensions, lower than the adopted level of significance of 5%, with a view to verifying whether the correlation matrix permits the use of factor analysis, according to the criterion suggested by [Marôco \(2011, p. 477\)](#).

[Table 4](#) shows the estimates for Cronbach's Alpha, variance explained, composite reliability and KMO for each dimension analyzed.

Analyzing the results estimated in [Table 4](#), it can be seen that through the Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests the use of the EFA technique was adequate. The reference values for the KMO can be deemed unacceptable when under 0.50, bad but acceptable from 0.50 to 0.60, fair from 0.60 to 0.70, average from 0.70 to 0.80, good from 0.80 to 0.90 and excellent from 0.90 to 1.00 ([Marôco, 2011, p. 477](#)). The value of Bartlett's sphericity test with a probability value close to zero, as occurred in the estimates of the study, demonstrates the adequacy of factor analysis for the set of data ([Carvalho & Matias-Pereira, 2007](#)).

Table 4
Estimate of exploratory factor analysis.

Dimensions	Factor loading after Varimax rotation					Cronbach's Alpha	Variance Explained	KMO	
	Items of the Scale	1	2	3	4				5
Assurance	q1	0.699					0.839	68.41%	0.767
	q2	0.746							
	q3	0.611							
	q4	0.680							
Empathy	q5		0.642				0.785	59.21%	0.759
	q6		0.559						
	q7		0.543						
	q9		0.513						
Reliability	q13			0.651			0.734	65.96%	0.688
	q16			0.676					
	q17			0.651					
Tangibles	q22				0.525		0.829	59.52%	0.810
	q23				0.651				
	q24				0.666				
	q25				0.585				
	q27				0.549				
Responsiveness	q28					0.700	0.797	62.33%	0.744
	q29					0.586			
	q30					0.635			
	q32					0.561			

Source: Prepared by the authors

4.2. Confirmatory factor analysis

In the present study, AMOS (Analysis of Moment Structures) software was used, considering the covariance matrix and adopting the ML (Maximum Likelihood) estimation method. Fig. 1 illustrates the structural model of the confirmatory factor analysis for the scale based on the dimensions of the SERVQUAL model, where the estimation method used is the Maximum Likelihood (ML).

When estimating the confirmatory factor analysis model shown in Fig. 1, the results of the parameters were found to be within the acceptable limits of reference, in accordance with the assumptions of Hair et al. (2009). The value of significance of the model represented by the CMIN/DF index (X^2/gI), whose values are expected to be lower than 0.5, was 2.193, showing an adequate model. The results are shown in greater detail in Table 5.

As shown in Table 5, the results are within the acceptable parameters for validating the model adapted to the SERVQUAL scale. Regarding the indicators, the CMIN/DF had a value of 2.193, below 5.0. The CFI value was 0.906, a little higher than the minimum acceptable parameter of 0.9. The parsimony value (PRATIO) was 0.842, higher than the minimum value of 0.7. The RMSEA was 0.069, showing how well the model adjusts to the population, and not only the sample in question. Table 5 also shows that the factor loadings of the indicators (variables) of the model had values of $p < 0.05 = 0.000$, i.e., significant to the level of 5%.

Table 6 shows the factor loadings of the indicators (variables and their respective dimensions of the scale adapted to the SERVQUAL. All the values were greater than 0.581, in keeping with the assumptions of Hair et al. (2009, p. 119) for the minimum values necessary for interpreting the model, which is 0.3. Most of the indicators are higher than 0.7, indicating a well-defined structure, which is the goal of any factor analysis (Hair et al., 2009, p. 119).

4.3. Discriminant validity

To test the validity of the confirmatory model, the Average Variance Extracted (AVE), Composite Reliability (CR) and Cronbach's Alpha tests were conducted. Table 7 shows the values of the AVEs, Composite Reliability and Cronbach's Alpha for the scale adapted to the SERVQUAL dimensions.

Table 7 shows that the values of the AVEs are higher than the ideal parameters (>0.50) for adapting the model. This proves that the indicators converge to the same common point. The values for CR are also adequate, i.e., above the ideal parameters (>0.70). The Cronbach's Alpha values were higher than 0.70, showing good internal consistency. Therefore, in general, the indicators consistently represent the dimensions of the scale.

Table 8 shows Pearson's correlation and the square roots of the AVE values of each dimension of the SERVQUAL scale.

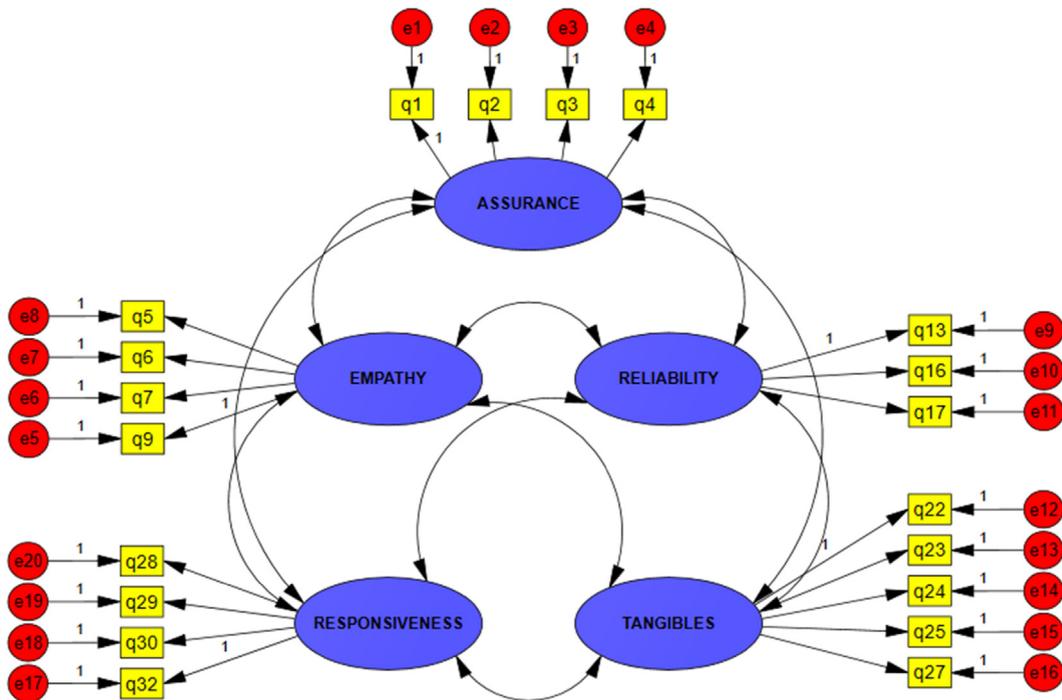


Fig. 1. Structural model of the confirmatory factor analysis adapted to the SERVQUAL dimensions. Source: Prepared by the authors

Table 5
Results of the confirmatory factor analysis for the adapted scale in the SERVQUAL dimensions.

Ideal values	Parameter in the AMOS output	Indicators to observe	Complete model
0.000	Notes for Model	Level of significance	0.000
Value < 5.0	CMIN	CMIN/DF(Chi ²)	2193
		CMIN	350.846
		DF	160
Value > 0.9	Baseline Comparisons	CFI	0.906
The closer to 1 and higher than 0.7 the better	Parsimony-Adjusted Measures	PRATIO	0.842
Value under 0.08	RMSEA (Error)	RMSEA	0.069
To be significant	Estimates	Regression Weights	0.000
<i>p</i> <0.05			

Source: Prepared by the authors

Table 6
Factor loadings of the variables and their respective dimensions for the scale adapted to the SERVQUAL model.

N	Dimension	Estimate	N	Dimension	Estimate
q1	Assurance	0.766	q22	Tangibles	0.644
q2	Assurance	0.821	q23	Tangibles	0.740
q3	Assurance	0.708	q24	Tangibles	0.745
q4	Assurance	0.752	q25	Tangibles	0.727
q5	Empathy	0.720	q27	Tangibles	0.659
q6	Empathy	0.678	q28	Responsiveness	0.824
q7	Empathy	0.715	q29	Responsiveness	0.655
q9	Empathy	0.581	q30	Responsiveness	0.713
q13	Reliability	0.684	q32	Responsiveness	0.622
q16	Reliability	0.709			
q17	Reliability	0.706			

Source: Research data

Table 7
Values of the AVEs. Composite Reliability and Cronbach's Alpha for the scale adapted to the SERVQUAL dimensions.

Dimensions of the scale	Cronbach's Alpha	AVE	CR
Assurance	0.839	0.71	0.91
Empathy	0.767	0.58	0.85
Reliability	0.734	0.62	0.83
Tangibles	0.829	0.63	0.89
Responsiveness	0.797	0.63	0.87

Note: AVE: Average Variance Extracted; CR: Composite Reliability.
Source: Research data

Table 8
Values of Discriminant Validity and AVEs for the scale adapted to the SERVQUAL dimensions.

Dimensions of the scale	Assurance	Empathy	Reliability	Tangibles	Responsiveness
Assurance	0.710				
Empathy	0.133	0.583			
Reliability	0.143	0.423	0.620		
Tangibles	0.063	0.279	0.444	0.625	
Responsiveness	0.090	0.193	0.298	0.524	0.628

Note: Values in bold represent the AVE (Average Variance Extracted).
Source: Prepared by the authors

The method used to evaluate the Discriminant Validity was the criterion comparing the square roots of the AVE values of each construct with the Pearson correlations between the dimensions. The values of the square roots of the AVE should be lower than the correlations of the dimensions. The Discriminant Value indicates to what extent the dimensions are independent of one another (Hair et al., 2009).

As shown in Table 8, the values of the correlations are lower than the values of the AVEs, proving good Discriminant Validity, i.e., indicating that the dimensions of the scale adapted to the SERVQUAL model are independent of one another.

5. Discussion of the results

The attributes of quality identified as important have different degrees for the different participants. This difference was perceived early in the data analysis. This study confirms the validity of the indicators developed by the Federal University of Rio Grande regarding the perception of quality in higher education. The elements indicated in the factor analyses (exploratory and confirmatory), regarding their clusters, resemble the five dimensions of the SERVQUAL model: assurance, empathy, reliability, tangibles and responsiveness. This suggests that the attributes related to these dimensions are those that are of greater importance to students in higher education. In studies such as those of [Russell \(2005\)](#); [Nasser, Khoury, and Abouchedid \(2008\)](#) and [Wang, Taplin, and Brown \(2011\)](#) on students' perception of quality, in general, the attributes are analyzed without exploring the formation of the dimensions. Studies such as those of [Tontini and Walter \(2011\)](#), [Arambewela and Hall \(2009\)](#) and [Eberle et al. \(2010\)](#) explore the formation of dimensions, but without necessarily linking them to the already consolidated theory of dimensions of service quality suggested by [Parasuraman et al. \(1985; 1988\)](#); [Parasuraman, Berry, & Zeithaml, 1991](#)), and [Cronin and Taylor \(1992; 1994\)](#).

Considering the indicators that make up the five dimensions similar to the SERVQUAL model, some highlights can be discussed in relation to previous studies addressing the services of HEI. It should be emphasized that some items are similar in all the works analyzed here, despite not being worded in the same way. Each study adopted indicators from different sources, which hampers a comparison and broader discussion. Nevertheless, it should be highlighted that this adaptation was suggested in previous studies ([Carman, 1990](#); [Parasuraman et al., 1988](#)).

Regarding indicators of perceived quality, this study corroborates the findings of [Athiyaman \(1997\)](#) and [Tontini and Walter \(2011\)](#), especially those concerning the ability of the professor to relate theory to practice. In the studies of these authors and the present study, this indicator is among the most significant. Indeed, this appears to be one of the most important indicators for students, because when they are faced with the demands of the labor market, they will be asked about experience and ability to carry out their work.

The study of [Arambewela and Hall \(2009\)](#) presents an inaccurate indicator for evaluating quality, which is teaching quality. It should be noted that quality is a subjective term. [Grönroos \(2009\)](#) claims that the perceived quality of service by consumers can be of a technical nature (what) and a functional nature (how). In other words, the quality of teaching may refer to several things at the same time, including how the teacher teaches, the resources used in class and how up to date the course content is. Therefore, teaching quality does not effectively measure an attribute that can lead to satisfaction. In the present study, the notion of quality was broken down into the 32 indicators that were evaluated. This reasoning, regarding the study of [Arambewela and Hall \(2009\)](#), is applied to other equally subjective attributes that the authors used, such as security, technology, prestige and accommodations.

The attributes related to the role of the course coordinator in the offer of services have been discussed little in previous studies on the perceived quality of students in post-graduate courses. In the present study, the items that make up this construct had the second lowest coefficient of variation. According to the respondents, the course coordinator should be efficient and quick at solving problems, be available to the students and make innovations and improvements to the course. These attributes are directly related to the “responsiveness” dimension, which is the willingness to help the customer and provide a service quickly and efficiently ([Parasuraman et al., 1985, 1988](#); [Grönroos, 2009](#); [Berry, 2010](#); [Zeithaml, Bitner, & Gremler, 2011](#)).

In addition to discussing indicators, it is also worth discussing the five constructs regarding the perception of quality in services, as is the case of a Higher Education Institution, which is the focus of this study. The work of [Eberle et al. \(2010\)](#), which seeks to identify and evaluate the perception of students regarding their satisfaction with the services provided by an HEI, concluded that the “professors/level of teaching” dimension had greater levels of composite reliability (0.869). The authors used 12 indicators to evaluate this dimension, with 8 of them directly related to the role of the professor in the evaluation of student satisfaction. These indicators correspond to the “assurance” dimension in the present study, with these variables being viewed as the most important in the opinion of the students. Corroborating the work of [Eberle et al. \(2010\)](#), this work also reinforces the idea of the assurance dimension as one of the main factors in the evaluation of student satisfaction. The notion of assurance has to do with the capacity of employees, whether they have the knowledge required to answer questions, thus creating an image of trust and reliability on the part of the staff and company ([Grönroos, 2009](#); [Parasuraman et al., 1991](#)). Because of this proximity of the students (customers) with the staff (professors), the assurance dimension carried most weight in the evaluation of the quality of a post-graduate course. On the other hand, in the work of [Parasuraman et al. \(1991\)](#), the assurance construct appears in third place. In that study, the sample was composed of service companies, such as banks, insurance companies and telephone companies, i.e., the context was different from that of higher education. Indeed, the students spend most of their time in the environment of the service provider (university) interacting with the professors in the classroom, receiving guidance for their work and clarifying doubts regarding the course content. In the work of [Arambewela and Hall \(2009\)](#), the assurance dimension corresponds only to two items, “protected” and “lifestyle”, i.e., unlike the original concept of assurance proposed by [Parasuraman et al. \(1991\)](#). In the work of these authors, this dimension was evaluated as least important by the students, reinforcing the idea that assurance should be estimated within the concepts of renowned works in the literature on the subject, such as that of [Parasuraman et al. \(1991\)](#).

The idea of reliability has to do with meeting the needs of the customer promptly and without defects or flaws ([Parasuraman et al., 1991](#)). In the study of [Eberle et al. \(2010\)](#), “structure/image” is a concept that refers to this notion of reliability. These factors influence a student's choice of post-graduate course, requiring institutions to develop a good

reputation on the market. In the present study, the reliability dimension was initially evaluated using 10 indicators, the highest number of all the dimensions. In the exploratory factor analysis, it was also the dimension with the most excluded items, with only 3 indicators remaining in the construct, which was the lowest number of indicators of all the dimensions in the final model, all of which were important in the students' evaluations. The data analysis in the work of Eberle et al. (2010) also had 10 indicators for this dimension, but did not identify the number of indicators remaining in the final model. In both works, the punctuality of the professors was significant, albeit to a lesser degree in relation to the other items. In the final model of the present study, this indicator still figures among those that compose the evaluation of the construct. In this sense, this indicator can be an item for easy improvement in the evaluation process of the students regarding the courses, as it is only right that the professor should be a good timekeeper and adhere to the entire class schedule.

The “teaching environment” dimension in the work of Eberle et al. (2010) and “class size” in the work of Athiyaman (1997) refer to the idea of the tangibles in the original work of Parasuraman et al. (1985). This construct is related to the installations, equipment and materials used by a service providing company, as is the appearance of the staff. In the present study, which was conducted at a private university, the physical aspects were the most varied of the students' responses, but had several indicators with a high average in the responses. Furthermore, in the work of Arambewela and Hall (2009), the significance of this dimension is noted in the international context of post-graduate courses, with Asian students doing post-graduate courses in Australia. According to the authors, Australia is a very popular destination for foreign post-graduate students, as it provides an opportunity to improve professional skills and English language skills simultaneously. This factor is important, and universities have to invest in their physical structure to become attractive amid the competition in the sector, which is becoming increasingly fierce (Arambewela & Hall, 2009; Wang et al., 2011).

The seminal study conducted by Parasuraman et al. (1991) used a service quality evaluation model that includes two more dimensions: responsiveness (willingness to serve) and empathy (individual attention), for which significant dimensions and indicators are not found in the analyses of other works that investigate post-graduate courses. In the present study, these dimensions have 4 indicators each in the composition of the final model, which are important for student evaluation. In the work of Eberle et al. (2010), the authors developed a construct called “service”, with indicators that refer to the idea of promptness and empathy, but this was not considered, as it did not influence the evaluation of the final model. The authors also included the dimensions of “course planning and development” and “cost-benefit relationship”. These also did not contribute towards the improvement of the final model. On the other hand, the work of Arambewela and Hall (2009) analyzed economic factors in the evaluation of quality and student satisfaction, with significant repercussions of the economic dimension in this relationship. Among these factors, the offer of temporary jobs and the cost of living in the city where the course is given are significant in the evaluation of the students.

6. Conclusions and implications

The competitive scenario affects higher learning institutions with *lato sensu* post-graduate courses as a source of revenue. Understanding the preference of the students for these courses in terms of service quality is a key factor when it comes to defining strategies to attract students and improve performance in items of quality that affect the evaluation of this satisfaction. In this context, the present study proposes to analyze the attributes of quality that are considered to be of major importance to students on post-graduate courses in the Brazilian teaching context.

The present study refined the indicators of quality of the Permanent Evaluation Committee of the Federal University of Rio Grande, Brazil. It is a robust instrument, used by a respected university, to meet the evaluation criteria of the normative entities of post-graduate teaching in Brazilian universities. These indicators were analyzed to follow the methodology recommended in the classic works of the SERVQUAL model, which has not been observed in similar works in the context of post-graduate teaching. Therefore, this is a contribution to the literature.

It should be highlighted that this study contributes to knowledge in the field by aligning specific quality perception indicators in the opinion of students in the environment of post-graduation with dimensions that have already been established in the literature through the works of Parasuraman et al. (1985, 1988) and Cronin and Taylor (1992, 1994).

The results of this study indicate that factors related to assurance, i.e., the ability, clarity and mastery of course content on the part of the professor, are of greater importance than the other dimensions, suggesting that these factors are more closely observed by students when it comes to services at a higher education institution. Furthermore, this study indicates that responsiveness is the second most important dimension in the evaluation of the perceived quality of the students in post-graduate courses that participated in this study. In this dimension, the role of the course coordinator is fundamental in the opinion of the students. The tangibles dimension, despite having relatively high averages in its indicators, has greater variability among the students and comes in third place regarding student perceptions.

Although the importance of the evaluation of quality in the services provided by HEI is widely recognized, other works with the same purpose have used particular approaches with models that retained experimental characteristics. In this sense, the theoretical contribution of this study is that it evaluates specific attributes regarding the perception of service quality at a higher learning institution, based on a well-established methodology. The managerial implications of these results are that institutions should give priority to investing in hiring and retaining good professors and coordinators, and concentrate on issues related to infrastructure.

There are limitations to this study, especially because only one private institution was included in the data collection, suggesting that further studies could be conducted to improve the instrument used here. Furthermore, the sample of 255

observations limits the generalization of the results presented here. New studies can explore the indicators and dimensions of quality analyzed in this study among students from various fields of post-graduation, including Master's Degree and Ph.D. programs. Finally, these studies can also consider the effects of moderator variables, such as the technology used in teaching and the monthly fees, in the relationship between the attributes of quality and satisfaction in the choice of post-graduate course.

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