

# Perception on Service Quality in a Military Training Course Measured by the HEdPERF Scale and Its Relationship with the Students' Characteristics

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## Abstract

Considering the educational services, the Brazilian Navy education aims to comply with continuous and progressive process of education, with own characteristics, which are constantly updated and improved based on some principles, such as guarantee of quality standard, continuous and progressive professionalisation, and integral and continuous evaluation. Therefore, this study aimed to assess the service quality of the training course at the Santa Catarina School of Sailor Apprentices, according to the students' perception. For this evaluation, the HEdPERF scale was used. Data collection was performed by using printed questionnaires and the sample consisted of 178 students enrolled in the sailor training course who voluntarily participated in the study. The instrument for data collection was validated by confirmatory component analysis by using the SmartPLS 3 software. Descriptive statistics and regression analysis were performed to assess the data with SPSS software. As a result, the study revealed that the respondents perceived the dimension "academic aspects" as having the highest quality, whereas the dimension "non-academic aspects" was perceived as having the lowest quality. Regression analysis showed that variables such as total monthly family income, education level and main motivation to enter the armed forces have a statistically significant relationship with certain items of the HEdPERF scale, which was adapted to the present study.

**Keywords:** HEdPERF, Service quality, Military training course, Brazilian Navy

## 1. Introduction

Since the 1980s, several scholars have been concerned with the measurement of the quality of services. Models of measurement of quality services have emerged over time, such as SERVQUAL by Parasuraman et al. (1988) and SERVPERF by Cronin and Taylor (1992), and been used in several sectors as service quality has become an essential requisite for competitive advantage among organisations.

When one talks about measurement of the quality of educational services, it is possible to find in the literature the frequent use of the SERVQUAL model (Soares et al., 2023). However, studies based on scales and models specifically developed for educational services have been recently found in the literature, such as HETQMEX by Ho and Wearn (1996), HEdPERF (2006), PESPERF by Yildiz and Kara (2009), HEDQUAL by Icli and Anil (2014), INSTAQUAL by Kumar and Dash (2014), EduQUAL by Mahapatra and Khan (2007), and MEQUAL by Verma and Prasad (2017).

The HEdPERF scale has been highlighted as one of the most appropriate models for educational services given its capacity to measure and be widely applied to different educational contexts worldwide (Brochado, 2009; Silva et al., 2017; Silva et al., 2021). This model was developed in Malaysia by Firdaus (2006a) based on the SERVPERF model to measure service quality, specifically in the higher education area. According to the author, the previous generic scales for measurement of service quality would not be adequate in the educational context. The scale has 41 items measuring the service quality based on the student's perceptions regarding the following dimensions: academic aspects, non-academic aspects, reputation, accessibility and programmatic content (Firdaus, 2005, 2006a, 2006b).

Concomitantly with the trend of continuous search for service quality, military training courses also assess their performance by using own instruments (Brasil, 2017). In the Navy Education System (NES) of the Brazilian Navy, this is not different. According to law 11.279/2006, the navy education must comply with a continuous and progressive education process, with own characteristics, and be constantly improved and updated. These peculiar aspects, once met, are based on some principles among which one can highlight the following: guarantee of quality standard, continuous and progressive professionalisation, and continuous integral evaluation (Brasil, 2006).

The search for a guarantee of quality standard as established by law is performed by the Institutional Evaluation of the Navy Education System (NES), which is a continuous process of improvement of academic performance and management planning (Brasil, 2017). This training-oriented evaluation seeks to guide the need for adopting new strategies and actions capable of generating elements which facilitate overcoming the problems detected (Brasil, 2017).

One of the most important courses in the NES is the sailor training course (STC) offered by the school of sailor apprentices, which is a military-technical course opening the path to a navy career. The Santa Catarina School of Sailor Apprentices (EAMSC) is one of the institutions providing STC and whose main mission is to train sailors for the Armed Corps (Brasil, 2020).

The target public of these courses is young men aged between 18–21 years old with complete secondary education (Brasil, 2012). These individuals have some common characteristics, such as desire to follow a military career and generation-Z features. According to Ceretta and Froemming (2011), this generation comprises those born in 1989 and is characterised by being demanding, individualist, consumerist, informed and digital.

Given the presented data, one can perceive the need to capture the students' perception on the STC regarding their satisfaction with the service quality because EAMSC is a public institution and these students are also considered client-citizens. Therefore, despite the diversity of applications of the HEdPERF scale to different contexts and in both public and private institutions, there was no attempt to use this tool in the context of military training courses.

Considering the above-described context from the scientific literature, the lack of a formal evaluation of this educational service using a validated instrument and the students' perception, the following research question was raised: What is the students' perception on the service quality of a military training course assessed with the HEdPERF scale? The objective of the present study is, therefore, to measure the quality of the STC according to the students' perceptions by using the HEdPERF scale.

## **2. Literature Review**

### *2.1 Military Education and Navy Education System*

Article no. 83 of Law no. 9394 of 20th December 1996, which establishes guidelines and bases of national education (LDB), defines that "military education is regulated by specific law, admitted the equivalence of studies, according to norms established by education systems" (Brasil, 1996). In this way, navy military education is present since the beginning of Brazilian education and today is grounded on the Navy Education System (SEN), currently ruled by Law no. 11279 of 9th February 2006—Law of the Brazilian navy education (Brasil, 2006).

According to this law, NES is aimed at training military and civil personnel for assuming positions and performing functions as stipulated by the Navy, whether in times of peace or war. Despite being organised according to the levels and modalities of education defined in the guidelines and bases of the national education, the Navy education has own characteristics and follows a continuous and progressive process of education which is constantly updated (Brasil, 2006). The objective of NES is to provide basic, professional and navy-military knowledge necessary for fulfilment of the constitutional mission of the Navy (Brasil, 2018).

It should be emphasised that the Navy's Board of Education (NBE) counts on technical and pedagogical staff to operate the education system based on norms and to follow up the development of courses in their teaching-learning processes depending on their several features. For instance, there are services of pedagogical and educational guidance in each centre of training ruled by the Guide of Pedagogical Practices and Principles in the Navy Education System) aimed at counselling the faculty, students and military operation command (MOC) regarding problems and services resulting from in-progress courses.

STC is conducted by the School of Sailor Apprentices (SSAs) on an internship basis and is entirely free, lasting one academic year and corresponding to 48 (forty-eight) weeks, in which the disciplines of elementary school

and military-naval education are performed. The apprentice sailor receives not only a scholarship during the whole course but also food, uniform, medical-dental, psychological, social and religious assistance, according to the military remuneration law.

STC is structured into two phases, totalising 1,920 class times (CT) of 45 minutes each. The first phase is conducted at a hierarchical level of sailor-apprentice (SA) and is aimed at military-navy training with 902 CTs, whereas the second one is conducted at a hierarchical level of apprentice (AP) aimed at technical specialisation with 390 CTs. This phase is called Initial Continued Specialisation (ICS) and is divided into three areas, namely: electro-electronics, support and mechanics. The remaining workload is dedicated to extra-class activities, reservation time and clerk time.

## 2.2 Measurement of Service Quality

One of the pioneer models of measuring the quality perceived by the customer is based on differences or gaps existing in the comparison between previous expectations regarding the service and actual perceptions on the service provided. This model, created by Parasuraman et al. (1985), is based on the customer satisfaction model created by Oliver (1980) in which the customer's perceptions on the quality of service depend on the difference between expectation and performance of the service. The gap model can be represented by the equation  $Q_j = D_j - E_j$ , where:

$Q_j$  = Assessment of service quality regarding characteristic;

$D_j$  = Values of measure of perception on the performance for service characteristic 'j';

and

$E_j$  = Values of measure of expectation on the performance for service characteristic "j"

To develop an instrument to measure service quality and consider the customer's perception, Parasuraman et al. (1988) developed the SERVQUAL scale based on quantitative research. Although the scale has been validated with confidence level regarding many types of services, it was created to measure the customer perceptions on service quality in organisations providing services and retail (Parasuraman et al., 1988).

It should be emphasised that many studies have been performed by the creators of the SERVQUAL scale in different contexts, when they applied and tested the instrument in various segments, thus providing a basic structure. The authors also concluded that, whenever necessary, this structure could be altered or complemented to become adequate to the characteristics of specific services (Parasuraman et al., 1988).

Differently from the SERVQUAL scale, which uses difference between expectation and performance to measure the quality of a service, Cronin and Taylor (1992) developed a model termed SERVPERF based only on the performance of a service to measure its quality. As a result, they concluded that the quality of service should be conceptualised as being the customer's attitude regarding the dimensions of quality, where quality is correlated to performance, which can be represented by  $Q_i = D_i$ , where:

$Q_i$  = Assessment of quality regarding characteristic i;

and

$D_i$  = Values of perception on the performance for characteristic 'i'.

The model SERVPERF uses the same theoretical base of the SERVQUAL scale, differentiating in terms of operation depending exclusively on the customer perception. In this way, the authors develop the SERVPERF instrument by using the same items and dimensions of the SERVQUAL scale, basically innovating in the reduction of items to be assessed, that is, from 44 in the SERVQUAL to 22 in the SERVPERF.

Cronin and Taylor (1992) concluded using statistical results that the SERVPERF scale is more reliable for depicting the variables of quality due to its greater capacity to assess service quality based only on the performance of the service provided. The authors also criticised the SERVQUAL model in which the main criticism was about the use of expectations as a measure of service quality.

In consonance with the studies conducted by Parasuraman et al. (1985, 1988) and by Cronin and Taylor (1992), from which originated the SERVQUAL and SERVPERF scales, respectively, and which are considered generic usage models to be applied to service companies of any sector, Firdaus (2005, 2006a, 2006b) proposed a new instrument to assess the quality of educational services, de so-called Higher Education Performance (HEdPERF).

Created in Malaysia, the objective of the HEdPERF scale is to measure service quality, specifically in the area of higher education, as according to its creator the previous generic scales developed to measure quality would not be adequate in the educational context. One can also observe that there are many areas of discordance in the

debate on measurement of the service quality and that recent studies have raised many questions on this issue (Firdaus, 2006a).

Considered the first scale specifically created for education, the instrument is aimed at detecting critical factors in the offer of services lacking attention and focus on the part of managers of education institutions based on the reports from the students (users) of the institution (Firdaus, 2006a).

As for the use of the scale, despite being recent, the HEdPERF model has already been shown to be widely used for assessment of the perception on the quality in education institutions (Silva et al., 2017).

Although the HEdPERF is considered to be recent and widely adapted by education institutions worldwide, it was not possible to find an adaptation for courses aimed at military education.

### 3. Method

The present study is aimed at assessing the sailor training course (STC), which has a workload of 1,920 class times of 45 minutes each. The course is offered to 18–21-year-old men who are approved in a public selection process. The course is conducted in full-time regime on an internship basis for 11 months, from Monday to Friday.

The participants of the present study consisted of 178 students who were enrolled in the sailor training course at the EAMSC in the period of data collection, and the sample was all those who volunteered to participate in the study.

Due to the convenience characteristic of the sample, the questionnaires of the present study were applied by the researcher in the classrooms. The questionnaires were elaborated and printed before being given to the respondents by the researcher, who instructed them on how to complete the instruments and waited for their return. It should be highlighted that the questionnaire was applied at a reservation time during the classes, which allowed approaching and inviting all the students. Because all of them expressed interest in participating in the survey, it was possible to reach the whole population of 178 students.

The questionnaire used was an adaptation of the HEdPERF scale. As described by the author of the instrument, it is a seven-point ranging scale where 1 means “fully disagree” and 7 means “fully agree” (Firdaus, 2005, 2016a, 2016b).

The adapted instrument for data collection comprises two blocks. The first block of the questionnaire contains a brief presentation of the survey and items for characterising the respondent. The second one contains 51 items of five dimensions, including an open question aimed at capturing information not addressed in the closed items.

As for the characterising items or descriptive variables of the sample in the first block of the instrument, it should be emphasised that the items of the original HEdPERF scale such as “gender”, “study in public or private institution”, “ethnicity”, “study modality”, “course”, “academic year” and “intended military rank” were not used in the adapted instrument because they did not apply to the sample’s characteristics, meaning that they were not the study object in the survey. On the other hand, the items “predominantly secondary education”, “colour or race”, “main motivation for entering the Armed Forces”, “how did you learn about the public contest for STC” were added to the model because it was necessary to know the sample, as the students of military schools are admitted by public selection process carried out across the country. It should be highlighted that these added items, as well as the scales used, are by the literature (Soares et al., 2023).

After being adapted, the questionnaire was submitted to evaluation by two specialist, one having PhD in education and member of the local faculty and the other being master in mathematics and member of the administrative staff of the education department. In this step, it was possible to make small corrections and refinements in the questions to improve their comprehension by the students given the context of military-navy context.

With the final instrument at hand, a pre-test was performed with nine students so that the comprehension of some questions could be improved and more options of answers added to the characterising items, as suggested by the respondents.

This step was initiated with validation of the instruments, including verification of the adequate filling of the questionnaire regarding erasure, missing data or incomplete answers. For those questionnaires containing items with missing answers or with more than one marking, the average was used as substitution of the answer. However, questionnaires with characterising items whose answers had the same imperfections but admitted no substitution were disregarded. Therefore, four questionnaires were excluded, remaining 174 ones for the following steps.

It was necessary to analyse the values of internal reliability (Cronbach's alpha) and composite reliability (CR). According to Ringle et al. (2014), both indicators are used to assess whether the sample is free of biases, or even, whether the answers are reliable as a whole. According to criterion by Hair Jr. et al. (2014), values of alpha between 0.60 and 0.70 are considered adequate in exploratory surveys, whereas values of CR between 0.70 and 0.90 are considered satisfactory. As both values of alpha and CR were found to be satisfactory, the reliability of the model was confirmed.

#### 4. Results

##### 4.1 Characterisation of the Sample

The sample was characterised according to the items of the original questionnaire of HEdPERF, with adaptations described in the Methodological Procedures section elsewhere. In this way, the characterisation brings demographic and socio-economic data of the respondents such as age, education level, where they completed secondary school, colour or race, total family income, main motivation for entering the Armed Forces, how they learned about the public contest for the Navy.

Table 1. Characterisation of the sample

Variable	<i>n</i>	%
Age		
18	1	0.6
19	37	21.3
20	51	29.3
21	48	27.6
22	35	20.1
23	1	0.6
24	1	0.6
Education Level		
Secondary education	108	62.1
Technical education	29	16.7
Incomplete higher education	37	21.3
Where the secondary school was completed		
Public school	100	57.5
Private school	74	42.5
Colour or Race		
Mixed	80	46.0
White	68	39.1
Black	25	14.4
Yellow	1	0.6
Total monthly family income (R\$)		
1,001 to 2,000	15	8.6
2,001 to 3,000	40	23.0
3,001 to 5,000	62	35.6
5,001 to 10,000	44	25.3
10,001 to 20,000	13	7.5
Motivation for the course		
Stability	83	47.7
Self-achievement	49	28.2
Family	16	9.2
Vocation	16	9.2
Salary	5	2.9
Image of the Armed Forces	2	1.2
To know the Navy	1	0.6
Necessity	1	0.6
Dream	1	0.6
How they learned about the course		
Family	74	42.5
Friends	66	37.9
Sites	20	11.5
Schools	9	5.2
Preparatory courses	3	1.7
Mandatory military service	1	0.6
Television	1	0.6

It should be highlighted that the variable “gender” is not considered because one of the prerequisites for entering the course is being male.

#### 4.2 Descriptive Analysis of the Observable Variables

Next, a descriptive analysis is presented showing a synthesis of the answers given by the respondents for the 27 items of the validated instrument. In Table 2, the following descriptive measures are sequentially listed: mean, standard error, median, fashion, standard deviation, variance, minimum, maximum and sum.

Table 2. Descriptive statistics of the answers given by the sample

Item	Mean	Standard error	Median	Fashion	Standard deviation	Variance	Minimum	Maximum	Sum
Academic aspects									
Item_1	5.81	0.08	6	6	0.98	0.95	2	7	866
Item_2	5.48	0.11	6	6	1.32	1.74	2	7	816
Item_3	5.6	0.1	6	6	1.16	1.35	1	7	835
Item_4	5.86	0.09	6	6	1.07	1.15	2	7	873
Item_5	5.83	0.08	6	6	1.02	1.04	3	7	868
Item_6	4.66	0.12	5	5	1.51	2.29	1	7	695
Item_7	4.84	0.14	5	5	1.67	2.8	1	7	721
Programmatic content									
Item_8	5.02	0.13	5	6	1.55	2.4	1	7	748
Item_9	4.01	0.15	4	5	1.79	3.19	1	7	598
Item_10	4.19	0.14	4	6	1.71	2.91	1	7	625
Item_11	5.05	0.15	5	6	1.79	3.19	1	7	752
Item_12	4.21	0.13	5	5	1.59	2.53	1	7	628
Item_13	4.74	0.12	5	6	1.51	2.29	1	7	707
Non-academic aspects									
Item_14	4.44	0.14	5	5	1.66	2.75	1	7	662
Item_15	4.19	0.12	4	5	1.43	2.06	1	7	624
Item_16	4.85	0.13	5	6	1.57	2.46	1	7	723
Item_17	4.09	0.14	4	5	1.75	3.05	1	7	610
Item_18	4.99	0.12	5	6	1.5	2.25	1	7	744
Item_19	3.89	0.14	4	5	1.69	2.85	1	7	579
Item_20	4.4	0.13	5	5	1.64	2.69	1	7	656
Accessibility									
Item_21	5.89	0.1	6	7	1.23	1.52	1	7	877
Item_22	4.65	0.14	5	5	1.76	3.11	1	7	693
Item_23	5.99	0.09	6	6	1.13	1.27	2	7	892
Item_24	4.79	0.16	5	7	1.99	3.96	1	7	714
Item_25	4.07	0.16	4	5	1.96	3.85	1	7	607
Item_26	5.5	0.12	6	7	1.51	2.28	1	7	820
Item_27	3.48	0.14	4	4	1.73	2.99	1	7	519

Given the data presented above, it is possible to initiate the identification of the respondents' satisfaction. By analysing their satisfaction on the STC, it was found that items 21 and 23 had the highest mean values, respectively, 5.89 and 5.99. Both items refer to the dimension “accessibility” (Item 21: Are the students respectfully treated by the platoon officers? and Item 23: Are the students respectfully treated by the teachers/instructors?) and demonstrate a higher satisfaction of the students with these aspects. On the other hand, the items with the lowest mean values and consequently the least satisfaction among the respondents were Items 19 and 27, respectively, 3.89 and 3.48. Item 19 (Does the crew at the EAMSC demonstrate positive attitude towards the students?) belongs to the dimension “non-academic aspects” and Item 27 (Does the EAMSC value the student's opinion/feedback to improve the service performance?) belongs to the dimension “accessibility”.

Considering the respondents' satisfaction regarding the dimension as a whole, one can perceive that the dimension “academic aspects” had items with the highest mean values for a total mean value of 5.44, thus indicating the greatest satisfaction among the respondents. The dimension “accessibility” was the second one with the greatest satisfaction among the respondents, with a total mean value of 4.91. On the other hand, the dimension “non-academic aspects” had the least satisfaction among the respondents as the items had the lowest

mean values for a total mean value of 4.41.

As for the choice of answers, the maximum score (7 = fully agree) had occurrence in all questions of the final instrument, whereas the minimum score (1 = fully disagree) was observed in the majority of the items, thus representing a low satisfaction among the respondents, mainly regarding the dimensions “programmatic content” and “non-academic aspects”. One can highlight that the highest minimum scores were those for items of the dimension “academic aspects”, with the highest minimum score for Item 5 (Do teachers/instructors communicate well with the students in the classroom, laboratories and sporting facilities?), which had score 3, indicating a strong satisfaction about this question.

#### 4.3 Regression Analysis

The last step of the data analysis was the regression linear multiple analysis. Each one of the 27 items of the validated instrument was used as dependent variable, whereas the variables age, education level, type of secondary school, colour or race, total monthly family income, main motivation for entering the Armed Forces and how they learned about the public contest for STC were independent variables.

It should be emphasise that except for the variable “age”, all the other variables were included in the model as dummies and that categories without statistical representativeness (less than 11 respondents) were not included in the regression analysis. Moreover, the multiple linear regression analysis was elaborated by using the stepwise procedure according to Fávero and Belfiore (2020) and has the property of excluding or maintaining parameters automatically in the model depending on the criteria and offer a final model with only parameters statistically different from zero at a given significance level. Still, according to these authors, all the 14 items found to be statistically significant (5%) had no problems of multicollinearity as the statistic variance inflation factor (VIF) of all items was less than 4 (Fávero & Belfiore, 2020).

The model of regression analysis is represented below:

$$Y_i = a + b_1.X_{1i} + b_2.X_{2i} + \dots + b_k.X_{ki} + UI$$

or

$$Y = a + b_1.age + b_2.tech\_ed + b_3.inc\_higher\_ed + b_4.priv\_school + b_5.white + b_6.black + b_7.income\_1 + b_8.income\_2 + b_9.income\_4 + b_{10}.income\_5 + b_{11}.self\_ach + b_{12}.family + b_{13}.vocation + b_{14}.friends + b_{15}.sites$$

where:

age = respondent’s age (in years) when data were collected;

tech\_ed = respondent has technical education;

inc\_higher\_ed = respondent has incomplete higher education;

prov\_sch = respondent studied in private secondary school;

white = respondent self-declared to be white;

black = respondent self-declared to be black;

income\_1 = respondent with total monthly family income from R\$ 1,001 to R\$ 2,000

income\_2 = respondent with total monthly family income from R\$ 2,001 to R\$ 3,000

income\_4 = respondent with total monthly family income from R\$ 5,001 to R\$ 10,000

income\_5 = respondent with total monthly family income from R\$ 10,001 to R\$ 20,000

self\_ach = self-achievement was the resident’s main motivation for entering the Armed Forces;

family = family was the respondent’s main motivation for entering the Armed Forces;

vocation = vocation was the respondent’s main motivation for entering the Armed Forces;

friends: respondent learned about the course using friends;

sites: respondent learned about the course using sites.

All the analyses were performed by using the SPSS software and the regression outputs of the 14 statistically significant items (5%) are listed and discusses below.

Table 3. Regression coefficients for perceptions on items of the dimension “academic aspects”.

Variable	Model for item 1				Model for item 3				Model for item 4				Model for item 5			
	B	SE	Beta	Sig	B	SE	Beta	Sig	B	SE	Beta	Sig	B	SE	Beta	Sig
(Constant)	5.584	0.101		0.000	5.462	0.102		0.000	5.882	0.125		0.000	5.624	0.101		0.000
tech_ed													0.461	0.225	0.164	0.042
white	0.453	0.158	0.227	0.005												
Income_1	0.546	0.265	0.164	0.041	0.772	0.318	0.195	0.016								
Income_4													0.512	0.186	0.220	0.007
Self_ach									0.434	0.185	0.188	0.020				
Friends									-0.377	0.174	-0.174	0.032				
Sites					0.576	0.285	0.162	0.045								
R	0.290				0.265				0.253				0.264			
R <sup>2</sup>	0.084				0.070				0.064				0.070			
F	6.697				5.494				4.975				5.456			
Sig	0.002				0.005				0.008				0.005			

The regression model of Item 1 was the first to be shown to be statistically significant as ANOVA indicated a P-value = 0.002 for test F. It is worth highlighting that Item 1 refers to attentive and polite communication with the students.

The regression output shows that there are two statistically significant coefficients, namely: being white and belonging to income-1 group (R\$ 1,001.00 to R\$ 2,000.00). Respondents self-declaring to be white and to the income-1 group have greater satisfaction with attentive and polite communication by teachers/instructors with the students compared to the reference categories (being mixed and belonging to income-3 group).

Regression analysis of Item 3 was also found to be statistically significant. This question addressed the student’s satisfaction with the genuine interest of teachers/instructor in demonstrating in solving their problems.

It is possible to observe that the relationship between respondents who belong to income-1 group or were informed about the public contest using sites and their satisfaction regarding this question was statistically significant (Item 3). This demonstrates that these respondents have greater satisfaction with a genuine interest of teachers/instructors in solving their problems compared to the reference categories (i.e. belonging to income-3 group and learning about the public contest by a family member).

Regression analysis of Item 4 was also found to be statistically significant. This question addressed the student’s satisfaction with the positive attitude of teachers/instructors about the students.

In Table 3, it is possible to observe that the relationship between respondents whose main motivation for entering the Armed Forces was their self-achievement or who learned about the public contest by friends and satisfaction regarding this question was statistically significant (Item 4). However, whereas respondents reporting self-achievement as the main motivation for entering the Armed Forces have greater satisfaction (0.434) about Item 5 compared to the reference category (i.e. stability was the main motivation for entering the Armed Forces), those who learned about the public contest by friends had less satisfaction about Item 4 compared to the reference category (i.e. learning about the contest by a family member).

The model generated for Item 5 was shown to be statistically significant. The respondents were asked whether teachers/instructors communicate well with the students in the classroom, laboratories and sporting facilities.

One can observe that respondents belonging to income-4 group (R\$ 5,001.00 to R\$ 10,000.00) as well as those reporting to have technical education are more satisfied with Item 5 compared to reference categories (i.e. belonging to income-3 group and having secondary education). Therefore, students belonging to income-4 group had more 0.512 point for satisfaction with this question, and the respondents having technical education had more 0.461 point.



Table 4. Regression coefficients for perceptions on items of the dimension “programmatic content”.

Variable	Model for item 8				Model for item 9				Model for item 10				Model for item 12			
	B	SE	Beta	Sig.	B	SE	Beta	Sig.	B	SE	Beta	Sig.	B	SE	Beta	Sig.
(Constant)	5.112	0.132		0.000	3.769	0.185		0.000	9.757	2.581		0.000	4.382	0.140		0.000
Age									-0.271	0.125	-0.175	0.033				
Inc_higher_ed													-1.238	0.297	-0.324	0.000
White					0.627	0.297	0.172	0.036								
Income_5													1.454	0.472	0.240	0.002
Family	-0.912	0.416	-0.178	0.030												
R	0.178				0.172				0.175				0.371			
R <sup>2</sup>	0.032				0.030				0.031				0.138			
F	4.798				4.474				4.660				11.670			
Sig	0.030				0.036				0.033				0.000			

Item 8 addressed the respondents’ satisfaction with the diversity of specialisations offered by the course.

One can observe in Table 4 that respondents whose main motivation for entering the Armed Forces was a family member had less satisfaction with Item 8 compared to the reference category (i.e. stability as main motivation). These students had -0.912 less points for satisfaction with this question.

Item 9 addressed the respondents’ satisfaction with the adequacy of the curriculum content of the course.

In Table 4, it is possible to observe that the relationship between respondents self-declaring to be white and satisfaction with this item was statistically significant. These respondents had more satisfaction with Item 9 (i.e. adequacy of the curriculum content) compared to the reference category (i.e. respondents self-declaring to be mixed).

Item 10 addressed the respondents’ satisfaction with the division of workload in the course.

In Table 4, one can observe that the relationship between the variable “age” and satisfaction with Item 10 is statistically significant, meaning that the older the respondent, the less the satisfaction with the quality of this item (i.e. division of the workload in the course).

Item 12 addressed the respondents’ satisfaction with the amount of practical classes during the course.

In Table 4 it is also possible to observe that the relationship between respondents with incomplete higher education, or who belong to the income-5 group, and satisfaction with Item 12 was statistically significant. However, whereas respondents with incomplete higher education are less satisfied with Item 12 in more than one negative point (-1,238) compared to the reference category (i.e. secondary education), those belonging to the 5-income group (R\$ 10,001.00 to R\$ 20,000.00) are more satisfied in more than one positive point (1.454 point) compared to the reference category (i.e. belong to 3-income group).

Table 5. Regression coefficients for perceptions on items of the dimension “non-academic aspects”.

Variable	Model for item 14				Model for item 15				Model for item 20			
	B	SE	Beta	Sig.	B	SE	Beta	Sig.	B	SE	Beta	Sig.
(Constant)	4.419	0.175		0.000	4.372	0.132		0.000	4.611	0.151		0.000
Income_2	-0.715	0.309	-0.185	0.022	-0.761	0.268	-0.228	0.005	-0.861	0.307	-0.225	0.006
Self_ach	0.637	0.286	0.178	0.028								
R	0.253				0.228				0.225			
R <sup>2</sup>	0.064				0.052				0.051			
F	4.993				8.035				7.872			
Sig	0.008				0.005				0.006			

Item 14, which measures the respondents’ satisfaction with the interest of the administrative staff in solving problems, also had a statistically significant regression model at 5%.

The results listed in Table 5 point to a statistically significant relationship between respondents belonging to 2-income group (R\$ 2,001.00 to R\$ 3,000.00), or those whose main motivation for entering the Armed Forces was self-achievement, and satisfaction with Item 14. It was found that belonging to income-2 group has a negative influence (-0.715) on the respondents’ satisfaction with Item 14. On the other hand, having self-achievement as the main motivation for entering the Armed Forces had a positive influence (0.637) on the

respondents regarding this same item.

Regression analysis for Item 15 was also found to be statistically significant. This question addressed the students’ satisfaction with the feedback from the administrative staff for their demands.

In Table 5, it is possible to observe that the relationship between respondents belonging to income-2 group and satisfaction with rapid feedback by the administrative staff in meeting their demands was statistically significant. These respondents are less satisfied (-0.761) compared to the reference category (income-3 group).

Item 20 addressed the respondents’ satisfaction with communication of the administrative staff.

Also in Table 5, it is possible to observe that the relationship between respondents belonging to income-2 group and satisfaction with communication by the administrative staff was statistically significant. Again, one can note that these respondents are less satisfied (-0.861) with Item 20 compared to the reference category (income-3 group).

Table 6. Regression coefficients for perceptions on items of the dimension “accessibility”

Variable	Model for item 21				Model for item 23				Model for item 25				Model for item 26				Model for item 27			
	B	SE	Beta	Sig	B	SE	Beta	Sig	B	SE	Beta	Sig	B	SE	Beta	Sig	B	SE	Beta	Sig
(Constant)	5.689	0.114		0.000	5.599	0.124		0.000	3.905	0.215		0.000	5.621	0.139		0.000	3.335	0.152		0.000
Tech_ed	0.622	0.272	0.183	0.024	0.680	0.247	0.219	0.007												
White																				
Income_1					0.928	0.310	0.241	0.003									-0.997	0.465	-0.169	0.034
Income_2													-0.978	0.280	-0.278	0.001				
Income_4					0.509	0.205	0.198	0.014												
Self-ach																				
Family									-1.154	0.522	-0.178	0.029								
Vocation																	1.565	0.517	0.237	0.003
Friends									0.686	0.319	0.173	0.033								
Sites	0.832	0.302	0.221	0.007	0.539	0.270	0.157	0.048					0.980	0.368	0.212	0.009	1.046	0.415	0.198	0.013
R	0.272				0.358				0.260				0.319				0.340			
R <sup>2</sup>	0.074				0.128				0.068				0.102				0.116			
F	5.826				5.304				5.295				8.268				6.332			
Sig	0.004				0.001				0.006				0.000				0.000			

Item 21, which addressed the respondents’ satisfaction with respectful treatment by the platoon officers, was also statistically significant.

Regression output for Item 21 shows that there are two statistically significant coefficients, namely: learned about the public contest using sites and having technical education. Both respondents reporting to learn about the public contest using sites and those having technical education are more satisfied with the respectful treatment by the platoon officers compared to reference categories (learned about the public contest by family members and having secondary education).

Item 23 addressed the respondents’ satisfaction with respectful treatment by teachers/instructors.

Regression outputs in Table 6 showed that variables “belonging to income-1 group”, “having technical education”, “belonging to income-4 group” and “learned about the public contest using sites” influenced the respondents’ satisfaction with Item 23. It was verified that respondents with technical education are more satisfied with the quality of this Item compared to the reverence category (secondary education). The same occurred with respondents belonging to income-1 and income-4 groups compared to those belonging to income-3 group. A positive influence was also found in the satisfaction with the quality of Item 23 when respondents learned about the public contest using sites compared to those learning it by members of the family.

The model generated for Item 25 was also found to be statistically significant. This question addressed the equal treatment by the administrative staff.

For Item 25 (i.e. equal treatment by the administrative staff), the regression coefficients indicate that respondents whose main motivation for entering the armed Forces was the family were less satisfied with this item in less than one negative point (-1, 154) compared to those whose motivation was stability. On the other hand, respondents learning about the public contest by friends were more satisfied (0.686) compared to those learning about it by members of the family.

Item 26 addresses the respondents' satisfaction with receiving equal treatment by teachers/instructors.

The results listed in Table 6 point to a statistically significant relationship between respondents belonging to income-2 group (R\$ 2,001.00 to R\$ 3,000.00) or those learning about the public contest using sites and their satisfaction with Item 26. It was found that belonging to income-2 group had a negative influence (-0.978) on the respondents' satisfaction with this item compared to reference category. On the other hand, learning about the public contest using sites has a positive influence (0.980) on the respondents satisfaction with this item compared to the reference category.

Lastly, Item 27 was the last one shown to be statistically significant. This item addressed the respondents' satisfaction with the valorisation of their opinion/feedback to improve the performance of the services provided.

The coefficients listed In Table 6 point to a statistically significant relationship between the variables "vocation as main motivation for entering the Armed Forces", "learning about the public contest using sites" and "belonging to income-1 group (R\$ 1,001.00 to R\$ 2,000.00)" and the respondents' satisfaction with Item 27. It was found that respondents whose main motivation for entering the Armed Forces was vocation or who learned about the public contest using sites were more satisfied in more than one point (1.565 and 1.046, respectively) with valorisation of their opinion/feedback considering their reference categories. On the other hand, belonging to income-1 group has a negative influence (-0.977) on the respondents' satisfaction with item.

It was observed, therefore, that the variable "total monthly family income" was statistically significance in ten of the 16 regressions. There was a tendency of positive influence on the satisfaction of respondents belonging to income-1 group for items of the dimension "academic aspects", which addresses the teachers/instructors' attentive communication and interest in solving problems of the students. On the other hand, there was also a tendency of negative influence on the satisfaction of respondents belonging to income-2 group for items of the dimension "non-academic aspects", which addresses the administrative staff's communication quality, rapid feedback and interest in solving problems of the students.

It should be also mentioned that as for the variable "education level" there is a tendency of positive influence on the satisfaction of respondents with technical education compared to items such as "good communication in the classroom" and "respectful treatment by teachers/instructors". However, it was also found that there is a negative influence on the satisfaction of students with incomplete higher education regarding practical classes of the course.

Coefficient analysis also showed the there is a tendency of positive influence on the satisfaction with Items 4, 14 and 27 by respondents who reported personal or emotional aspects, such as vocation or self-achievement, as the main motivation for entering the Armed Forced. These items addressed issues on "teachers/instructors' demonstration of positive attitude towards the students, resolution of problems by the administrative staff and valorisation of the students' opinion to improve the performance of the service.

Overall, the present study showed similarities as well as differences compared to other related works. Nevertheless, the diversity of methodologies in the application of the scale makes detailed comparisons of the results difficult. Moreover, for Firdaus (2006a), the most important is that the institutions can provide adequate services in different dimensions so that they can assess which one deserves more attention.

## 5. Conclusion

The main objective of the present study was to assess the service quality according to the perceptions of their users, in the case, a military training course (STC) provided by the EAMSC—an education institution of the Brazilian Navy. Therefore, the HEDPERF scale was used to assess the service quality.

The instrument used in the present study was adapted from 41 items distributed into five dimensions of the original HEDPERF scale. Therefore, 50 items were formulated based on a 7-point scale, including items characterising the sample. After pre-test and subsequent application, the instrument was submitted to analysis of confirmatory components (ACC) by using the SmartPLS3 software to assess the model of measurement according to the sequence recommended by Ringle et al. (2014) and by Bido and Silva (2019). Therefore, the instrument used in the present study was validated with 27 items after successive adjustments of the model, in which the dimension "reputation" was excluded as it did not meet the criterion expected to reach a satisfactory result (Fornell & Larcker, 1981).

Regarding the perceived quality, it was found that the dimension "academic aspects" had the highest mean value of satisfaction among the respondents, highlighting the good communication, attention, time availability and resolution of problems by teachers/instructors. Next, the dimension "accessibility" was highlighted for respectful and equal treatment by teachers/instructors as well as by the administrative staff.

On the other hand, the dimension “non-academic aspects” had the lowest mean value of satisfaction among the respondents. This dimension consists of items addressing the functions performed by the administrative staff and which allow the students to fulfil their duties. Items with the lowest mean values for this dimension refer to the dissatisfaction with activities carried out by the administrative staff (division of students), such as rapid feedback, date compliance and effective communication.

Considering the items individually, the two ones with the highest mean values of satisfaction were Item 23 (5.99), which refers to the teachers’/instructors’ respectful treatment towards the students, and Item 21 (5.89), which also refers to the same issue regarding the platoon officers, though. On the other hand, the two items with the lowest mean values of satisfaction were Item 27 (3.48), which addresses the valorisation of the students’ opinions/feedback regarding the performance of the services, and Item 19 (3.89), which addresses the relationship of other military personnel of the EAMSC who do not work directly with the students.

Overall, as for the question raised by the present study, it was possible to identify a perception of the students about the sailor training course provided by the EAMSC. As mentioned elsewhere, this study presented both similarities and differences compared to other related works. Nevertheless, the lack of specific research aimed at assessing the service quality of military training courses makes it difficult to conduct more punctual comparisons.

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### **Authors’ contributions**

GFS, SVS, TCS, and CM were responsible for Conceptualization, Methodology and Validation. GFS, and SVS were responsible for Data curation, Formal Analysis and Investigation. SVS, NAN, TCS, and JBSOAG were responsible for Funding acquisition and Resources. SVS was responsible for Project administration, Visualization and Writing – original draft. SVS, TCS, and JBSOAG were responsible for Supervision. SVS, NAN, TCS, CM, and JBSOAG were responsible for Writing – review & editing. All authors read and approved the final manuscript.

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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 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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