An Assessment of the Effectiveness of the Quezon City Bus Service based on Users' Satisfaction

Camille L. SY [a], Jose Regin F. REGIDOR [b]

[a,b] *Institute of Engineering, College of Engineering, University of the Philippines, Diliman, Quezon City, Metro Manila, 1101, Philippines*
[a] *E-mail: clsy@up.edu.ph*
[b] *E-mail: jfregidor@up.edu.ph*

Abstract: The Quezon City Bus Augmentation Program (QCBAP) is a free bus service offered by the Quezon City Government. The service has been operating since June 2020. For the service to continue and improve its operations, its effectiveness was assessed only focusing on user satisfaction. This study assessed seven out of the eight existing routes of the QCBAP, which were selected in coordination with the Quezon City Government. The study gathered data on the user satisfaction, determined commuters' preferences in public transportation, and formulated recommendations on the future actions the city government can take to sustain and improve the service. Data on user satisfaction and preferences were collected through a survey that consists of questions regarding socio-demographic characteristics and levels of importance and satisfaction using Likert Scale. Data were analyzed by descriptive analysis, gap analysis, factor analysis, cluster analysis, importance-satisfaction analysis, and Kruskal-Wallis Test. Passengers of the QCBAP are generally satisfied with the service, but factors including safety, comfortability, cleanliness, frequency, and accessibility can be further improved to increase satisfaction and meet user expectations of the service.

Keywords: Transport, Asia, Academic Paper, Practical Paper, Awards (max: 6 keywords)

1. INTRODUCTION

1.1 Background

The Quezon City Bus Augmentation Program (QCBAP), also known as the Quezon City Bus Service, is a free bus service offered by the Quezon City government, which was first implemented in June 2020 during a general community quarantine in Metro Manila (Quezon City Government, 2021). This was to address the lack of transportation services due to the pandemic restrictions. The program is open to all public transport users and, according to the local government unit (LGU), will still be public for a long time. The QCBAP operates under a contract with different bus companies to provide the buses for different routes.

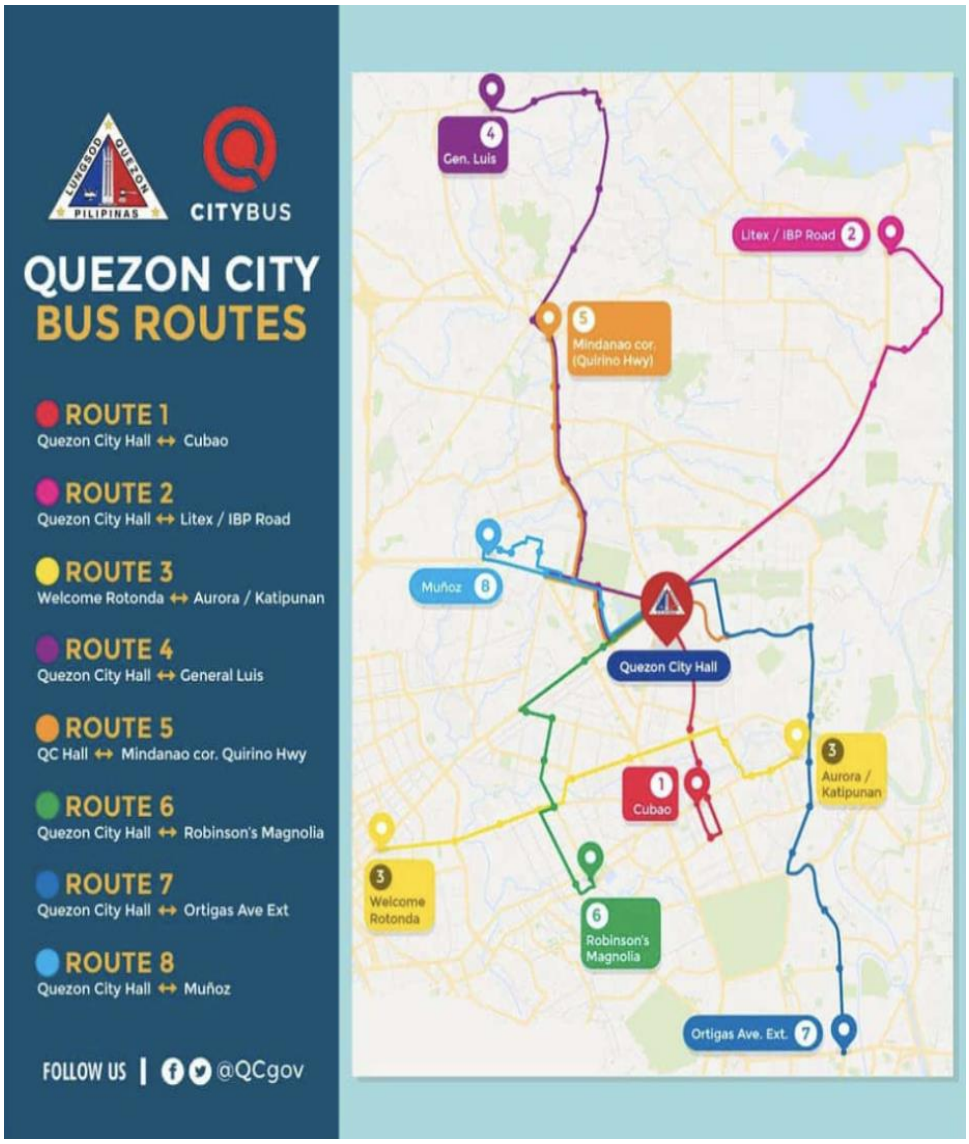

Figure 1. Q City Bus Service Routes (from quezoncity.gov.ph)

The Quezon City Bus Augmentation Program (QCBAP) is currently offering eight (8) routes: QC Hall to Cubao, QC Hall to Litex/IBP Road, Welcome Rotonda to Katipunan, QC Hall to General Luis, QC Hall to Mindanao Avenue via Visayas Avenue, QC Hall to Gilmore, QC Hall to C5/ Ortigas Avenue Extension, QC Hall to Muñoz. There are also specific schedules and designated stops for each route.

At present, even with the ease, if not discontinuation, of the COVID-19 restrictions, the QCBAP continues to operate and also increasing the number of buses servicing the program (Quezon City Government, 2021). However, even with three years of operations, data on the effectiveness of the Quezon City Bus Augmentation Program, specifically on user satisfaction and factors affecting user satisfaction are not yet available.

The assessment of the Quezon City Bus Augmentation Program (QCBAP) as a mode of public transportation focuses on the satisfaction of its users to be able to measure the effectiveness of the program from the commuter's or user's perspective. The results of the assessment will aid the Quezon City Government decide on future actions that can improve the service.

1.2 Objectives

The main objective of this research is to assess the effectiveness of the Quezon City Bus Augmentation Program focusing on the satisfaction of its users. Specifically, the objectives are – to obtain data on user satisfaction on the QCBAP, to determine commuters' preferences in public transportation, and to formulate recommendations on what actions the Quezon City Government can take to sustain and improve the service.

1.3 Significance

The results will provide the Quezon City government data on user satisfaction on the Quezon City Bus Augmentation Program. This study will also help the Quezon City government decide what measures to take to sustain and further improve the free bus service.

Furthermore, this research, especially its methodology of the assessment of user satisfaction on the QCBAP, can serve as a basis for future research and assessments as it involves conducting a survey to gather data. The questionnaire for the survey can be reused and/or improved.

1.4 Scope and Limitations

The assessment of the Quezon City Bus Augmentation Program only focuses on the user satisfaction with the criteria of accessibility, waiting time, safety, speed (travel time), and comfort. These were obtained from different studies and were used to measure the level of satisfaction of the users. The questionnaire was formulated to make sure that, as much as possible, participants could answer the survey objectively and without monetary bias due to the rising prices of commodities.

Moreover, only seven out of eight QCBAP routes were covered. The seven routes, Routes 1, 2, 4, 5, 6, 7, and 8, that were included in the study were selected in coordination with the Quezon City Government. These routes were chosen with the premise that the survey will be conducted in the Quezon City Hall, which is the common starting point of the seven routes.

Lastly, the research will not consider the future exclusiveness of the service to commuters holding a QCitizen ID, as according to the head of the QCBAP, the service will be open to the public indefinitely.

1.5 Conceptual Framework

Figure 2 shows the conceptual framework for this study. The effectiveness of the Quezon City Bus Augmentation Program can be assessed from several factors, such as the operator's or the Quezon City Government's perspective on the free bus service program, the effect on road traffic, etc. However, this research only focused on the user satisfaction of the QCBAP, specifically with the criteria of accessibility, waiting time, safety, speed (travel time), and comfort.

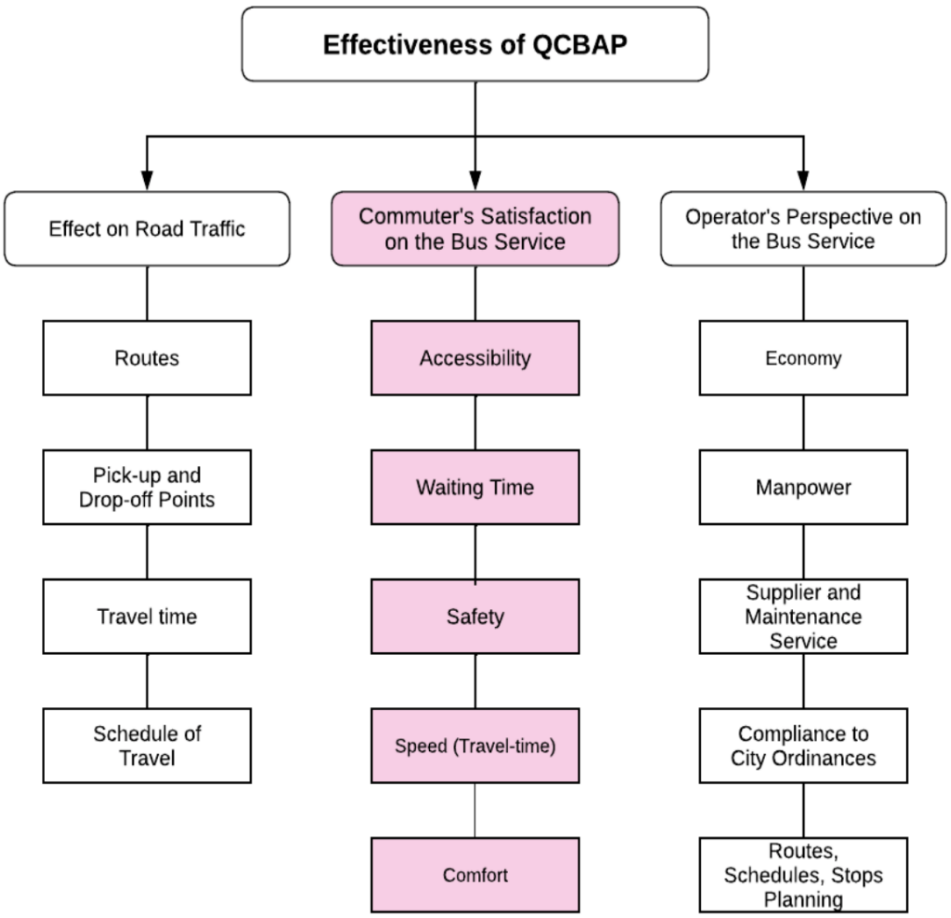

Figure 2. Conceptual Framework of the study

2. DATA COLLECTION

2.1 Coordination with LGU

In coordination with the Quezon City Government, open and existing information was gathered. Due to confidentiality, only the Terms of Reference, which contains the project background, guidelines on operations, responsibilities of the city government and the bus companies, and other relevant information related to the bus service.

An informal interview was also conducted with the head of the Quezon City Bus Augmentation Program to know how the bus service operates and to gain internal insights on the program. It was determined that the routes were all centered on Quezon City Hall and connected it to the strategic locations along its border. The most direct routes connecting the trip ends were selected. The routes were previously shown in Figure 1.

Using the gathered information, routes assessed were selected and the schedule of data collection was planned in consultation with the Quezon City Government depending on accessibility and feasibility.

2.2 Mind Map for Service Quality Attributes

Figure 3 shows the mind map developed to determine the service quality attributes. Listed on the leftmost column of the chart are the factors affecting the user satisfaction on bus services in other countries. For convenience and simplification, these were classified into five categories (middle column). The service quality attributes in the rightmost column were then produced from both the listed factors and categories.

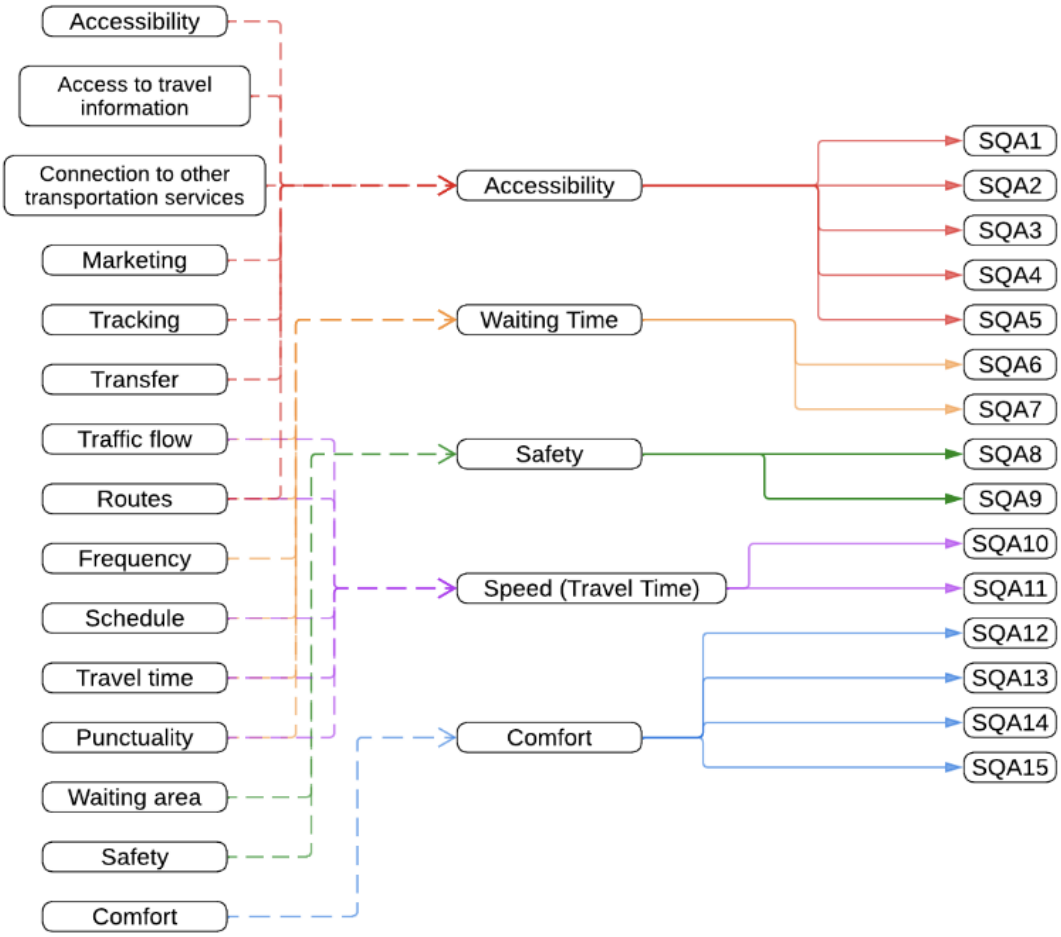

Figure 3. Mind Map for Criteria

2.3 Surveys

The user satisfaction was assessed through a survey. Survey questions were formulated focusing on accessibility, waiting time, safety, speed or travel time, and comfort. Further questions were also included to obtain data on the user preferences on public transportation.

The main objective of the survey was to examine the user satisfaction and perspectives for the seven chosen routes. A pilot survey was conducted before the main survey to improve the survey questionnaire. For both surveys, questionnaires were printed and distributed to the passengers lining up to ride the bus. Each participant was also given a pen to use to answer the survey. Just before the passengers needed to board the bus, the survey questionnaires were collected.

Voluntary response sampling was used as a sampling method for survey proliferation. The research participants were the QCBAP users of the seven routes. Both pilot and main

surveys were done with the help of the QCBAP staff. The surveys consisted of closed-ended questions that were answered by the participants by choosing a number from 1-5 with 5 showing that they agree strongly and 1 showing that they disagree strongly to assess the user satisfaction based on the criteria said above, and open-ended questions that were answered by the participants with short answers to determine user preferences.

A pilot survey was first conducted on March 15, 2023, in Quezon City Hall using the first draft of the survey questionnaire. The questionnaire included socio-demographic questions, ratings on level of importance and satisfaction of different service quality attributes, and open-ended questions. The target number of respondents was 60, and the route that had the most users, according to the head of QCBAP, was surveyed which was Route 4. The number of valid and invalid responses was tallied for each question. With the ratio of 48 valid responses and 12 invalid responses, it was determined that at least 481 responses must be obtained to get minimum valid responses of at least 385. Furthermore, to decrease the number of invalid responses, the following were the changes done to the survey: i.) symbols were added for respondents to know which rating is the highest and which is the lowest, ii.) a question regarding waiting time was added, iii.) the question about the origin was removed, and iv.) the open-ended questions were reworded.

After finalizing the questionnaire, the main survey was conducted on April 22, 2023 at Quezon City Hall. A total of 600 questionnaires were given out, and 590 responses were obtained. Of these responses, only 442 surveys were determined to be valid.

3. ANALYSIS

The descriptive statistics on the responses showed that the mean age of the users is around 35 years old. 49.8% of the respondents were male, 48.2% were female, and 2.0% preferred to be recognized as neither male nor female. Furthermore, 66.7% of the users were employed and 33.3% declared themselves to be unemployed. Most users stated that they earned less than Php 9,100 which is 53.4% of the sample size. 27.1% earn between Php 9,100 to Php 18,200, 14.9% earn between Php 18,200 to Php 36,400, and only 4.5% earn more than Php 36,400.

The descriptive analysis also summarized the ratings for level of importance and satisfaction for each service quality attribute. Generally, users rated both levels of importance and satisfaction highly. However, as shown in the gap analysis, it was observed that the level of importance of all the service quality attributes are higher than the level of satisfaction. This implies that the current implementation of the QCBAP does not meet the expectations of the users and can further be improved to increase the level of satisfaction. Specifically, the users found that punctuality, frequency, and number of buses could be improved more. However, there was no test done to prove the significance of the values in the gap analysis.

Figure 4. Overall Mean of Importance and Satisfaction of QCBAP Service Quality Attribute

Gap analysis was employed to determine which of the service quality attributes has the highest gap in terms of the perceived importance and satisfaction of QCBAP passengers. The following Figure 5 illustrates the difference of these ratings in each of the attributes.

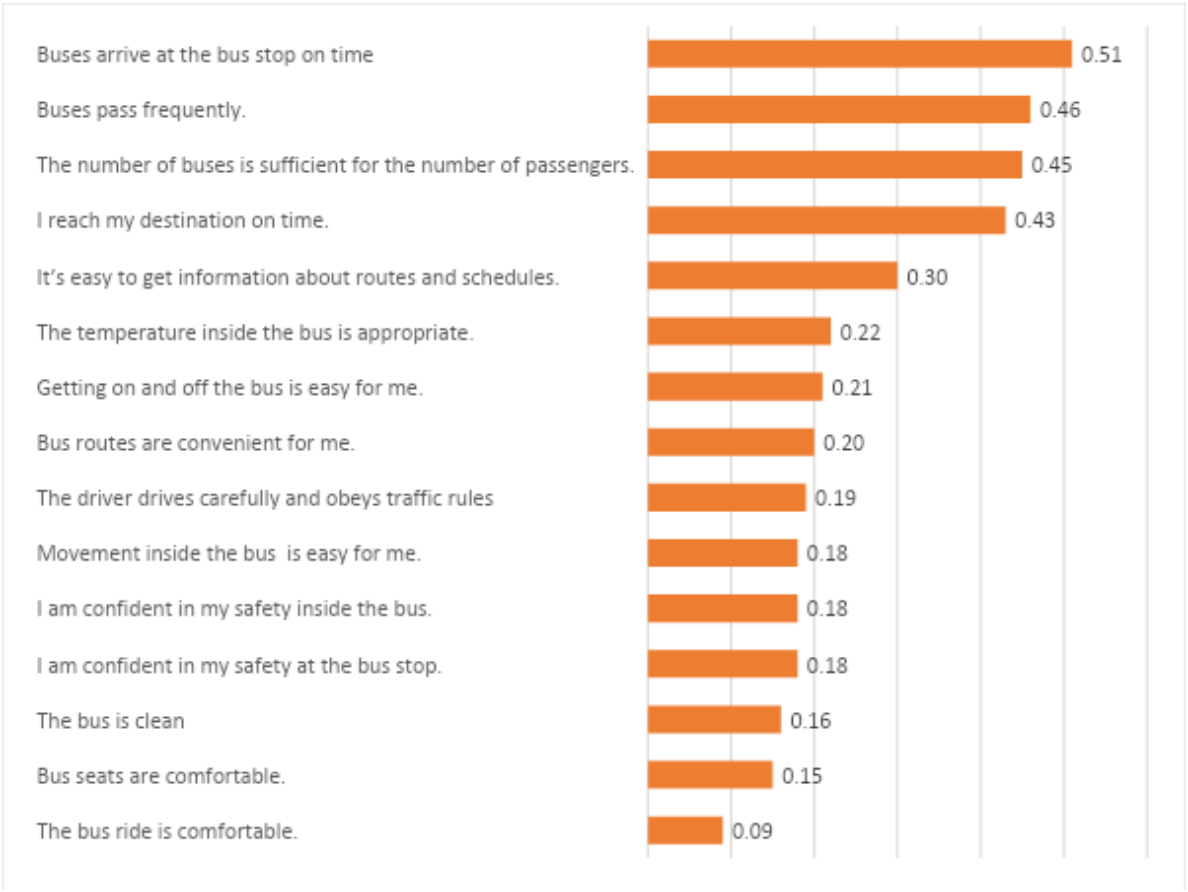

Figure 5. Gap Values for QCBAP Service Quality Attributes

The factor analysis related and grouped the 15 service quality attributes into three service quality factors which are physical environment, accessibility and convenience, and reliability and timeliness. This analysis also showed that the physical environment was rated the highest, followed by the accessibility and convenience, and reliability and timeliness last. ANOVA was then used to show that these factors are independent from each other.

The first service quality factor is labeled as physical environment. This factor encompasses all the tangible aspects of the QCBAP service that has a direct impact on passengers' comfort, safety, and overall experience. This factor includes attributes such as cleanliness, comfort of the bus seats, appropriateness of the temperature inside the bus, and the overall condition of the bus. Moreover, the behavior and adherence of the driver to traffic rules and passenger safety at the bus stop also fall within the physical environment factor.

The second service quality factor is categorized as accessibility and convenience. This factor covers characteristics that make QCBAP service easily accessible, convenient, and user-friendly for passengers. This factor includes service quality attributes such as safety inside the bus, convenient bus routes, ease of boarding and alighting the bus, and the smooth movement inside the bus.

The third service quality factor pertains to reliability and timeliness. This factor incorporates attributes associated with meeting schedules, providing accurate and reliable information, maintaining sufficient capacity, ensuring timely arrivals, and offering a frequent and dependable QCBAP service. Table 1 enumerates the overall satisfaction rating on each service quality factor.

Table 1. Overall satisfaction rating on each factor

Factor	Mean (SD)	Median
Physical Environment	4.63 (0.46)	5.00
Accessibility and Convenience	4.56 (0.44)	5.00
Reliability and Timeliness	4.23 (0.84)	4.40

F-value = 32.024, $p < 0.01$

The cluster analysis identified the characteristics of the QCBAP users based on homogeneous opinions of the service. They were then grouped based on age, gender, employment status, monthly income, route used, and frequency of using the QCBAP. Four clusters were formed with 104 passengers in the first cluster, 139 passengers in the second cluster, 111 passengers in the third cluster, and the remaining 88 passengers in the fourth cluster.

The importance-satisfaction analysis (ISA) identified the characteristics intro four quadrants: “Keep up the Good Work” which has high rating for both importance and satisfaction, “Possible Overkill” which has a low rating for importance and high for satisfaction, “Low Priority” which has a low rating for both importance and satisfaction, and “Concentrate Here” which has a high rating for importance but low on satisfaction. The ISA was done overall and per cluster. It was revealed that for most clusters and overall, service quality attributes have either high rating for both importance and satisfaction or low rating for both importance and satisfaction. For the users in the fourth cluster, they find that the comfortability, safety, and cleanliness should be improved. For the users in the first cluster, they find that the frequency of the bus and the accessibility to information on bus routes and schedules should be improved.

Table 2. Service Quality Attributes of Q.C. Bus

Quadrant	**Service Quality Attribute**
Q1: Keep up the Good Work *High Importance* *High Satisfaction*	The bus ride is comfortable. The bus is clean Bus routes are convenient for me. Getting on and off the bus is easy for me. I reach my destination on time. Movement inside the bus is easy for me. The number of buses is sufficient for the number of passengers. Buses pass frequently. Buses arrive at the bus stop on time.
Q2: Possible Overkill *Low Importance* *High Satisfaction*	I am confident in my safety inside the bus.
Q3: Low Priority *Low Importance* *Low Satisfaction*	The driver drives carefully and obeys traffic rules I am confident in my safety at the bus stop. Bus seats are comfortable. The temperature inside the bus is appropriate. It’s easy to get information about routes and schedules.

Quadrant	Service Quality Attribute
Q4: Concentrate Here *High Importance* *Low Satisfaction*	None

The Kruskal-Wallis test related the responses to the socio-demographic characteristics of the users. All the three factors from the factor analysis were revealed to have been rated differently by passengers having different age brackets, monthly income, and employment status. Users with higher age, especially senior citizens, rated all the factors higher than younger users. It was also found that employed passengers and those who earn more than Php 9,100 rated the service higher.

4. CONCLUSIONS

For the first objective of obtaining data on user satisfaction on the Quezon City Bus Augmentation Program, this was achieved by collecting data through a survey and by conducting necessary analyses to draw conclusions on user satisfaction. This includes summarizing and comparing the ratings on level of importance and satisfaction, and relating the ratings or responses of the users to their socio-demographic characteristics.

For the second objective of determining the preferences of commuters in public transportation, this was only partially achieved through the open-ended questions in the survey questionnaire. Data on what commuters prioritize in choosing a mode of public transportation was collected; however, due to lack of time, software or resources for analyses, and expertise, the data collected were not summarized and analyzed. Thus, there were no specific conclusions produced for this.

Lastly, for the objective of formulating recommendations on what actions the Quezon City Government can take to sustain and improve the program, the recommendations were developed in two main ways. First was by comparing the perspective of the users on the importance of each service quality attribute and their level of satisfaction on the current program. This was to identify which service quality attributes needed to be addressed to meet the expectations of the users. Second was from grouping users based on their socio-demographic characteristics and routes used and assessing their perspective on each of the service quality attributes. This was to determine what specific groups of people need from the QCBAP.

Overall, though the ratings on the level of satisfaction are generally high as the mean of all the ratings are more than 4.00, there are still aspects of the QCBAP that can be improved to meet the expectations of its users especially those that lie in the high importance but low satisfaction quadrant of the ISA.

5. RECOMMENDATIONS

Looking closely at specific groups of people, passengers aged between 50 to 76 years old found that comfortability, safety, and cleanliness need to be improved. This was distributed among different routes, so it is recommended to maintain the physical environment of the bus. It is also suggested to add security measures inside the bus and in different bus stops to increase the feeling of safety of the passengers.

Furthermore, passengers aged between 15 to 22 years old found that the frequency of the buses and the accessibility of information about the service should be improved. Majority of this cluster uses Route 4. Being informed by the head of the QCBAP that the longest lines are usually in Route 4, it is recommended to add more buses to service Route 4. It is also suggested that the Quezon City Government should find ways in disseminating the information on the service.

Generally, users of the QCBAP are satisfied with the service as this helps them greatly financially. However, as the number of users increase, the number and frequency of buses should also increase to accommodate the increasing number of users and maintain their satisfaction with the service.

Since the study only focused on user satisfaction to assess the Quezon City Bus Augmentation Program, recommendations for other LGUs that may want to operate their own free bus programs would only be based on the perspective of the commuters. The general recommendations to the other LGUs are the following:

- **Plan the routes.** It is suggested that the routes be planned in a way that is convenient for most target passengers. The buses should stop at places where most target passengers need to go. It is also recommended to consider connecting the routes to other public transportation.
- **Have a preliminary run on the bus program.** The number of buses and frequency of the buses are two of the most important factors for the users of QCBAP. After establishing the routes, a preliminary run is recommended to know which routes have higher demand so the buses can be allocated and schedules can be adjusted accordingly.
- **Assign security personnel inside the bus and in bus stops.** Since safety is one of the most important factors for passengers who fall under the ages of 50 to 76 years old in QCBAP, it is recommended to assign security personnel inside and outside of the bus, especially since most of the people in this age group may be physically incapable to protect themselves.

The study was not able to fully utilize and analyze other data collected such as on the commuters' preferences for transport modes in comparison or with respect to the bus service. As such, it is recommended that further studies be undertaken for this purpose to also determine how the service compares with other modes in terms of performance, among other criteria.

Finally, it may be worthwhile to also examine the operations of the bus service from the perspective of Quezon City. The experiences in operations and maintenance including route planning, provision of vehicles to address the demand, impacts on traffic, operations and maintenance costs and feedback from passengers would be invaluable in further improving services. This also would help determine what additional resources or investments would be required for the service to be both attractive and sustainable from the city's perspective. Such can be a very good reference for other LGUs to learn or benchmark from should they also consider similar services.

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