PROPOSAL OF SYSTEMATICS TO ANALYZE THE QUALITY OF COLLECTIVE TRANSPORTATION IN THE "HOME-COLLEGE" PATH: THE PERSPECTIVE OF UNIVERSITY STUDENTS

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ABSTRACT

Highlights: this article aims to propose a systematic analysis of the quality of collective transportation from the perspective of the students of the Center for Legal and Political Sciences (CCJP) of the Federal University of the State of Rio de Janeiro, which is composed of the courses of Public Administration, Political Sciences and Law.

Aim: the research aims to measure the degree of satisfaction of the students of the CCJP campus in relation to the collective transports used on the way home from college.

Methodology: qualitative exploratory research, of the case study type, with 84 students from the CCJP.

Results: based on the quality factors for public transport described by Ferraz et Torres (2004), the research concluded that, for the researched sample of students, the degree of satisfaction in relation to public transportation in the "home-college" route is, generally, fair but acceptable. It is emphasized that the time spent in transportation is seen by the majority as a factor that negatively influences the academic performance.

Limitations of the research: the qualitative analysis is limited to the respondents of the research composed of students of the CCJP campus that use the collective public transportation in the route until the college. Although some of the students use more than one modal in the accomplishment of the path, it is clarified that the assessment of satisfaction did not occur individually on each modal, but rather on the experience lived in the "home-college" path as a whole.

Practical implications: the problem of urban mobility goes beyond the public planning issues of the cities, resulting in negative impacts both on the quality of life of its users and on the levels of productivity of the companies.

Originality/Value: through a documentary research and case study, the article points out that there is a gap regarding research that evaluates the impact of urban mobility on the academic performance of undergraduate students.

Keywords: Public transportation; Quality management; Quality in Services.

1. INTRODUCTION

Urban mobility, especially in large metropolitan areas, is a recurrent issue in the media and social media, as well as being a prominent subject in academic studies, which portrays its challenges and impacts on the quality of life of the population. According to Suguiy (2017), urban mobility can be defined as the easiness of movement of people and goods in the city, being compromised by problems in infrastructure and quality of transportation.

Freire et al. (2010) argue that the means of transportation generates impacts on urban development, considering that this process is responsible for the displacement of people and goods. According to the Institute for Applied Economic Research (IPEA, 2011, acronym in Portuguese), problems related to the mobility of people and goods in urban centers directly affect the quality of life of the population and the economic performance of urban activities.

A study by IPEA and the Brazilian National Association of Public Transport (ANTP, acronym in Portuguese) in 1998 reveals figures estimating the financial loss caused by transport problems in ten cities in Brazil. Monetarization involving time (congestion), fuel consumption, pollution and road system resulted, in that year, in the city of Rio de Janeiro alone, a total diseconomy of approximately 72 million Reais (ANTP, 1999)

Costa (2015) points out that the increase in the time of travel in the "home-work" route has become a factor that causes companies to lose their employees' performance by delay or fatigue. Thus, the absence of more efficient mobility has negative consequences both on the quality of life of society and on the economy. Because of this, it is perceived that public transportation is an important and necessary means of integration between the various economic and social areas of urban centers, whose role is to provide accessibility, mobility and quality of life for the population (Silva et Schlag, 2017).

In relation to collective public transport, the city of Rio de Janeiro and its metropolitan region have a certain variety: bus, subway, train, ferry, alternative transportation, bus rapid transport system (BRT) and, more recently, light rail vehicle (VLT, acronym in Portuguese). On a daily basis, a part of the population needs to use different modes in the same route, which makes the integration between them of great importance for the improvement of mobility.

According to Reis et al. (2013), demonstrations in Brazil in June and July 2013 demonstrated the population's dissatisfaction with the quality of collective transportation and the price of the tariff. For Silveira et Cocco (2013), at that moment, part of the society started to question about which

problems affect the public transport sector, which is responsible for the production and social reproduction amplified of the workforce and its productivity.

Therefore, understanding the opinions of users is fundamental to identify the most effective actions in the search for customer satisfaction, getting to make more managerial decisions and avoiding that efforts are spent on actions that are not efficient in improving the user's perception (Raia Junior et Moreira, 2001). Thus, the importance of studies that deal with quality from the point of view of users is perceptible.

Thus, the present study has the purpose of answering the following question: does the Rio de Janeiro public transportation satisfactorily serve the students of the Center for Juridical and Political Sciences (CCJP, acronym in Portuguese) of the Federal University of the State of Rio de Janeiro (UNIRIO), located in Botafogo, based on the factors proposed by Ferraz et Torres (2004)?

2. LITERATURE REVISION

2.1 Public transportation

in Reck's view (2012), transportation is understood as the means of intentional displacement of people or goods. Therefore, a transport system can be defined by a set of parts (vehicles, roads and terminals) that interact with each other to promote the displacement according to the will of the users and the pre-established control rules. In this way, the population of a city can make its daily commutes through its own vehicles or using public transportation.

Collective public transport is a service of great importance in cities, since, in addition to democratizing mobility, it is a fundamental means of transportation to reduce congestion, pollution levels and the indiscriminate use of automotive energy, minimizing the need to construct roads and parking lots (Gomide, 2006). Rodrigues et Sorratini (2008) also pointed out the importance of public transportation to interconnect city regions and to reduce problems arising from the urbanization process, such as congestion, traffic accidents and emission of pollutants.

According to Suguiy (2017), in Brazil, most users of public transport have no means of acquiring their own vehicle. For Reck (2012), public transport is a means accessible to the whole population by paying a fee (or free of charge in certain cases), and their services are subject to the obligation to permanently operate a certain transport network; transport all passengers at a fixed time; charge fees defined by the public authority; inform passengers in advance of the value of

the services; and carry out social transport, in some cases, in favor of certain social groups or to serve certain regions.

According to Gomide (2006), the inadequate supply of public transport harms the poorest part of the population and stimulates the use of individual transport, which, in addition to causing pollution and congestion levels, also attracts more resources for the expansion and construction of roads.

Suguiy (2017) pointed to some problems in cities in developing countries, including the lack of an accessible public transport service and a secure infrastructure to integrate non-motorized modes of transport, such as cycling and walking. In his thesis, the author has also mentioned the problem that in any means of passenger transport, occupancy density directly interferes with the quality of the service offered, for the larger the number of passengers per trip, the worse the comfort condition. In order to avoid this, public transport system managers must constantly reassess the performance of the system, both in terms of operating parameters and costs, in order to achieve the balance between maintaining a reduced tariff and the quality of the service offered.

It is important to emphasize, therefore, that the benefits generated by collective public transport include, besides improvements to the environment, the improvement of urban quality of life. The benefits include reduced fuel consumption, air pollution and noise, and, with fewer cars being used for locomotion, greater mobility is achieved in urban areas (Higa, 2012).

2.1.1 Public transport in Rio de Janeiro and Metropolitan Region

According to Costa (2015), Rio de Janeiro suffers a crisis of urban mobility. The culture of motor vehicle use makes the stretches more exhaustive, contributing to congestion and deterioration of the quality of life, even with studies pointing out the problems of excessive use of private transport.

According to statistics of the Transit Department of the State of Rio de Janeiro (DETRAN/RJ), in September 2018 the city of Rio de Janeiro had a fleet of 2,260,874 automobiles. In comparison, Nova Iguaçu and Duque de Caxias, the cities of the Metropolitan Region, owned a fleet of 194,300 and 212,434 automobiles, respectively. According to a research carried out by Paulo Cezar Ribeiro (Silva, 2011), professor of Transport Engineering at the Alberto Luiz Coimbra Institute for Graduate Studies and Engineering Research at the Federal University of Rio de Janeiro (Coppe/UFRJ), the trend is that the fleet of cars in the city of Rio de Janeiro reaches almost 3 million by 2020.

For Rodrigues (2014), the main origins of the Carioca mobility crisis are related to the growth of motorized transportation; to the deficiencies of collective transport (which includes the lack of investment in mass transportation such as trains and subways); deregulation of the public transport sector; and the generalization of precarious and insecure forms of transportation. The main effects are the increase in congestion and travel time; the growth of traffic accidents; and the increase in inequality of mobility conditions among social groups.

In July 2018, a survey conducted by Expert Market consultancy (Negócios, 2018) pointed Rio de Janeiro as the city with the worst mobility in a global ranking with 73 other cities. It should be noted that countries already known for their chaotic transits, such as China, India and Russia, did not participate in the research. The methodology considered the average time of the daily journey; the average waiting time for transport; the average distance traveled; the percentage of transshipments required in a single journey; the monthly cost of public transportation compared to monthly income; and the time of hours spent in congestion. Some of the results indicated that people in Rio take an average of 19 minutes waiting for transportation, travel for 90 minutes on the way, and spend approximately 9.4% of their salary with tickets.

As already mentioned, buses, BRT, subway, train, VLT, ferry and the Local Public Transport System (alternative transportation vans) are among the collective public transportation modes that serve the metropolitan region and the city of Rio de Janeiro.

2.2 Quality in services

According to the ISO 9000[1] series of standards, the term quality can be defined as the degree to which a set of inherent characteristics meets requirements. Lanzas (1994) compared the quality approaches according to different authors, as shown in Table 1.

Table 1. Classic definitions of quality

Author	Definition
Campos	It means delivering reliable, accessible, secure and timely customer service to the needs of the customer.
Crosby	Compliance with requirements.

1 The ISO 9000 series of standards is composed of three specific standards: NBR ISO 9000, NBR ISO 9001 and NBR ISO 9004 - versions published in Portuguese by the Brazilian Association of Technical Standards (Associação Brasileira de Normas Técnicas - ABNT).

Deming	Quality should aim at the needs of the user, present and future.
Feigenbaum	Quality means the best for customer conditions.
Ishikawa	Continuous search for consumer needs.
Juran	Suitability for purpose or use.

Source: Adapted from Lanzas (1994)

According to Parasuraman et al. (1985), service quality can be defined as the breadth of the discrepancy between customer perceptions and expectations. Hoffman et Bateson (2003) found that the quality of service is verified by means of a long-term evaluation of a performance, that is, by the perceived pattern over time of all the transactions of a service, which is determined by the satisfactory average.

According to Kotler (2009), the quality is concentrated in the consumer: the company that provides customer satisfaction in their needs is a quality company. Thus, one of the main ways of differentiating themselves from competing companies is by providing quality services.

For Lovelock et Wright (2002), quality of service is the degree to which a service meets or exceeds customer expectations. That is, if customers perceive the effective delivery of the service as better than expected, they will be pleased; if they are below expectations, they will be unhappy and will judge the quality according to their degree of satisfaction.

In the view of Zeithaml et Bitner (2003), services are heterogeneous, after all, a service rendered to one client will never be exactly the same as what is offered to another, because they have specific needs and interact differently with the service. Therefore, companies have difficulties in ensuring that their services are offered with a consistent quality, as they depend on factors that cannot be fully controlled. Therefore, the standardization of the service according to the needs of the consumers and how to overcome them gains importance.

2.2.1 Services and their main characteristics

Kotler (1998) defines services as any act or performance, essentially intangible, that one party can offer to another and that does not result in the ownership of anything. In addition, the execution of a service may or may not be linked to a particular asset. Based on this definition, the author indicates that the service component may be a secondary part or the main part of the total supply. In this respect, five categories of offers to the market are determined:

- Purely tangible goods – tangible goods without any type of service associated with them. For example: sugar, pans, etc.;

- Tangible goods associated with services – tangible goods associated with one or more services. In general, the more technologically sophisticated these goods are, the more their sales will depend on a high quality of consumer services. For example: cars, cell phones, etc.;

- Hybrids – are also offers made up of goods and services, such as a meal in a restaurant;

- Main service associated with secondary goods or services – a main service with additional services or support goods. As an example, it can be mentioned an airline that, in addition to transportation, provides food and entertainment during the flight;

- Pure service – essentially an intangible service, such as a medical consultation or a massage session.

- Of the five offers previously presented, only the first one does not involve any type of service. Services have four characteristics that directly affect and differentiate them from goods: intangibility, inseparability, variability, and perishability (Kotler, 1998).

Intangibility means, according to the author, that services cannot be seen, tasted, felt, heard or smelled before being acquired. In order to reduce uncertainty about quality of service, consumers seek evidence of quality in the equipment used, the facilities, the people involved in communication material, symbols and prices. Thus, it is up to the service provider to "administer the evidence" to "make the intangible tangible" (Kotler, 1998).

Inevitability means that services are produced and consumed simultaneously, that is, they cannot be separated from the provider and the way the service is perceived. In this way, the interaction between the provider and the consumer assumes great importance.

The variability is related to the quality of services provided. As they depend on who, where and when they are provided, Kotler (1998) stated that services are highly variable. In this way, the service provider needs to pay attention to the processes to reduce the implications of variability and thus to retain customer confidence.

Lastly, perishability expresses the idea that services cannot be stocked for resale or later use. In view of this, perishability can be a problem when demand fluctuates, causing the provider to adapt as demand for his service.

2.2.2 Evaluation of quality in services

According to Pride et Ferrell (2001), the quality of services is evaluated by the clients and not by the organization. This understanding agrees with the approach of Parasuraman et al. (1985), who formulated a quality of service measurement that assumes customer satisfaction as a function of the difference between expectation and performance. Thus, the quality perceived by the consumer is obtained from the subtraction between the perception and the expectations in relation to a certain service. The higher the positive index the greater the service superiority. The authors also developed a service quality model that identifies the gaps that lead to failure (Figure 1).

Gap 1 refers to the difference between the consumer's expectation and the company's perception, that is, the management cannot correctly identify what the service desired by the client is. For service, which is the first contact, it is of the utmost importance to have knowledge about how clients expect to be treated. The failure of this gap inevitably leads to other failures.

Gap 2 is about the difference between company perceptions and quality specifications, which means that management can even understand expectations, but it cannot establish standards to meet these expectations. Gap 3 may be a consequence of the previous one, creating a problem between standards and service delivery. It means the difference between the established quality specifications and their actual quality. That is, employees may not understand or disregard the established process and compromise the outcome.

Gap 4 corresponds to the difference between service delivery and external communications. Communication about the service, such as ads for example, influences the expectations customers will have. Gap 5, finally, occurs when consumers do not perceive the quality of the service. It is the distance between the expectation of the clients and their perception of the service actually rendered, thus being a consequence of previous gaps. All gaps affect the quality and satisfaction with services.

The authors argue that gaps are not the only ways consumers measure the quality of services. They also presented five dimensions:

- Reliability – means the ability to perform the promised service accurately, consistently and reliably;

- Response capacity or responsiveness - refers to providers' willingness to provide good service, running the service with agility;
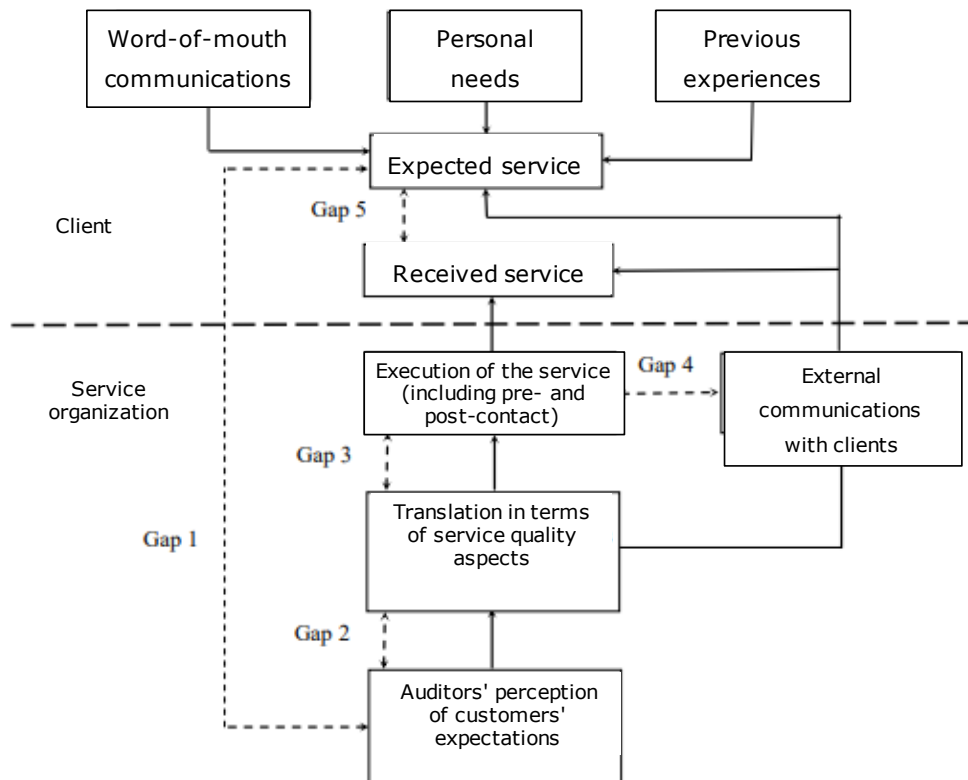

Figure 1. Service quality gaps model
Source: Parasuraman et al. (1985)

- Security – represents the provider's ability to transmit security to the consumer, demonstrating courtesy, responsibility, respect and knowledge of the service;

- Empathy – expresses the cordiality, attention and care provided to clients individually;

- Tangibility – are the physical evidence of the service, such as physical facilities, employees and equipment used.

2.3 Attributes of quality of transport services

Ferraz et Torres (2004) developed a model to measure quality in urban public transport. For the authors, it is important that each quality standard be evaluated according to individual and joint perception, since the indicators vary according to the characteristics of the user, such as social and economic class, gender, age, customs, culture and tradition of the region. For them, it is necessary to balance the cost and benefit of the service, since normally the increase in quality means higher tariffs. With high investments in quality, there is the possibility that the user with lower purchasing power is excluded, generating a loss of demand.

According to the authors, the factors of public transport quality are: accessibility, frequency, travel time, capacity, reliability, security, vehicle characteristics and bus stops, information systems, connectivity, operators' behavior, and road conditions.

Table 2 highlights these 12 factors or indicators and their due assessment parameters, which adequately cover the main aspects that involve quality in public transport. For this reason, they form the conceptual basis for conducting this research and the questionnaire used.

Table 2. Quality standards for public transport

Factors	Evaluation Parameters	Quality Standards		
		Acceptable Good	Acceptable Regular	Not acceptable Bad
Accessibility	Walking distance at the beginning and at the end of the journey (in meters)	<300	300 - 500	>500
	Condition of sidewalks, proper signs, ramps for wheelchair users, street lighting	Satisfactory	Falls short	Unsatisfactory
Frequency	Interval between calls (in minutes)	<15	15 - 30	>30
Travel Time	Relação entre tempo de viagem transporte público/carro (proporção)	<1,5	1,5 - 2,5	>2,5
Capacity	Standing passenger rate (pass/m²)	<2,5	2,5 - 5,0	>5,0
Reliability	Trips not carried out or made with an advance of more than 3 minutes or a delay of more than 5 minutes (%)	<1	1 - 3	>3
Security	Index of accidents (accidents/100 thousand km)	<1	1 - 2	>2
Vehicle characteristics	Age and conservation status (years)	<5	5 - 10	>10
	Number of doors and corridor width	3 doors and wide	2 doors and wide	Other situations
	Height of steps	Low	Falls short	High
Characteristics of stopping places	Signaling, cover and seats	The majority	Falls short	Unsatisfactory
Information systems	Brochures with itineraries and schedules, adequate information on the stops and channel for information/complaints	Satisfactory	Falls short	Unsatisfactory
Conectivity	Transshipment (%)	<15	15 - 30	>30
	Physical integration	Satisfactory	Falls short	Unsatisfactory
	Tariff integration	Yes	No	No
Behavior of operators	Drivers driving with caution / drivers and collectors helpful and polite	Satisfactory	Falls short	Unsatisfactory
Road conditions	Paved roads with no irregularities (bumps, ditches, holes)	Satisfactory	Falls short	Unsatisfactory

Source: Adapted from Ferraz et Torres (2004)

3. SCIENTIFIC METHODOLOGY

This study, according to Richardson (1999) and Vergara (2006), can be classified as a qualitative exploratory research. The exploratory research aims to provide greater familiarity with the problem in question, seeking to make it more explicit or to construct hypotheses (Silveira et Córdova, 2009).

Even taking into account the traditional critiques of qualitative analyzes and case studies, referenced by Yin (2015) as subjective in their interpretation and not generalizable in terms of results, this methodology was chosen as a function of the contemporaneousness of the research problem.

Therefore, the present work will be conducted through a case study that is characterized by the use of different types of data collection instruments, such as interview script, interview questionnaire, direct observation and documentary research, aiming to provide character of depth and detail to the research (Fonseca, 2002).

In order to reach the research objectives, a questionnaire was applied with questions related to the profile and the opinion of the users regarding the transportation used in the home-college course, whose questions about the quality criteria were adapted from the model proposed by Ferraz et Torres (2004).

The questionnaire of this study was made available from June to September 2018 and has obtained feedback from 84 students of the Public Administration, Political Science and Law courses, which are part of the CCJP. Among the interviewees, 74% are young people between 18 and 24 years of age and 20 are in the age group 25-35 years. Of the group of students, 45 and 39 declared themselves women and men, respectively; 76% (64 students) attend the Public Administration course, 14% (12 students) attend Law School and 10% (8 students) attend Political Science.

Still with regard to the profile of the interviewees, 69 (82%) live in the city of Rio de Janeiro; 9 (11%) live in Nova Iguaçu, 5 (6%) live in Duque de Caxias and 1 (1%) lives in Niterói. Of the inhabitants of the city of Rio de Janeiro (n=69), more than half (n=43; 62%) reside in the North Zone of the city, 21 (31%) reside in the West Zone and 5 are residents of the South Zone.

It should be emphasized that the qualitative analysis is limited to the respondents of the research, which is composed of students from the CCJP campus that use public transport in the "home-college" route. As some of the students use more than one modal when traveling, it is important to clarify that the assessment of satisfaction did not occur individually on each modal, but rather on the experience lived on the whole journey.

4. RESULTS AND DISCUSSION

4.1 Preliminary analysis

As one of the interviewees stated that they did not use any public transportation in their "home-college" displacement, the results were analyzed starting from the adjusted sample, which is: 83 students.

From the distribution of the modalities used, according to Table 3, the subway is the means of transport used by 79% of the respondents. As the location of the campus is very close to the Botafogo subway station, it is inferred that this factor is decisive in the choice of this transport. In addition, it can be seen the influence of this modal on the result of the accessibility factor: 71% of the respondents consider the distance to be walked on foot after the satisfactory trip (Table 4).

Table 3. Percentage of the modalities used in the "home-college" route

| Modal	Percentage
Bus and Subway	47%
Bus	21%
BRT and Subway	13%
Bus, BRT and Subway	7%
Train and Subway	6%
Subway	6%

Table 4 presents the percentage of responses for each factor analyzed, according to the interviews. In this regard, it can be seen that, for the researched sample of students, the degree of satisfaction with public transport on the "home-college" route is, in general, regular, but acceptable; it should be noted, however, that the degree of dissatisfaction, represented by bad and, consequently, "not acceptable", presents close values.

The degree of dissatisfaction with the general quality of the modes is also evident in the answers to the following questions (Figure 1): "Finally, how satisfied are you with the overall quality of the chosen transport for you to travel the "home-college" path? *Note: Considering all the modalities used during the trip, if you use more than one. ( ) Very dissatisfied ( ) Dissatisfied ( ) Reasonably satisfied ( ) Satisfied ( ) Very satisfied ".*

Table 4. Analysis of indicators based on quality standards

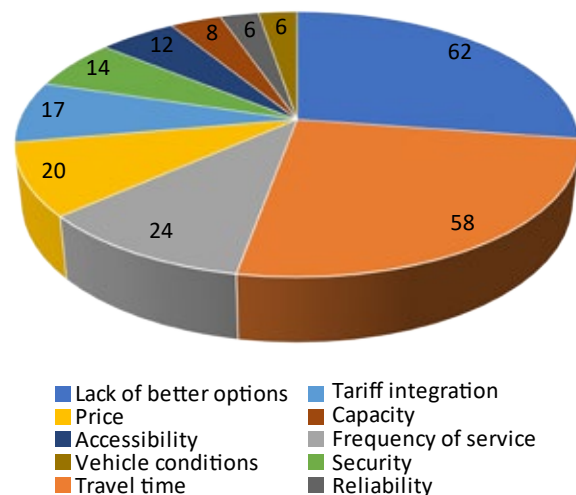| Factors	Evaluation Parameters	Padrões de qualidade		
		Acceptable Good	Acceptable Regular	Not acceptable Bad
Acessibility	Walking distance at the beginning and at the end of the journey (in meters)	71%	26%	3%
	Condition of sidewalks, proper signs, ramps for wheelchair users, street lighting	19%	56%	25%
Frequency	Interval between calls (in minutes)	23%	38%	39%
Travel Time	Relationship between travel time public transport / car (proportion)	31%	35%	34%
Capacity	Passenger rate on foot (pass/m²)	7%	39%	54%
Reliability	Travel not done or carried out with an advance payment of more than 3 minutes or a delay of more than 5 minutes (%)	24%	47%	29%
Security	Index of accidents (accidents/100 thousand km)	18%	27%	55%
Vehicle characteristics	Age and conservation status (years)	13%	62%	25%
Characteristics of stopping places	Signaling, cover and seats	16%	28%	56%
Information Systems	Brochures with itineraries and schedules, adequate information on the stops and channel for information/complaints	14%	34%	52%
Conectivity	Physical and tariff integration	14%	27%	59%
Behavior of operators	Drivers driving with caution / bus drivers and collectors helpful and polite	32%	34%	34%
Road conditions	Paved roads with no irregularities (bumps, ditches, holes)	37%	41%	22%

■ Reasonably satisfied ■ Dissatisfied ■ Very dissatisfied
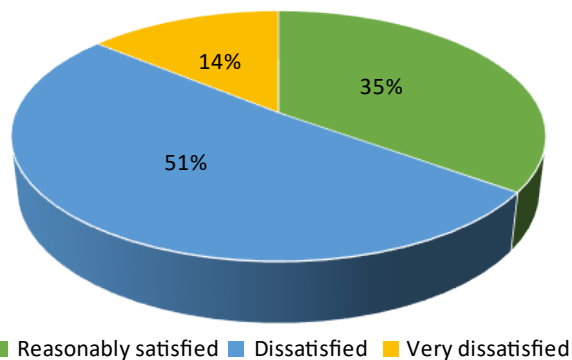
Figure 1. Level of satisfaction regarding the general quality of the modalities in the "home-college" path

4.2 Degree of satisfaction and power of choice

Even with the high degree of dissatisfaction found among the interviewees, there is a consensus about the best alternative transportation for the group surveyed: the subway. This choice can be understood based on accessibility factors, in particular: location of the campus near the subway station and travel time, since the subway is not subject to the common congestion in the city.

Figure 2 refers to the motives for choosing the modals on the "home-college" route. For this question, the students could choose multiple answers, so the sum results in a value greater than the sample of 83 students.

■ Lack of better options ■ Tariff integration
■ Price ■ Capacity
■ Accessibility ■ Frequency of service
■ Vehicle conditions ■ Security
■ Travel time ■ Reliability

**Figure 2.** Reasons for the choice of modals in the "home-college" path

Of the 83 interviewees, 62 answered that the choice of modalities is based on lack of better options. Analyzing this alternative as the one that repeats the most, one can conclude that 75% of the students are clients dependent on the services of the chosen modal, according to the model proposed by Jones et Sasser (1995 apud Martins, 2009). For the authors, dependent clients are those whose loyalty is a result of the lack of better alternatives of service providers.

The second motif that was most frequently repeated was travel time, with 58 responses (70% of the sample). Considering that 18% of students live in the Metropolitan Region of Rio de Janeiro, according to Chart 4, and that 93% of those living in the city of Rio de Janeiro do not live in the South Zone, according to Chart 5, it is understandable that travel time is a relevant factor in the choice of modalities for the journey to college. The attendance frequency, which refers to the time interval of passage of vehicles, was the third reason most cited by the students (n=24; 29%).

Only 20 students (24%) consider the price as one of the reasons for choosing the modal; 17 (20%) consider the integration of tariffs, 14 (17%) consider security, 12 (14%) consider accessibility, 8 (10%) consider capacity, 6 (7%) consider reliability, and 6 (7%) consider the conditions of vehicles.

4.3. Perception of improvements

Again, almost unanimously, 94% of respondents agree that the modalities used need improvement. And when asked which improvements would be essential to increase their degree of satisfaction with the transportation, several factors were pointed out, as shown in Figure 3. It is emphasized that the students could choose multiple answers, therefore, the sum results in a value greater than the sample.
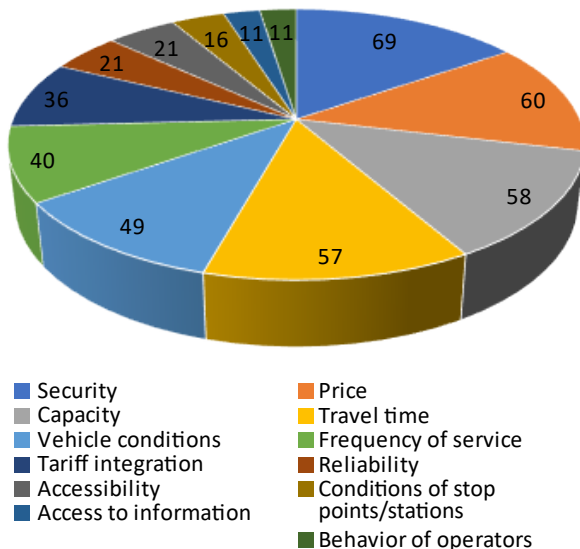
Figure 3. Factors that need to be improved in the modalities used in the "home-college" path

Of the 78 students who consider that modal needs improvement, 69 (88%) consider security to be critical. It is important to emphasize that this factor, different from that proposed by Ferraz et Torres (2004), does not only consider traffic accidents, it also includes public security.

According to 74% of the sample (58 students), the third factor that needs to be improved is the state public transportation, which is a recurring theme in the news, such as security. Another factor pointed out by 57 (73%) students was travel time. As mentioned earlier, most interviewees do not live near the campus, so it is understandable that students consider it when choosing the means of transportation to be used and evaluate it as an aspect that deserves improvements.

The conditions of the vehicles, according to 49 students (63%), also need to improve. Issues such as lack of cleanliness and lack of proper refrigeration are often criticized by news vehicles. For 40 students (51%), the frequency of attendance – time interval of passage between one vehicle and another – also needs improvements.

According to 46% of the students (n = 36), tariff integration is another factor that needs improving. According to information from the RioCard website (2018), the Single Ticket card offers different integrations at the cost of only one bus fare (R$ 3.95): bus + bus, bus + BRT and bus + VLT, paying only one bus fare. In the case of integrations intercity bus + boat, VLT + intercity bus or boat and intercity bus + subway or train, the fare is higher and decided according to a specific calculation. There are also the integrations van + subway, bus + subway and BRT + subway, but each one has its specific rules and values.

The improvement of reliability, understood as the fulfillment of scheduled departure and arrival times, is important for 27% of the sample (21 students), as is the accessibility issue; while the conditions of bus stops/stations, access to information and the behavior of operators need to be improved according to 21% (n=16), 14% (n=11) and 14% (n=11) of students, in this order.

4.4. Travel time

The present study sought to raise the level of satisfaction with the quality of public transportation in Rio de Janeiro from the perspective of the students of the CCJR campus of UNIRIO and, therefore, did not delve into other issues, such as the impact on the quality of life of the interviewees.

However, one of the data that calls attention, according to Figure 4, is the average time spent by the interviewees to reach college: more than half of respondents (n=46; 56%)

take between 1 and 2 hours, 25% (n=21) take between 30 minutes and 1 hour, 13% (11) take more than 2 hours, and 6% (n=5) take less than 30 minutes.

It is not surprising that 61% (n=51) of respondents feel that travel time negatively influences academic performance.
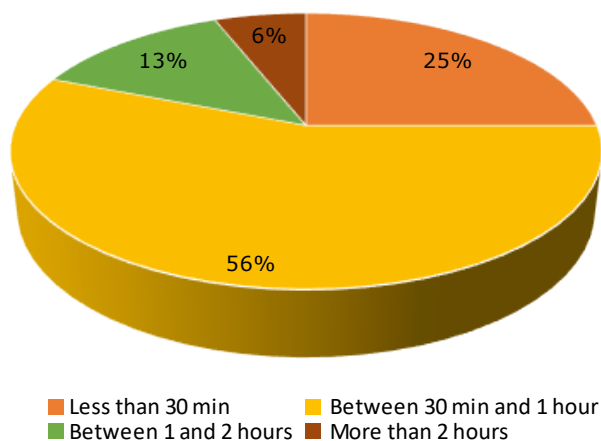

Figure 4. Average travel time spent on the "home-college" path

5. FINAL CONSIDERATIONS

Carioca urban mobility suffers a serious crisis with the deficiencies of collective transportation, causing an increase in congestion and inequalities of mobility conditions among social groups. The lack of an effective public transport system has a negative impact on the quality of urban life. In this context, and considering the importance of understanding the needs of public transport users, this article takes a look from the perspective of undergraduate students, who are strongly impacted from a social and academic perspective.

Thus, this research, developed in 2018, had as main objective to measure the degree of satisfaction of CCJP/UNIRIO students in relation to the collective transports used in the "home-college" route. Through the development of a bibliographic review, one can establish the concept of quality related to public transportation, the parameters necessary for its evaluation and the means of transportation existing in the city of Rio de Janeiro and those that connect it to the Metropolitan Region of the state.

According to the sample in question, the research results indicate that the majority of students are dissatisfied with the service provided by public transport and indicates that the lack of better options is one of the reasons considered for the choice of modalities to be used in the course until

college. All 61 students who use more than one modal on the home-college route have stated that there are differences between modals and that the subway is the one that best meets their expectations.

Regarding the factors that need to be improved, the most cited were safety, price, capacity and travel time. It is necessary that the transport managers and the public power understand the interests of the users, so that the balance between a service of quality and the value charged occur.

Costa (2015) highlighted the travel time on journeys as a factor that affects the performance of users. In the sample of this research, the majority of the students (61%) answered that the travel time on the way to college negatively influences the academic performance. Transportation in the capital and metropolitan region of the state of Rio de Janeiro is predominantly based on road transport, and is directly affected by daily congestion problems. In this way, investment in modalities, such as subway and naval, deserves attention.

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APPENDIX - QUESTIONNAIRE

Questionnaire to measure the quality of public transportation on the "home-university" route in the opinion of CCJP students
Gender
( ) Female
( ) Female transgender
( ) Male cisgender
( ) Male transgender
( ) Prefer not to say
( ) Others

Age group
( ) Up to 17 years
( ) From 18 to 24 years old
( ) From 25 to 35 years old
( ) From 36 to 50 years old
( ) More than 51 years
( ) Rather not answer

Adding your income to the income of the people who live with you, how much is the monthly family income?
( ) Up to 1 minimum wage
( ) From 1 to 3 minimum wages
( ) From 3 to 6 minimum wages
( ) From 6 to 9 minimum wages
( ) From 9 to 12 minimum wages
( ) From 12 to 15 minimum wages
( ) More than 15 minimum wages
( ) Rather not answer

What is your course on the CCJP campus?
( ) Public administration
( ) Political sciences
( ) Law

Where do you live in Rio de Janeiro? (Note: question conditioned to question 5)
( ) North Zone
( ) West Zone
( ) South Zone

Do you use some public transportation to get from your home to CCJP?
( ) Yes
( ) No

Which transport methods do you use on the "home-CCJP" route?
( ) Bus
( ) Subway
( ) Train
( ) BRT
( ) VLT
( ) Ferry boat
( ) Alternative transportation (such as vans and buses)
( ) Others

If you use more than one modal on the "home-CCJP" route, do you think they have differences in quality of service?
( ) Yes, there are differences
( ) There are no differences
( ) I only use one modal

Which of the following modalities best meets your expectations? (Note: question conditioned to question 10)
( ) Bus
( ) Subway
( ) Train
( ) BRT
( ) VLT
( ) Ferry boat
( ) Alternative transportation
( ) Others

The choice of your transportation means in the "home-CCJP" route is based on which factors?
( ) Accessibility
( ) Price
( ) Tariff integration
( ) Capacity
( ) Security
( ) Reliability - compliance with scheduled departure and arrival times
( ) Travel time
( ) Frequency of service - time interval of the passage of vehicles
( ) Vehicle conditions
( ) Conditions of bus stops/stations
( ) Behavior of operators
( ) Access to information - leaflets with itineraries and schedules, appropriate information at bus stops/stations
( ) Lack of better options
( ) Others

From the factors mentioned in the previous question, do you consider that any of them need to be improved on your transportation means chosen on the "home-CCJP" route?
( ) Yes
( ) No

Which factor or factors need improvement in your transportation means chosen on the "home-CCJP" route?
( ) Accessibility
( ) Price
( ) Tariff integration
( ) Capacity
( ) Security
( ) Reliability – compliance with scheduled departure and arrival times
( ) Travel time
( ) Frequency of service – time interval of the passage of vehicles
( ) Vehicle conditions
( ) Conditions of bus stops/stations
( ) Behavior of operators
( ) Access to information – brochures with itineraries, schedules, and appropriate information at bus stops/stations

How do you rate the level of accessibility of your transportation means used on the "home-CCJP" route? Note: Include walking distance at the beginning and end of the trip in meters.
( ) Good <300
( ) Regular 300 - 500
( ) Bad> 500

How do you rate the level of accessibility of your transportation means used on the "home-CCJP" route? Note: Accessibility in relation to the condition of sidewalks, ramps, adequate signs and public lighting.
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the interval between calls (frequency)?
( ) Good <15
( ) Regular 15-30
( ) Bad >30

On average, what is your travel time on the "home-CCJP" route?
( ) Less than 30 min
( ) Between 30 min and 1 hour
( ) Between 1 and 2 hours
( ) More than 2 hours

How do you rate your travel time on the "home-CCJP" route?
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the capacity level of your chosen transportation means on the "home-CCJP" route?
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the reliability level on your chosen transport means on the "home-CCJP" route? Note: Reliability in relation to the scheduled departure and arrival times.
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the safety level of your transportation means used on the "home-CCJP" route? Note: Safety in relation to accidents, aggressions, robberies and robberies.
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you classify the physical characteristics of your chosen transport means on the "home-CCJP" route? Note: Features such as proper ventilation, seats, cleaning, etc.
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the characteristics of stop locations? Note: Signaling, cover, and seats.
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate information systems, such as itineraries and schedules?
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate connectivity in the case of physical and tariff integration?
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the behavior of operators?
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the condition of the roads?
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

How do you rate the tariff values of your chosen transport means on the "home-CCJP" route?
( ) Satisfactory
( ) Falls short
( ) Unsatisfactory

Do you consider that the travel time spent on the "home-CCJP" path influences your academic performance?
( ) Yes, it influences it positively
( ) Yes, it influences it in a negative way
( ) It does not influence it

Finally, how satisfied are you with the overall quality of your chosen transportation means on the "home-CCJP" route? Note: Considering all the modalities used during the journey, if more than one.
( ) Very unsatisfied
( ) Unsatisfied
( ) Reasonably satisfied
( ) Satisfied
( ) Very satisfied