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Determinants of student satisfaction and loyalty among students from Brazilian Accounting Sciences graduate programs

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Abstract

Objective: To analyze whether the European Customer Satisfaction Index (ECSI) is suitable to verify the determinants of satisfaction and loyalty among graduate students from Accounting Sciences programs in Brazil.

Method: This survey was conducted among students from 29 graduate programs in the field of Accounting Sciences that were active in 2017 and assessed by Capes. A total of 331 responses were collected from 26 graduate programs and 311 were valid, reaching approximately 90% of the programs. Structural Equations Modeling was used in data analysis.

Result: The study met statistical criteria for validation and, after re-specifications, the conceptual model of student satisfaction met the appropriate quality adjustment indexes and was stable for the sample addressed, explaining 96.6% of the variation in student loyalty and 80.6% in student satisfaction.

Contributions: The structural model that portrays the determinants of student satisfaction is expected to promote a high level of student satisfaction with academic studies, so that students perform well, positively reflecting on the institution and the field of Accounting teaching as a whole.

Key words: Student Satisfaction, Loyalty, Student, European Model of Satisfaction

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1. Introduction

In the decade beginning in 2005, an almost 100% increase was observed in the number of Brazilian graduate programs integrating the *Sistema Nacional de Pós-Graduação (SNPG)* [National Graduate Programs System]. Starting in the 2000s, a time when there were only four Master's programs in Accounting Sciences, all located in the Southeast, graduate programs in this field also presented considerable growth. In 2017, according to the Sucupira Platform, 13 out of the 29 existing graduate programs were located in the Southeast, followed by the South with 7 programs, Northeast with 5, and Midwest (CAPES, 2017).

The expansion in the number of graduate programs contributed to increase the Brazilian scientific production of papers and improved the quality of the education provided by Higher Education Institutions (HEI), providing new masters, doctors and experts to the Brazilian academy. Thus, education has gained a new perspective, being acknowledged as one of the most relevant factors, both in the training of people and as a stimulus to a country's educational development (Santos-Neto, 2016).

Numerous researchers deem important that a HEI is aware of the needs, expectations and desires of students to ensure the quality and continuity of its programs and courses (Ostergaard & Kristensen, 2005; Alves & Raposo, 2010; Turkyilmaz, Temizer & Oztekin, 2018). Souza and Reinert (2010) consider satisfaction to be an important aspect in all forms of learning, especially in academic life. The literature presents studies addressing student satisfaction, based on psychopedagogical approaches found in the Brazilian context and educational marketing in the international context.

Therefore, international research and recent Brazilian studies have used constructs based on the European Customer Satisfaction Index (ECSI) to verify the determinants and consequences of student satisfaction in the field of higher education, considering that the European model consistently and reliability explain student satisfaction at the different levels of learning and teaching.

The adapted version of the ECSI intended to identify the perception of students is an econometric structural model that relates the satisfaction of individuals to its conditioning factors, such as institutional image, students' expectations, perceived quality of services, perceived value and student loyalty. The latter is an indicator of performance that allows understanding the dimensions that compose student satisfaction and also presents the resulting factor of satisfaction.

Even though there are various studies addressing satisfaction, those focusing on student satisfaction, both in Brazil and internationally, mainly analyze the satisfaction of undergraduate students and mostly only at a local and institutional level. In general, there is a lack of studies addressing the satisfaction of graduate students at a national level; the same is true in the specific field of Accounting Sciences.

Considering the aforementioned evidence and the need for new studies addressing student satisfaction, the following question was asked: is the model provided by the European Customer Satisfaction Index suitable to analyze the determinants of student satisfaction and loyalty among graduate students in Brazilian Graduate Programs in the field of Accounting Sciences? To answer this question, this study's objective was to use structural equation modeling to verify whether the ECSI model is suitable to verify the determinants of student satisfaction among Master's and Doctoral students from Brazilian Graduate Programs in Accounting Sciences.

The relevance of this study lies in the need to understand the current needs of students and their future expectations, seeking to achieve academic excellence and strengthen the learning process as well as to complete a gap in existing knowledge concerning student satisfaction in Brazilian graduate programs in the field of Accounting Sciences.

Additionally, the measurement of an econometric model to analyze student satisfaction and the entire latent structure conditioning it and its consequences, presents aspects that are unique to this specific population, which should be analyzed to support the continuous advancement of teaching programs. From this perspective, the objective is to contribute to the discussion presented both in the Brazilian and international literature investigating student satisfaction and its implications, collaborating to the advancement of this topic.

The study sample represents 90% of the graduate programs current active in Brazil. These programs' students answered a structured questionnaire, based on the chosen model, composed of 44 questions.

The results show that the ECSI model is suitable to investigate the factors that discriminate student satisfaction and loyalty among Brazilian graduate students. Determination coefficients superior to 70% were found, indicating that the determinants of student satisfaction and loyalty include perceived value and perceived quality of human elements, which directly influence satisfaction and loyalty, while image and expectation constructs, along with perceived quality of non-human elements, serve as mediating dimensions.

2. Literature Review

2.1 The European Customer Satisfaction Index (ECSI)

Satisfaction is seen as a set of perceptions and attitudes that influence a given situation, that is, it is an affective response, over a certain period, resulting from the assessment of quality of a given service (Cunha, Gomes & Beck, 2016). Hence, satisfaction is a critical measure of service performance, weighted by one's expectations and needs.

Given the relevance of individuals' level of satisfaction for organizations and quality of life in general, various countries have a national index to measure and monitor individual satisfaction with organizations in various economic sectors.

The main national indices and barometers intended to measure satisfaction with services presented in the literature are: Swedish Customer Satisfaction Index (SCSI), American Customer Satisfaction Index (ACSI), Norwegian Customer Satisfaction Barometer (NCSB), and the European Customer Satisfaction Index (SARMENTO, 2010). Anderson and Fornell (2000) consider that their main advantage is the fact they are uniform national measures using a single process to estimate satisfaction, thus allowing for comparisons and verifications of how quality has improved at a national level (Fornell, et al., 1996).

The conceptual model this study and the hypotheses proposed here are based on is the same that originated the ECSI. This structural model relates satisfaction to its conditioning factors and consequences, which permits understanding the antecedents and effect on student satisfaction.

What differentiates the ECSI from the remaining satisfaction indexes presented in the literature is that institutional image is considered the first dimension to be operationalized because, in its context, the model expects the variable "image" to cause a direct and positive effect on client satisfaction (Cavalheiro, Tavares, Ferreira, Araujo & Stedile, 2014).

Martensen et. al. (2000) and Eskildsen *et al.* (2000) report that the European model consistently and reliably explained student satisfaction and can be used at different teaching and learning levels and segments, being able to answer the following questions: **How satisfied and loyal are students? How do student satisfaction and loyalty originate at your university? What are the satisfaction and loyalty indexes of students from a given university compared to students from other institutions?**

To support the choice of such a structural model, references list the empirical studies, which directly or indirectly suggest the use of these latent variables suggested by ECSI. Table 1 presents the model's constructs and the definition of each, as well as the authors and studies grounding the theoretical model.

Table 1
Theoretical Support of the European Customer Satisfaction Index (ECSI) model

Latent variables	Definition	Authors/Year
Image	It is the general impression an individual holds of a given service; the sum of all beliefs an individual holds regarding such a service.	Yugo and Reeve (2007); Alves and Raposo (2010); Duarte, Alves and Raposo (2010).
Expectations	It is an assessment of an individual's experiences and consists of one's expectations that a given event will be confirmed.	Voss, Gruber and Szmigin, (2007); Gruber, Reppel, Szmigin and Voss (2008)
Perceived quality	It is an assessment that reflects individuals' perception of specific factors or dimensions concerning the quality of a given service (whether it comes from human or non-human elements).	Sadiq-Sohail and Shaikh (2004); Telford and Masson (2005); Chiandotto, Bini and Bertaccini (2007); Lourenço and Knop (2011)
Perceived value	It is a general assessment of the utility of a service based on the perception of what is received in exchange (cost-benefit).	Parasuraman and Grewal (2000); McDougall and Levesque (2000); Ledden, Kalafatis and Samouel (2007).
Satisfaction	Satisfaction refers to a feeling of pleasure or disappointment that results from comparing a service's perceived quality (performance) with one's prior expectations.	Anderson, Fornell and Lehmann, (1994); Johnson, Gustafsson, Andreassen, Lervik and Cha (2001); Alves and Raposo (2006); Rodrigues and Liberato (2016)
Loyalty	Loyalty is the commitment of an individual to a given service, to keep choosing it and recommending it to others.	Eskildsen et al. (2004); Ostergaard and Kristensen (2005); Morgeson, Mithas, Keiningham and Aksoy (2011); Fernandes, Ross and Meraj (2013)

Source: developed by the authors based on literature review.

Note that the variables of the ECSI model are not directly observed. A set of observable indicators, in the form of a questionnaire with 44 questions, is associated with each of the latent variables to capture the specified behaviors.

In the light of the European Customer Satisfaction Index and empirical evidence, the following hypotheses were established according to this study's objective (Table 2), based on the theoretical review.

Table 2

Hypothesized relationships investigated in this study from the ECSI perspective

Study hypotheses	Empirical studies indicating this relationship
H1: The image of a graduate program positively influences students' expectations	Martensen et al. (2000), Johnson et al (2001), Cruz (2013), Cassel and Eklof (2001), Eurico, Silva and Valle (2015) and Cavalheiro et al. (2014)
H2: The image of a graduate program positively influences the value perceived by students	Martensen et al. (2000), Pereira et al. (2016), Cavalheiro et al. (2014), Palacio, Meneses and Pérez (2002), Alves and Raposo (2006; 2010), Kristensen, Eurico, Silva and Valle (2015) and Turkyilmaz, Temizer and Oztekin (2018).
H3: The image of a graduate program positively influences students' satisfaction	Eurico, Valle and Silva (2013), Egyir (2015), Turkyilmaz, Temizer and Oztekin (2018), Martensen et al. (2000), Pereira et al. (2016), Cavalheiro et al. (2014)
H4: The image of a graduate program positively influences students' loyalty	Alves and Raposo (2006;2010), Martensen et al. (2000), Pereira et al. (2016), Cavalheiro et al. (2014), Palacio, Meneses and Pérez (2002), Alves and Raposo (2006; 2010), Kristensen, Martensen and Gronholdt (1999), Eurico, Silva and Valle (2015) and Turkyilmaz, Temizer and Oztekin (2018)
H5: Students' expectations positively influence the perceived quality of a graduate program	Fornell et al. (1996), Zeithaml and Bitner (2003), Gonçalves-Filho, Guerra and Moura (2004), Cruz (2013), Cavalheiro et al. (2014) and Pereira et al. (2016)
H6: Students' expectations positively influence the value they perceive	Alves and Raposo (2006) and Cavalheiro et al (2014), Fornell et al. (1996) and Ostergaard and Kristensen (2005)
H7: Perceived quality directly influences students' perceive value	Fornell (1992), Telford and Masson (2005), Cruz (2013) and Pereira et al. (2016),
H8: Perceived value positively influences students' satisfaction	Alves and Raposo (2006), Gonçalves Filho, Guerra and Moura (2004), Turkyilmaz, Temizer and Oztekin (2018), Martensen et al, (2000) and Ostergaard and Kristensen (2005)
H9: Perceived quality positively influences students' loyalty	Turkyilmaz, Temizer and Oztekin (2018)
H10: Perceived value positively influences students' satisfaction	Alves and Raposo (2006), Egyir (2015), Gonçalves Filho, Guerra and Moura (2004), Ostergaard and Kristensen (2005), Eurico, Silva and Valle (2015) and Turkyilmaz, Temizer and Oztekin (2018)
H11: Students' satisfaction with their educational experience directly and positively influences their loyalty toward a graduate program	Martensen et al. (2000), Ostergaard and Kristensen (2005), Alves and Raposo (2006), Gonçalves-Filho, Guerra and Moura (2004), Duarte (2013), Eurico, Silva and Valle (2015), Henning-Thurau, Langer and Hansen (2001), Turkyilmaz, Temizer and Oztekin (2018), Cavalheiro et al. (2014), Faé (2016) and Pereira et al. (2016)

Source: developed by the authors based on research (2017)

From this perspective, research on student satisfaction and its dimensions is relevant to assess the efficiency of education services, contributing to quality indicators to measure the perception of service users, to identify an institution's image, and to understand students expectations concerning the perceived value one intends to obtain when choosing a program, that is, the aspects that enable institutions to identify their weaknesses and achieve satisfaction and loyalty.

Therefore, the objective is to contribute to graduate programs in Accounting Sciences by understanding the current needs of students and their future expectations, seeking to strengthen the learning process and to achieve academic excellence, improving the academic relationship between students and their respective graduate programs.

2.2 Empirical studies addressing student satisfaction from the ECSI perspective

We present references of empirical studies that directly or indirectly ground the use of these latent variables to support the choice of this structural model. Table 3 lists studies that have applied the ECSI, along with their main results.

Table 3

Recent studies using the ECSI model in the education context

Author/Year	Purpose and Method	Results
Martensen et al (2000)	To develop and apply a model of students' perceived quality, satisfaction and loyalty inspired in the ECSI model. The study addressed students from different programs at a public university in Denmark. Data were collected by mail with a 24% response index.	The authors concluded that the ECSI structure adapted to the educational context satisfactorily. The model was considered flexible enough to be used in higher education institutions.
Ostergaard and Kristensen (2005)	To evidence the potential application of the ECSI model to measure student satisfaction. The study was applied among college, Master's and doctoral students from the Aarhus School of Business in Denmark.	Among the exogenous latent variables, the study shows students' high expectations and poor perception of service quality. The students' perceptions in terms of the endogenous latent variables, perceived value and loyalty was higher than their satisfaction.
Alves and Raposo (2006)	To test an explanatory model of satisfaction among undergraduate students (ECSI) to understand the factors influencing student satisfaction. The model was tested, using structural equations, among undergraduate students from various fields of knowledge in Portugal.	The study reports that institutional image was the variable that imost strongly nfluenced satisfaction among undergraduate students, followed by perceived value and perceived quality. The study also shows that expectations negatively influences satisfaction while loyalty was reported as the main consequence of satisfaction.
Alves and Raposo (2010)	To analyze how institutional image influences student satisfaction and loyalty. Therefore, the study employed an adapted model of ECSI through structural equations addressing students from various fields of knowledge at public universities in Portugal.	The results indicate that institutional image strongly impacts student satisfaction, directly or indirectly. Institutional image influences loyalty to a lesser but significant extent; its influence becomes more important when indirect effects are considered.
Eurico, Valle and Silva (2013)	To better understand the factors influencing former tourism students working in the field. An adapted ECSI model was used.	The authors concluded that the ECSI is suitable to assess student satisfaction and the findings suggest that institutional image is the most significant predictor of student satisfaction, loyalty being a direct consequence of satisfaction.
Cavalheiro et al. (2014)	To assess the determinants of general satisfaction among undergraduate students at a private higher education institution located in the Northwest of Rio Grande do Sul, Brazil using the European model of student satisfaction.	The results indicate that perceived value, institutional image and expectations explained 78% of student satisfaction at the institution.
Egyir (2015)	To investigate antecedents of student satisfaction and loyalty among undergraduate students from Ghana. The sample included students from the University of Ghana and an adapted ECSI model was used.	The study shows that perceived value, institutional image and perceived quality are antecedents that positively influence student satisfaction levels. Additionally, satisfaction implies students' loyalty.
Pereira et al. (2016)	To propose and validate a student satisfaction model based on the ECSI. The sample was composed of students from the centers of applied social sciences at two private higher education institutions located in Rio Grande do Sul, Brazil.	The ECSI proved to apply to the Brazilian educational context. Institutional image directly and significantly influences perceived value, satisfaction, and loyalty of the students from the institutions addressed.

Source: developed by the authors based on research (2017)

The empirical studies presented in Table 3 present the applicability of the ECSI to investigate student satisfaction and loyalty both in Brazil and in the international context, supporting the use of this model in this investigation. Thus, it is important to note the lack of studies addressing graduate programs. Therefore, one of this study's objective was to expand studies directed at the target population: graduate students.

Hence, assessing students' satisfaction with their program is essential for institutions, as it permits reflecting on how students perceive the general quality of the institution's educational services, contributing to improve the programs' quality and continuity (Andrade, Tavares & Valle, 2000; Santos-Neto, 2016).

3. Methodological Procedures

In terms of its objective, this is a descriptive study with a quantitative approach. A structured questionnaire was used, adapted from the studies by Ostergaard and Kristensen (2005), Martensen, *et al.* (2000), and Paswan and Young (2002) and adopting the ECSI perspective. The instrument resulted in a survey with 44 associated questions and six latent variables, composing the determinants of student satisfaction and loyalty.

To build upon previous studies, this study incorporated the original instrument applied by Ostergaard and Kristensen (2005), with 31 observable variables intended to capture the determinants of student satisfaction and loyalty in light of marketing according to the ECSI, indicators that originated from Martensen *et al.* (2000) and Paswan and Young (2002). It presents a psychopedagogical aspect of student satisfaction, including more detailed questions addressing perceived quality, resulting in a survey with 44 associated questions and six latent variables that compose the determinants of student satisfaction and loyalty.

The original instrument is based on education marketing, which investigates satisfaction utilizing constructs and indicators, viewing students as consumers who hold expectations and behaviors toward a given service. The point of view of this psychopedagogical perspective analyzes student satisfaction by verifying specific indicators related to the student-professor interaction as well as the academic environment and behavior of professors when administering the content of courses.

The questionnaire used an ordinal seven-point Likert scale with randomly distributed questions, named in the first and last label according to each question to enable respondents to better understand what each question intends to capture. The categories of answers, labeled according to Weijters, Cabooter and Schillewaert (2010), are an important aspect because they may interfere in the results.

A nationwide non-probabilistic sample was used in this study. It is composed of graduate students from Accounting Sciences programs identified on the Capes website using the Sucupira platform. After applying filters to select the minor and major fields using the terms "accounting sciences, accounting, and controllership" to refine the search, 29 graduate programs were identified: 4 professional degree programs and 25 academic degree programs, with a population of 1,205 students in 2017. The link to the questionnaire was disseminated by e-mail to the addresses in the programs' registration on the Sucupira platform. The questionnaire was sent between October and December 2017, when the questionnaire was also posted on Google to receive responses.

The study reached respondents from 26 programs and 323 valid observations were collected. Assumptions used to apply multivariate analysis were verified according to methodological stages, treatment of missing data, inexistence of outliers, absence of multicollinearity, and multivariate normality.

Previous data analysis consisted of verifying missing data using descriptive analysis (frequency of variables) to verify central trend measures, sample distribution kurtosis, detecting two missing data in the observable variable (Q2), which represented 0.6% of total data. Therefore, as avoiding missing data would affect the variable's property, even though still within the parameters recommended by Hair, Black, Babim, Anderson and Taham (2009), i.e., not below 5 or 10%, we opted to remove the cases from the database. Thus, the observations concerning individuals 161 and 245 were excluded.

The procedure used to diagnose the presence of outliers was a visual diagnostic measure with boxplot chart and standard deviations to compare cases. The standardized scores of variables were considered, using a procedure in the statistical software that transforms each response score into standard deviation. We used the one proposed by Hair *et al.* (2009) to verify whether cases were between 2.5 and 4.0 deviations. There were 11 cases in which the individuals presented extreme responses below 4.0 standard deviations from the mean of the variable under study. Thus, individuals 40, 84, 103, 132, 133, 206, 209, 242, 248, 316, who presented extreme answers below the maximum value established for standard deviations, were considered outliers and removed from the database. After removing extreme observations, the database totaled 311 valid answers included in the data analysis.

Cronbach's alpha was used to verify the instrument's consistency. It measures a questionnaire's internal consistency on a scale between 0 and 1 $(0 < \alpha < 1)$, verifying the coherence of answers assessing each item. Values above 0.7 indicate good consistency and above 0.8 indicate very good consistency. The coefficients calculated for each latent construct and their respective indicators present very good internal consistency, with alphas between 0.8 and 0.9, while the internal consistency of the entire questionnaire was equal to 0.98.

The Variance inflation factor (VIF) was used to verify the existence of multicollinearity using the parameter proposed by Gujarati (2011): one VIF≤10 indicates absence of multicollinearity. The VIF analysis using multiple linear regression indicated no multicollinearity in any of the exogenous variables as VIFs were well below 10. Hence, all variables were kept in the original model used to analyze student satisfaction and loyalty.

Finally, the last assumption measured was the Multivariate Normality Test, using distribution measures such as skewness (sk) and Kurtosis (ku). To accept the assumption of normality of data, we considered sk≤2 and ku≤7. The results concerning *sk* and *ku* show no serious violation of the normality assumption considering that all *sk* values were below 2 and *ku* values were below 7.

Hence, no extreme conditions of violation of normality were found, that is, we have no reason to question the quality of the adjustment indexes and estimated parameters. Thus, the Maximum Likelihood method was applied.

We then performed descriptive data analysis. Afterwards, multivariate analyses were conducted, including Exploratory and Confirmatory Factor Analysis using Structural Equation Modeling. Table 4 presents the statistical procedures and tests and the corresponding references to the literature.

Table 4

Multivariate techniques

Procedures	Statistical technique	Purpose	Author
Exploratory Factor Analysis	Exploratory Factor Analysis - Kaiser-Meyer-Okin (KMO) test	To seek underlying dimensions, aiming to find the most important or significant in a set of variables. To verify patterns of relationships and correlations over a large number of variables in the theoretical model to establish a factor through which differences among respondents are observed in an established test scale.	Hair et al (2009); Corrar, Paulo e Dias Filho (2007)
	Exploratory Factor Analysis – Bartlett's sphericity		
	Exploratory Factor Analysis - Communalities		
	Exploratory Factor Analysis – Anti-image correlation matrix		
	Exploratory Factor Analysis – Total variance explained		
	Exploratory Factor Analysis – Factor loading of components		
Structural Equation Modeling using Confirmatory Factor Analysis	CMIN/DF (Chi-square/degrees of freedom)	To test the hypotheses concerning the relationships of variables contained in the theoretical model proposed by the ECSI, assessing the model from a global perspective of analysis, validating assumptions on the collected data and mutual relationships.	Marôco (2014); Hair et al (2009)
	CFI (comparative fit index)		
	GFI (goodness of fit index)		
	TLI (Tucker-Lewis index)		
	RMSEA (root mean error of approximation)		

Source: developed by the authors based on the study's data (2017)

In agreement with this study's objectives, EFA was used to study underlying structures and relationships between the six latent variables with each respective observable variable; totaling 44 stated variables of the ECSI proposed to address the students. This procedure proceeds because this study builds upon previous studies adding other indicators to the original instrument applied by Ostergaard and Kristensen (2005).

Note that even though EFA is used, *a priori*, the latent structure of data is little known. This study was based on prior theoretical knowledge presented in Chapters 2 and 3. In that sense, this is not a complete exploratory factor analysis.

Extraction of the appropriate number of factors was performed using the Principal Components method with the eigenvalue criterion (*Eigenvalue* ≥ 1). To improve the interpretation of the factor solution, the Varimax orthogonal rotation was used, in which factors assume an independent basis in the vector space, contributing to minimize cross-loadings or vector ambiguity.

The recommendations by Hair *et al.* (2009) were considered, according to which the following statistical tests and measures should be analyzed while recommended values should be observed: i) factor loading of components ≥ 0.30; ii) the commonalities of each variable ≥ 0.50; iii) Kaiser-Meyer-Olkin test (KMO) ≥ 0.50, as Measure of Sampling Adequacy-MAS; iv) Bartlett's sphericity test < 0.001; v) percentage of cumulative variance of variables for the generated latent factor ≥ 60% and eigenvalue > 1. The anti-image correlation matrix was analyzed to access the sample adequacy measure for each variable, with all elements on the matrix diagonal being > 0.5 to justify their retention in the analysis.

After the exploratory analysis, a confirmatory analysis of factor structure was performed to confirm structural patterns, verifying goodness of fit indexes according to the references proposed by Marôco (2014) and Hair *et al.* (2009). The methodological steps developed in this stage were suggested by Marôco (2014) for structural equation modeling, which comprises: identification of the model, estimation of the parameters, assessment of adjustment criteria, re-specification and validation of the model based on the structural equation modeling.

4. Analysis of Results

4.1 Results of Exploratory Factor Analysis (EFA)

The results of the exploratory factor analysis of the models resulting from the variables tested in the ECSI model are presented in Table 5, as follows:

Table 5
Results of the exploratory factor analysis of the variables of the ECSI model

Factor	Observable variable	Communalities	Factor loading	Kaiser-Meyer-Olkin (KMO)	Barlett's sphericity test	Anti-image matrix		Total variance explained	
						MSA Mean	Minimum value	Eigenvalue>1	(%)
Image	IM1	0.63	0.80	0.80	0.000	0.805	0.782	2.66	66.55
	IM2	0.61	0.78						
	IM4	0.70	0.84						
	IM5	0.72	0.85						
Expectation	E2	0.71	0.84	0.81	0.000	0.816	0.756	2.78	69.63
	E3	0.63	0.79						
	E5	0.65	0.81						
	E7	0.80	0.89						
Perceived quality (Human elements)	Q9	0.59	0.77	0.84	0.000	0.84	0.812	3.26	65.32
	Q10	0.73	0.85						
	Q11	0.67	0.82						
	Q12	0.61	0.78						
	Q13	0.67	0.82						
Perceived quality (non-human elements)	Q1	0.58	0.76	0.89	0.000	0.899	0.859	3.67	61.30
	Q3	0.29	0.54						
	Q6	0.71	0.84						
	Q8	0.63	0.80						
	Q14	0.72	0.85						
	Q15	0.75	0.86						
Perceived value	V1	0.72	0.85	0.80	0.000	0.798	0.752	3.15	63.09
	V2	0.70	0.84						
	V3	0.63	0.79						
	V4	0.58	0.76						
	V5	0.52	0.72						
Satisfaction	S1	0.85	0.92	0.92	0.000	0.921	0.903	4.62	77.03
	S2	0.82	0.90						
	S3	0.67	0.82						
	S4	0.68	0.82						
	S5	0.80	0.89						
	S6	0.81	0.90						
Loyalty	L1	0.84	0.92	0.86	0.000	0.872	0.806	3.65	73.15
	L2	0.60	0.78						
	L3	0.85	0.92						
	L4	0.76	0.87						
	L5	0.61	0.78						

Source: developed by the authors based on the study data (2017)

The exploratory analysis resulted in the initial exclusion of 9 observable variables that presented low commonalities (<0.5), that is, the portion of data that is explained by common factors, namely: IM3(0.49), E1(0.48), E4(0.31), E6(0.44), E8(0.47), Q2(0.43), Q4(0.47), Q7(0.41), Q5(0.34). That is, common factors do not explain variance, indicating that these variables are not correlated, so that they should not be included in the factor analysis, as noted by Hair *et al.* (2005).

The EFA also shows that the psychometric characteristics of those variables in terms of perceived quality accrued from two latent factors. In this sense, the Theoretical Model of Departure was re-specified, incorporating human elements (HEPerceivedQ) and non-human elements of perceived quality (NHEperceivedQ). Therefore, the relational structure of ECSI was *adapted*, resulting in the model presented in Figure 1.

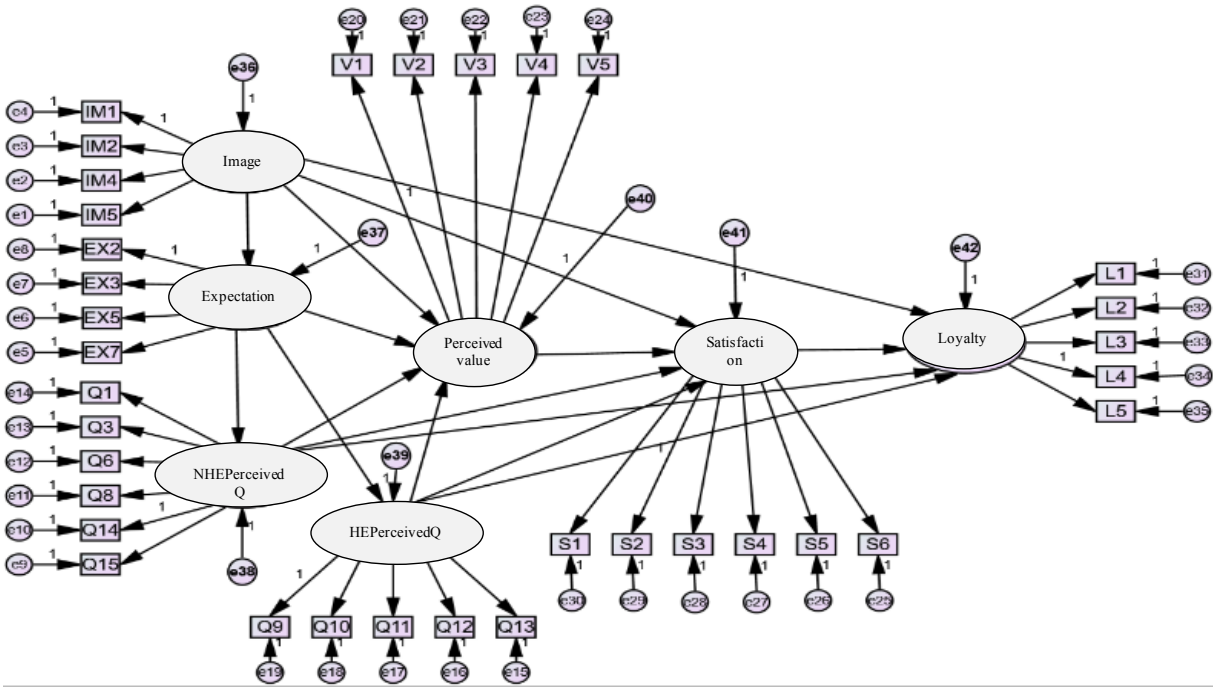

Figure 1. ECSI model proposed after EFA

Source: developed by the authors based on the study data (2017)

Martensen et. al. (2000) and Eskildsen *et al.* (2000), corroborated by Alves and Raposo (2006) and Ostergaard and Kristensen (2005), suggest separating the general factor perceived quality into two factors called: "hardware" perceived quality, composed of non-human elements such as studies, curricula, physical facilities, and "software" perceived quality, that is, human elements such as teaching and personal contact with faculty members, administration and employees.

Dividing perceived quality between human and non-human elements, as they are called in this study, is coherent in an educational institution, and the empirical study confirmed that this separation results in higher psychometric properties; hence, it is appropriate to this investigation (Martensen et. al., 2000) and shows that students consider different aspects when perceiving the quality of the educational services.

4.3 Confirmatory Factor Analysis (CFA) and Structural Equations Modeling (SEM)

Confirmatory Factor Analysis (CFA) was performed using the Maximum Likelihood method.

To achieve stability of the empirical model of student satisfaction, the following variables needed to be excluded: IM1 (image factor), EX5 (expectation factor), Q3 and Q15 (non-human perceived quality factor), Q9 (human perceived quality factor), S3 and S6 (satisfaction factor). Note that all the 35 stated variables were appropriate when individually analyzed in the EFA. When analyzing the complete structural model, with all factors together, however, these seven stated variables needed to be excluded to obtain convergence and stability for the model. The CFA's goodness of fit indexes show what Marôco (2014) and Hair *et al.* (2009) noted regarding reference values for the analysis, as presented in Table 6.

Table 6
CFA results for the study's structural model

Indexes	Results of the model's indexes	Acceptance levels
Adjustment tests		
Chi-square (X^2)	801.733	Menor melhor
Degrees of freedom (df)	335	≥ 1
p-value	0.000	> 0.05
Absolute indexes		
CMIN/DF	2.393	< 3
RMSR	0.080	< 0.08
GFI	0.844	> 0.90
Relative indexes		
CFI	0.935	> 0.90
TLI	0.927	> 0.90
Population discrepancy indexes		
RMSEA	0.067	< 0.08
Parsimony indices		
PCFI	0.829	> 0.60
PNFI	0.793	> 0.60

Source: developed by the authors based on the study's data (2017)

Analysis of the adjustment indexes enables verifying that GFI=0.844 for the model presented moderate adjustment. All the remaining quality indexes, though, achieved good levels, and all the latent and stated variables were significant at 1%. Therefore, in general, the indexes of the proposed model were within adjustment patterns considered to be adequate.

Additionally, as recommended by Marôco (2014), the construct validity indicator was analyzed to assess the quality of the structural model. Hence, the composite and convergent validity of the model's observable variables were verified. The aforementioned authors estimate that acceptable values for these indicators are ≥ 0.70 for composite reliability and ≥ 0.50 for convergent validity, as shown in Table 7.

Table 7

Results of the composite and convergent validity of factors

Factor	Composite Validity	Convergent Validity
Image	0,75	0,58
Expectations	0,75	0,56
Perceived Quality (Human elements)	0,80	0,59
Perceived Quality (Non-human elements)	0,80	0,60
Perceived Value	0,83	0,52
Satisfaction	0,80	0,74
Loyalty	0,83	0,69

Source: developed by the authors based on the study's data (2017)

The parameters present in Table 7 confirm the composite reliability and convergent validity of all the factors analyzed. The results concerning confirmatory factor analysis were incorporated in the proposed theoretical model validated through CFA, resulting in the model of satisfaction of graduate students from Accounting Sciences programs in Brazil.

Therefore, after obtaining the structural model of student satisfaction in the context of graduate programs, it is essential to present the explained variance of the factors integrating the final model. This analysis permits understanding the extent to which each variable is explained by the remaining latent variables.

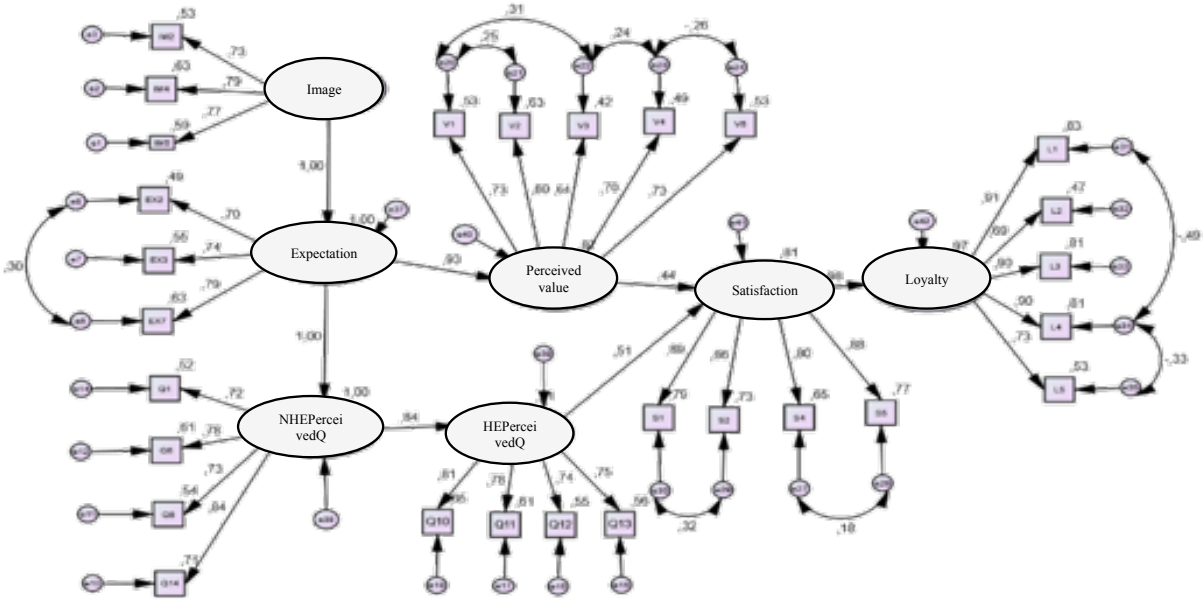

Figure 2. Research model after Confirmatory Factor Analysis

Source: developed by the authors based on the study's data (2017)

Table 8
Explained variance of the endogenous latent variables

Endogenous latent variables	% explained variance of the model
Expectations	99,8%
NHEPQ	99,9%
HEPQ	71,2%
Perceived Value	87,4%
Satisfaction	80,6%
Loyalty	96,6%

Source: developed by the authors based on the study's data (2017)

The explained variance of the model's constructs presented in Table 8 shows that the conceptual model adopted in this study explains 96.6% of the variance concerning loyalty and 80.6% of student satisfaction verified among graduate students from Brazilian Accounting graduate programs. According to the ECSI's Technical Committee (1998, *apud* Ostergaard & Kristensen, 2005), the coefficient of determination, i.e., R^2 of consumer satisfaction must be at least 0.65, that is, the model has to explain at least 65% of what leads to satisfaction.

Thus, the prevalence of a model with high explanatory power is verified, considering that the variances indicate that student loyalty and satisfaction can be measured by changes in factors that integrate the student satisfaction model. The remaining 3.4% and 19.4%, respectively for loyalty and satisfaction, are attributed to constructs not considered in the model. Hence, the ECSI model adapted for students has high power to explain the dimensions that influence student satisfaction and loyalty among graduate students from Brazilian Accounting Sciences programs.

4.3.1 Analysis of the study hypotheses

Even though some relationships in the analysis of hypotheses did not present significance to be kept in the conceptual model as it was originally developed, after being re-specified, the ECSI model proved to be suitable to measure student satisfaction and loyalty among Brazilian graduate students. This corroborates results from similar studies and is coherent with the literature grounding this conceptual model.

The first hypothesis (H1) was not rejected, that is, a significant association was found between the image and expectations constructs. Emphasizing the importance of this relationship, the confirmation of hypothesis 1 shows that the image of a program held by students shaped their expectations. This result is in line with Martensen *et al.* (2000), Johnson et al (2001), Cruz (2013), Cassel and Eklof (2001), Eurico, Silva and Valle (2015) and Cavalheiro *et al.* (2014). The analysis also confirmed hypothesis 5 as it reports that expectations have a positive and significant effect on perceived quality, a result that is in agreement with Fornell *et al.* (1996), Gonçalves-Filho, Guerra and Moura (2004), Zeithaml and Bitner (2003), Cruz (2013), Cavalheiro *et al.* (2014) and Pereira *et al.* (2016), as they argue that expectations have a significant and positive impact on perceived quality. Hence, students are expected to create rational expectations to be coherent with the levels of quality they will experience when they enroll in the chosen program.

Hypothesis 6 was not rejected either, that is, there is a relationship between the students' prior expectations and perceived value, a result that is similar to Fornell *et al.* (1996), Ostergaard and Kristensen (2005), Alves and Raposo (2006), Cavalheiro *et al.* (2014) however, opposes those reported by Cruz (2013) and Pereira *et al.* (2016). This result shows that the perceived value students attach to an academic experience is closely linked with their prior expectations based on their needs. Additionally, there is a direct association between the perceived quality of human elements and satisfaction, confirming hypothesis 8, corroborating the results presented by Alves and Raposo (2006), Filho, Guerra and Moura (2004) and Turkyilmaz, Temizer and Oztekin (2018). All these authors found that perceived quality is a satisfaction antecedent, against the findings of Pereira *et al.* (2016), in which such a relationship was not significant.

In agreement with the studies by Alves and Raposo (2006), Filho, Guerra and Moura (2004), Egyir (2015), Ostergaard and Kristensen (2005), Eurico, Silva and Valle (2015) and Turkyilmaz, Temizer and Oztekin (2018), a positive association was found between perceived value and student satisfaction as predicted in hypothesis 10. As suggested by Woodruff (1997) and Gonçalves-Filho, Guerra and Moura (2004), the high level of satisfaction students may experience accruing from the perceived value of attending a graduate program, indirectly (mediated by satisfaction) reflects on student loyalty.

Finally, satisfaction was also found to be directly and significantly related to loyalty, which confirms hypothesis 10, that is, loyalty is a consequence of satisfaction, showing the importance of the construct satisfaction in determining student loyalty, contributing to improve a program's academic reputation. This result was previously reported by Martensen *et al.* (2000), Ostergaard and Kristensen (2005), Alves and Raposo (2006), Gonçalves Filho, Guerra and Moura (2004), Duarte (2013), Eurico, Silva and Valle (2015), Henning-Thurau, Langer and Hansen (2001), Turkyilmaz, Temizer and Oztekin (2018), Cavalheiro *et al.* (2014), Faé (2016) and Pereira *et al.* (2016).

Nonetheless, some relationships did not present significance to be kept in the model's original conception and the hypotheses that investigated direct relationships between institutional image and perceived value, satisfaction and loyalty, as confirmed by Martensen *et al.* (2000), Pereira *et al.* (2016), Cavalheiro *et al.* (2014), Palacio, Meneses and Pérez (2002), Alves and Raposo (2006; 2010), Kristensen, Martensen and Gronholdt (1999), Eurico, Silva and Valle (2015), Turkyilmaz, Temizer and Oztekin (2018) and Egyir (2015), were not significant in this study.

Results regarding relationships originating in the "institutional image" factor, were contrary to expectations based on the literature addressing student satisfaction from the ECSI perspective, according to which institutional image is the main driver of value perception, satisfaction and loyalty among students. These relationships, however, were rejected in this study as, according to the graduate students, the image of a program does not interfere in the perceived value, satisfaction or loyalty.

Note that the relationships between perceived quality (both of human and non-human elements) and perceived value, which were rejected in this study, diverge from the findings by Fornell (1992), Cruz (2013), Pereira *et al.* (2016) and Telford and Masson (2005), despite being similar to Eurico, Silva and Valle (2015). Likewise, the direct impact between perceived quality and student loyalty is not supported by data obtained in this study, so that this hypothesis was rejected, corroborating with the results reported by Martensen *et al.* (2000) and confirming that perceived quality and loyalty are not directly related in this sample.

5. Final Considerations

The literature addressing satisfaction defines it as a psychological state, which prevents its direct observation. Thus, satisfaction is considered a latent trait that should be analyzed based on the observation of related secondary variables that contribute to the development of its specific concept (Anderson, Fornell & Lehmann, 1994; Fornell et al., 1996; Tontini & Walter, 2011). The existence of latent dimensions such as perceived quality, expectations, institutional image, perceived value, loyalty and its relationships are considered aspects that compose satisfaction with all its implications.

The structural equation modeling was used to test the conceptual model proposed by Martensen *et al.* (2000), aiming to verify whether this model represents the determinants of student satisfaction and loyalty among graduate students enrolled in Brazilian programs in the Accounting Sciences field. The study sample included approximately 90% of the graduate programs in Accounting Sciences active in Brazil and, after treating the data, 311 valid responses were obtained.

The results show that six out of the 11 hypothetic relationships analyzed in this study were not rejected, based on empirical studies and theory based on the ECSI. These predicted relationships between image and expectations (H1), expectations and perceived quality (H5), expectations and perceived value (H6), perceived quality and satisfaction (H8), perceived value and satisfaction (H10), and satisfaction and loyalty (H11. As a result, an adapted empirical model was developed to measure student satisfaction based on the ECSI.

The results of determination coefficients revealed that the aforementioned dimensions are antecedents and explain 80.6% of satisfaction, indicating that the determinants of satisfaction are perceived value, perceived quality with human elements, directly influencing the constructs of image, expectations, and perceived quality of non-human elements as mediating dimensions. The model also shows that six dimensions explain 96.6% of the construct loyalty; satisfaction directly influences while the remaining factors exert an indirect influence.

The results obtained in this study are similar to the results obtained by previous studies at the extent that all the factors integrating the original ECSI model were kept after empirical analysis was conducted in the context of Brazilian graduate programs. Nonetheless, the relationships between the constructs integrating the model and their influences on the study's central constructs, satisfaction and loyalty, are not similar with those reported by preceding studies, revealing there is a difference between the perceptions hold by undergraduate and graduate students.

The differences between these groups of individuals mainly occurred between institutional image and perceived quality, which in previous studies, appear as primary dimensions composing the relationships between student satisfaction and loyalty. That said, this study's findings suggest that, the external institutional image of a program does not directly influence the satisfaction of graduate students, their loyalty toward the program or the value they perceive of their academic experience, differently from what happens among undergraduate students.

Another discordant point of view presented by previous studies refers to the dimensions permeating perceived quality students hold regarding the program they are enrolled in. The results show that, the perceived quality of an institution's structure facility elements, which serve as a support to studies, does not prompt the value perceptions, satisfaction or loyalty among graduate students from public universities (a representative sample in this study), showing that the faculty of public HEIs along with human relations, that is, the perceived quality of human elements, directly impact the satisfaction of students.

Therefore, an effort on the part of coordinators to improve the human elements of a program and, consequently, to improve the perceived quality of human elements, is a differential that leads to student satisfaction and, thereafter, student loyalty. Loyalty may be manifested by students committing to their programs, seeking, together with faculty members and coordinators, to constantly improve the program, obtaining expressive rates of attraction of future students and achieving high grades in the Capes program.

The conclusion, after identifying the dimensions that contemplate student satisfaction, as well as its implications, is that this study presents a differential when compared to earlier studies, as it proposed a nationwide analysis of student satisfaction and obtained the representativeness of 90% of graduate programs. Additionally, studies addressing student satisfaction in the scope of graduate program are rare. The results show that the ECSI model of satisfaction is suitable to analyze student satisfaction and loyalty among Brazilian graduate students, as it obtained good representativeness of programs and significant explanatory indexes.

Therefore, by revealing the structural model that portrays the determinant of student satisfaction and going beyond an assessment of programs' technical production, we intended to carefully look at the academic experience of graduate students. The results obtained here are expected to contribute to students' academic learning so they obtain a high level of satisfaction and good performance, translating in positive assessments of programs and the entire area of education.

The specific knowledge generated in this study concerning how graduate students in Accounting Sciences programs behave toward educational services is a differential for the field as it enables understanding the perspective of students on their academic experience. Thus, this information is expected to support constant improvement of processes to meet students' desires. Without exhausting the potential for the practical application of this study's results, monitoring student satisfaction can contribute to the improvement of programs (Capes grade) and continuity of programs in the field.

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