Trips Generation of College Students in Fairview Quezon City, Philippines

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Abstract: This research investigates the transportation challenges experienced by senior high school and college students in Barangay Fairview, Quezon City, Philippines. With a student population comprising 27.60% (approximately 20,628) of the barangay's 74,737 residents, efficient and reliable transport is essential for their well-being and academic success. The study highlights persistent issues such as traffic congestion, inadequate pedestrian infrastructure, and limited mass transit options, all of which contribute to stressful and time-consuming commutes. The primary aim of this study is to generate actionable insights that can be utilized by urban planners and local policymakers to improve transport systems in education zones. Data was collected through surveys and analyzed using Multiple Linear Regression (MLR) to examine trip generation, student's primary modes of transport and influential commuting factors. Results show that most students rely on Jeepney (251 respondents), followed by tricycles (50 respondents). The most valued features influencing mode choice include air conditioning, shorter waiting times, easy transfer, Wi-Fi access, and clean vehicles. The study found that lower-income households generate more trip, indicating reliance on economical shared, or public transportation. Recommendations include improved public transport amenities, better connectivity, and flexible schedules to support academic performance and reduce congestion during peak hours.

Keywords: Trip Generation; Socio-economic characteristic; Travel Characteristic

1. INTRODUCTION

Transportation has long been a pressing issue in the Philippines, especially in highly urbanized areas like Quezon City. Daily commuters' workers, businesspeople, and especially students struggle with traffic congestion, delays, and unreliable public transportation systems (Dowling et al., 2015). These recurring issues lead to missed work, meetings, and school hours, affecting productivity, economic activity, and educational performance. As urban populations continue to rise, there is a critical need for more efficient, reliable, and inclusive transportation systems. Quezon City, one of the most populated cities in Metro Manila, urgently needs a stronger transportation strategy to keep up with urban development. Alongside the need for more commercial spaces and infrastructure, improving transportation facilities is key to ensuring a livable and well-connected urban environment (Yannis & Chaziris, 2022). The Metro Manila Development Authority (MMDA) continues to collect data on travel patterns and traffic delays, which aids planners and engineers in understanding the needs of daily commuters (Regidor, 2017).

Barangay Fairview, Quezon City, is a densely populated residential neighborhood with 74,737 residents based on the 2015 Philippine census. Among this population, about 27.60% approximately 20,628 individuals are students who commute daily to ten (10) major educational institutions offering Senior High School and College-level programs. These include, Bethel Christian School, Datamax College of St. Adeline, Datamax Institute of Computer and Technology, Far Eastern University - Dr. Nicanor Reyes Medical, Gateways Institute of Science and Technology, Good Shepherd Cathedral School, Mother of Perpetual Help School – Fairview, National College of Business and Arts – Fairview, St. Adeline College St. Bernadette College of Nursing.

The daily commute of students is significantly affected by several issues: long traffic jams, poor pedestrian infrastructure, and limited mass transport options (Musa Y., 2023). These factors contribute to stress, lateness, and reduced academic performance. Atlas (2015) emphasized that students' travel difficulties directly influence their well-being and school achievement. With urbanization continuing to grow, it becomes increasingly urgent to understand and resolve these mobility issues. This study aims to examine the transport challenges of students in Barangay Fairview and assess how their commuting experiences impact their academic life. By understanding the daily struggles of student commuters, the research can provide insights that support more student-friendly transportation planning and infrastructure development.

This area was selected based on the following criteria: (1) high density of student population, (2) presence of multiple educational institutions, (3) variety in transport mode usage, and (4) visible mobility challenges including congestion, lack of pedestrian facilities and inadequate public transport options as used criteria in the research study by (Sarkis Balabanian, 2020). The study focuses on the students because they represent a significant share in daily commuters. Their travel patterns heavily influence peak-hour congestions, especially during school opening and closing times. Moreover, students' mobility reflects the responsiveness of public transportation systems to vulnerable groups.

Common travel difficulties among students include long waiting time for rides, discomfort due to overcrowded or poorly maintained vehicles, safety concerns especially for female and LGBTQIA+ students, and inconsistent travel durations These factors influence their academic performance (Sarkis Balabanian, 2020).

The paper aims to address the following objectives: To determine the socio-economic and travel characteristics of the student commuters in Barangay Fairview. To analyze the relationship between these characteristics and the number of trips generated per household. To identify which modes of transport are preferred and why? And to provide recommendations that can inform transportation policy and planning for student-dense communities.

2. METHODOLOGY

Fig. 1. Methodological Framework

This study adopts a quantitative research approach to explore the socio-economic and travel characteristics of students in Barangay Fairview, Quezon City. Quantitative research involves collecting and analyzing numerical data to identify patterns, test hypotheses, and draw generalizable conclusions (Bhandari, 2023; Babbie, 2010). This approach is ideal for assessing how student travel behavior relates to socio-economic factors. A stratified random sampling technique was used to ensure fair representation across different student subgroups. This method divides the population into strata based on common characteristics like educational level or school and selects respondents randomly from each stratum (Hayes, 2024). Over 1,000 student respondents were targeted to provide valid data after cleansing and to support actionable recommendations for improving mobility.

Socio-Economic Characteristics: Age, Gender, Civil Status, to observe demographic trends. Household Income, Household Size, to assess economic capacity and trip-making potential. Travel Characteristics:

Trip Purpose, Travel Time, Travel Mode, Travel Cost, Departure Time, and Trip Origin which provide insight into mode preference and commuting burden.

Statistical Treatment The gathered data were analyzed using Multiple Linear Regression (MLR) to identify relationships between socio-economic factors and travel behavior (JMP, 2024). MLR helps in explaining the effects of multiple independent variables on a continuous dependent variable. Respondents' identities remain confidential. Survey and Interview Process Surveys were conducted across 10 schools in Barangay Fairview. Factors assessed include age, gender, civil status, income, household size, allowance, trip purpose, travel time/mode/cost, and departure time.

Disaggregate models are usually analyzed using analytical techniques such as Dependent Variable (Number of Auto) and Independent Variable (Number of Trips Per HH) category or cross-classification analysis and the multiple linear regression model. (Chatterjee & Venigalla, n.d.)

$$P_{gh} = HH \times I_g \times A_{gh} \times (P_H)_{gh} \quad \text{(Eq. 1)}$$

Where:

HH = number of households in the zone,
Ig = percentage of households (decimal) in the zone with income level g (low, medium, or high),
Agh = percentage of households (decimal) in income level g with h autos per household (h = 0, 1, or 2+),
Pgh = number of trips per day generated in the zone by householders with income level g and auto ownership h,
$PHgh$ = number of trips per day produced in a household at income level g and auto ownership h.

Understanding the number of trips per household helps estimate overall travel demand. This data is vital for designing routes, schedules, and infrastructure improvements, especially near schools and residential areas.

Hypotheses include: (1) Student from lower income household generate more trips. (2) Travel Preference is significantly influenced by service quality (Comfort and safety).

3. RESULTS AND DISCUSSION

The household interview survey conducted across ten schools in Barangay Fairview initially contained 600 entries, but many had missing, inconsistent, or incorrect values. After processing the data, only 422 entries were deemed suitable for visualization, analysis, and interpretation.

Table 1. Descriptive Statistic for the students' interviews results

Variables	Min	Median	Mean	1st Quartile	2nd Quartile	3rd Quartile	Max	Standard Deviation
Age *(years)*	15	18.11	18	16	18	20	24	2.00
Household Income *(PHP)*	2,500	20,000	20,050.91	7,500	20,000	27,000	46,000	10,178.06
Household Size	1	4	4.91	3	4	6	30	2.53
Travel Time *(minutes)*	30	30	46.66	30	30	60	120	20.2
Travel Cost *(PHP)*	10	20	50.59	15	20	45	2,000	149.26

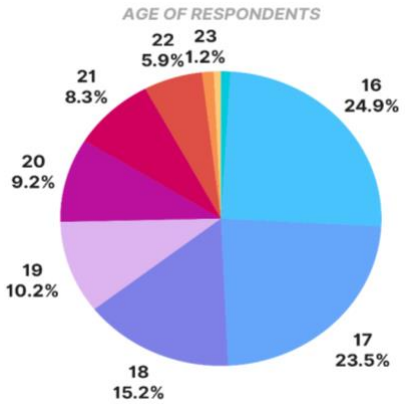

Fig. 2. Pie Chart of the ages of the respondents

The pie chart shows the age distribution of respondents, with 16-year-olds making up 24.9%, 17-year-olds at 23.5%, 18-year-olds at 15.2%, 19-year-olds at 10.2%, 20-year-olds at 9.2%, 21-year-olds at 8.3%, 22-year-olds at 5.9%, and 23-year-olds at 1.2%. The largest age group is 16-year-olds, followed closely by 17-year-olds, indicating a predominantly younger demographic in the survey.

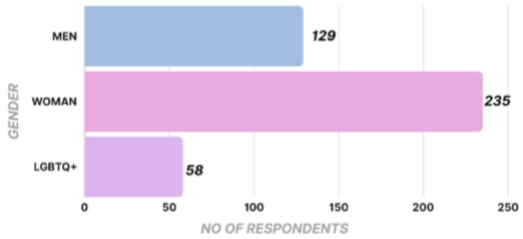

Fig. 3. Bar chart for the gender of the respondents

The bar chart shows the gender distribution of respondents, with approximately 150 men, 230 wo men, and 50 identifying as LGBTQ+. Women are the largest group, followed by men, and then a smaller n umber of LGBTQ+ respondents, highlighting the pro minence of female participants in the survey.

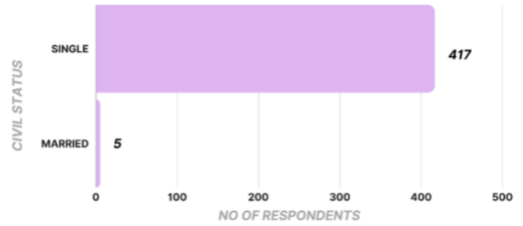

Fig. 4. Civil Status of the Respondents

The bar chart shows the civil status of respo ndents, with nearly 450 respondents being single and very few respondents being married. This indicates that the majority of the respondents are single, while only a small number are married.

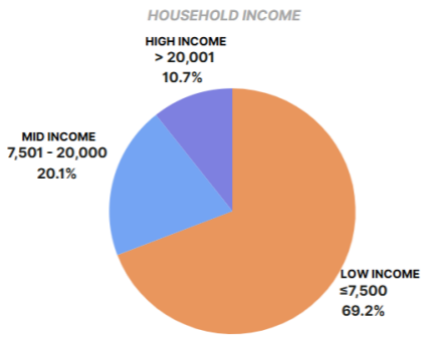

Fig. 5. Household Income of the respondents

In the distribution of household incomes, 292 households fall into the low-income category earning 7,500 or less, 85 households are in the mid-income range earning between 7,501 and 20,000, and 45 households are in the high-income bracket earning more than 20,001.

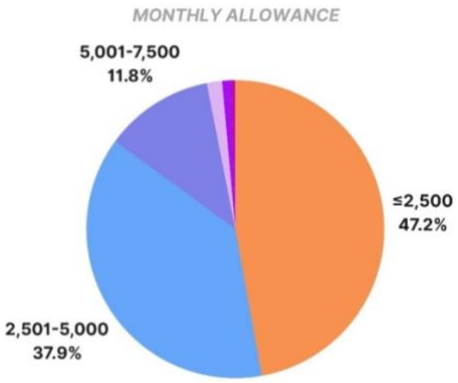

Fig. 6. Monthly allowance of the respondents

The pie chart shows that 47.2% of individuals receive ₱2,500 or less monthly, while most others receive up to ₱5,000. Only a small portion gets more than ₱7,500, indicating generally low monthly allowances.

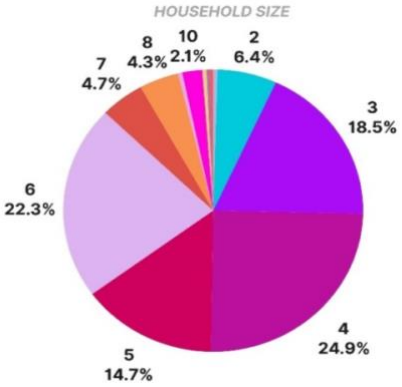

Fig. 7. Household Size of the respondents

The pie chart shows the distribution of household sizes by percentage. The most common household size is 4 persons, making up 24.9% of the total. This is followed by 6-person households at 22.3%, and then 3-person households at 18.5%. The smallest household size represented is 10 persons, which accounts for only 2.1%. Overall, most households have between 3 and 6 members.

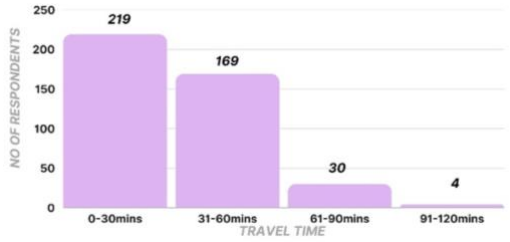

Fig. 8. Travel Time of the respondents

The bar chart shows that the majority of respondents, 219 in total, have a travel time of 0-30 minutes. This is followed by 169 respondents who travel for 31-60 minutes, 30 respondents who travel for 61-90 minutes, and 4 respondents who travel for 91-120 minutes. The data highlights that most individuals have relatively short travel times.

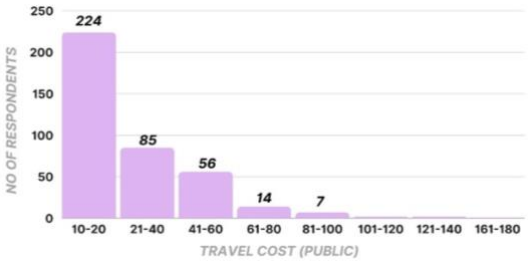

Fig. 9. Travel Cost (Public)

The bar chart shows the number of respondents categorized by their travel costs for public transportation. Most respondents, 224 in total, spend between 10 and 20. This number drops to 85 respondents for the 21-40 range, 56 for the 41-60 range, 14 for the 61-80 range, and 7 for the 81-100 range. There are very few or no respondents in the higher cost ranges of 101-120, 121-140, and 161-180.

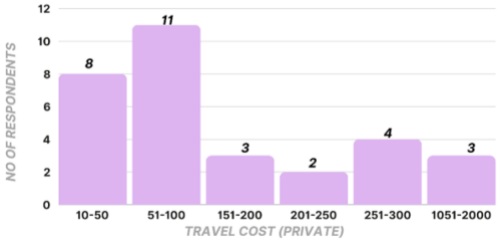

Fig. 10: Travel Cost (Private)

The bar graph shows most respondents (11) spend ₱51–₱100 on private travel, followed by 8 spending ₱10–₱50. Fewer fall into higher cost ranges, with the least (2) in the ₱201–₱250 bracket, highlighting ₱51–₱100 as the most common cost range.

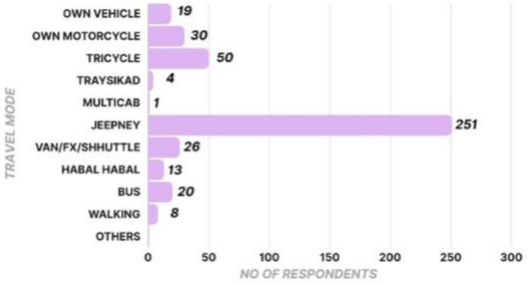

Fig. 11: Travel Mode of the respondents

The bar chart shows jeepneys as the most used travel mode (251 respondents), followed by tricycles (50), own motorcycles (30), and vans/FX/shuttles (26). Walking (8) and multi cabs (1) were least used, with no respondents selecting "Others."

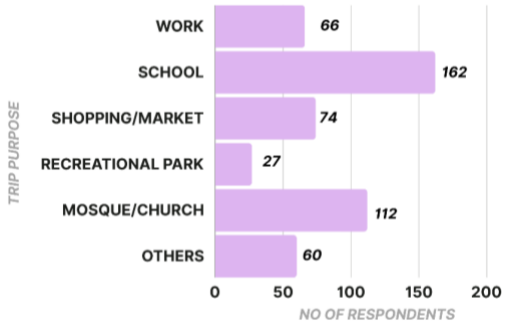

Fig. 12. Trip Purpose of the Respondents

The bar chart shows the number of respondents for different trip purposes. The most common trip purpose is school, with 162 respondents. This is followed by 112 respondents traveling to the mosque or church, 74 for shopping or market, 66 for work, and 60 for other purposes. The least common purpose is visiting recreational parks, with only 27 respondents.

Fig. 13. Time leaving from home.

The bar chart illustrates the number of respondents who leave home at different times of the day. The highest number of respondents, 167, leave home between 5:00 AM and 8:59 AM. This is followed by 154 respondents who leave between 9:00 AM and 12:59 PM. A smaller group, 91 respondents, leave home between 1:00 PM and 4:59 PM. The fewest respondents, just 10, leave home between 5:00 PM and 9:59 PM. This data shows peak times when people are most likely to leave their homes.

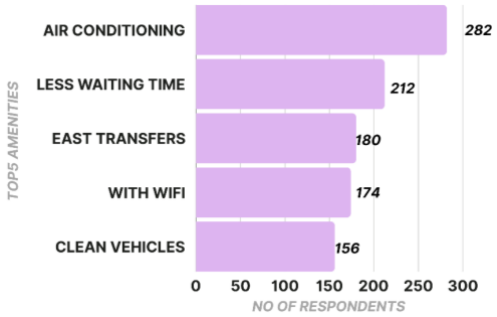

Fig. 14. Top Five Amenities influence students in selecting transportation mode

The bar chart highlights the top 5 preferred amenities among respondents: air conditioning (282), less waiting time (212), easy transfers (180), Wi-Fi access (174), and clean vehicles (156), reflecting a strong preference for comfort and convenience.

Key Finding include: Jeepneys are the most used mode, followed by tricycle and motorcycles. Also, the top transport preferences are air-conditioning, less waiting time, easy transfer, Wi-Fi and cleanliness. Students from low-income households made more trips, suggesting dependency on public/ shared transportation. And lastly the regression results show statistically significant inverse relationship of household income and trip frequency.

Table 2. Excel Computation for trip produced per household (Motor)

Number of trips per household (Motor)			
	Low Income	Mid Income	High Income
	≤ 7,500	*7,501 – 20,000*	*>20,001*
0	2150.1744	467.9136	21.1
1	2228.16	1020.9024	3.165
2+	278.52	255.2256	3.165
Total Trips	4656.8544	1744.0416	27.43

Total Trips (Motor) = 6429 trips
Total Trips (Non Motor) = 2640 trips
Total Trips (Motor Owned) = 3790 trips

Table 3. Excel Computation for trip produced per household (Auto)

Number of trips per household (Auto)			
	Low Income	Mid Income	High Income
	≤ 7,500	*7,501 – 20,000*	*<20,000*
0	4993.8636	1304.4864	8.44
1	396.891	460.824	4.22
2+	41.778	113.4336	164.58
Total Trips	5432.5326	1878.744	177.24

Total Trips (Auto) = 7489 trips
Total Trips (No Auto) = 6307 trips
Total Trips (Owned Auto) = 1182 trips
Total Trips (Motor & Auto) = 13,917 trips

Researchers used regression analysis to develop an MLR equation estimating total trips based on household income. The ANOVA results showed a p-value < 0.05, confirming a statistically significant relationship between income and household trips.
The data revealed that lower-income households generate more trips. At a ₱7,500 income level, households made 5,432.53 auto trips and 4,656.85 motorcycle trips. As income rose to ₱20,000 and ₱27,000, trip numbers dropped significantly, indicating greater travel demand among lower-income groups, likely due to dependence on economical transport modes like motorcycles. The regression analysis produced two MLR equations: First Equation: Intercept = 7,423.70, Slope = -0.271 Second Equation: Intercept = 6,446.31, Slope = -0.237 Both show a slight negative correlation between income and trips, suggesting that higher-income households make fewer trips, possibly due to consolidated travel patterns or reduced mobility needs. Overall, the MLR models effectively capture how income influences travel behavior in Barangay Fairview.

4. CONCLUSIONS

On average, an urban household in Barangay Fairview consists of 4.91 student members, with most households classified as low-income. Despite financial constraints, 25.8% of respondents own at least one motorized vehicle, typically a motorcycle, to address the limited availability of public transport options. Among students, jeepneys are the most frequently used mode of transportation, with 251 respondents identifying them as their primary mode, followed by tricycles with 50 users. Jeepneys are favored for their affordability and convenience over longer distances, while tricycles are commonly used for shorter, local trips.

Key factors influencing transport mode choice include air conditioning (282 respondents), shorter waiting times (212), easy transfers (180), Wi-Fi access (174), and clean vehicles (156), indicating a strong preference for comfort and efficiency. Even during weekends, school remains a major reason for travel (162 respondents), followed by shopping (74), work (66), other activities (60), and visits to parks or churches (33).

In terms of trip volume, motor vehicles generated 6,347 trips and autos generated 7,310. Owned motor vehicles accounted for 3,790 trips, while non-owned motor vehicles contributed 2,640. For autos, 1,182 trips were made using owned vehicles, while a significant 6,307 were made using non-owned ones. This reflects a reliance on non-owned autos, possibly due to economic limitations or the accessibility of shared transport. Overall, the data underscores the importance of jeepneys and affordable transport options in supporting student mobility in Barangay Fairview.

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