
Analysis of the Relationship between Perceived Service Performance and Students' Socioeconomic and Demographic Characteristics: A Study of a Private Technical School

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Abstract:

Purpose: This study analyzed the relationship between service performance and students' socioeconomic and demographic characteristics at a private technical school in Florianópolis.

Design/Methodology/Approach: The research was quantitative, descriptive, and survey-type. It used an adapted HEDPERF questionnaire with 35 items. It employed the Osgood semantic differential scale, a final sample of 197 respondents, reliability and fit indices in line with the literature, and analysis using descriptive statistics, ANOVA, and Tukey's post-hoc test.

Findings: The results show differences in the perception of course quality according to the variables Shift, Sex, Schooling, Number of children, Semester, and Income of the students. These findings are partially in line with previous literature. On the other hand, results indicate there is no difference in the perception of course quality according to the variables Course, Race, Marital Status, Age, Number of Dependents, and Nature of High School. These findings are partially in line with the reviewed literature.

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Practical Implications: *The findings of this research will enable technical course managers to develop actions focused on the profiles of students who are most critical to service performance.*

Originality/Value: *These findings are partially in line with the reviewed literature.*

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1. Introduction

From the perspective of service quality, it is necessary to start with the student's perception of educational services since they are the end users and should be heard to measure the degree of satisfaction with the institution they attend.

Measuring their opinion of the service provided allows institution managers to act on points for improvement and invest even more in strengths, considering there is a direct correlation between the performance of a service and the quality perceived by the end consumer of that service. Opinion is an essential tool for strategic planning aimed at action plans to achieve the proposed objectives (Kotler, 1998).

In a highly competitive market, providing quality services is necessary for companies' survival and success; educational institutions are included in this, regardless of whether they are private or public. Each person and each author interprets service quality differently, which brings about a broad discussion that the common understanding does not seem to be close to (Baffour-Awuah, 2018).

Espartel (2009) highlights the importance of evaluating student satisfaction with the course as it allows critical points for identifying improvement and the continuation of points considered positive. Measuring quality in the education sector leads to measuring the quality of services; this introduces complexity, as there is a discussion in academia about different ways of understanding the subject of quality since service is a perishable, intangible experience developed for a consumer who plays the role of co-producer.

Kotler and Fox (1994) emphasize that, to be successful, an educational institution must deal effectively with diverse audiences and generate a high level of satisfaction.

Some authors were dedicated to creating instruments that can help managers measure the quality of their services and, consequently, guarantee customer satisfaction since quality is an antecedent to customer satisfaction. For example, Parasuraman *et al.* (1988) with the SERVQUAL scale; Cronin and Taylor (1992)

with the SERVPERF model; and Abdullah (2006b) with the HEdPERF methodology.

Abdullah's (2006b) model with adaptation was used for this study, as it was created specifically for the higher education sector and was validated by other researchers in research with national and international educational institutions.

In Brazil, there is a type of education popularly known as technical education. The object of this research is a private technical school founded in 2000. The school has 877 students enrolled and units in the cities of Florianópolis and Itajaí. Most (75%) students are enrolled in the technical nursing course. The Technical School offers five technical courses: Business, Nursing, Interior Design, Radiology, and Massage Therapy (information collected from the school's institutional website).

Recent studies using the HEdPERF scale with socioeconomic and demographic variables found in the main databases include Lopes and Guimarães (2023); Souza *et al.* (2020); Ramzi *et al.* (2022); Khalid *et al.* (2019); Gürbüz and Bayraktar (2023); Yavuz and Gülmez (2016); Ahmad and Kawtharani (2021); Rachmadhani *et al.* (2018); Khalid *et al.* (2021); Swai *et al.* (2022); Pinna *et al.* (2023).

The HEdPERF scale is used in educational institutions in several countries, which demonstrates its applicability in different cultural contexts; however, among the analyzed studies, no application of the HEdPERF scale with socioeconomic and demographic variables was found in a private technical school, which emphasizes the relevance of this study.

Based on this context, the research question is: “*What is the relationship between service performance and the socioeconomic and demographic characteristics of students at a technical school?*”

Therefore, this research aims to analyze the relationship between service performance perception and students' socioeconomic and demographic characteristics at a private technical school.

2. Literature Review

2.1 Service Quality

Professionals and academics are interested in measuring service quality to understand its essential antecedents and consequences better and, thus, establish methods for improving quality to gain competitive advantage and customer loyalty (Zeithaml *et al.*, 2014). The pressures that drive successful organizations towards high-quality services make measuring service quality and its consequences extremely important (Webster, 1989).

According to Falconi (2014), a quality service is reliable and accessible and meets customers' needs. Zeithaml *et al.* (2014) state that what is considered a quality service for the customer in a given period or situation may no longer be so in another period or situation. Grönroos (2016) presents that quality in the provision of a service is related to customer perception; the perceived quality of a certain service is obtained from its consumers, who choose service providers by comparing the expected service with the service provided.

Thus, good service results are obtained when customer expectations are met. For Bordoloi *et al.* (2022), a service is a perishable, intangible experience developed for a consumer who plays the role of co-producer.

There are tools for measuring the quality of services in a company, and these instruments are generally used by external customers to measure quality when evaluating internal services. One tool used to measure quality was developed in studies by Parasuraman *et al.* (1985; 1988); it is called the SERVQUAL scale and is one of the most essential evaluation tools. Cronin and Taylor (1992) developed the SERVPERF model based solely on the perception of service performance.

Conversely, Abdullah (2005; 2006a; 2006b) proposed a new instrument to evaluate only the quality of educational services, called Higher Education Performance (HEdPERF).

2.2 Hedperf

In education, there are service relationships that maintain the same dynamic as in other areas. Nogueira and Las Casas (2015) point out that when students enroll in an educational institution, they acquire a service and expect to receive knowledge to put a professional growth plan into practice and obtain better future financial conditions.

Neiva (2018) observes that when the concept of quality in education is addressed, the idea of suitable teachers with appropriate training and a good structure for the institution is assumed. In other words, quality in teaching goes beyond the relationship between student and teacher, and this calls for a more in-depth and specific analysis of the satisfaction survey.

Students starting higher education have expectations regarding the services provided, like any other service relationship. For this reason, the perspective of evaluating service users, in this case students, is essential for assessing quality in higher education (Jager and Gbadamosi, 2009). Therefore, it can be understood that there is a need to assess the quality of services in educational institutions, and that this type of satisfaction survey has been conducted in light of generalist methodologies. These tools are used for various service segments, such as SERVQUAL and SERVPERF.

Based on the specific need for quality management in higher education and the methodologies implemented in existing tools, Abdullah (2006b) suggests a specific model for this segment. The author considers generic models such as SERVQUAL or SERVPERF to be insufficient to carry out a good evaluation of higher education institutions. So, Abdullah (2006b) proposes the HEdPERF scale, developed based on the SERVQUAL and SERVPERF models. The tool initially had 41 items segmented into six areas, with specific approaches to education: academic aspects, non-academic aspects, reputation, access, programmes issues, and understanding.

The HEdPERF tool, with its 41 items, was applied considering principles such as unidimensionality, reliability, and validity, using exploratory and confirmatory factor analysis (Abdullah, 2006b). The methodology focused on measuring service quality within a single segment with a defined audience, i.e., higher education students. According to the model proposed by Abdullah (2006b, p. 575), the tool has a structure containing five dimensions:

Factor 1: non-academic aspects. This factor consists of items that are essential to enable students fulfil their study obligations, and it relates to duties carried out by non-academic staff.

Factor 2: academic aspects. The items that describe this factor are solely the responsibilities of academics.

Factor 3: reputation. This factor is loaded with items that suggest the importance of higher learning institutions in projecting a professional image.

Factor 4: access. This factor consists of items that relate to such issues as approachability, ease of contact, availability and convenience.

Factor 5: programmes issues. This factor emphasizes the importance of offering wide ranging and reputable academic programmes/postgraduate education with flexible structure and syllabus.

Factor 6: understanding. It involves items related to understanding students' specific need in terms of counselling and health services.

According to Brochado (2009), the HEdPERF has an advantage because it is specific to education. It can reliably capture students' perceptions since it uses questions focused on higher education. Brochado (2009) agrees with the theory proposed by Abdullah (2006b): both state that the HEdPERF tool is reliable for analyzing the quality of services provided in higher education institutions.

The HEdPERF scale is relevant compared to other scales, as it has appropriate measurement attributes for the education segment (Swai *et al.*, 2022). The scale has also been applied in specific situations, such as in the study by Rachmadhani *et al.*

(2018), which highlighted the influence of decision-making on the choice of an educational institution.

Research into the application of Abdullah's (2005; 2006a; 2006b) HEdPERF scale, methodology, or tool has been explored more frequently in the last decade. This is because the tool was developed just over a decade ago, and competition between educational institutions has increased considerably in the same period.

3. Research Methodology

The data for this research was collected at a private technical school with two locations in the state of Santa Catarina. The school offers five technical courses: Nursing, Business, Interior Design, Radiology, and Massage Therapy. The study's population is the students enrolled in technical courses in nursing and business at the Technical School.

According to the school's institutional website, in October 2023, 795 students were enrolled in the Technical Course in Nursing and 82 in the Technical Course in Business, for a total of 877 students.

The type of sampling used was a non-probabilistic sample for convenience since the researchers had access to the researched institution. After eliminating invalid questionnaires, underage respondents, missing data, and outliers, the final sample was 197 respondents. Data collection for this study was carried out using a questionnaire at the beginning of November 2023.

The survey questionnaires were administered in classrooms, with the researcher present. The researcher drew up and gave the questionnaires to the respondents in printed form, guided them, and waited for them to complete and return the instrument. The questionnaire was administered during class, making it easier to reach and invite all the students.

This research used a model adapted from the HEdPERF scale proposed by Abdullah (2005; 2006a; 2006b). The adaptation suggests changing the instrument to fit the reality of each object of study.

In addition, the original instrument was also supplemented and divided into two parts: the first part referred to questions about the socio-economic and demographic characteristics of the respondents in order to draw up their profile and later cross-check the information in the data analysis section; the second part referring to the questions of the HEdPERF scale, with appropriate adaptations to the reality of the target audience of this research.

The original scale consists of a questionnaire with 41 questions, which address the five aspects studied by Abdullah (2005; 2006a; 2006b): Academic aspects; Non-

academic aspects; Access; Reputation; and Programme issues. After being analyzed and adapted to the reality of this research's object of study (the Technical School surveyed), the scale consisted of 35 questions. Despite the reduction in the number of questions, the four aspects studied and validated by Abdullah (2006) were still addressed.

According to Cooper and Schindler (2016), pre-testing questionnaires is an established practice to discover possible errors in the collection instruments and is also helpful for training the team. According to these authors, a pre-test is expected even if the instrument is constructed with new questions or adapted from ideas (Cooper and Schindler, 2016).

Therefore, once the survey instrument was finalized, a pre-test was carried out with ten students, five from each course at the Technical School studied, to find questions that were difficult to understand, typos, expressions that did not fit the target audience, or other possible improvements. Two minor changes were made to the way the question asked about the number of children and dependents and the time taking the course.

The original questionnaire had 35 questions divided into five dimensions. The wording of the items was adapted according to the nature of the technical school. Some questions were excluded, and others were included. Given these adaptations, the reliability analysis was necessary again. Cronbach's alpha and composite reliability were used.

Field (2020) states that values of 0.7 and 0.8 for Cronbach's alpha are acceptable. In order to achieve these values, it was necessary to eliminate question 7 from the Academic aspects dimension and question 15 from the Programmes issue dimension, as it was the only OV relating to this LV.

Hair Jr., *et al.* (2014) state that composite reliability values of 0.7 to 0.9 are considered satisfactory. Tables 2 and 3 show the Cronbach's alpha coefficients and composite reliability of this instrument. In Table 3, the Item Number column shows the series of items already renumbered after the exclusion of questions 7 and 15, i.e., the question that appears as number 7 in Table 3 was initially question 8, and so on.

Table 1. Reliability

Dimension	Coefficient α
ACA	0.710
NAA	0.897
ACE	0.766
REP	0.815

Source: Own study.

Table 2. Composite reliability

Item Number	Standardized Loading	Error Variance	Item R-Square
1	.418	0.825	0.175
2	.248	0.938	0.062
3	.308	0.905	0.095
4	.407	0.834	0.166
5	.441	0.806	0.194
6	.582	0.661	0.339
7	.384	0.853	0.147
8	.592	0.650	0.350
9	.790	0.376	0.624
10	.761	0.421	0.579
11	.853	0.272	0.728
12	.557	0.690	0.310
13	.790	0.376	0.624
14	.723	0.477	0.523
15	.663	0.560	0.440
16	.452	0.796	0.204
17	.382	0.854	0.146
18	.549	0.699	0.301
19	.763	0.418	0.582
20	.702	0.507	0.493
21	.557	0.690	0.310
22	.530	0.719	0.281
23	.441	0.806	0.194
24	.416	0.827	0.173
25	.486	0.764	0.236
26	.542	0.706	0.294
27	.594	0.647	0.353
28	.600	0.640	0.360
29	.658	0.567	0.433
30	.195	0.962	0.038
31	.620	0.616	0.384
32	.568	0.677	0.323
33	.565	0.681	0.319

Source: Own study.

The model's fit indices were analyzed after ensuring the scale's internal consistency. The primary model fit indices align with those recommended in the literature. For Hair Jr., *et al.* (2009), CFI and TLI values above 0.9 are generally associated with a well-fitting model. Hair Jr., *et al.* (2009) recommend that the RMSEA be less than 0.10. Tables 5 and 6 show the values found in the analyses.

Table 3. Fit indices

Index	Value
Comparative Fit Index (CFI)	0.984
Tucker-Lewis Index (TLI)	0.983
Bentler-Bonett Non-normed Fit Index (NNFI)	0.983
Bentler-Bonett Normed Fit Index (NFI)	0.888
Parsimony Normed Fit Index (PNFI)	0.822
Bollen's Relative Fit Index (RFI)	0.879
Bollen's Incremental Fit Index (IFI)	0.985
Relative Noncentrality Index (RNI)	0.984

Source: Own study.

Table 4. Other fit measures

Metric	Value
Root mean square error of approximation (RMSEA)	0.027
RMSEA 90% CI lower bound	0.013
RMSEA 90% CI upper bound	0.037
RMSEA p-value	1000
Standardized root mean square residual (SRMR)	0.098
Hoelter's critical N ($\alpha = .05$)	192984
Hoelter's critical N ($\alpha = .01$)	201183
Goodness of fit index (GFI)	0.915
McDonald fit index (MFI)	0.839
Expected cross validation index (ECVI)	3548

Source: Own study.

The CFI and TLI values for this scale were 0.984 and 0.983, respectively, so both indices align with the parameters recommended in the literature. The RMSEA value for this scale was 0.027, which is also in line with the parameters recommended by the literature.

4. Research Results and Discussion

This section presents the analysis of the data from this study. It is divided into two parts: Respondent characterization and Analysis of the relationship between perceived service quality and socioeconomic and demographic variables.

4.1 Respondent Characterization

The sample was characterized according to the responses to the items in the original HEdPERF questionnaire, with the adaptations described in this study's methodology. The characterization provides demographic and socioeconomic data on the respondents, such as their age, level of education, type of institution they predominantly studied at in high school, race, family income, number of children

and dependents, and amount of time taking the course.

Table 5. *Socio-economic and demographic characteristics of the sample*

Characteristic	<i>n</i>	%
Shift		
Morning	79	40.1
Afternoon	42	21.3
Evening	76	38.6
Course		
Business	23	11.7
Nursing	174	88.3
Race		
White	121	61.4
Black	21	10.7
East-Asian	3	1.5
Mixed-race	48	24.4
Prefer not to say	4	2.0
Marital Status		
Single	135	68.5
Married	55	27.9
Divorced	7	3.6
Sex		
Male	35	17.8
Female	162	82.2
Age		
18-23	74	37.6
24-29	53	26.9
30-35	30	15.2
36-41	26	13.2
42 or over	14	7.1
Schooling		
High-School	176	89.3
Higher Education	19	9.6
Postgraduate Education	2	1.0
Children		
0	119	60.4
1	39	19.8
2	24	12.2
3	11	5.6
4	4	2.0
Dependents		
0	186	94.4
1	9	4.6
2	2	1.0
Semeser		
First	62	31.5

Fourth	4	2.0
Second	64	32.5
Third	67	34.0
Income		
Up to R\$ 1.320,00	13	6.6
From R\$ 1.320,01 to R\$ 2.640,00	66	33.5
From R\$ 2.640,01 to R\$ 3.960,00	31	15.7
From R\$ 3.960,01 to R\$ 5.280,00	29	14.7
From R\$ 6.600,01 to R\$ 7.920,00	17	8.6
Over R\$ 7.920,01	10	5.1
Prefer not to say	31	15.7
High-school		
Fully in public institutions	148	75.1
Mostly in public institutions	10	5.1
Half in each	14	7.1
Mostly in private institutions	10	5.1
Fully in private institutions	15	7.6

Source: Own study.

The majority of respondents were from the technical nursing course: 174 students (88.3%) were from the technical nursing course, and 23 students (11.7%) were from the technical business course. This aligns with the institution's student population, as the institution has 795 (92%) students in the technical nursing course and 64 (8%) in the technical business course.

4.2 Analysis of Relationship between Perceived Service Quality and Socioeconomic and Demographic Variables

Below is an analysis and discussion of the perception of the quality of the course and the socio-economic and demographic characteristics of the students. The quality of the service was assessed according to the shift in which the students were enrolled. Afternoon students had the highest averages in all dimensions, while evening students had the lowest average.

Table 6. Mean and Standard Deviation by Shift

Shift	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
Morning	79	6.65	0.465	6.08	1.061	6.07	0.888	6.13	0.672
Afternoon	42	6.67	0.483	6.55	0.454	6.37	0.717	6.32	0.523
Evening	76	6.48	0.551	5.72	1.130	5.61	1.070	5.65	0.868

Source: Own study.

The ANOVA test indicates there is a difference in the perception of service quality between the groups in the dimensions of non-academic aspects, accessibility, and reputation.

Table 7. ANOVA by Shift

	F	gl1	gl2	p
ACA	2.65	2	108	0.076
NAA	18.01	2	129	< .001**
ACE	10.31	2	118	< .001**
REP	13.66	2	119	< .001**

Note: * $p < .05$, ** $p < .01$.

Source: Own study.

Regarding non-academic aspects, Tukey's post-hoc test indicates that morning students perceive differently from afternoon students, and afternoon students perceive differently from evening students. Morning students, on the other hand, perceive differently from evening students.

In the accessibility dimension, Tukey's post-hoc test indicates that morning students have different perceptions from evening students and afternoon students have different perceptions from evening students. Morning students, on the other hand, have similar perceptions to evening students.

In the reputation dimension, Tukey's post-hoc test indicates that morning students have a different perception from evening students and afternoon students have a different perception from evening students. Morning students, on the other hand, have a similar perception to evening students when it comes to this dimension.

In general, morning and afternoon students have similar perceptions of each other, while evening students have different perceptions from those of the other two periods. The quality of the service was assessed according to the course in which the students were enrolled. The average for the business course was lower in all dimensions.

Table 8. Mean and Standard Deviation by Course

Course	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
Business	23	6.52	0.585	5.86	1.103	5.85	1.019	5.74	0.723
Nursing	174	6.60	0.499	6.06	1.029	5.97	0.968	6.02	0.777

Source: Own study.

The ANOVA indicates that the difference in means between the students enrolled in the business and nursing courses is not statistically significant in any of the four dimensions ($p > 0.05$).

The quality of service was assessed according to the race of the respondent. East Asian students had the highest average in the academic aspects, non-academic aspects, and reputation dimensions, while mixed-race students had the highest average in the accessibility dimension. It was also possible to see that black

students had the lowest average in the academic aspects, accessibility, and reputation dimensions, while mixed-race students had the lowest average in the non-academic aspects dimension. These results differ from those of Silva (2021), who found that self-declared white respondents had a higher perception of quality.

Table 9. Mean and Standard Deviation by Race

Race	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
White	121	6.61	0.4567	6.11	0.9540	5.95	0.9860	5.93	0.8179
Black	21	6.42	0.7263	5.94	10.193	5.83	0.8173	5.92	0.7822
East-Asian	3	6.62	0.2974	6.37	0.8038	6.00	0.7265	6.39	0.5912
Mixed-race	48	6.61	0.5449	5.84	12.683	6.01	10.613	6.10	0.6865
Prefer not to say	4	6.61	0.3168	6.42	0.3191	6.21	0.4383	6.27	0.3624

Source: Own study.

The ANOVA indicates that the difference in means between students of different races is not statistically significant in any of the four dimensions.

The quality of the service was assessed according to the marital status of the respondents. Married students had a higher average in the academic aspects and reputation dimensions. In comparison, single students had a higher average in the non-academic aspects dimension and divorced students in the accessibility dimension.

Divorced students had the lowest average in the non-academic aspects and reputation dimensions, while married students had the lowest average in the accessibility dimension; in the academic aspects dimension, they tied with the worst average.

Table 10. Mean and Standard Deviation by Marital Status

Marital Status	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
Single	135	6.59	0.524	6.05	0.985	5.96	0.928	5.95	0.766
Married	55	6.60	0.487	6.03	1.197	5.94	1.064	6.08	0.766
Divorced	7	6.59	0.416	5.94	0.739	6.02	1.207	5.92	1.054

Source: Own study.

ANOVA indicates that the difference in means between students according to marital status is not statistically significant in any of the four dimensions.

The quality of the service was assessed according to the respondents' sex. Female students had the highest average in all dimensions. This result is partially in line with the study by Soares *et al.* (2023b), who identified that women tend to rate some aspects of service better than men.

On the other hand, this result differs from the results found by Souza *et al.* (2012), where female students rated the course worse than male students.

Table 11. Mean and Standard Deviation by Sex

Sex	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
Male	35	6.37	0.677	5.79	1.075	5.50	1.129	5.62	0.896
Female	162	6.64	0.453	6.09	1.024	6.05	0.909	6.06	0.726

Source: Own study.

The ANOVA indicates that the difference in means between students according to gender is statistically significant in academic aspects, accessibility, and reputation dimensions. This result contradicts the work of Yavuz and Gülmez (2016), who found no differences by gender. Tukey's post-hoc test identified the same results as ANOVA.

Table 12. ANOVA by Sex

	F	gl1	gl2	p
ACA	4.86	1	40.8	0.033*
NAA	2.30	1	48.3	0.136
ACE	7.54	1	44.0	0.009**
REP	7.33	1	44.1	0.010*

Note: * $p < .05$, ** $p < .01$.

Source: Own study.

The quality of the service was assessed according to the age group of the respondents. Students aged 42 or over had the highest mean scores in the academic aspects, non-academic aspects, and reputation dimensions; students aged 36 to 41 had the highest mean scores in the accessibility dimension. This result is in line with the work of Soares *et al.* (2023a), who found that older students tend to rate the courses they attend more highly, but differs from the work of Silva (2021), who found the opposite, i.e., older students tend to have a lower perception of quality than younger students.

Table 13. Mean and Standard Deviation by Age

Age	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
18 to 23	74	6.60	0.495	6.13	0.879	6.06	0.855	5.98	0.730
24 to 29	53	6.52	0.601	5.79	1.302	5.84	1.050	6.02	0.863
30 to 35	30	6.61	0.529	6.13	1.026	5.98	1.043	6.00	0.605
36 to 41	26	6.62	0.391	6.05	0.781	5.94	1.059	5.72	0.846
42 or over	14	6.70	0.356	6.27	1.090	5.79	1.009	6.33	0.780

Source: Own study.

The ANOVA indicates that the mean difference between students according to age

group is not statistically significant in any of the four dimensions.

The quality of the service was assessed according to the respondents' schooling. Students with only secondary education had the highest average in all dimensions; meanwhile, students with postgraduate education had the lowest average in all dimensions. It is important to note that the group of respondents with postgraduate education comprised only 2 (two) respondents.

Table 14. Mean and Standard Deviation by Schooling

Schooling	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
High-School	176	6.60	0.496	6.06	1.053	6.02	0.927	6.03	0.752
Higher Education	19	6.52	0.623	5.94	0.937	5.39	1.222	5.65	0.876
Postgraduate Education	2	6.07	0.101	5.44	0.157	5.17	0.236	4.88	0.177

Source: Own study.

Table 15. ANOVA by Schooling

	F	gl1	gl2	p
ACA	18.53	2	3.90	0.010**
NAA	8.93	2	5.09	0.022*
ACE	10.69	2	3.39	0.034*
REP	30.30	2	3.53	0.006**

Note: * $p < .05$, ** $p < .01$.

Source: Own study.

Due to the disproportionate size of the groups, Tukey's post-hoc test failed to identify the statistically significant differences indicated by the ANOVA results in 3 dimensions. It also identified that the difference in mean between respondents with secondary education and respondents with higher education is statistically significant only in the accessibility dimension.

The quality of the service was assessed according to the number of children of the respondents. Students with three children had the highest average in the academic aspects and non-academic aspects dimensions, while students with four children had the highest average in reputation, and students with four and two children had the highest average in the accessibility dimension.

Students with one child had the worst average in the non-academic aspects, accessibility, and reputation dimensions, while students with two children had the lowest average in the academic aspects dimension. It is important to note that the respondents with 4 (four) children comprised only four students.

Table 16. Mean and Standard Deviation by Number of Children

Children	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
0	119	6.58	0.527	6.09	1.001	6.02	0.934	5.98	0.777
1	39	6.58	0.419	5.78	1.054	5.61	1.172	5.84	0.858
2	24	6.52	0.639	5.87	1.310	6.13	0.743	6.05	0.702
3	11	6.78	0.346	6.62	0.405	6.08	0.970	6.23	0.582
4	4	6.71	0.117	6.56	0.521	6.13	0.854	6.40	0.695

Source: Own study.

The ANOVA indicates that the mean difference between the students according to the number of children is statistically significant in the non-academic aspects dimension.

Table 17. ANOVA by Number of Children

	F	gl1	gl2	p
ACA	1.46	4	24.9	0.245
NAA	5.14	4	19.6	0.005**
ACE	1.16	4	17.5	0.364
REP	1.03	4	17.7	0.419

Note: * $p < .05$, ** $p < .01$.

Source: Own study.

Due to the disproportionate size of the groups, Tukey's post-hoc test could not identify the statistically significant differences indicated by the one-way ANOVA results.

The quality of the service was assessed according to the number of dependents of the respondents. Students who have 1 (one) dependent had the highest average in the academic aspects, accessibility, and reputation dimensions, while students who have two dependents had the highest average in the non-academic aspect dimension.

The lowest average was found in students who do not have dependents in the non-academic aspects and accessibility dimensions, while students who have two dependents presented the lowest average in the academic aspects and reputation dimensions. It is important to note that only two respondents had 2 (two) dependents.

The ANOVA indicates that the difference in means between the students according to the number of dependents is not statistically significant in any of the four dimensions.

Table 18. Mean and Standard Deviation by Number of Dependents

Dependents	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
0	186	6.59	0.515	6.03	1.058	5.94	0.991	5.98	0.790
1	9	6.63	0.358	6.16	0.601	6.20	0.564	6.06	0.491
2	2	6.50	0.707	6.44	0.314	6.00	0.707	5.88	0.412

Source: Own study.

The quality of the service was assessed according to the length of time the respondent had been attending the course. Students attending the fourth semester had a higher average in the academic aspects, non-academic aspects, and accessibility dimensions. In comparison, students attending the first semester had a higher average in the reputation dimension. Students attending the third semester gave the lowest average in all dimensions.

This result partially diverges from the results found by Soares *et al.* (2023a) and Soares *et al.* (2023b), who identified that students in the final part of the course tend to have a lower perception of quality than students in earlier stages. As a parameter for comparison, results from the research by Souza *et al.* (2012) identify that students with more time on the course tend to rate it worse than students from previous phases. It is important to note that the group of respondents attending the fourth semester has four students.

Table 19. Mean and Standard Deviation by Semester

Semester	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
First	62	6.54	0.609	6.04	1.145	6.05	0.966	6.08	0.768
Second	64	6.69	0.403	6.19	0.938	6.01	1.001	5.99	0.811
Third	67	6.52	0.498	5.86	1.016	5.79	0.951	5.88	0.740
Fourth	4	6.86	0.117	6.50	0.927	6.46	0.786	6.04	0.968

Source: Own study.

ANOVA indicates that the difference in means between students according to the length of time they attend the course is statistically significant in the academic aspects dimension.

Table 20. ANOVA by Semester

	F	gl1	gl2	p
ACA	6.107	3	23.9	0.003**
NAA	1.489	3	14.7	0.258
ACE	1.396	3	14.9	0.283
REP	0.702	3	14.4	0.566

Note: * $p < .05$, ** $p < .01$.

Source: Own study.

Due to the disproportionate size of the groups, Tukey's post-hoc test helped identify the statistically significant differences indicated by the one-way ANOVA results.

Service quality was assessed according to the respondent's family income. Students with the lowest income bracket had the highest average in the academic aspects and reputation dimensions, while students with the highest income bracket had the highest average in the non-academic aspects and accessibility dimensions.

These results diverge from the work of Silva (2021), who identified that students from lower income brackets tend to have a lower perception of quality than students from higher income brackets. Students in the family income bracket of four to five minimum wages had a lower average in the academic aspects, accessibility, and reputation dimensions, while students in the family income bracket of two to three minimum wages had a lower average in the non-academic aspects dimension.

Table 21. Mean and Standard Deviation by Income

Income	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
Up to R\$ 1.320,00	13	6.71	0.425	6.24	0.795	5.96	1057	6.49	0.512
From R\$ 1.320,01 to R\$ 2.640,00	66	6.60	0.470	5.97	1091	6.00	1066	6.03	0.739
From R\$ 2.640,01 to R\$ 3.960,00	31	6.62	0.396	5.84	1054	5.84	0.869	5.74	0.925
From R\$ 3.960,01 to R\$ 5.280,00	29	6.63	0.485	6.07	1080	6.04	1014	5.99	0.754
From R\$ 5.280,01 to R\$ 6.600,00	17	6.31	0.741	5.89	1334	5.68	1030	5.73	0.992
Over R\$ 7.920,01	10	6.39	0.833	6.28	0.921	6.17	0.828	6.23	0.709
Prefer not to say	31	6.66	0.433	6.27	0.797	5.98	0.835	5.97	0.587

Source: Own study.

The ANOVA indicates that the difference in means between students according to family income is statistically significant in the reputation dimension.

Table 22. ANOVA by Income

	F	gl1	gl2	p
ACA	0.741	6	51.2	0.619
NAA	0.830	6	53.2	0.552
ACE	0.439	6	52.9	0.849
REP	2.497	6	53.1	0.033*

Note: * $p < .05$, ** $p < .01$.

Source: Own study.

Due to the disproportionate size of the groups, Tukey's post-hoc test explained the statistically significant differences indicated by the one-way ANOVA results.

The quality of the service was assessed according to the nature of the institution where the respondent attended high school. It was possible to see that students who

had always studied at a public school had the highest average in the accessibility and reputation dimensions; students who had studied partly at a public school and partly at a private school had the highest average in the academic aspects dimension and students who had always studied at a private school had the highest average in the non-academic aspects dimension.

Students who studied mainly at a private school had the lowest average in the academic aspects and reputation dimensions. In contrast, students who studied predominantly at a public school had the lowest average in the non-academic aspects and accessibility dimensions. The findings are comparable to the results of the research by Souza *et al.* (2012), who identified that public school students rated the course worse than private school students.

Table 23. Mean and Standard Deviation by Nature of High-School

Nature of High-School	n	ACA		NAA		ACE		REP	
		M	SD	M	SD	M	SD	M	SD
Fully in public institutions	148	6.58	0.530	6.07	1.026	5.98	0.969	6.01	0.781
Mostly in public institutions	10	6.60	0.300	5.69	1.179	5.75	0.940	5.97	0.629
Half in each	14	6.63	0.576	5.94	1.073	5.88	1.073	5.93	0.866
Mostly in private institutions	10	6.56	0.389	5.82	1.145	5.92	0.940	5.76	0.818
Fully in private institutions	15	6.60	0.446	6.16	1.016	5.97	1.068	5.96	0.760

Source: Own study.

The ANOVA indicates that the difference in means according to the public or private nature of the institution where the respondent attended high school is not statistically significant in any of the four dimensions.

5. Conclusions, Proposals, Recommendations

The main objective of this study was to analyze the relationship between the perception of service performance and the socioeconomic and demographic characteristics of students at a private technical school. To this end, the adapted HEdPERF instrument was used to assess service quality. This general objective was divided into three specific objectives.

First, we characterized the students of a private technical school in Florianópolis according to socioeconomic and demographic variables. The students of the technical courses analyzed are predominantly female, single, white, between 18 and 23 years old, with a high school education, no children or dependents, with a family income of between 1 and 2 minimum wages, and have always attended high school in public schools.

We then adapted the HEdPERF scale for use in technical education courses; Cronbach's Alpha and composite reliability tested the scale's internal consistency.

Both coefficients met the parameters suggested by the literature, so the scale can be considered internally consistent.

Finally, we analyzed the relationship between the students' socio-economic and demographic characteristics and the courses' performance at the school surveyed. Students enrolled in the morning and afternoon shifts have similar perceptions, and students enrolled in the evening shift have worse perceptions than those in the other periods. These differences are statistically significant in the dimensions of non-academic aspects, accessibility, and reputation.

Students with postgraduate education had a worse perception of quality than students with other levels of education in all four dimensions, in a statistically significant way. Depending on the length of time students have been attending the course, students in their third semester have a worse perception of quality than those in other semesters, and this difference is statistically significant in all four dimensions.

Differences were found in the variables number of children and number of dependents, as well as the public or private nature of the institution where the respondent attended high school and the family income bracket. Despite this, the differences vary from dimension to dimension, and it was not possible to identify a general trend. These diffuse results could be the subject of future research with different samples that could identify some general trend.

The results showed that female students had a better perception than male students and this difference was statistically significant in the dimensions of academic aspects, accessibility and reputation. The gender variable together with the course shift variable were apparently the most consistent with the literature reviewed. The other variables showed results that were only partially in line with the literature. It is possible that the characteristics of technical course students are different from those of higher education students.

The fact that the literature on quality of service in higher education institutions is more numerous than quality of teaching in technical schools indicates that there is a gap in further research focused on technical school students.

The limitations of this research were mainly the size of the sample and the volume of questionnaires eliminated due to missing data and outliers. Another limitation was that some groups were under-represented, which may have affected some statistical tests, especially Tukey's post-hoc test.

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