

# Relationship between Student Expectations, Perceptions, and Personal Characteristics in Integrated Technical Courses

Sandro V. Soares<sup>1,2</sup>, Giovana R. Smania<sup>1</sup>, Carlos R. M. Lima<sup>3</sup>, Thiago C. Soares<sup>1,2</sup> & Clarissa C. Mussi<sup>1,2</sup>

<sup>1</sup> Universidade do Sul de Santa Catarina - Unisul, Palhoça, Brazil

<sup>2</sup> Anima Institute - AI, São Paulo, Brazil

<sup>3</sup> Agência de Fomento do Estado de Santa Catarina - BADESC, Florianópolis, Brazil

Correspondence: Sandro Vieira Soares, Graduate Program in Administration, Universidade do Sul de Santa Catarina, Florianópolis, Brazil. E-mail: sandrovieirasoes@hotmail.com

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## Abstract

The objective of this study is to analyse relationships between the characteristics of students attending an integrated technical course and their expectations and perceptions by using the SERVQUAL scale. A questionnaire was applied to the students in two municipalities based on a version adapted from the Servqual scale. A pre-test was performed with five students and the final sample had 249 respondents. Descriptive statistics and multiple regression analysis were the techniques used for data analysis. The results show that students of different school years, those who always attended public schools, those who were at the campus of Araranguá, those who intend to follow a career in their field of study, and mainly those intending to take college entrance exams, have different expectations and perceptions of the course quality. The present study concluded that taking the college entrance exam is the characteristic most strongly related to different levels of expectation and perception. However, the results differ partially from the revised literature.

**Keywords:** Servqual, student's characteristics, integrated technical course

## 1. Introduction

Professional and technological education (PTE) is a teaching modality established in the Law of Directives and Bases of National Education (LDB) aimed at preparing the students for the practice of a profession, in addition to contributing to the insertion of people in the labour market and social life (MEC, 2019). The conception of PTE is based on the integration of science, technology and culture as inseparable dimensions of human life, while developing the ability of scientific investigation, which is considered essential in the construction of intellectual autonomy (Pacheco, 2010). The scope of PTE encompasses professional qualification courses, secondary-school technical education, undergraduate technological education and post-graduate technological education, all organised in order to take advantage of studies on a continuous and articulated basis (MEC, 2019).

The secondary-school technical education (SCTE) is aimed at people who have completed the primary school and are attending the secondary school or have completed it, being provided across the federal education network on an integrated or simultaneous basis. Its courses qualify for practising professional activities recognised by the labour market through the development of knowledge and professional competencies grounded on a scientific and technological basis (Brasil, 2012). SCTE is not limited only to the federal education as it is present in the state and municipal levels, including the private education network.

SCTE, popularly known as "integrated secondary education", encompasses from technical qualifications to the corresponding professional qualification as a secondary-school technician, including technical specialisation to complement the professional training planned and provided by the educational institution (MEC, 2019).

Kotler and Fox (1995) emphasise that an educational institution seeking to fulfil the demands placed on it will make all the efforts to sense, consider and meet its public's needs according to its budget and mission. The same authors point out that educational institutions will increasingly need procedures and software to assess the quality of service they offer (Kotler & Fox, 1995). The precise identification of the points to be improved avoids the inappropriate use of resources by both public and private institutions, with the identified strengths being enhanced for the user's satisfaction.

In the context of educational services, they can only be evaluated as intangible goods, that is, after being experienced by the users, which makes them different from the tangible goods. For Bordoloi et al. (2022), measuring the quality of a service is a challenge because the customers' satisfaction is determined by many intangible factors, whereas a physical product can be objectively measured.

With the need to improve the quality of services in the education sector, Nogueira and Las Casas (2015) performed a study to evaluate the quality of the services provided by a higher education institution in Brazil, concluding in general that they were not satisfactory in the students' point of view. Another study by Elliot and Healy (2001) examined which aspects of the students' educational experience are more important in influencing their satisfaction. Their findings show that the features 'focus on the student', 'campus climate' and 'instructional efficacy' have a strong impact on the degree of satisfaction of the students (Elliott & Healy, 2001). In order to make it possible to assess the quality of the educational services and obtain reliable results, it is necessary to use adequate tools for doing so.

Among the tools currently available for assessment of the quality of services, one can highlight the SERVQUAL scale. Originally created by Parasuraman et al. (1988) after some years of research on quality of services, the model proposes that the quality of a service is the difference existing between expectation and performance perceived by the customer (Zeithaml et al., 2014). The scale consists of 44 items to measure the users' expectations and perceptions regarding the five dimensions of the quality of service, namely: tangibility, reliability, responsiveness, empathy and assurance (Hoffman & Bateson, 2003).

In this context, the object of the present study is the Instituto Federal de Santa Catarina (IFSC), which is highlighted for providing this modality of teaching. According to data from the Nilo Peçanha platform (2019), IFSC has 44 technical courses integrated to secondary school, which are distributed in 13 technological axes, totalising 5,693 registrations in all units across the state of Santa Catarina.

Therefore, considering the theme of 'analysis of the quality of educational services' from the literature, the following research question was formulated: 'Which factors influence the expectations and perceptions of the quality of service in an integrated technical course on the basis of the SERVQUAL scale?' The objective of the present study is to analyse the relationships between the characteristics of students of an integrated technical course and their expectations and perceptions of the quality of the provided services by using the SERVQUAL scale.

## 2. Literature Review: The Servqual Scale

From an exploratory study on the quality of services, the authors A. Parasuraman, Valerie A. Zeithaml & Leonard L. Berry created the SERVQUAL scale. According to Oliveira et al. (2019), the model proposes to measure the perceived service quality based on the difference between expectation and performance of the service.

The study on precursors of the model was set into four phases, including an extensive qualitative survey with customers and CEOs of service providers, which resulted in a model of service quality which was then refined by the authors and named SERVQUAL – a combination of the words 'services' and 'quality' (Zeithaml et al., 2014). Although the authors suggest many applications for the scale, its main function is to identify the trends of quality in services by surveying the customers regularly.

Parasuraman et al. (1985, p. 41), who reported their experiences with focal groups of customers and CEOs, defined that 'quality is a comparison between expectations and performance'. As for the expectations, Zeithaml et al. (2017) consider that customers view services differently. The authors state that the customer's expectation is situated in a zone between the desired service and the adequate service, in which the former represents an expectation combining what the customer believes 'is possible' and 'should happen', whereas the latter represents the 'minimally tolerable expectation' (Zeithaml et al. 2017).

For development of such expectations, Asuboteng et al. (1996) point out that customers rely on three factors: mouth-to-mouth communication, personal needs and previous experience. Mouth-to-mouth communication refers to what the customers listen from others, personal needs refers to individual circumstances, and previous experiences refer to what the customer experienced with a similar service (Zeithaml et al., 2014).

These factors substantiate the concept of customer expected service and perceived service, which is viewed from the perspective of dimensions (Parasuraman et al., 1985). In the exploratory study of customer's perception, 12 focal groups were formed and the expectations on services were raised, initially rendering ten dimensions characterising the aspects of the quality of services, namely: reliability, accountability, competency, access, empathy, communication, credibility, assurance, understanding of the customer, and tangibility (Parasuraman et

al., 1985). Because these dimensions came from the experience of studying groups of customers, some of these dimensions ended up overlapping each other, which resulted in their grouping into five dimensions as follows: 1. Tangibility (appearance of the physical facilities, equipment, personnel and communication materials); 2. Reliability (ability to perform the promised service dependably and accurately); 3. Responsiveness (willingness to assist customers and provide the service without delay); 4. Assurance (knowledge and courtesy of employees and their ability to inspire trust and confidence); 5. Empathy (careful and individualised attention the company provides to its customers].

Many studies were performed by the creators of the SERVQUAL scale in different contexts, and the results show that reliability is considered the most important dimension by the customers, whereas tangible aspects are considered less important (Zeithaml et al., 2014). Matos and Veiga (2000) point out that the greater importance given to reliability is related to the fact that this dimension mostly refers to the result of the service and whether the promised service is being provided. Therefore, the other dimensions are related to the process by which the service is provided.

The above-mentioned authors highlight that the SERVQUAL scale provides a basic structure which was tested in several segments, meaning that this structure can be changed or complemented, whenever necessary, so that the characteristics of a given service can be met (Zeithaml et al., 2014). In a study performed by Carrilat et al. (2007), the need to adapt the SERVQUAL scale to the context was confirmed by 17 empirical studies conducted in five continents. In Iran, Kouchaki and Motaghi (2017) used the five original dimensions of the scale, but they changed the dimension of responsiveness to one of accountability, which means literally 'rendering accounts'. However, by verifying the items included in this dimension, it becomes clear that the intent was to assess the 'ability to respond'.

According to Parasuraman et al. (1988), the scale consists of three steps, all guided by the five dimensions. As for expectations, statements are formulated for each of the five dimensions as a specific assessment, in which the respondents are asked to score them on a scale from 1 (I fully disagree) to 7 (I fully agree) with no verbal labels (Parasuraman et al., 1988). According to the authors, the second step consists of assessing the degree of importance given to each dimension by the respondent, who needs to score a total of 100 points among the five dimensions. The higher the score is, the more important the dimension. Finally, the last step consists of assessing the respondents' perceptions based on the five dimensions of the same scale used for expectations.

Once the service has been consumed, the customer will be able to compare the expected quality with that of the provided service (Mazaro et al., 2017) according to his or her expectations and perceptions of the dimensions. Zeithaml et al. (2017) put out that when the expectations are not met, there is a gap between what the customer expected and what he or she received. In order to fill this gap, it suggested that the other four possibly existing ones are filled.

Various researchers have used the Servqual scale to investigate service quality in educational institutions across the countries, including the USA, France (Foropon et al., 2013), Turkey (İncesu & Aşıkçil, 2012), Canada (Yasin & Bélanger, 2015), Morocco (Goumairi & Ben Souda, 2020), Iran (Asefi et al., 2017), Bangladesh (Mamun-ur-Rashid, 2023), Colombia (Vergara-Schmalbach & Quesada-Ibargüen, 2011), and Brazil (Lourenço & Knop, 2011).

Several studies have explored the relationships between the individuals' characteristics and the various levels of expectation and perception regarding the service quality (Antunes et al., 2020; Asefi et al., 2017; Garcia et al., 2020; Souza et al., 2012; Yasin & Bélanger, 2015).

Souza et al. (2012) applied the SERVQUAL scale to accounting students from a private Brazilian university. They examined several variables such as gender, age, type of secondary education (either public or private), professional sector (public or private), time spent in the course, and anticipated time to complete to course. The findings revealed prominent associations between gender, involvement in professional accounting tasks and course duration. Specifically, women perceived a lower service quality compared to men. Additionally, those employed in the private sector had a less favourable perception compared to their public sector counterparts, and students further along in their studies felt the service quality was lower than that perceived by those new to the course.

Yasin and Bélanger (2015) applied the SERVQUAL scale to international students at a university in Ontario, Canada. The authors used the variables gender, age, progress level, nationality, work experience, enrolment status and education level. The authors discovered a significant association of gender, work experience and educational level with satisfaction levels, in which women were found to be less satisfied than men, students more dissatisfied than undergraduate ones and participants with extensive professional experience more satisfied

than those with minimal professional experience.

Asefi et al. (2017) applied the SERVQUAL scale to nursery students from an Iranian university. They investigated potential differences based on variables such as gender, time spent in the course, marital status, course type and place of residence. The results revealed no discernible differences between the groups.

Antunes et al. (2020) assessed characteristics such as gender, type of secondary education, involvement in remunerated activities, factor for choice of the course, coming from another course at the same institution, intending to take another course at the same institution, intending to work in the field of study and receiving financial assistance at the IFSC. The authors identified that there are significant relationships between SERVQUAL scale items and age, not knowing or not wanting to take another course at the institution, and intending to open a business in the same field of study attended by the student.

Garcia et al. (2020) assessed characteristics such as age, gender, position, service length at the institution, education level, practising functions of IT coordination and knowing the information support system at the IFSC. The authors identified statistically significant relationships between SERVQUAL scale items and variables age, gender, service length, education level, practising functions of IT coordination and knowing the IT coordinator.

Several variables appear to have associations with different expectations and perceptions of quality in educational institutions. For instance, literature suggests that students nearing the end of their course generally perceive a lower quality compared to their junior counterparts (Souza et al., 2012). Conversely, student expectations seem to strengthen as they progress academically, with age positively correlating with perceived quality of the course (Antunes et al., 2020). As for the 'type of secondary education', students from public schools often rate quality lower than those from private ones (Souza et al., 2012). Findings related to 'gender' are somewhat mixed: while some studies show women perceiving lower quality than men (Souza et al., 2012; Yasin & Bélanger, 2015), others suggest the opposite (Antunes et al., 2020; Garcia et al., 2020).

In light of these discrepant findings in the literature, it was deemed appropriate to incorporate the variables course year, age, gender, primary education (either public or private), college entrance exam, career and local of the institution in the regression analyses. This was made in order to better explore the relationships between these demographic factors and the several levels of expectations and perceptions.

### 3. Method

In this section the methodological procedures are described. The study population consisted of all second-semester students enrolled in the integrated technical course in electromechanics at the campuses of Araranguá and São Miguel do Oeste, respectively, 198 and 101 students, thus totalising 299 students in 2019.

In view of the fact that not all the students were in the class room on the day of application of the questionnaire, the sample had 250 students. Of these, 160 were at the campus of Araranguá and 90 at the campus of São Miguel do Oeste, but some questionnaires were not completely answered. The questionnaire was excluded when a categorical question was not answered, whereas in case of an unanswered numerical question, the lacking information was replaced by the average score of each question. A total of 190 questions were not answered and thus required the use of average scores, which allowed the use of 40 incomplete questionnaires. Among the questionnaires, one was excluded because the question on gender was not answered by the respondent, totalising 249 questionnaires corresponding to 159 students at the campus of Araranguá and 90 at the campus of São Miguel do Oeste.

Data were collected from both campuses between 12 and 16 of August 2019, in which it was possible to reach 249 students who were present in the classroom at the moment of data collection and expressed interest in participating in the study.

The questionnaire used was adapted from the SERVQUAL scale, being divided between expectations and perceptions. As suggested by the authors of the SERVQUAL scale, the answers had an interval scale from 1 to 7, which corresponded to "I fully disagree" and "I fully agree", respectively, whereas those from number 2 to 6 were not labelled (Parasuraman et al., 1988). This type of scale can be considered as an interval one because, according to Malhotra (2020, p. 204), "There is a constant or equal interval between scale values. The difference between 1 and 2 is the same as the difference between 5 and 6".

The questionnaires used were self-administered ones. They were elaborated and printed before being given to the respondents, who completed the questionnaires and returned them to the researchers. For Fowler Jr. (2013), the use of self-administered instruments requires the use of more pre-tests than those applied by interviewers. In this way, the pre-test was performed with a group of five students who were attending the integrated technical course in electromechanics at the campus of Araranguá. No adjustment was necessary in the questionnaire.

With the objective to verify whether the proposed questionnaire was reliable, the Cronbach's alpha coefficient was calculated for the 44 items of the questionnaire. Initially, it was found that the questions on expectation within the dimension of tangibility had low values (i.e. 0.52), whereas the other four dimensions had adequate values (i.e. > 0.70). Questions on perception within all dimensions were found to have adequate values (i.e. > 0.60). Next, the sample was divided by campus and the alpha coefficient was calculated for tangibility. It was observed that the alpha coefficients were lower among the students at the Araranguá compared to those at the São Miguel do Oeste (i.e. > 0.60). Considering the sample as a whole, it was decided to maintain these questions and perform a slight analysis of the findings in the light of the literature.

The multiple regression analysis was the statistical technique used for assessing the relationships between the respondents' characteristics and levels of expectation and perception. The answers to the questions in the SERVQUAL instrument were treated as dependent variables and the respondents' characteristics as independent ones before being included in the model as metric or dummy variables. The results will be presented in the following section. SPSS statistical software, version 20, was used.

#### 4. Results

Initially, the respondents were asked to indicate their course year, age, gender and previous academic experience, including intent to take college entrance exam and intent to follow a career in the field of electromechanics or engineering.

Therefore, the class to which the respondents belong is represented by the number of years in the course, as seen in the Table 1. As the technical course was started at the campus of São Miguel do Oeste in 2017, a new didactic planning structure was followed by distributing the workload within three years instead of four years, as was the case at the campus of Araranguá. In this way, it was observed that 71% of the students are in the first and second years of the course. However, evasion was also observed as the first- and second-year students advance into the third year.

Table 1. Characteristics of Participants

	Araranguá		São Miguel do Oeste		Total	
	n	%	n	%	n	%
<b>Course Year</b>						
1st	66	41.51	36	40.00	102	40.96
2nd	45	28.30	30	33.33	75	30.12
3rd	27	16.98	24	26.67	51	20.48
4th	21	13.21	0	0.00	21	8.43
<b>Age</b>						
14	6	3.77	0	0.00	6	2.41
15	42	26.42	30	33.33	72	28.92
16	40	25.16	24	26.67	64	25.70
17	37	23.27	20	22.22	57	22.89
18	29	18.24	15	16.67	44	17.67
19	5	3.14	1	1.11	6	2.41
<b>Gender</b>						
Female	31	19.50	14	15.56	45	18.07
Male	128	80.50	76	84.44	204	81.93
<b>Primary Education</b>						
Always in public school	128	80.50	81	90.00	209	83.94
Predominantly in public school	11	6.92	6	6.67	17	6.83
Predominantly in private school	5	3.14	2	2.22	7	2.81
Always in private school	15	9.43	1	1.11	16	6.43
<b>Vestibular*</b>						
Yes	128	80.50	70	77.78	198	79.52
No	4	2.52	6	6.67	10	4.02

Unsure	27	16.98	14	15.56	41	16.47
Career						
Yes	35	22.01	35	38.89	70	28.11
No	71	44.65	16	17.78	86	34.54
Unsure	53	33.33	39	43.33	93	37.35

\* 'Vestibular' is the name of the examination for entry into higher education, in Brazil.

Table 1 also shows the age of the respondents. One can observe that the majority of the students (76%) are aged between 15 and 17 years old, which is expected in the first- and second-year classes of the course. Also, 5% of the respondents were aged 19 years old, corresponding to five students at the campus of Araranguá and one at the campus of São Miguel do Oeste.

With regard to the gender of the respondents, one can observe that males are predominant (81%) at both campuses. And considering the proportion of students per campus, one can also observe that gender distribution is similar between the campuses (Table 1).

With regard to the primary education, the two municipalities of Araranguá and São Miguel do Oeste where the campuses are located have both public and private schools. Data show that the great majority of the respondents (83%) always studied in public schools, whereas only 6% always studied in private ones before entering the IFSC.

When asked whether they intended to take college entrance exams, 79% of the respondents answered they would do so, whereas 16% did not know. Among the respondents not intending to take college entrance exams, 4% of them were at the campus of Araranguá and 6% at the campus of São Miguel do Oeste.

When the data listed in Table 1 are cross-checked with those listed in Table 2, it is possible to verify the interest of the respondents in taking college entrance exams. One can observe that as the students advance in the course, their interest in taking college entrance exams also increases.

Table 2. Relative frequency of interest in taking university entrance examinations, by class

	Araranguá				São Miguel do Oeste			Total
	1st	2nd	3rd	4th	1st	2nd	3rd	
Yes	72.73	82.22	88.89	90.48	77.78	73.33	83.33	79.52
No	4.55	2.22	0.00	0.00	5.56	10.00	4.17	4.02
Unsure	22.73	15.56	11.11	9.52	16.67	16.67	12.50	16.47
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The students were asked whether they intended to follow a career in their field of study. The results revealed that 44% of the students at the campus of Araranguá did not intend to follow a career in the same field of study, whereas 17% of those at the campus of São Miguel do Oeste also intended to do so. Interestingly, the absolute number of students intending to follow a career in the same field of study was the same at both campuses ( $n = 35$ ), but this figure corresponded to 22% and 38% of the respondents at the campuses of Araranguá and São Miguel do Oeste, respectively (Table 2).

After characterising the sample, analysis of the relationships between the respondents' characteristics and their levels of expectation and perception of the quality of the course was performed by using the SERVQUAL scale. Multiple regression analysis was performed for each of the 44 items of the questionnaire, in which the respondents' characteristics were considered independent variables (i.e. metric or dummy variables, depending on the case).

Overall significance of the models was tested by using the ANOVA F test at a significance level of 5%. Therefore, only coefficients of items within the model were presented, namely: questions 3, 14 and 15, which measured the respondent's expectations; and questions 23, 29, 30, 32, 35, 36, 37, 40, 42 and 43, which measured the respondent's perception.

Question 3 belongs to the dimension of tangibility and was formulated as follows: '3. Teachers and other personnel from excellent educational institutions are presentable and take care of their appearance'. Questions 14 and 15 belong to the dimension of assurance and were formulated as follows: '14. The behaviour of the personnel of excellent educational institutions gives reassurance to the students' and '15. The students of

excellent integrated courses in electromechanics feel confident within the educational institution’ The output coefficients of the three questions on expectations are presented elsewhere herein.

Table 3. Regression coefficients of Expectations with the items from the Tangibility and Assurance dimensions

Variable	Tangibility				Assurance							
	Model for Question 3				Model for Question 14				Model for Question 15			
	B	S. E.	Beta	Sig.	B	S. E.	Beta	Sig.	B	S. E.	Beta	Sig.
<i>(Constant)</i>	5.055	.464		.000	5.999	.319		.000	6.111	.331		.000
<i>Male</i>	.006	.247	.001	.982	-.274	.170	-.104	.109	-.275	.176	-.100	.121
<i>Second_year</i>	.207	.223	.063	.355	-.028	.154	-.013	.857	-.081	.160	-.035	.614
<i>Third_year</i>	-.412	.253	-.111	.105	.367	.175	.146	.036*	.216	.181	.083	.234
<i>Fourth_year</i>	-.556	.358	-.103	.122	.251	.247	.069	.309	.043	.256	.011	.867
<i>Always_public</i>	.862	.329	.212	.009**	.360	.226	.131	.113	.105	.235	.037	.654
<i>Predom_public</i>	.788	.469	.133	.094	.286	.323	.071	.378	.180	.335	.043	.591
<i>Vestibular</i>	.587	.234	.158	.013	.324	.161	.129	.046*	.528	.167	.202	.002**
<i>Career</i>	-.152	.211	-.046	.471	.041	.145	.018	.781	.043	.151	.018	.775
<i>Araranguá</i>	-.420	.204	-.135	.041	.014	.141	.007	.920	.017	.146	.008	.905

\*p < .05 \*\*p < .01 \*\*\*p < .001.

Regression analysis revealed that there is statistical evidence showing that students who always attended public schools have greater expectations (0.862) regarding the question on presentation and appearance of the personnel.

The regression output shows that there were two statistically significant coefficients: being a third-year student and intending to take college entrance exams. The respondents in the third year and those intending to take college entrance exams have greater expectations regarding the assurance given through the behaviour of the personnel of excellent educational institutions.

It is possible to observe the importance of the relationship between the intent to take college entrance exams and expectation regarding this question. This demonstrates that students intending to take college entrance exams have greater expectation regarding the question on the assurance provided by the educational institution.

The relationships between the respondents’ characteristics and perception of the course were analysed through the questions 23 and 44, whereas the items 23, 29, 30, 31, 35, 36, 37, 40, 42 and 43 are presented elsewhere herein.

Tangibles	23. The integrated technical course in electromechanics that you are enrolled in has adequate and well-maintained equipment (blackboards, desks, etc.).
Reliability	29. Your integrated technical course in electromechanics allocates teachers proficient in the course subjects. 30. Your integrated technical course in electromechanics employs punctual and consistent staff (teachers and other employees). 31. Your educational institution keeps student records up-to-date and error-free.
Responsiveness	35. The staff (teachers and other employees) at your educational institution do not refuse to serve students.
Assurance	36. The behaviour of the staff (teachers and other employees) at your educational institution instils confidence in students. 37. You, as a student of the integrated technical course in electromechanics, feel confident in the educational institution that offers the course.
Empathy	40. Your educational institution gives appropriate attention to its students. 42. Your educational institution meets the specific demands of its students. 43. Your integrated technical course in electromechanics meets the various objectives of the students.

Figure 1. Questionnaire items, by dimension

The coefficients of the models generated by using the SPSS software are listed in the tables below.

Table 4. Regression coefficients of Perceptions with the items from the Reliability dimension

Variable	Tangibles			
	Model for Question 23			
	B	S.E.	Beta	Sig.
<i>(Constant)</i>	6.250	.308		.000
<i>Male</i>	.261	.164	.101	.112
<i>Second_year</i>	-.098	.148	-.045	.509
<i>Third_year</i>	-.225	.168	-.091	.183
<i>Fourth_year</i>	-.403	.237	-.112	.091
<i>Always_public</i>	-.114	.218	-.042	.601
<i>Predom_public</i>	.156	.311	.040	.616
<i>Vestibular</i>	.160	.155	.065	.303
<i>Career</i>	.087	.140	.039	.533
<i>Araranguá</i>	-.541	.135	-.260	.000***

\*p < .05 \*\*p < .01 \*\*\*p < .001.

This question investigated the students’ perception on whether the equipment provided by the institution are in good conditions and sufficient in number. Regression analysis revealed that the students at the campus of Araranguá have a worse perception on such a tangible aspect. This was the only question in the dimension of tangibility indicating a relationship between respondents’ characteristics and perception on the course. This result is consistent with the findings by Mamun-ur-Rashid (2023), who had previously identified that the average scores for both student expectations and perceptions are statistically different between schools located in different districts, even when the same course is offered.

Table 5. Regression coefficients of Perceptions with the items from the Reliability dimension

Variable	Reliability											
	Model for Question 29				Model for Question 30				Model for Question 31			
	B	S.E.	Beta	Sig.	B	S.E.	Beta	Sig.	B	S.E.	Beta	Sig.
<i>(Constant)</i>	5.435	.334		.000	5.484	.351		.000	5.741	.449		.000
<i>Male</i>	.170	.178	.061	.341	.220	.187	.076	.239	-.010	.239	-.003	.966
<i>Second_year</i>	.041	.161	.018	.800	.218	.169	.089	.199	-.619	.217	-.193	.005**
<i>Third_year</i>	.280	.182	.107	.126	.027	.191	.010	.888	-.455	.246	-.125	.065
<i>Fourth_year</i>	-.158	.258	-.041	.541	-.449	.271	-.111	.098	.054	.347	.010	.876
<i>Always_public</i>	.346	.236	.120	.145	.072	.248	.024	.772	.314	.319	.079	.325
<i>Predom_public</i>	.223	.337	.053	.509	.065	.355	.015	.855	.279	.455	.048	.540
<i>Vestibular</i>	.487	.168	.185	.004**	.385	.177	.139	.030*	.240	.227	.066	.290
<i>Career</i>	.159	.152	.067	.297	.267	.159	.107	.096	.389	.204	.119	.059
<i>Araranguá</i>	-.073	.147	-.033	.619	-.269	.154	-.115	.082	-.718	.198	-.235	.000***

\*p < .05 \*\*p < .01 \*\*\*p < .001.



The results point out that those students intending to take college entrance exams had significantly higher perception on this question from a statistical standpoint of view compared to those who did not know or did not intend to. The intensity of this perception on the allocation of teachers in the course was up to 0.487 point more than that of those not intending to.

Regression analysis revealed that respondents intending to take college entrance exams had a higher perception on the question regarding punctuality and attendance of the personnel at the institution.

One can observe that second-year students as well as those at the campus of Araranguá had a worse perception on this question, with the former scoring up to -0.619 point and the latter scoring up to -0.718 point. This finding aligns with the studies by Souza et al. (2012) and Antunes et al. (2020), who reported lower scores for quality perception among students nearing the end of course compared to their junior counterparts.

Table 6. Regression coefficients of Perceptions with the items from the Responsiveness and Assurance dimensions.

Variable	Responsiveness				Assurance							
	Model for Question 35				Model for Question 36				Model for Question 37			
	B	S.E.	Beta	Sig.	B	S.E.	Beta	Sig.	B	S.E.	Beta	Sig.
<i>(Constant)</i>	6.185	.319		.000	5.569	.371		.000	5.799	.383		.000
<i>Male</i>	-.197	.170	-.075	.246	-.222	.197	-.073	.261	-.105	.204	-.033	.609
<i>Second_year</i>	-.288	.154	-.131	.062	-.184	.179	-.072	.303	-.101	.185	-.038	.585
<i>Third_year</i>	.096	.174	.039	.580	.110	.202	.038	.588	.177	.209	.059	.398
<i>Fourth_year</i>	-.398	.246	-.109	.107	-.024	.286	-.006	.934	-.033	.296	-.007	.912
<i>Always_public</i>	.247	.226	.090	.275	.227	.263	.071	.388	-.170	.272	-.051	.533
<i>Predom_public</i>	-.102	.322	-.025	.753	-.333	.375	-.071	.375	-.477	.388	-.099	.220
<i>Vestibular</i>	.386	.161	.154	.017*	.388	.187	.133	.039*	.602	.193	.199	.002**
<i>Career</i>	-.080	.145	-.036	.579	.371	.169	.141	.029*	.209	.174	.077	.231
<i>Araranguá</i>	.002	.140	.001	.988	.187	.163	.076	.253	.204	.169	.081	.227

\*p < .05 \*\*p < .01 \*\*\*p < .001.

On the other hand, respondents intending to take college entrance exams had a better perception on this question. Moreover, respondents intending to take college entrance exams as well as those intending to follow a career in the same field of study had a better perception on this question too.

Regression coefficients indicated that the intent to take college entrance exams was scored up to 0.602 point more than that of those had no intent to do so.

Table 7. Regression coefficients of Perceptions with the items from the Empathy dimension

Variable	Empathy											
	Model for Question 40				Model for Question 42				Model for Question 43			
	B	S.E.	Beta	Sig.	B	S.E.	Beta	Sig.	B	S.E.	Beta	Sig.
<i>(Constant)</i>	5.694	.366		.000	5.774	.365		.000	5.499	.340		.000
<i>Male</i>	-.073	.195	-.024	.709	-.122	.194	-.041	.530	.011	.181	.004	.952
<i>Second_year</i>	-.211	.176	-.083	.233	-.390	.176	-.155	.027*	-.303	.164	-.128	.066
<i>Third_year</i>	.336	.200	.116	.094	-.196	.199	-.068	.326	-.146	.186	-.054	.435
<i>Fourth_year</i>	-.143	.283	-.034	.613	-.337	.282	-.081	.233	-.524	.263	-.134	.048*
<i>Always_public</i>	.059	.259	.019	.819	.056	.259	.018	.828	.214	.241	.073	.375
<i>Predom_public</i>	-.428	.370	-.093	.249	-.434	.369	-.095	.241	-.064	.344	-.015	.853

<i>Vestibular</i>	.284	.184	.098	.125	.513	.184	.179	.006**	.558	.172	.208	.001**
<i>Career</i>	.235	.166	.091	.160	.147	.166	.057	.378	.195	.155	.081	.210
<i>Araranguá</i>	.371	.161	.153	.022*	-.036	.161	-.015	.821	.018	.150	.008	.905

\*p < .05 \*\*p < .01 \*\*\*p < .001.

The regression outputs pointed out that the respondents at the campus of Araranguá had a better perception on the attention given by the institution compared to those at the campus of São Miguel do Oeste, with the former scoring up to 0.371 point more than the latter. This finding regarding the campus of Araranguá aligns with the conclusion of Mamun-ur-Rashid (2023).

There were two significant coefficients, but which had distinct meanings. While second-year students have a negative perception on this question (-0.390), those who intended to take college entrance exams had a positive perception (0.513) regarding specific demands. The results regarding second-year students once again align with the conclusions drawn by Souza et al. (2012) and Antunes et al. (2020).

Being in the fourth year of the course and intending to take college entrance exams were the two items with statistically significant coefficients, meaning that the respondents showed a positive perception on having their objectives met throughout the course (0.558). On the other hand, fourth-year respondents had a negative perception (-0.565) compared to the first-year ones. The findings regarding fourth-year students are also in line with the conclusions drawn by Souza et al. (2012) and Antunes et al. (2020).

Of the relationships assessed, the intent to take college entrance exams was the most frequently reported characteristic, suggesting that these students had a positive expectation on two items and a better perception on seven items regarding quality. Studying in Araranguá was a characteristic related to low expectation and worse perception on quality regarding each item and a better perception as well. Being a second-year student had the worst perceptions on quality regarding two items, whereas third-year students had higher expectation on one item.

## 5. Conclusion

The objective of this study was to assess the relationships between the characteristics of the students and their expectations and perceptions of the quality by using the SERVQUAL scale in an integrated technical course. For doing so, the expectation and perception reported by 249 students were measured by using a questionnaire adapted from the SERVQUAL scale, in which 44 items were assessed with regression analysis.

Regression analysis showed that the intent to take college entrance exams was the most frequent characteristic. These students have more expectation and they better perceive the aspects of the course compared to those who do not know whether taking college entrance exam or do not intend to do so. Being in the second, third or fourth year of the course, having always studied in public schools, intending to follow a career in the field of study and studying at the campus of Araranguá were other characteristics indicating statistically significant relationships.

These findings partially align with the literature. Antunes et al. (2020) and Garcia et al. (2020) identified that the student of a technical course who intend to open a business or practise in the same field of study has expectations and perceptions on the quality of different courses compared to one who does not. In addition, Garcia et al. (2020) identified that respondents practising functions of IT coordination or knowing the IT coordinator had expectation and perception different from the others.

Considering these findings as a whole, and mainly the fact that students intending to follow a career in the same field of study have expectation and perception different from those who do not, one can conclude that when there is a greater engagement/involvement with the service provided, the expectation and perception are different.

As a suggestion for further studies, we believe that this instrument should be applied again to the same students of the institution in order to verify whether there are changes in the relationships between the SERVQUAL items and the respondents' characteristics over time. It is also suggested to use other statistical techniques such as factorial analysis and structural equation modelling.

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## Authors contributions

SVS was responsible for Project Administration and Supervision. SVS and GRS were responsible for Data

Curation, Resources and Writing – Original Draft Preparation. SVS, GRS, and CRML were responsible for Conceptualization, Methodology, Validation, Investigation and Formal Analysis. SVS, GRS, CRML, TCS, and CCM were responsible for Visualization and Writing – Review & Editing. SVS, TCS, and CCM were responsible for Funding Acquisition.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Obtained.

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The Publication Ethics Committee of the Canadian Center of Science and Education.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

### **Data sharing statement**

No additional data are available.

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