'Unlimited Access' for San Juan's University Population: A Market Study of Student Attitudes Toward Transit

by

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Bachelor of Science in Civil Engineering
University of Puerto Rico – Mayagüez, 1999

Submitted to the Department of Civil and Environmental Engineering
in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE IN TRANSPORTATION

at the

Massachusetts Institute of Technology

June 2001

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Abstract

Transit must respond to current and emerging markets. People age 17 to 25, particularly university students, are considered an emerging transit market. Transit agencies have reported that the provision of fare-free passes to this university student market has had a positive impact in transit ridership. Therefore, transit agencies need to better understand the university students' attitudes and preferences towards transit in order to target this university population to attract and retain them as regular riders.

The university population of San Juan, PR is composed of nearly 39,000 students from the five major universities in the area (Universidad del Sagrado Corazón, Universidad Politécnica de PR, Universidad de Puerto Rico, Universidad Metropolitana and Recinto de Ciencias Médicas). This population represents a significant and potential market for Tren Urbano. The purpose of this thesis is to understand why San Juan's university students are a promising market for Tren Urbano conducting a comprehensive market research study to better comprehend their perceptions, attitudes and preferences towards transit, Tren Urbano and the relative promise of providing them with an unlimited transit pass.

This study is the first quantitative study on the San Juan university population. Representative samples of university students were surveyed to identify their characteristics, behaviors and opinions. Survey results suggest that students perceive Tren Urbano as a possible solution to the parking situation at their universities and as an alternative to driving to school. If provided with a fare-free pass, nine out of every ten students would feel motivated to use Tren Urbano and a large number would consider driving less. These results show that university students need an alternative to driving and if provided with a fare incentive like an unlimited transit pass, they have the potential to become an important transit market for Tren Urbano. This analysis recommends a continuing and sustained market research effort and a university transit pass program to Tren Urbano attract and retain the university riders.

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Acknowledgments

First and foremost, my gratitude goes to God. Thank you Lord for being my inspiration and my strength and for guiding me through the completion of this research project. My profound gratitude also goes to my thesis advisor, mentor, and friend, Dr. Joseph F. Coughlin. You have been a blessing in my life since we met in 1998. Thanks for all your advice about research, work and life. Thanks for your words of encouragement every time I needed them most and for making me very proud of this thesis work. It would not been possible without your guidance. God bless you!

I also give special thanks to Professor Nigel Wilson, who in the summer of 1997, when we first met, explained to me the Tren Urbano UPR-MIT Professional Development $ Research Program without knowing how that meeting was going to impact my future. Thanks for being an advisor, a teacher and also a friend. Thanks for believing in me and inspire me to pursue a career in transit. I truly admire and respect you. I also have to thank Professor Ismael Chabini, who in the summer of 1997 accepted me as his summer research intern. Thanks for introducing me to the world of transportation and for giving me the first opportunity to conduct a research project. You taught me to believe in my ideas, and that is something I would never forget.

Special appreciation goes to all the students, faculty and staff that participate or have participated in the UPR/MIT Tren Urbano Research Group. Thanks for the ideas shared. Particular gratefulness goes to Lydia Mercado, who has always being supporting and encouraging me in my pursuit of a career in transit. I am also very grateful to the Tren Urbano, HTA, and Siemens staff that have contributed in many ways to the completion of this project. Thanks to Mr. Miguel Cruz, Mrs. Joan Berry, Mrs. Marisol Rodríguez, Mr. Edward Morales, and Mr. Carlos Ayala from the Tren Urbano Office; to Dr. Sergio González, Ms. Freya Toledo, Mr. Gabriel Rodríguez from HTA; and to Mr. Joe Ferretti and Ms. Amarilis Viera from Siemens Transit Team. Thanks to all these people that took time to discuss with me my research and gave important criticisms and information that were an integral part of this research. Two MIT administrative assistants also deserve my acknowledgement, because their assistance every time I needed something meant a lot to me. Thanks Ginny and Paula for everything and sorry to bother you so much!

This research would definitely have not been possible without the participation of three special groups of individuals that are mentioned in Appendix E. They are the university students that participated in the focus group discussion in March 28, 2000. Also, all the professors that kindly cooperated with me and gave me some minutes of their classes to administer the survey and all the university officials and administrators that provided me with information about the student population and parking situation at their schools. Particular recognition goes to Mr. Héctor J. Román, who taught me how to enter the survey data into SPSS. Thank you Héctor!

Immense appreciation goes to Patricia Crumley for helping me enter and code the 1,243 surveys into the computer. Patricia, without your help I would have never finished on time. Thanks for your time and it has been very nice knowing you. I am also truly thankful to Lisa D'ambrosio, who guided me in the survey analysis process. Lisa, thanks for your time and for showing me how to do regression analysis and teaching me important aspects of survey research. Thanks to both of you! Also, I would like to mention UPR professor Jorge Ivan Velez for helping me in the survey design. *Bendición, Don Jorge!*

I need to thank the MIT Summer Research Program for giving me the opportunity to come to MIT while I was finishing my undergraduate degree and conduct research for the first time in my life. Thanks for my participation in this program I discovered my interest in transportation and I am here today, completing a Master's thesis. Thanks to Dan, Roy, Ed, Dean Statton and all the students that participated in MSRP'97 and '98 for their support and love. I will never forget you!

Enormous thanks I have to give to my MST'01 and MST'02 classmates who I will never forget. Thanks for all the moments we have shared since we started the program. Thanks for the study groups. I would have never survived the core courses without your help. Georges and Sheldon, my admiration and gratefulness go to you guys, without your support and friendship I would have never made it. Love you tons! Thanks to all the "Speedbumps" volleyball players for all the fun games and times we spent on the court.

I extend my love, affection and gratitude to the Youth Group of St. Francis Chapel in Boston. Since I came to Boston, you have been my family and have been there for me in my happy and not-that-happy times. I have grown in faith thanks to all of you and I will never forget you. You are my friends for life. Thanks for your prayers, but most importantly for your friendship. I love you all! To all my friends here in Boston, back home in Puerto Rico, and I have met along the way, thanks for your emails, calls and time spent together. You have made my time here unforgettable.

I would like to thank my housemates ("jausmeits"). Iris and Luisto, thanks for accepting me as the new "jausmeit" when I arrived here in 1999. I would have never finished my first semester at MIT without your love, support and friendship. Thanks to both of you! Astrid and Danny, our family was like a match in heaven. You have a very special place in my heart. Thanks for all the great times we have spent together and for all the ones that remain. Noreen and Ricky, I also consider you my "jausmeits" even though we have not lived together. Thanks for all the family weekends and your friendship. Giovanna, you are the last "jausmeit" to join the family, thanks for your friendship. I love you all!

All my gratefulness goes to my family for their unconditional love and support. Thanks to my mother, father, grandparents, stepmom, brother, sister, cousins, aunts, and uncle for their emails, calls and prayers. My achievement is yours! Thanks for always been there for me, since all I have accomplished is thanks to all the love and support you have given me. *Mami, esta tesis te la dedico a ti, te amo con todo mi corazón!* Many thanks go to my best friend and greatest love, Carlos. Your support, prayers, and love have made all this process a lot much easier. Thanks for loving me like you do, *Ai Vov U!!*

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Chapter 1: Introduction and Research Objectives

Automobile travel is the largest mode of transportation in the United States with a share of 86.4% (FHWA, 1995). Public transportation only captures a 1.8%, while walking trips attracts 5.4% of the person trips. The 1995 National Personal Transportation Survey (NPTS) demonstrates that the automobile has become an indispensable and loved member of American families. Yet, public transportation continues to be an alternative to certain individuals, especially commuters (today, 1 of 20 American workers commutes via transit). However, transit needs to pursue or better meet the needs of other specialized markets in order to increase its market share.

1.1 National Transit Trends and Markets

The role of public transit in the travel patterns of many Americans has decreased sharply in the last two decades. Cambridge Systematics, Inc. (1999) in the *TCRP Report 53: New Paradigms for Local Public Transportation Organizations* reports that long-term ridership stagnation and declining market share, reliance on a narrow range of traditional services, and poor public image are some of the most obvious indicators of the impending crisis public transportation is facing.

Nevertheless, the expectations placed on public transportation are rising since the need for alternatives to personal vehicle use are urgent. In response to these expectations and the decline in patronage, many public transit operators have attempted to either 1) find or create new markets, or 2) strengthen and expand ridership among their current markets in order to increase ridership levels (Rosenbloom, 1996). According to Rosenbloom, transit agencies do not fully understand the nature of transit use among current riders or the potential market niches among other groups in society.

The National Transit Database Program of the Federal Transit Administration (FTA) estimated that 8.1 billion trips using public transportation were made in 1998 and that ridership increased by 4.9 percent since 1991 (FTA, 2000). Figure 1.1 shows this increase. The American Public Transportation Association (APTA) reports that the most popular destination of these trips with 54% is workplaces (APTA, 2000). Next, 15% of trips go to schools; 9% to shop,

9% are social visits; and 5.5% medical appointments. According to APTA, current riders are people age 65 and older, 7%; 18 years and under, 10%; and women, 52%.

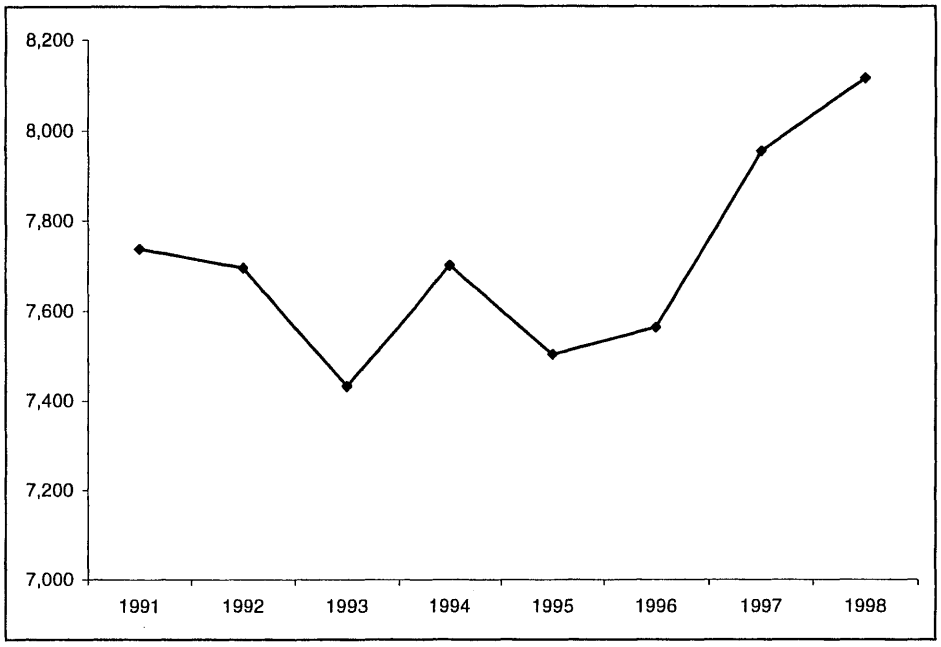


Figure 1.1: Unlinked Passenger Trips (millions)
Source: FTA, 2000

Rosenbloom (1998) in the *TCRP Report 28: Transit Markets of the Future, The Challenge of Change* found that communities that had implemented new or different services or that had changed the ways in which they organized and targeted their traditional services experienced an increased transit ridership by doing so. The ridership increases occurred in the following transit niches and markets:

- People with disabilities,
- People age 17 to 25 (particularly university students),
- Children age 5 to 12,
- People age 65 and over,
- People with high incomes,
- People age 50 and over, and
- Men

Many of these riders are not those traditionally seen to depend on transit. Therefore, there is a great potential for transit agencies to specifically focus more clearly on the needs of

each group. They can target each of them with a variety of transit services (i.e., feeder services, express buses, fare incentives, service to large employers, park-and-ride services, and route restructuring among others) and succeed in increasing transit ridership. Unless they respond to the current and emerging markets, most transit systems will see their ridership erode –and their public and political support with it (Elmore-Yalch, 1998). One way to generate information about transit customers' current and future needs and the factors affecting them is using market research methods as a tool to better understand the current and emerging markets.

1.2 Definition of Market Research

Market research is the collective term used for methods of eliciting information about customer preferences (Moreira, 2000). These set of tools aim to better understand which attributes of a service are important to customers and then influence the choices made by customers or potential customers. In other words, market research allows companies or organizations to better understand their customers and design products and services that meet their needs. Products and services are often thought of in the context of the "marketing mix". The marketing mix is composed of the following elements, known as the 4Ps (Messinger, 1995):

- **Product**: The actual product or service that is being sold to the customer.
- **Price**: The pricing structure for the product or service.
- **Placement**: The channel of distribution, or the path the product takes to reach the ultimate customer.
- **Promotion**: Advertising, sales promotions, public relations, and personal selling.

Market research allows for the gathering and processing of information so that the marketing mix for a particular product or service, including transit, can be better adapted to the needs of the customer. The marketing mix applied to public transportation is illustrated in Table 1.1.

Table 1.1: Marketing's Four Ps Applied to Transit
Source: Oram, 1987

Product	Price	Place	Promotion
Vehicles: (buses, trains)	Trip cost	Routes	Advertising: (radio, TV,
Service frequency	Bulk purchase cost	Frequencies	newspaper, posters,
Coordinated service	Reduced fares	Accessibility	mail, flyers, internet)
Special services	Special service fares	Prepaid sales	Timetables: (portable,
Commuter services	Coordinated fares	outlets	fixed, easily usable)
Off-peak services	Free fares	Special events	Brochures
Package deals	Surcharges	services	Public Relations activities
Express services	Prepaid options: (tokens,	Transfer ease	School projects
Speed	tickets, passes)	Park & ride	Information services
Reliability	Flat fares		Displays
Comfort	Distance-based fares		Promotions
Inside cleanliness	Quality-based fares		Store discounts
Outside cleanliness	Off-peak fares		
Safety	Incentive fares		
Staff appearance	Package deals		
Staff attitude	Fare subsidy programs		
Customer service	Credit card sales		

1.3 Market Research and Market Segmentation in Transit Agencies

Transit agencies have recognized that growth in ridership is likely to come from attracting new riders to the system, increasing the frequency of riding among current riders, and stronger rider retention effort. An effective program of market research and a market segmentation strategy are essential to increase ridership through customer acquisition and through customer retention.

Market Research: As mentioned before, public transit's share of passenger trips is less than two percent. Despite this, the transit industry has been slow to recognize the importance of tools such as market research to better understand their customers, even though these tools have been continuously and successfully used in the private sector and in other public sector organizations. Elmore-Yalch (1998) in the *TCRP Report 37: A Handbook: Integrating Market Research into Transit Management* produced one of the most comprehensive overviews of market research at public transit agencies.

Her study found that most agencies that conducted market research did so to assess customer satisfaction or assess public opinion of their performance or image. Figure 1.2 shows that more than 70% of the agencies reported they used market research to measure market

characteristics and trends, identify potential markets, and estimate demand. On the contrary, only half of the agencies surveyed had conducted market research in order to develop and test new services. Therefore, it seems that although transit agencies are using market research for some purpose, many have not realized its full potential for understanding their current or potential customers. Their marketing research efforts appear to be more geared towards evaluating current services than understanding how to change and expand service to better meet customer needs and preferences.

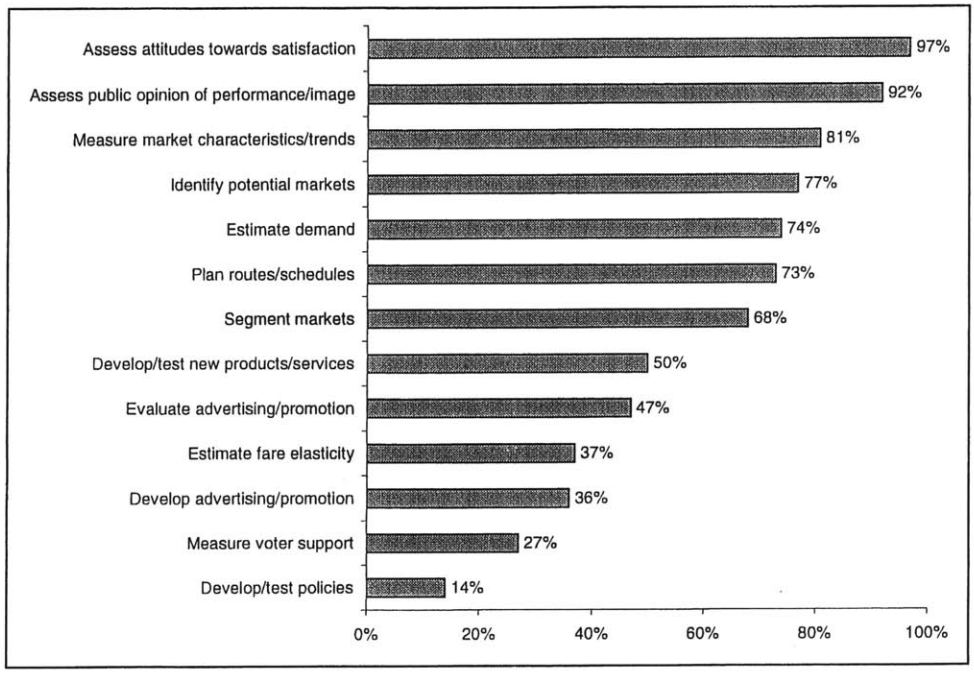


Figure 1.2: Purpose of Agency Market Research, 1996-1998
Source: Elmore-Yalch, 1998

Another interesting observation is that less than half of the transit agencies had used market research to evaluate advertising and promotions. Fewer agencies had used market research to develop advertising and promotional materials, which implies that they may be developing them without knowing which attributes of the system to focus on. In addition, slightly more than a third of agencies have used market research to estimate fare elasticity, indicating that agencies have not put enough effort to measure their customer's sensitivity to fare changes.

The transit agencies surveyed in this report informed the use of different market research methods in the past few years. Figure 1.3 suggests that most agencies reported the

use of on-board surveys, but these are limited to system riders and therefore do not provide any information about individuals who are not riding the system. Often these are the potential choice riders who are utilizing other modes of transportation and the agency should aim to shift these to transit. Many transit agencies also do random telephone interviews, which may be more effective in targeting non-riders. However, since most transit agencies do not conduct research to identify system attributes that are important to potential choice riders, it seems that most market research that includes non-riders is done for the purpose of assessing public opinion of transit's image or performance. The most widely used market research methods appear to be on-board surveys, random telephone interviews, and intercept interviews. These are costly since they require personal contact. Mail surveys, which may be less costly, are used by only a third of the agencies.

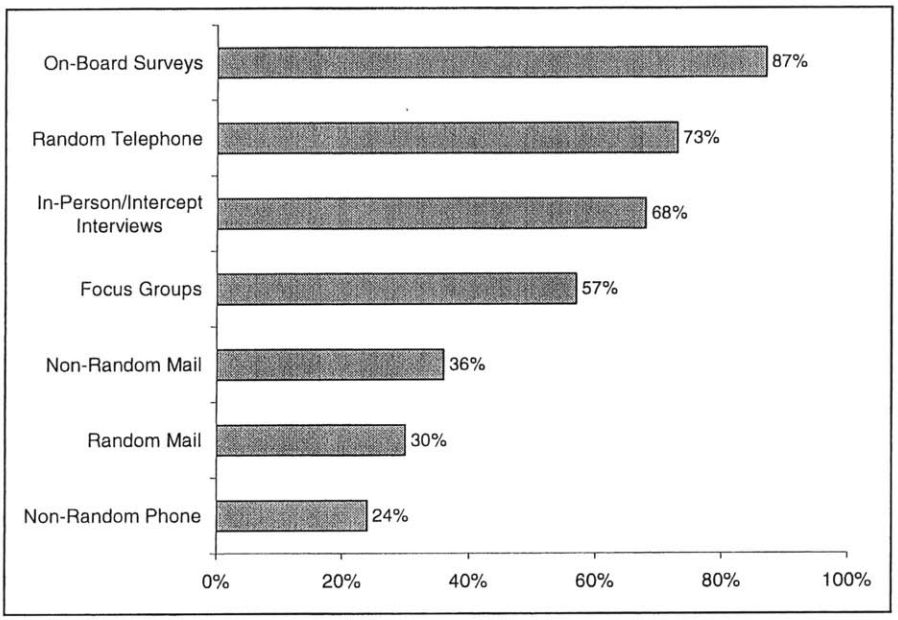


Figure 1.3: Research Methods Used at Pubic Transit Agencies
Source: Elmore-Yalch, 1998

In conclusion, TCRP Report 37 indicates that transit agencies are by no means averse to the use of market research tools. However, they have not realized the full potential of these tools, particularly in helping them maintain and increase market share. One of the most powerful purposes of market research is to understand which attributes of a product or service are most important to current and potential customers, and transit agencies have been slow to recognize that they can use research for this purpose.

Market Segmentation: Segmentation is the process of targeting both products and marketing interventions to the audiences where they will have the greatest impact (Planck, 1998). It also can be defined as the identification of groups of customers -or market segments- that have similarities in characteristics or similarities in needs who are likely to exhibit similar purchase behavior and/or responses to changes in marketing mix (Elmore-Yalch, 1998). An effective market segmentation strategy improves the transit agency's competitive position and better serves the needs of the public transportation customers. It rewards the agency with:

- Increased ridership
- Improved share of more choice
- New customers
- Better customers
- More satisfied customers
- Potentially more 'profitable' marketing and service opportunities

Two basic approaches to market segmentation are:

1. Pre-determined segmentation – selecting certain groups from a population based on known characteristics and declaring them "segments".
2. Market-defined segmentation – identifies segments based on actual market investigations, notably analysis of answers to survey questions intended to predict marketplace responses.

In summary, market segmentation provides the necessary research base on which all other marketing strategies can be successfully formulated. Following segmentation, the agency can select target markets –one or more groups that will respond favorably to certain product or service configurations and messages about these products or services. The agency can then position its product and services by developing unique marketing strategies to appeal to the selected target market(s).

1.4 Transit Marketing Strategies

Although historically the transit industry has given short shrift to marketing activities, in the last quarter century marketing and promotions have been increasingly recognized as a possible means of attracting patrons to transit services. To try to get more use out of their services, transit properties have begun to experiment with innovative marketing strategies that go beyond

advertising on the system itself or in the mass media. Charles River Associates Inc. (1997) in the *TCRP Report 27: Building Transit Ridership, An Exploration of Transit's Market Share and the Public Policies that Influence it* consider fare-free zones and innovative fare-media techniques as innovative marketing strategies that attract people to transit.

Table 1.2: Summary Evaluation of Selected Transit-Marketing Techniques
Source: Oram, 1987

Marketing Technique	Extent of Use[a]	Perceived Success[b]	Evidence of Success[c]
Product and Place			
Express buses	Wide	+++	+/-
Subscription bus	New	+++	+
Van pool	New	+++	+
Price			
Discounted passes	Wide	++	-
Employer pass programs	Some	+++	+
Free-ride days	Wide	+++	-
Free-ride offers	Wide	+++	+
Shop and ride	Some	+	None
Free-fare zones	New	++	+
Peak/Off peak differential	Some	+	+
Promotion			
Sponsor contests	Some	++	None
Merchant discounts	New	New	None
Telephone info. service	Wide	++	+
Teleride	New	Unclear	+/-
Promotional items	Wide	+	None
Anniversary promotions	Wide	++	None
Trip planners	New	+++	+
Direct-contact marketing	New	+++	+
Media advertising			
Newspaper	Wide	++	+
Radio	Wide	++	+
Outdoor	Some	+	None
Television	Some	++	+
Cable television	New	New	None
Internet	New	New	None
Community education	Wide	+++	None
System maps	Wide	+++	+/-
Newsletters	Some	+	None
Student art displays	Some	+	None
Bus meisters/mystery riders	Some	++	None

[a] Wide = Very Common; Some = Somewhat common; New = Recent Innovation.
[b] +++ = Very Successful; ++ = Quite Successful; + = Considered worthwhile; Unclear = contradictory opinions exist; New = too soon to identify dominant opinion.
[c] + = Positive evidence exists; - = Negative evidence exists; +/- = Conflicting evidence or opinion exists; None = No evidence exists.

Oram (1987) in the *TCRP Synthesis of Transit Practice: Transit Marketing – Successes and Failures*, summarizes selected transit marketing techniques and suggest that there is a need of further evaluation of these techniques in order to identify the transit marketing successes and failures. Table 1.2 summarizes these transit marketing techniques and evaluates

their extent of use, perceived success and evidence of success. He indicates that most transit marketing activity is focused on promotion. Promotion is purposely the last of marketing's "Four Ps", and marketing theory indicates that promotion can be ineffective if inadequate attention is paid to product, place and price.

Recent trends in the transit industry seem to favor new service variations, revised fare policies, and other innovations that focuses in the other three Ps of marketing: product, place and price. Rosenbloom (1998) identifies thirteen service concepts that have been effective in increasing transit ridership, which agree with the recent trends in transit marketing. These service concepts are considered transit-marketing techniques and are as follows:

- Feeder Services,
- Express Buses,
- Services to large employers/universities,
- Reverse-commute services,
- Vanpool incentives,
- Park-and-Ride services,
- Fare incentives,
- Travel training and transit familiarization,
- Light Rail,
- Commuter Rail,
- Route restructuring,
- Community buses and service routes, and
- Special event services.

These 13 transit service concepts are based on 21 case studies and contact with approximately 40 additional transit systems. Many systems indicated that other service concepts had been successful in increasing ridership but they had no evidence to document those increases and therefore, were not included in the list. One of the market niches that was expanded by the implementation of a series of these service concepts were people aged from 17 to 25 (particularly university students). They became an important market when provided with free or fare-free passes, restructured services (i.e., better routing, scheduling, time transfers, and suburban transfer stations), and feeder or shuttle services from rail and regional bus.

1.5 Thesis Objectives

This chapter has described the importance of customer/market research and market segmentation in identifying and understanding the needs of potential niche markets in order to attract and retain transit riders. Also, it has proved the positive effect that serving large employers or universities have in increasing transit patronage. Consequently, it is appropriate to analyze the possibility of attracting the university population of San Juan, Puerto Rico to Tren Urbano, the new transit system being built, given the proximity of five schools to Tren Urbano stations. In addition, it has been indicated that the provision of fare-free passes to the university student market has a positive impact in transit ridership.

For this reason, this thesis work has two principal objectives:

- Complete a comprehensive market study of the attitudes, knowledge and preferences of the San Juan Metropolitan Area (SJMA) university student population towards transit and Tren Urbano.
- Explore, define, and recommend a possible strategy of implementing an innovative transit marketing technique that consists of an unlimited transit pass (i.e., fare-free pass), better called as the university pass or UPASS.

This study is the first comprehensive assessment of the San Juan's university students' characteristics, travel behaviors and opinions toward transit.

1.6 Thesis Outline

The remainder of this thesis consists of six chapters, as outlined below.

Chapter 2: Problem Definition and Background: Chapter two presents the substantial role university students have as an emerging transit market and how a transit marketing strategy exclusively targeted to university students could positively impact ridership. The transit and transportation situation in San Juan and its universities will be described. The purpose is to understand why this population is important for Tren Urbano, why it is important to use market research to understand their attitudes and preferences, and how a transit marketing strategy like an unlimited pass program could benefit students, universities and Tren Urbano.

Chapter 3: Research Methodology: This chapter details the survey research methodology conducted at the five universities in the SJMA. The chapter begins with a description of the questionnaire development, which included a focus group discussion. It then describes the survey's administration and concludes with the limitations of the survey.

Chapter 4: Survey Findings: In Chapter 4 the results of the survey conducted are presented and tabulated by university and for the total university student population. The chapter presents the survey results organized according to six major areas included in the survey: background data, student travel patterns, attitudes towards transportation services, mode choices, attitudes towards Tren Urbano, and attitudes towards the UPASS concept.

Chapter 5: Survey Analysis and Implications: Chapter 5 focuses on two aspects: (1) the anticipated usage of Tren Urbano by the university students; and (2) in what manner the findings affect Tren Urbano, the universities and the possible implementation of the UPASS concept. The chapter presents a cross-tabulation analysis of the anticipated usage of Tren Urbano and follows with a regression analysis that suggests typical profiles of student users that are more or less likely to ride Tren Urbano. It concludes with a description of the survey finding's implications on Tren Urbano's operations and marketing strategy to the university community.

Chapter 6: Summary and Recommendations: The final chapter summarizes the research presented and indicates the most outstanding findings as well as the promises and challenges they represent for Tren Urbano. Additionally, chapter 6 defines a series of recommendation for Tren Urbano and suggests how this research can be extended.

Chapter 2: Problem Definition and Background

Transit needs to respond to current and emerging markets if it wants to increase its market share. People age 17 to 25, particularly university students, are considered an emerging transit market. If transit agencies pursue the university population, especially its students, it will have significant results. This chapter focuses its attention in the substantial role the university students have as an emerging transit market and how a transit marketing strategy exclusively for university students have impacted positively transit ridership. The transit and transportation situation in San Juan, Puerto Rico and its universities will be presented. The intention is to understand why San Juan's university students are a potential market for Tren Urbano, why it is important to use market research to understand their attitudes and preferences, and how the UPASS concept could be applied to San Juan and benefit transit, universities and students.

2.1 University Population as a Transit Market

Universities and their students represent an emerging market for transit agencies. Rosenbloom (1998) includes in her emerging transit market list the young people between the ages of 17 to 25, particularly those who are university students. According to her study, college students are an important market in many service environments when provided with free or fare-free passes, restructured service (i.e., better routing, scheduling, timed transfers, and suburban transfer stations), and feeder or shuttle services from rail and regional bus.

Table 2.1 shows that universities are considered an effective transit market in increasing ridership. Transit service to large employers, like universities, provides the greatest societal benefits in addition to increase transit usage because can affect a large absolute number of riders. Besides, school trips are the second destination of transit users according to APTA data (APTA, 2000). Therefore, universities and its population seem to be an important market who transit agencies should pay serious attention to since marketing it suggests increased ridership and equitable and efficient societal benefits.

Table 2.1: Transit markets reported by transit operators as effective in increasing ridership
Source: Rosenbloom, 1998

Service Environments	Work Trip	Non-Work Trip	Destinations
50,000 – 500,000			
• *very low density*	University Faculty and Staff		
• *low density*	University Faculty and Staff	**University Students**; Disabled Travelers; Preschool and School Children	Large Employers/ **Universities**
• *medium density*			
• *high density*			
500,000 – 1 million			
• *low density*	University Faculty and Staff	**University Students**; Families; Single Parents; School Age Children; Riders 70+ years old; Disabled Riders	Social Services Agencies; Shopping Malls; Large Employers/ **Universities;** Industrial Sites; Grocery Stores
• *medium density*		Public School Students	Shopping Malls
• *high density*			

The Chicago Transit Authority (CTA) is a transit operator that implemented a new service and targeted it specifically to an emerging market, the university students, and has experienced an increase in transit patronage. In the Fall of 1998, CTA began a pilot fare-free pass program at fourteen colleges and universities in the Chicago area (CTA, 1998). This new initiative was aimed to tap into new markets (i.e., the university students) to broaden the agency's ridership base, increase ridership levels and serve more customers. According to Chicago Transit Board Chairman Valerie B. Jarrett, "by focusing on (university) students, there is a great potential for the CTA to attract new customers, solidify ridership among occasional riders and expand transit use by regular customers". CTA President Frank Kruesi declared that CTA will "continue to look for partnership and opportunities that will help identify and capture new markets", like the university students are.

In 1999 CTA ridership increased by 17.8 million riders; 6.8 million of these rides were attributed to the university pass program, better called as U-PASS (CTA, 1999). Thus, CTA's initiative is an excellent illustration of the effectiveness of targeting a transit service (i.e., a fare incentive) to an emerging transit market and succeeds in increasing transit ridership. It also

demonstrates that college students can become an important market when provided with free or fare-free passes, as Rosenbloom's study showed.

2.2 UPASS as a Transit Marketing Strategy

An unlimited access transit pass program, or UPASS, is an arrangement invented together by universities and public transit agencies that provides fare-free transit service for over 825,000 people in the United States (Brown, Hess and Shoup, 2000). An unlimited access program consists of a university paying the transit agency an annual lump sum based on expected student ridership, and students simply showing their university identification to board the bus or swiping the university-exclusively transit pass in the turnstiles to board the train, as Figure 2.1 illustrates. The advantages of providing a fare-free incentive to university students are many. Students are who directly benefit from it, since they enjoy unlimited rides in the transit system anytime, anywhere they want to go. However, both the transit agency and the universities indirectly benefit from it since as a consequence of the student's opportunity to ride the system "free", transit ridership increases and parking demand at universities decreases as will be shown next.

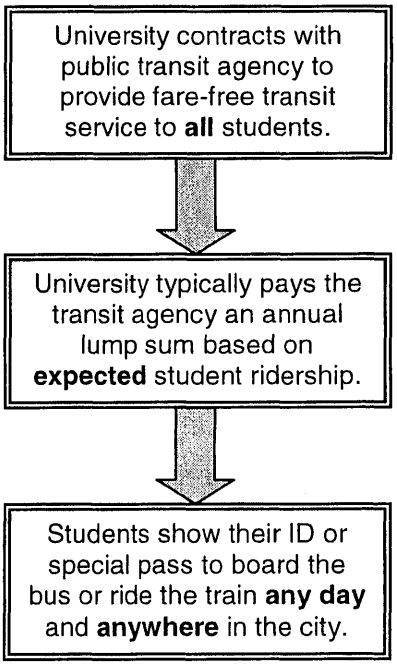


Figure 2.1: How Does Unlimited Access Work?

2.2.1 Benefits to the University

Miller (2000), in his *TCRP Synthesis of Transit Practice: Transportation on College and University Campuses,* indicates that one factor that accounts for the growth of unlimited access systems in universities in the 1990's is the promise and the proven contribution that transit can make to addressing a number of objectives shared by both students and university administrators. These objectives are to reduce the demand for parking, to increase students' access to housing, employment and other places, and to reduce congestion on campus and in the surrounding communities. Brown, Hess and Shoup (2000) is the most comprehensive study on unlimited access programs available. They report the results of a survey of unlimited access programs at 35 universities across the United States. They asked campus officials why they offered UPASS and their responses were that UPASS:

- Reduces the demand for on-campus parking,
- Increases students' accessibility and mobility,
- Helps recruit and retain students,
- Reduces the cost of attending college, and
- Increases transportation equity.

Reduce parking demand: Most university officials reported that their primary reason for offering UPASS was to reduce the demand for parking and avoid the expense of providing new parking spaces. Having a UPASS encourages some students to shift from cars to public transportation for their trips to campus. But not all the students that switch to transit were driving alone to campus before. Maybe some used to walk or bike to school. In addition, many students will use transit for trips other than commute to school, therefore an increase in student ridership does not mean a reduction in parking demand on campus at once. However, after the implementation of their UPASS program, parking demand declined by between 250 and 400 spaces at the University of Pittsburgh, by about 750 spaces at the University of Colorado and about 1,000 spaces were eliminated at the University of Illinois at Urbana-Champaign (Brown, Hess and Shoup, 2000). This availability of parking spaces improves the parking situation, especially for those students that commute from areas that are not served by transit and their only option to get to school is driving. In addition, therefore the political pressure to expand parking supply is less since UPASS provides an alternative to the car. A reduction in parking operations and maintenance costs is expected too.

Increases students' accessibility: UPASS gives the students better access to campus, to social, cultural, educational and recreational opportunities, to less expensive housing, and to jobs, internships and volunteer positions throughout the region transit serves. The increased mobility is particularly valuable in large cities since it gives students greater access to many cultural, professional and recreational events.

Recruit and retain students: Campus officials have reported that UPASS programs help recruit and retain students because it provides increased mobility at low cost. In the University of Winsconsin – Milwaukee (UWM), a student survey indicates that nearly 41% of students said that UPASS had a major or minor effect on their decision to attend UWM in future semesters (Meyer and Beimborn, 1996). UPASS also attracts students who do not own a car, prefer not to drive, environmentalists, and those who think transit pass programs reduce cost of living. The university's competitive advantage also increases since UPASS becomes another promotional tool of the university that probably other universities do not have.

Reduce cost of attending college: UPASS provides more affordable transportation to all students, therefore reduces the amount of money students spent on transportation. It allows a student to get around without a car while attending college and might delay a student's need to buy a car. If the transit pass program reduces the financial aid needs for some students, a university's financial aid budget can also serve more students (Brown, Hess and Shoup, 2000).

Increase transportation equity: Unlimited access transit programs treat everyone fairly since students are assessed the same fee, receive the same transportation service, and are eligible to ride transit without paying a fare using their UPASS. In addition, all students are provided with an alternative to the car, particularly low-income students and those that do not have a car available to go to school. For the University of Wisconsin – Milwaukee, the UPASS package is the equivalent of giving each student a $3,000 per year scholarship, because it precludes the need for a personal vehicle (Poinsatte and Toor, 1999).

2.2.2 Benefits to the Transit Agency

In his synthesis report, Miller (2000) indicates three factors that have accounted for the accelerated implementation of UPASS programs in the recent years. These factors are:

- Transit systems serving campus communities have matured and have the organizational, managerial and operating capability to provide expanded high-quality service.
- The significant increases in federal transit funding since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991 and the Transportation Equity Act for the 21st Century (TEA 21) in 1998.
- Transit systems are now in the position to experiment with new services.

In the survey conducted by Brown, Hess and Shoup (2000), transit officials said that UPASS programs (1) increase transit ridership, (2) provide guaranteed revenue, and (3) improve overall transit service. These benefits are discussed in detail below.

Increase total ridership: UPASS programs can greatly increase transit ridership immediately due to six factors. (1) By reducing the fare to zero, the programs encourage students to ride more frequently simply to take advantage of the financial savings (i.e., marginal cost of using transit becomes zero). (2) Many transit agencies improve their services making transit more convenient and more reliable for the users and this higher level of service in turn increases ridership by students and passengers who pay full fare. This is consistent with Mohring's (1972) hypothesis, shown in Figure 2.1, that if increases in transit demand lead to more frequent service, the more frequent service then attracts more riders, and subsequently ridership grows (Brown, Hess and Shoup, 2000).

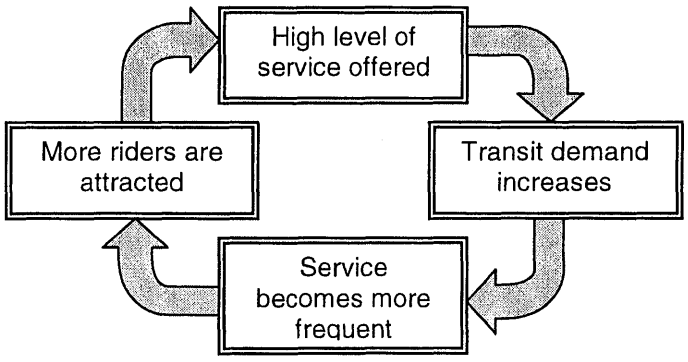


Figure 2.2: Mohring's Effect

UPASS encourages students to travel together by public transit since the transit pass not only makes transit free for individuals, but also for groups who want to go somewhere

together. (3) Because of this group behavior, UPASS makes it more likely that larger groups will ride transit. This will lead to more frequent service that will then attract more riders and ridership will grow, as Mohring's hypothesis indicates. (4) Since UPASS are provided to everyone, this flexibility encourages those who have never considered using transit to give it a try and those who were unfamiliar with the system to learn where buses or trains can take them. The more students familiarize with transit, the more likely they are of adopting transit as their new way of getting around. (5) If UPASS is able to reduce automobile ownership in students, this can greatly increase transit ridership. Students without a car are far more likely to ride transit than are students with cars (Poinsatte and Toor, 1999). Finally, (6) students that thanks to having a UPASS move near transit lines contribute to transit ridership. This enables the student to use transit for other trips other than going to school, increasing student ridership furthermore. Table 2.2 demonstrates the increase in student ridership experienced in different universities in the United States after the first year of implementing their UPASS program.

Table 2.2: Unlimited Access Increases Student Ridership
Source: Brown, Hess and Shoup (2000)

University	Year Began	First-Year Increase in Student Ridership			Subsequent Growth Rate (%/year)
		Before	After	Change	
Cal. State Univ., Sacramento	1992	315,000	537,700	+71%	+2%
University of California, Davis	1990	587,000	1,054,000	+79%	+10%
University of Wisconsin, Madison	1996	812,000	1,653,000	+104%	*
Univ.of Illinois, Urbana-Champaign	1989	1,058,000	3,102,000	+193%	+8%
University of Colorado, Boulder	1990	300,000	900,000	+200%	+8%

* Subsequent growth rate is not available because the program started in 1996 (study was in 1997).

Increase in revenues: Transit companies benefit from a pass program in receiving guaranteed revenue since they know they can depend on a lump sum of revenue from the student group which will not fluctuate as individual fare box revenues do. The University of Washington in Seattle paid to the transit systems a total amount of $7,891,000, which is an 87% of the operating budget of their UPASS program (UW Transportation Office, 1999). This pre-payment for transit services by universities is a source of funding that could potentially help transit systems when federal funding reductions take place.

Furthermore, transit agencies increase their revenue because additional student riders fill unused transit capacity. The Chicago Transit Authority reports that 69% of all student transit

rides were made during off-peak hours where there is excess of capacity (CTA, 1999). Because students are filling empty seats, the marginal cost of serving these additional riders is low. Considering that more students are riding per bus or train and when there is excess in capacity, the operating cost per ride, the operating subsidy per ride, and the total operating subsidy of transit agencies is reduced.

Figure 2.2 shows the results obtained by Brown, Hess and Shoup (2000) when they analyzed different transit agencies' performance measures (i.e., transit agencies' total ridership, riders per bus, cost per rider, vehicle miles of service, operating subsidy per rider, and total operating subsidy) in the two years before and after each agency began to offer unlimited transit passes to the university students. The results suggest that UPASS programs reduce transit cost and increase transit revenue because collect revenue without significant expenditures.

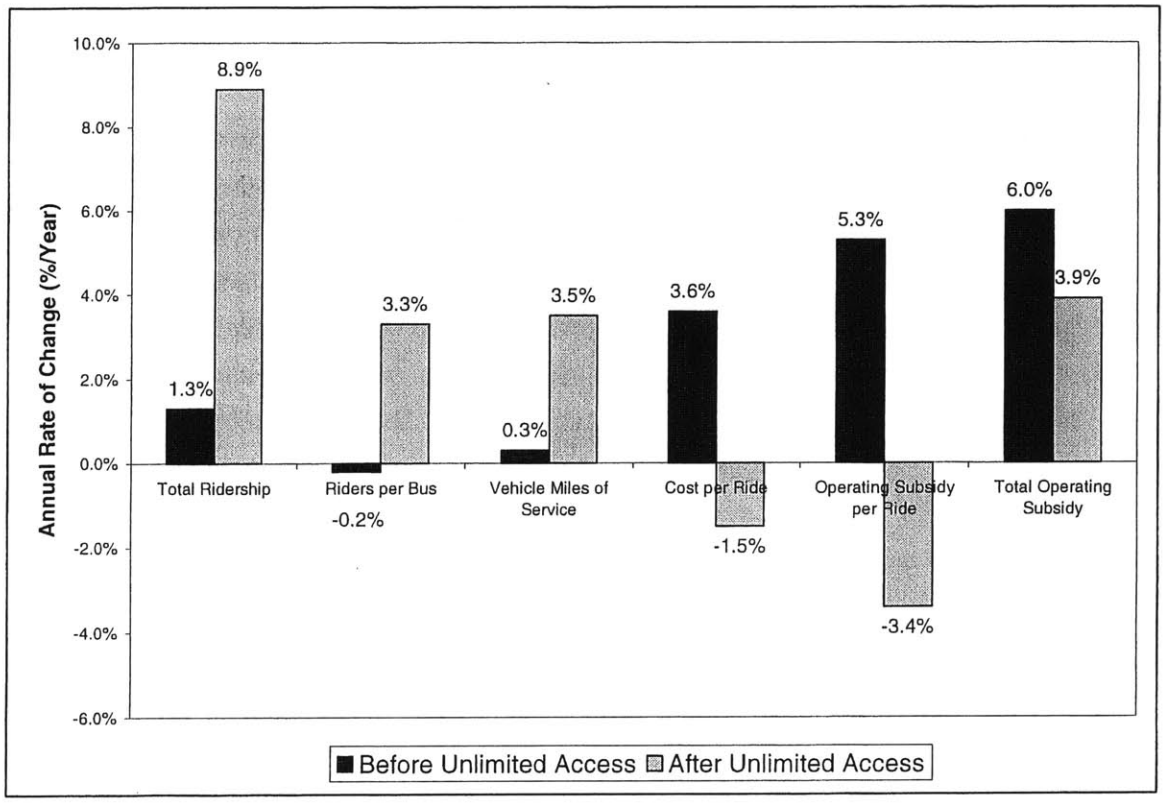


Figure 2.3: Average Annual Rate of Change in Transit Agency Performance Indicators
Source: Brown, Hess and Shoup, 2000

Improves transit performance: As mentioned earlier, many transit agencies improve their service to support their new UPASS programs, which make transit more convenient and more reliable to users and thus attract more student riders than would be expected. If the students have a

positive experience when riding transit, they spread the word to others and they start using transit as well. Hopefully, they will continue riding later in life, creating a sense of loyalty and pattern of usage that may result in students opting to use public transit later in their post-college lives. Many transit agencies have improved the quality and increased the quantity of transit services to universities with more frequent buses, more routes, and service that extends later at night and on weekends (Brown, Hess and Shoup, 2000). Figure 2.2 shows the increase experienced in vehicle miles of service due to these improvements. The image of transit has also improved as the community starts noticing students getting out of their cars and onto buses or trains. Transit suffers from an image problem and college students give a rejuvenating image to transit.

2.3 Impact of UPASS

Two case studies will be used to demonstrate the benefits of implementing a UPASS program, as explained in the first section. First, the impacts of UPASS for a transit agency are presented in the case of the Chicago Transit Authority. Then, the case of the University of Wisconsin at Milwaukee shows how the UPASS program has impacted that campus.

2.3.1 Chicago Transit Authority (CTA)

The CTA University Pass (U-PASS) Program is a discount fare medium that provides full-time college and university students unlimited rides on all CTA trains and buses throughout the duration of an academic term (Kaitcer, 2000). Any accredited, post-secundary, degree-granting institution in the CTA service area is eligible to participate in the program. Institutions enter into a contractual agreement with the CTA to provide the U-PASS to every full-time student. Students pay for the discounted fare pass as a part of the regular fees assessed by their school.

Twenty schools, nearly 40,000 students, are currently participating in the program. The CTA's expectations of the program have been successfully accomplished in the two years it has been implemented.

- The U-PASS program has contributed to an increase in overall CTA ridership, particularly during off-peak hours. In 1999 ridership increased by 17.8 million rides; 6.8 million of these rides are attributed to the U-PASS Program.

- 58% of rides using U-PASS have been in the off-peak periods when CTA has excess capacity.
- The U-PASS has created a sense of loyalty and patter of usage among students. Only 45-55% of all student travel via U-PASS appears to involve trips to and from school, with the next most significant trip purpose being to and from work.
- The U-PASS has allowed for evaluation of its program. Studies have been completed to measure gains and lose in ridership and travel patterns of students, but more study is necessary to accurately evaluate the effectiveness of this program.

2.3.2 University of Wisconsin at Milwaukee (UWM)

The UPASS transit pass program at The University of Wisconsin-Milwaukee (UWM) is an innovative transit program developed by the University and the Milwaukee County Transit System (MCTS) in which approximately 22,000 UWM students receive an unlimited transit pass as part of their tuition (Meyer and Beimborn, 1996). The pass can be used anytime, anywhere, for any trip purposes throughout Milwaukee County without any additional fare required.

The UPASS program has been effective in reducing vehicle trips, increasing transit ridership, and reducing the impact of the automobile on the environment since its implementation in Fall 1994. The principal impacts of this program were the following:

- The UPASS program has influenced modal shifts. Students who drive to UWM declined about 14.5% and students choosing to ride MCTS increased around 13.5% after the implementation of UPASS.
- The UPASS program has increased transit ridership to UWM. MCTS on-board counts show between 31% and 45% increase in transit ridership compared to counts conducted prior to the implementation of the UPASS.
- The UPASS program reduced vehicle trips to the university, which resulted in a reduction in emissions, fuel consumption, and resulted in dollar savings to students. During the 94-95 school year, 221,055 fewer vehicle trips were made to UWM. This resulted in a reduction of 5,084,265 VMT for trips to UWM, a savings of 242,108 gallons of fuel, and a savings of $295,371.76 in fuel costs.

2.4 Student's Travel Patterns

The benefits of a transit marketing strategy like UPASS may not be effective if the population it is targeted to is not fully understood. University students are a transit market with opportunities since they are more heterogeneous than other populations. It is composed of students of less than 18 years to over 30 years old that may work while enrolled in classes or not at all, may be married or single, and may have no car available to go to school, while others may have more than one. These, among other characteristics describe the university population and turn it into an interesting and diversified market; one that needs to be understood if transit agencies and universities want to attract it and benefit from it. Thus, it is very important to study how student's characteristics affect their travel patterns and preferences. This way transit agencies can develop specific service concepts, like the unlimited pass described above that will meet student needs and promote their usage of transit.

It is very difficult to attempt to describe the travel patterns of university students since these depend on many other variables like for example:

- mode of transportation available,
- preferred mode of transportation,
- alternative modes of transportation available,
- number of credits enrolled in,
- employment while at school, and
- parking policies at school

Few studies are available about university students travel patterns prior to any transit agency's attempt to attract this market to public transportation. One student travel pattern study available is a survey conducted by the University of Wisconsin-Milwaukee (UWM) in 1994 before the implementation of their transit pass program. This study showed that the student population is mainly composed of females, undergraduates, full-time students, and students that work while being enrolled in classes. About 2,100 students live on-campus while more than 20,000 live in the surrounding neighborhoods (Meyer and Beimborn, 1996). A high percentage of these 20,000 students commute to campus every day driving alone (54%), as Figure 2.3 shows. The majority of the survey respondents indicated they have access to an automobile to travel to the university and considered that the parking situation at the university was a problem. Eighty percent indicated that their trip to UWM originated at their home and approximately the

same percentage reported returning to their home after leaving UWM. However, 72% of respondents indicated they went from home to school and then home again, while an average of 8% originated their trip at home but after school they went to work, and 13% originate their trip at their workplace and after school they went home. These complex trip patterns play a major force in deciding whether or not to use transit since they need to be on time at work and cannot afford to wait for the bus. Only twelve percent of the survey respondents indicated using transit as their primary mode of transportation.

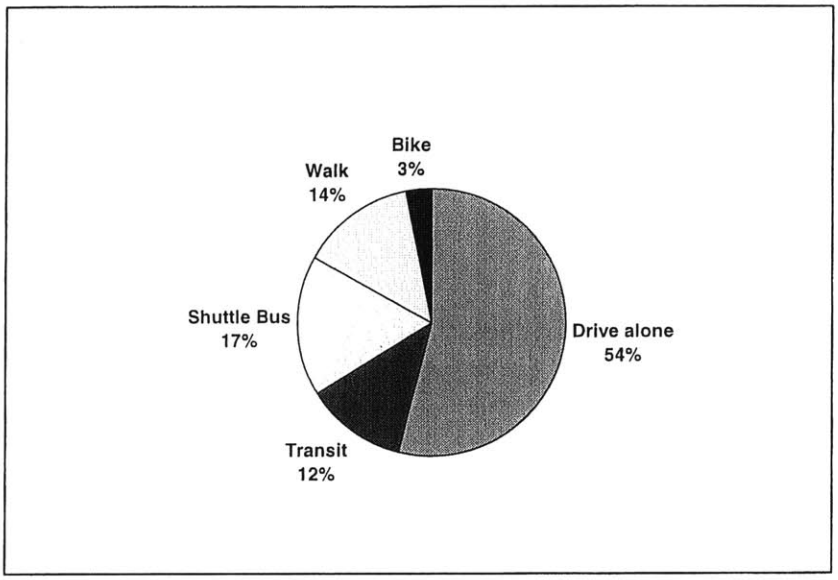


Figure 2.4: Mode Choice to UWM (%)
Source: Meyer and Beimborn, 1996

From this study one may conclude that students with no car available use transit as their primary transportation mode to go to school. Students that have a car prefer to drive alone. If there are no alternate modes of transportation available, demand for parking is high. Part-time students and students that work have a tendency to have complex trip patterns require a flexible and reliable mode of transportation. The parking policies at each school may be a disincentive or incentive to drive to school or take transit respectively. These trends are perhaps obvious and may be generalized to all university populations. However, not all university populations have the same characteristics. The transportation and transit situation might be different, and therefore all transit agencies, including Tren Urbano, should study the university population they serve and want to attract carefully since student's travel patterns and attitudes towards transit may be different from other university populations.

2.5 Transportation and Transit in the SJMA

The San Juan Metropolitan Area (SJMA) is the most congested region in Puerto Rico. It comprises 13 municipalities with a land area of 400 square miles and a total population of 1.3 million (FTA, DTPW and HTA, 1995). High population and job density is concentrated in the area, resulting in 3.2 million trips per day. The capacity of the network of highways and arterial streets is limited and little land remains underdeveloped meaning that roadway facilities cannot be easily expanded. Public transportation service is inadequate and unreliable. Bus and privately operated non-subsidized *público* van services are the only two available public transit alternatives. These systems have suffered from poor service quality, which has resulted in declining ridership over the long term as auto ownership and use has increased. The population of the SJMA has had no other choice than to rely almost completely on the automobile for urban travel as evidenced by the 90% modal share for auto (FTA, DTPW and HTA, 1995). Major emphasis on improving public transportation and better management of the existing system is a primary concern today in order to mitigate future congestion and increase mobility of the SJMA residents.

2.5.1 Tren Urbano

One response of the Government of the Commonwealth of Puerto Rico to manage the negative impacts of heavy auto use is Tren Urbano (TU). TU is a rapid rail transit system currently under construction and the most important public transit and infrastructure project in the metropolitan area of San Juan, Puerto Rico. Phase I will be 17.2 kilometers in length, with 16 stations and is scheduled to begin revenue services in approximately two years. Phase I-A will add two more stations to the TU alignment, but this phase is currently in the design stage.

Tren Urbano (TU) is expected to become an effective alternative to the private automobile and reduce congestion and thus be a significant saving in travel time. It is hoped that it will reduce the demand for parking in the metropolitan area and reduce the cost of transportation for its users. However, this can only happen if the transit system is attractive to all the SJMA residents and if many choose to use TU or the other public transportation modes (bus or *públicos*) as an option to the car. Market research methods are needed in order to understand who is the potential market for TU and the other transit modes and who is most likely to ride them.

2.5.2 Market Research for Tren Urbano

Because the system is new, marketing and market research efforts for TU have been minimal. Few expert efforts have been completed and some academic work on market research has been produced for Tren Urbano as part of student research projects or theses. Undergraduate and graduate students mainly conducted these pieces of work. Nonetheless, these efforts have not produced a comprehensive market study for Tren Urbano and who will be the potential customer of Tren Urbano is still not known precisely. Some of these market research efforts are described below.

The Luntz Research Companies: Tren Urbano planners commissioned a formal study in March 1995. This study conducted by The Luntz Research Companies (1995), reports the results of 1,000 door-to-door interviews conducted among 700 homes and 300 businesses along the Tren Urbano corridor. The study indicated that general support to build Tren Urbano was intense with 93% of the population in favor including 77% who strongly favor the idea. It also indicated how much people is willing to pay for Tren Urbano (i.e., mean payment of 88 cents). Only a slim majority of the San Juan residents say they will use Tren Urbano regularly (52%). Those who are most likely to use the train regularly included:

- Use the train for work (48%)
- Part-time workers (31%)
- Bus riders (28%)
- Men 18-34 (27%)
- Pay more than $1 for the train (25%)
- No access to car (24%)

The Luntz Research Co. study was a baseline study for TU planners in 1995, since it gave them an overview of the public perception on Tren Urbano prior to the beginning of the construction phase, which started in 1996. For this reason, this study can no longer be used as a baseline since the study is six years old and surely public perception and opinion have changed significantly given the construction, political, and other issues related to Tren Urbano that were not present in 1995.

Hispania Research Corporation: Another attempt to conduct a market research study was considered in March 1999 by Tren Urbano decision-makers (i.e., Secretary of Transportation

and Tren Urbano officials), four years later than The Luntz Research Co. study. This time, the Hispania Research Corp. (1999), in joint venture with Fleishman-Hillard presented a formal proposal to develop a Tren Urbano Marketing/Communication Research Program. They were suggesting a baseline study using a combination of qualitative (focus groups) and quantitative research (surveys). They were also proposing to be involved in developing communication programs and helping to implement them. Unfortunately, the government of Puerto Rico never signed the contract even though the proposal was presented to the Secretary of Transportation and the President of Hispania Research Corp. signed the contract.

During the summer of 1999, all marketing efforts suffered due to the political environment in Puerto Rico. The Secretary of Transportation in that time had to resign to his position since he decided to run for governor of the island in the November 2000 elections. A new Secretary was appointed who did not continue the process of finalizing the contract with Hispania Research Corporation. Until present, nothing has been done to conduct the market communication/research program proposed.

Academic Work: In early 2000, a team of the UPR magazine, *Comercio y Producción* conducted a survey of 370 telephone interviews including residents close to a TU station, university students from San Juan, Bayamón and Guaynabo, and private and public industries in the SJMA in an attempt to anticipate the usage of Tren Urbano. The results indicate that 99% know about the Tren Urbano project. About 66% of respondents think many people would use Tren Urbano, while a 76% is willing to use it. From the 76%, a 60% would use it for recreational travel, a 31% would use it to get to their workplace, and a 9% would use it to go to the university.

A series of MIT Master's theses have been done for Tren Urbano with respect to marketing and market research. Hoffman (1996), in his thesis, *Towards a Positioning Strategy for Transit Services in Metropolitan San Juan,* uses focus groups to provide an initial typology of public perception of transit options in San Juan. Planck's thesis (1998), *Transit Marketing: Strategies for San Juan, Puerto Rico,* provides a good overview of transit marketing in general and presents examples of innovative marketing strategies at transit agencies, and recommends a possible marketing plan for Tren Urbano. In her thesis, *Older Adult Perceptions of Transit Security and Their Utilization of Public Transportation: Ridership Strategies for the Elderly on Tren Urbano,* Blackman (2000) analyzes the elderly perception of transit security. Her study

surveyed 182 seniors age 60 and over in the Boston Metropolitan Area and the results were applied to the Tren Urbano context. Moreira's thesis (2000), *The Use of Market Research Methods in Understanding Choice Transit Riders*, tests and evaluates three market research techniques for use by public transit agencies in understanding choice rider priorities. She used qualitative research to design four surveys that were conducted at companies in Boston and the results were used to recommend a preliminary market research strategy for Tren Urbano.

The interest in market research and marketing in general is increasing since it is very crucial for the success of the project. Recently, the Secretary of Transportation of Puerto Rico declared that a massive marketing campaign is needed to convince people to get out of their cars and use transit (Figueroa, 2000). He mentioned that this campaign would be focused in four populations or markets: elementary school children, high school students, university students and employees. Therefore, Tren Urbano decision-makers comprehend the importance of identifying target markets and the important role San Juan's university population plays for Tren Urbano. However, they have to pay more attention in developing a market research program that describe and understand these potential customers of Tren Urbano. If Tren Urbano is not able to meet these customers' needs and preferences, it will not be able to reach the ridership expected. For this reason, it is important to understand and describe the university population in San Juan.

2.6 San Juan's University Population

The university community is an important component of the population of the SJMA. It can become a potential group of users for TU since currently it represents a considerable share of the transit ridership in the different public transportation modes available. A recent survey conducted for the Metropolitan Bus Authority (AMA) indicates that students constitute about 25% of transit riders (Berry, 1999). Although there are no records of how many of these students are university-level, the considerable number of university students in the metropolitan region would indicate that there is a large potential market.

Within ¼ of a mile of a Tren Urbano station, shown in Figure 2.4, there are five universities with individual enrollments exceeding 2,000 students. These five universities are:

1. Universidad del Sagrado Corazón (**USC**)
2. Universidad Politécnica de Puerto Rico (**UPPR**)
3. Universidad de Puerto Rico (**UPR**)
4. Universidad Metropolitana (**UMET**)
5. Recinto de Ciencias Médicas – Universidad de Puerto Rico (**RCM**)

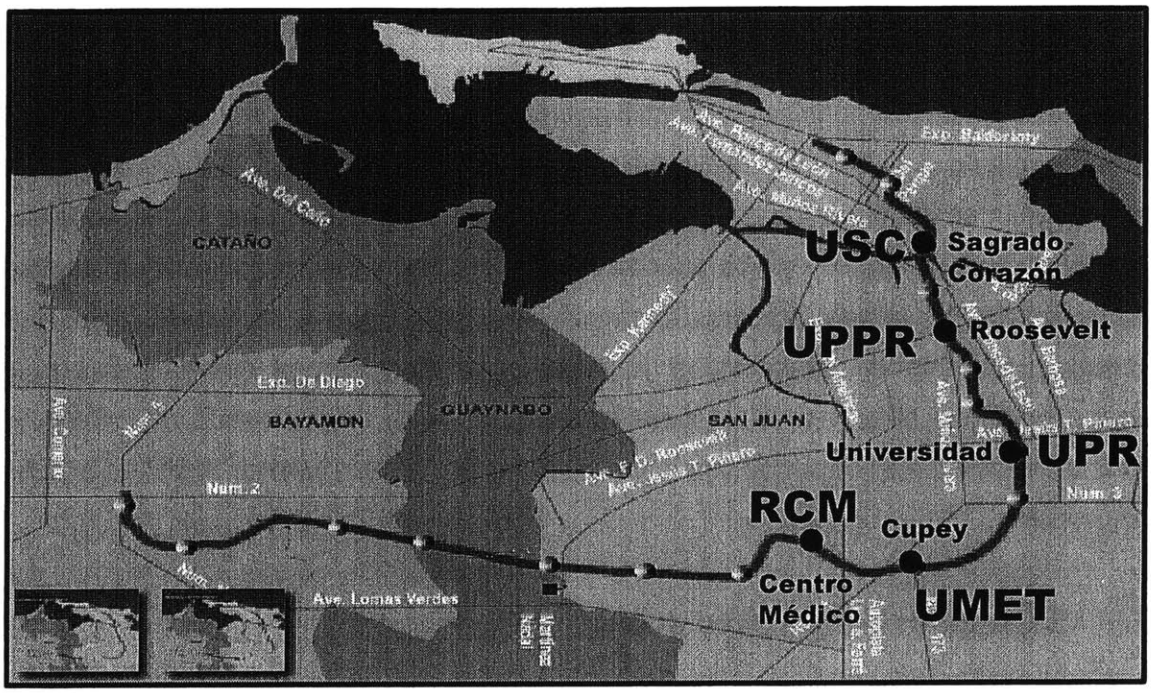


Figure 2.5: The five major universities and their closest Tren Urbano station
Source: Tren Urbano Office, 1999

For Fall 2000, there were a total of 38,813 students enrolled at these universities. Table 2.3 presents the student population by university, where UPR population is over half of the total number of students in San Juan. These nearly 39,000 students could represent an important segment of TU's market, particularly during non-peak hours when there is excess capacity in all transportation systems. If students are attracted to transit, the demand for parking on university campuses will decrease, their transportation costs will be reduced, and their access to housing, employment, entertainment and other destinations will increase.

Table 2.3: Student population at each university for Fall 2000
Source: Individuals' University Registrar's Office, 2000

University	Student Population	Proportion
USC	5,234	13%
UPPR	4,511	11%
UPR	21,539	53%
UMET	4,379	16%
RCM	3,150	8%
Total	**38,813**	**100%**

Recently, some universities and transit agencies in the United States have implemented successful programs (i.e., UPASS) that have encouraged transit ridership in their communities, proving that when an attractive transit system meets the transportation needs of the students, all the benefits mentioned above can be accomplished. However, the most important motive is defining programs that attract students to transit. These programs may build future public transportation ridership by encouraging a transit-orientation among these young people producing a significant difference in the travel behavior of the SJMA population. Therefore, Tren Urbano and the university population along its corridor might benefit from an unlimited access or UPASS program.

2.7 UPASS Applicability in San Juan

TU needs to attract riders to the system. It needs to create a constituency as early as possible of a young generation that will continue to use the system, as they grow old. As a new transportation mode choice for the population of San Juan, incentives need to be provided to the population in order to promote the use of this modern transportation system. The universities need to provide a solution to the parking situation their campus faces and to the traffic congestion at the university and on the communities around. Students lack effective transportation alternatives and Tren Urbano hopefully will improve their transportation choices, their accessibility and their mobility, and decrease their dependency in automobile travel to go to school.

The opportunity exists for Tren Urbano and the universities to develop and implement a UPASS program. Here are presented the major reasons why a UPASS Program might work in San Juan:

1. Need to improve parking situation at universities:

The parking situation at the five universities included in this study is critical. Student demand for parking is high given the high percentage of students (and faculty and staff) that drive alone to school and the lack of parking spaces to satisfy this demand. In other words, this reflects the lack of alternative transportation choices since students (and faculty and staff) always consider the car as the mode choice. The Dean of Students of RCM, Dra. Ilka C. Rios, indicated that even with the parking garage recently built on campus, parking supply is only serving 10% to 20% of the student parking demand (Interview with author, March 2000). This indicates that parking supply and capacity at these schools is very limited. UPR has about 6,000 parking spaces for approximately 27,000 people among students, faculty and staff (Rosario, 2000). At all schools, parking is guaranteed to faculty and staff, but not to students. Comparing the parking spaces available for students and the number of vehicles registered, as shown in Table 2.4, the lack of parking spaces at all schools is evident.

Table 2.4: Parking supply at each school
Source: Transportation Office at each school, 1999-2000

University	Category	Parking Spaces Available	Number of Vehicles Registered
USC	*Students*	1,130	2,775
	Faculty	314	499
	Staff		127
UPPR	*Students*	~900	Not available
	Faculty	121	~450
	Staff	59	
UPR	*Students*	~ 5,000	5,059
	Faculty	~ 1,000	360
	Staff		306
UMET	*Students*	887	3,950
	Faculty	62	1,450
	Staff	538	400
RCM	*Students*	460	Not Available
	Faculty	470	
	Staff	862	

The most serious situation is at RCM where according to Mr. Nelson Díaz, administrator of the Planning Office of RCM, there are 2.7 persons per each parking space on campus and

this is the largest ratio of all UPR system campuses (Interview with author, March 2001). The situation could be better if the parking policies were improved and priority was given to students. In the majority of the schools (i.e., USC, UPPR, and UMET), faculty and staff are not charged to park on campus, while students are. In UPR, neither students, faculty or staff pay for parking and therefore the parking is described as a privilege and not as a right. The situation at UPR is critical since there is no parking cost associated to bring a car to school and therefore many students, professors and staff feel encouraged to bring their cars to school.

At RCM, even though students, faculty and personnel are charged for parking, the spaces available for students are very disproportionate with the student demand for parking at the campus. For instance, the garage built recently with space for 1,340 vehicles has only 100 spaces reserved for student parking (Parés-Arroyo, 2000). The rest is for staff, resident doctors, and professors. The student's spaces are distributed based on a lottery from a list of names requesting parking spaces to the Student Council of each school in the campus (i.e., School of Medicine, School of Nursing, School of Public Health, School of Dentistry, and School of Health Professionals). Table 2.5 indicates the parking policies at each university. These policies need to be evaluated to provide priority to student's needs. Privileges should be given to them instead of professors and staff, since they receive a salary, while students do not.

Table 2.5: Parking policies at each university.
Source: Transportation office at each school, 1999-2000.

University	Parking Policy
USC	- Student parking available on campus by permit only. - Cost of permit: $50 per year, $30 per semester, $10 per summer session. - Parking for faculty and staff is free and on campus.
UPPR	- Parking available on campus by permit only. - Cost of permit: $40 per trimester. - Private parking is available in the area during the evening areas. - Parking for faculty and staff is free and on campus.
UPR	- Free parking for students, faculty and staff with permit only. - Permits have to be renewed at the beginning of each school year. - Freshmen and sophomores park outside of campus.
UMET	- Parking fees: $0.35/day for students with permit, $1.00/day for visitors. - Student permit is included in registration. Additional permit costs $5 per vehicle. - Parking for faculty and staff is free and on campus.
RCM	- Parking available for students, faculty and staff with permit only. - Cost of permit is $15/month for students and $70/month for resident doctors. - Cost of permit is $32/month for faculty and $25/month for staff. - Students permits are lottery-based (Sixteen permits only are granted by school). - Private parking is available in the area.

Space to build new parking spaces and expand the supply of parking is constrained and results expensive for these schools as Table 2.6 indicates. According to the Dean of Students of USC, Mr. Manuel de Jesús, there is little possibility to expand the parking spaces since the school is such a small campus (Interview with author, March 2000). At some schools, students have the alternative to park in private parking but these are expensive and present a burden for a student's budget. However, some students have no other alternative than to park at a private parking given the lack of parking spaces at their universities.

Table 2.6: Parking Investment Plans and Costs

Source: Transportation office at each school, 1999-2000.

University	Investment Plans and Costs
USC	300 parking spaces for $900,000
UPPR	Not available
UPR	One garage for 950 vehicles
UMET	One garage of approx. $2 million
RCM	No plans have been considered

Given the poor transportation alternatives students have to go to school, parking demand results high, as indicated. The introduction of Tren Urbano represents what students might perceive as a true alternative to the car, thus increasing the probability that parking demand decreases with the use of TU and parking became available to those that really need to drive to go to school. The UPASS program has proved to reduce the demand for parking at universities in the United States. Students feel attracted to use the transit system given the convenience of having a transit pass that allows them to ride the bus or the train any time, anywhere they want. Given the proximity of Tren Urbano to each of the schools and the need of an alternative to the car for students, implementing an unlimited access transit program for the university population of San Juan could mean a solution to the critical parking situation all universities face.

2. Opportunity to create a constituency for Tren Urbano:

Tren Urbano is both a new system and experience for the San Juan metropolitan area. Many have never ridden a train and do not use the current array of transit services. Tren Urbano

ridership goals are to attract 115,000 boardings each day in the year 2010 (FTA, DTPW and HTA, 1995). The university population in San Juan represents a large potential market for Tren Urbano and an excellent opportunity of building transit orientation among these young people. Students that ride the system and have a positive experience will continue riding after they graduate and later in life, creating a permanent constituency for Tren Urbano.

The implementation of a UPASS program may help Tren Urbano and the universities create this constituency. The benefit of having a transit pass in hand for the use of university students at any time whether that be regularly or occasionally, encourage students to use the system. UPASS could even entice those students that rarely or have never use transit before to give it a try. Once they experience the convenience of using transit without paying fare and the time and dollar savings, they would continue using it since no cost would be incurred. Hopefully, a shift of non-transit users to transit will occur increasing the ridership of Tren Urbano and creating a true constituency.

3. Possibility to improve transit's public image:

Public transportation in the metropolitan area of San Juan has been described as "undependable", "bad" and "unsafe" (Hoffman, 1996). This public image of the transit services of San Juan can be improved if Tren Urbano and the other services –AMA, Metrobus and publicos– attract the university students. According to CTA President Frank Kruesi, other customers feel safe and like to see college students in the system (Kruesi, 2000). As communities start noticing students getting out of their cars and onto AMA or Metrobus, a publico or Tren Urbano, transit's image improves.

University students have an active night life that Tren Urbano can benefit from. People often do not use transit at night because demand is low and they feel unsafe. However, if university students, thanks to the UPASS, use the system to go to restaurants, concert, clubs, or bars, which are places they use to go at night, they will bring life to the system and keep it animated even at nights. People will see that others are running the system late at night, and they will not feel they are alone or that the system is unsafe. The transit image improves.

Non-transit users perceive transit as a service only for low-income people or those that do not own a car and have no other option but to take transit. When university provides all

students with a UPASS, not only low-income students will use it, but also all will feel encouraged to use it including those that have higher incomes and also have a car available to go to school. Transit images improves because people perceive that young people and soon-to-be professionals are choosing to take transit over the private automobile and therefore are convinced that transit is a real transportation alternative. Hopefully, other segments of the population will make more use of transit when they see that university students are also making more use of it, thanks to the UPASS.

2.7.1 Potential Challenges to Implementing a UPASS program

Implementing a UPASS program for Tren Urbano and the San Juan's university population will not be an easy task. First, both Tren Urbano and the use of transit passes will be new to the population in general, therefore people will be skeptical about them, especially about their benefits. Strong marketing efforts and an effective informational campaign are needed in order to explain the benefits of Tren Urbano, and to the university population, the convenience of having an unlimited access transit pass exclusively for them. In addition to the inexperience with a heavy transit system and the use of a fare-free pass, in order to implement a UPASS program, support from all the parties involved –students, university administrators, transit officials, special interest groups, and others– is necessary and fundamental. None of the parties can initiate a program without the cooperation and support of the others, since a UPASS program affects all of them. Careful negotiations among these groups are also essential and agreements between students, university administrators, and transit officials are not that easy.

How the program will be funded is the most critical aspect. If student fees (i.e., include UPASS cost in student's tuition) are used to fund the program and all students are automatically enrolled in the program in order to reduce the cost per participant, students might oppose to this action since this means an increase in their tuition. In addition, not all students might want to have a UPASS and will not allow being charged for it when they are not going to use it. If Tren Urbano has to provide some kind of subsidy to fund the program, the Highway and Transportation Authority (owner of Tren Urbano) might not accept it because Tren Urbano will already be operating with subsidies. Universities may also cover the cost of the UPASS program from their general funds or the parking revenues generated. However, the general funds are very limited and not all universities charge for parking. Also, using parking revenue to pay for a transit pass program may be odd for the San Juan's university population and not fair

for those that are not served by transit. A combination of funding methods might be the best alternative, since the important aspect is that all parties are convinced that a UPASS program benefits them all, that it is a win-win situation for everyone.

In conclusion, implementing a UPASS program is not simple, however it is very possible. Many universities in the United States have implemented it and several transit agencies have also included them in their fare structure. A strong student support, an open-minded university administration, and a capable and credible transit agency can initiate a UPASS program. They just have to have patience and a desire to see the positive impact UPASS could generate for each of them.

2.8 Studies about the San Juan's University Population

It is extremely important to understand the travel patterns, attitudes and preferences of the San Juan's university population before implementing a UPASS. Few market studies are available about the five universities along Tren Urbano corridor. These analyze the students' mode choices and their attitudes towards Tren Urbano.

Mode Choice: The University of Puerto Rico (UPR) is the only one that conducts a survey and prepares a profile of the freshmen class at the beginning of each school year. One of the variables in this study is the mode of transportation students choose to travel to the university. In 1990-91, 40.5% of the freshmen class surveyed drove to school, 15% ride with someone, and 22.5% took transit (De León-Lozada, 1999). Nineteen percent of these students walked to school. In the survey conducted for the freshmen class of 1998-99, 38% drove to school, 23% took transit, and 21% rode with someone (De León-Lozada, 2000). Seventeen percent walked, while 0.2% of survey respondents went to school riding a bike.

Comparing survey responses of 1990-91 with responses of 1998-99, it seems that freshmen have decided to drive less to campus, since this figure reduced from 40.5% to 38%. The reduction is minimal, and probably insignificant. However, an increase of 6% in the number of freshmen respondents that ride with someone to school is observed. In 1996-97 the entire undergraduate population was surveyed (including freshmen) and 54% indicated they drive a private vehicle to school (De León-Lozada, 1999). About 16% ride with someone and around 13% take transit. Thirteen percent walk to campus. An increase of 16% in auto use by

undergraduates is indicated and a reduction of 10% in transit use was observed when compared to the freshmen responses. Freshmen tend to drive a car to school less than sophomores, juniors and seniors. Freshmen also tend to ride transit more than the rest of the undergraduates. These are important trends when studying the market of the university population. It indicates how different freshmen and upperclassmen perceive things and the importance of knowing this difference when analyzing the profile of the students at UPR, or at any other school.

Another university that has studied the mode of transportation students use to go to school is UMET. According to a statistical report for 1999-00, 39% of the students drive a private vehicle to school (Zavala, 2000). Thirty four percent arrive by transit, 24.5% ride with someone, while 3% walk to school. These descriptive statistics show that almost 40% drive to school but a considerable percentage of students take transit too (34%). Comparing these results to UPR responses, UMET's student population drive less to school, take transit more and a small number of students walk to school. This indicates the difference among schools and the importance of analyzing each school separately, since not all the school's student population behaves equally. Only 13% of UPR survey respondents are transit users, while almost three times this amount are transit users in UMET.

Table 2.7: Mode choice to go to school (%)
Sources: De León Lozada,1999 and 2000, Zavala, 2000

	UPR			UMET
Mode Transportation to School	**Freshmen (1990-91)**	**Freshmen (1998-99)**	**Undergraduates (1996-97)**	**Population (1999-00)**
Drive alone	40.5%	37.7%	54.0%	39.0%
Ride with someone	14.8%	21.2%	16.5%	24.5%
Take transit	22.5%	23.3%	13.2%	33.6%
Walk	19.4%	17.1%	13.1%	2.9%
Other	2.7%	0.8%	3.1%	0.0%

Attitudes toward Tren Urbano: A group of students of the Business of Administration School of the University of Puerto Rico conducted a research study about the knowledge and opinion of the students of UPR about the Tren Urbano project in May 2000. In this research these students measured the level of knowledge and education of the students of UPR about the Tren Urbano project with a series of three focus group discussions with a total of 20 participating

students from different schools of the campus (Malavé and Giménez, 2000). The results of these discussions were the following:

- Students indicated they know about the Tren Urbano project in general but do not know in detail important operational information. They did not know the fare per trip, hours of operation, location of stations, service frequency or waiting time, quantity and capacity of vehicles, and the existence and purpose of the buses "TU Conexión" (painted AMA and Metrobus buses with the Tren Urbano logo suggesting the integration of modes once TU becomes operational).
- The majority of the participants of this study indicated that TU represents a possible solution to the traffic congestion they experience everyday or a transportation alternative for them. In addition, they think it might help with the existing parking problem at the university.
- The most important factors to consider using Tren Urbano are security, efficiency and service reliability according to focus groups participants. Another important factor is how accessible the stations are to them. If Tren Urbano meets these characteristics, students indicated they would be willing to ride Tren Urbano.
- The study also concludes that students that own an automobile are less likely to use Tren Urbano than one that does not have a car available. Similarly, the residents of the metropolitan area that have a station of Tren Urbano close and accessible to them would become frequent users of the system.

In conclusion, this research revealed the lack of information about the Tren Urbano project in the UPR market segment and how the TU orientation campaign has not accomplished its purpose of positioning Tren Urbano in the mind of UPR potential users. The study then recommended the development of a publicity campaign directed towards the education of potential users in the UPR. It also proposes to attract not only university students, but also teenagers and young adults in general, since the young community is more willing to change their travel preferences. If use is fostered among this population, when older, they would adapt better to the new transportation system and become regular users. Again, this study completed by UPR students about their attitudes towards Tren Urbano is an important basis for this thesis work, since it gives an idea of how university students perceive Tren Urbano and this may be generalized to all other university students. However, this study is qualitative work and not representative of the complete population since it is based in focus group discussions (i.e., opinion of a small group of participants) at the UPR only. Nevertheless, it presents a good

description of the student attitudes towards Tren Urbano that may be confirmed with the results of this thesis project. For this reason, a quantitative research method is necessary to be able to generate conclusions that can be applied to all the university population of San Juan. A survey will be conducted and explained in the following chapter.

Chapter 3: Research Methodology

Quantitative research methods are necessary to generate conclusions that can be generalized to a larger population. The university student's preferences, attitudes and likely travel behavior have only been analyzed qualitatively using focus group discussions. This was only conducted at one university, therefore there has been no empirical study about the complete university population of San Juan or its five universities. In order to understand the students' transportation needs, their preferences and their attitudes towards transit, it is important to first conduct a market research study of the student population. For this reason, a survey was conducted in order to describe the student population's attitudes, preferences and possible travel behavior, to define university students' potential as customers of Tren Urbano and to explore the relative promise of the UPASS concept. The following chapter shows why a survey was selected and details the approach used to design the survey, collect the data, and analyze it.

3.1 Data Collection Methods

Various methods exist for collecting market research data, all of which can be categorized as either secondary or primary (Aaker and Day, 1990). Secondary data already exist and therefore do not require any additional collection by the researcher. Examples are existing information, databanks from other organizations, and syndicated data sources. However, market research studies are often very specific and it can be difficult to locate the appropriate secondary data. Consequently, primary data are often collected to address specific research questions. Primary data includes qualitative research methods, like focus groups, surveys and experiments. Table 3.1 describes these methods.

Table 3.1: Methods for Collecting Primary Data
Source: Aaker and Day, 1990

Primary Data	Description	Typical Methods
Qualitative	Unstructured interviews with small samples, usually intended to generate ideas and hypotheses.	Expert opinion In-depth interviews Focus group interviews
Survey	Structured collection of data directly from representative samples of respondents	Mail interviews Telephone interviews Personal interviews On-line interviews
Experimental	Introduce a change into the environment and then measure the resulting effect	Laboratory experiments Field experiments

No previous empirical study exists examining the San Juan's university population, therefore a survey was selected as the data collection measure to find out the characteristics, behaviors and opinions of this particular population. This primary data collection method gives the opportunity to obtain information from a number of respondents in order to describe the characteristics of the entire student population analyzed (i.e., the five universities included in this study). In order to identify the objectives of the survey, a focus group discussion was conducted.

3.1.1 Focus Group Discussion

A focus group is a discussion of a small group of people, typically 8 to 10, on a particular issue to gather information about how much the group knows and feels about the issue being discussed. The purpose of this qualitative research method is to obtain general background information about the topic of interest, generate impressions of programs, services, or other objects of interest, learn how respondents talk about a phenomenon of interest, and generate research hypotheses (Stewart and Shamdasani, 1990).

Table 3.2: Comparison of Focus Groups and Surveys
Source: Salant and Dillman, 1994

	Focus Groups	Surveys
Purpose	To stimulate thinking and elicit ideas on a particular subject	To determine what proportion of a predefined population has a particular attribute or opinion
Structure	Discussion of a small group of people (8-10), led by a moderator	Mail, telephone, or face-to-face questionnaire, completed by an individual respondent
Capacity to generalize to a Larger population	No	Yes
Capacity to generate ideas or Hypotheses for later testing	Yes	To some extent
Capacity to test ideas or Hypotheses	To some extent	Yes
Must questions and answers be formulated ahead of time?	No, but the moderator must be ready to guide the discussion	Yes, except for open-ended questions

As Table 3.2 indicates, focus groups do not substitute for quantitative surveys because participants are not randomly selected nor do they comprise a sufficiently large sample to yield reliable estimates of a larger population (Salant and Dillman, 1994). However, this directed group discussion could provide a head start on knowing which questions to ask in the survey.

Therefore, in order to elicit ideas about the travel behavior and travel options of university students, and their opinion about Tren Urbano and what would motivate them to use it, a focus group discussion with university students of the SJMA was conducted in March 28, 2000.

Sixteen students from the different schools that are being studied participated in the group. The discussion generated preliminary ideas of how the students respond and react to transportation issues, and what are their feelings, impression, and/or expectations of the public transportation system, about Tren Urbano, and about different programs that might attract them to transit. The focus group discussion guide is included in Appendix A. Table 3.3 shows the profile of the students that participated in the focus group discussion. As indicated before, the number of participants is small and the proportion of students from each school does not correspond to the real university population proportions. Therefore, focus group considerations can not be generalized. They should be used to generate ideas that will later be tested using the survey.

Table 3.3: Focus Group Participant Profile

Universities	Participants	Gender	Average Age	Academic Program
USC	1	1 M	19	1 U
UPPR	3	2 F, 1 M	26	2 U, 1 G
UPR	4	3 F, 1 M	20	4 U
UMET	2	1 F, 1 M	39	2 G
RCM	6	5 F, 1 M	27	3 U, 3 G
Total	**16**	**11 F, 5 M**	**26**	**10 U, 6 G**

Note: F = Female, M = Male, U = Undergraduate, and G = Graduate

3.2 Survey Design

The focus group discussion was a useful starting point for the design of the survey questionnaire. The survey objectives were specified and are the following:

- To understand the characteristics, preferences, and travel behavior of the SJMA university population,
- To identify the range of perceptions of the public transportation system and their expectations with Tren Urbano, and
- To explore the potentiality of implementing a university-pass program in the five major universities along Tren Urbano alignment.

3.2.1 Sample Method Selection

In order to accomplish these objectives a representative sample is needed to obtain the information desired from a small amount of respondents to describe the characteristics of the entire population, which is of nearly 39,000 students (See Table 2.3). The sampling procedure used was stratified random sampling. A stratified random sample is obtained by separating the population elements into non-overlapping groups, called strata, and then selecting a sample random sample from each stratum. Each university of this study is considered a strata because the proportion of students at each school varies, therefore the sample size of the population had to consider the size of students at each university in order to best represent the population at large.

3.2.2 Sample Size Calculation

The sample size depends on the sampling error that will be tolerated, the variation in the population with respect to the characteristics of interest, and the subgroups within the sample for which estimates are needed (Salant and Dillman, 1994). A sampling error of 3% was tolerated with a 95% confidence level. To be conservative, the variation of the population was assumed to be 50%, which means that the population is relatively varied. With these initial conditions, the following equation was used to calculate the sample size:

$$n = \frac{\sum_{i=1}^{L} \frac{N_i^2 P_i q_i}{w_i}}{N^2 D + \sum_{i=1}^{L} N_i P_i q_i}$$

where, n = sample size required

L = number of stratas

N = total university student's population in the SJMA

N_i = university student's population in strata i

P_i = estimated percentage of the variation in the population

$q_i = 1 - P$

w_i = proportion of the total population in each strata

$D = B^2/4$, where B is the tolerated sampling error.

Then, if B = 3% and P_{1-5} = 0.50, the minimum sample size required is 1,080 surveys. Table 3.4 shows the total sample size and the sample size required at each university.

Table 3.4: Sample Size Calculation

Strata	Universities	N_i*	w_i	P_i	n_i
1	USC	5,184	0.13	0.50	145
2	UPPR	4,989	0.13	0.50	139
3	UPR	21,539	0.56	0.50	601
4	UMET	4,212	0.11	0.50	118
5	RCM	2,757	0.07	0.50	77
Total		**38,681**	**1.00**		**1,080**

* The universities' population used corresponds to the number of students registered for the Fall semester of 1999.

3.2.3 Initial Questionnaire Design

Based on the focus group discussion and the survey objectives previously identified, a preliminary questionnaire was designed. The primary considerations in the questionnaire design were order or progression of questions, content, appearance, and clarity. The questionnaire content was based on the qualitative research conducted and using other survey instruments found in the literature review. Three survey instruments used to understand the student travel at the University of Winsconsin – Milwaukee were used as models for this questionnaire. Meyer and Beimborn (1996) used these surveys to evaluate the UPASS program at the University of Winsconsin – Milwaukee. The first one was prior to the implementation of the program in Spring 1994, the second was right after the program was implemented in Fall 1994, and the third one was conducted to evaluate the effectiveness of the program in Spring 1995. These surveys included questions about students travel patterns, mode choice, attitudes towards transportation services, and attitudes towards the idea of UPASS which served as a guide to design the questionnaire used for the university students of San Juan.

The majority of the questions used in this survey were adapted from UWM student travel study. However, the best source of questions for this survey was the discussion generated during the focus group conducted. Student's responses were used to determine the options or alternatives for some of the questions.

3.2.4 Pre-Testing

Prior to administering the survey, a pre-test is essential to ensure that the questionnaire can be clearly understood and is not too long. Usually, ten or more people are needed that are willing to complete the survey in order to monitor the ease with which respondents complete the questionnaire and also its ease of administration and scoring (Fink, 1995). The questionnaire was first tested with the focus group participants. They were asked to complete the survey and inform what questions were confusing, how long it took them to complete it, any suggestions about information they thought was not included and should be included, or any other recommendation. The impression of five was that it was long, but that the questions were very good and covered all the issues discussed in the focus group.

Then, the survey was tested with seven summer interns of the Tren Urbano Office in San Juan that attended the universities included in this study. These students were interviewed so that they could provide feedback for subsequent questionnaire revisions. Their recommendations were excellent and incorporated in the final instrument. In summary, a total of twelve students tested the survey and spent an average of 15 to 20 minutes completing it.

3.2.5 Final Questionnaire Design

Based on pre-test results, the questionnaires were revised to produce the final design. A cover letter was added to the survey explaining to the respondents (the students) the purpose of the survey and that the information collected is anonymous, voluntarily, and will only be used for the purposes of this study. This final version of the questionnaire and its cover letter are included in Appendix B (in Spanish). The questions were organized according to the survey objectives. They can be organized in six major areas.

1. Background data: describes the characteristics of the student population (university, gender, academic program, academic load, employment status, age, civil status, income, and housing arrangement).
2. Students travel patterns: includes how, when and where students travel (availability of auto, auto ownership, weekly transportation costs, origin and destinations, trip patterns, and arrival and departure times).
3. Attitudes towards transportation services: illustrate the student's responses about the parking situation at their school and the current transit services in the SJMA (preferred solutions to parking situation, use and opinion of current transit services).

4. Mode choices: presents the mode of transportation regularly used to different trip purposes (to school, from school, to work, to do errands, to go shopping). It also presents the alternate mode of transportation preferred.
5. Attitudes towards Tren Urbano: shows the student's perception and preferences towards the future mode of transportation of San Juan (knowledge, proximity to a station, service characteristics, trip purposes, anticipated usage, effect in parking situation, reasons to ride, willingness to pay, and student fare discount).
6. Attitudes towards UPASS: explores the possibility of students having a UPASS and their opinion towards the concept (encourage transit use, using car less, special discounts included, anticipated benefits, cost, funding, eligibility and general attitude).

3.3 Survey Administration

The survey method selected to administer the survey was the drop-off method. For this method the surveyor (the author) personally delivers the surveys and either waits for them to be completed or leaves them and returns to pick them up later (Salant and Dillman, 1994). The approach selected to accomplish this at the five different universities and with the different sample sizes in each was to contact as many professors at each school as possible and coordinate with them the administration of the survey in their classrooms.

3.3.1 Coordinate administration of survey

Several professors from each university provided 15 to 20 minutes of their class to administer the survey. Once the professors were contacted initially (by e-mail, personally, or by reference), they were followed up in order to coordinate the day, time and classroom that the survey could be administered in their classes. Some professors agreed with the surveyor to administer the survey during their class time. Others preferred to administer the survey themselves and let the students complete them on their own, and then were collected in the next class.

3.3.2 Data Collection

The collection of data occurred during the month of August 2000, during the first days of classes at each school. Not all schools started classes at the same time, therefore the surveys could be administered at each school following the order classes started at each (i.e., RCM first,

UPPR second, UPR third, UMET fourth, and finally USC). Approximately 1,300 surveys were collected and the incomplete ones were disregarded. The total number of surveys collected was of 1,243 questionnaires meeting the minimum sample size of 1,080. Table 3.5 compares the sample size calculated with the sample size collected by university.

Table 3.5: Data Collected by University

Strata	University	Sample size calculated	Sample size collected
1	USC	145	165
2	UPPR	139	184
3	UPR	601	685
4	UMET	118	120
5	RCM	77	89
Total		**1,081**	**1,243**

3.4 Data Analysis

In order to analyze the survey data collected, the data was organized and entered in a computer database. The first task was to assign a code to all the anticipated responses in the questionnaire. Then, a codebook was prepared to serve as a dictionary to the person coding the data and entering the data in the computer. An example of the code book is included in Appendix C (in Spanish). Two persons were available to enter the data in the computer. A code sheet was created in the software package Excel and this data was then imported to a statistical software package called Statistical Package for Social Scientists (SPSS). Besides providing survey results, the analysis statistically interpreted these results and important implication were identified.

3.5 Limitations of the Survey

A perfectly accurate survey is rarely achieved. Salant and Dillman (1994) specify that to make accurate estimates, four requirements have to be met:

- The sample needs to be large enough to yield the desired level of precision.
- Everyone in the population has to have an equal (or known) chance of being selected for the sample.
- Questions asked have to enable people answering the survey to respond willingly and accurately.

- The characteristics of the people who do not participate in the survey are similar to the characteristics of those who do.

The survey administered for the purpose of this thesis minimized the sampling error, since enough people was sampled to achieve the needed level of precision using the stratified random sampling technique. However, the sample was not completely random since the method used to collect the data depended on the availability of a professor to allow the surveyor administer the survey at their classroom. In other words, using professors to sample the students in their classroom was convenient but not random because students that were not in the classes of those professors had not an equal chance of being selected for the sample. Therefore, coverage error was not avoided.

Measurement error was not eluded either because some questions were answered incorrectly by the university students. This means that some students interpreted the question correctly but others answered the question inaccurately, imprecisely, or their response could not be compared in any useful way to the other respondent's answers. Many of these questionnaires were disregarded to minimize this type of error.

In addition, Tren Urbano is a public infrastructure project that is constantly on the public agenda. The survey was conducted approximately seventy days before the general elections of Puerto Rico in November 2000. Many of the inaccuracy of the students' answers were due to the political environment at the moment the survey was conducted. One of the contenders was the former Secretary of Transportation of Puerto Rico and spokesperson of the Tren Urbano project during his time as Secretary. Given his inevitable association with the project, the political strategy of the other parties against him was to negatively promote Tren Urbano. Therefore, many students were politically biased when responding to the questionnaire. Reviewing the comments written in the survey, many students made political remarks about the project. This affects the accuracy of the survey, since student responses may have been influenced by this political environment and therefore, were not objective.

Chapter 4: Survey Findings

This chapter presents the survey results and is organized according to the six major areas included in the survey: background data, student travel patterns, attitudes towards transportation services, mode choices, attitudes towards Tren Urbano, and attitudes towards UPASS concept.

4.1 Background Data

This section describes the characteristics of the university student population. These include the university they attend, their gender, academic program, academic load, employment status, age, civil status, income, and housing arrangement.

4.1.1 University Classification

The university population around the Tren Urbano alignment consists of five major universities (USC, UPPR, UPR, UMET and RCM). Table 4.1 shows the percentage breakdown of survey respondents by university compared to the actual population at each university in Fall of 1999.

Table 4.1: Survey Response Rate by University (%)

University	Survey	Population	*% Difference*
USC	13.3	13.4	*-0.1*
UPPR	14.8	12.9	*1.9*
UPR	55.1	55.7	*-0.6*
UMET	9.7	10.9	*-1.2*
RCM	7.2	7.1	*0.1*

The percentages show that the surveys collected at each school are proportionate to the current university population at each school. Considering that the sampling error of the survey administered was of 3% and the difference between the survey population and the current population is less than 3%, the survey is found to be representative of the university population along Tren Urbano.

4.1.2 Gender

The breakdown between male and female students for the university population analyzed is 39/61 ratio of males to females. Survey response rates were almost the same as the real ratio

in all schools indicating a precise representation. A 30/60 ratio of males to females is shown in most of the schools with the exception of UPPR where female are only a quarter of the student population. Table 4.2 shows this percentage breakdown.

Table 4.2: Survey Response Rate by Gender (%)

University		Female	Male
USC	Survey	66.7	33.3
	Population	66.7	33.3
	% Difference	*0.0*	*0.0*
UPPR	Survey	24.5	75.5
	Population	24.5	75.5
	% Difference	*0.0*	*0.0*
UPR	Survey	67.8	32.2
	Population	67.7	32.1
	% Difference	*0.1*	*0.0*
UMET	Survey	63.0	37.0
	Population	62.5	36.7
	% Difference	*0.5*	*0.3*
RCM	Survey	67.4	32.6
	Population	67.4	32.6
	% Difference	*0.0*	*0.0*
Total	**Survey**	**60.8**	**39.2**
	Population	**60.7**	**39.2**
	% Difference	***0.1***	***0.1***

4.1.3 Academic Program

Students were classified as undergraduate and graduate. Undergraduate students are those that are pursuing an Associated Degree or a Bachelor's Degree. The graduate student population surveyed consists of those completing a Master's, Ph.D. or Juris Doctor Degree. Table 4.3 shows the percentage breakdown by student classification or academic program.

In four of the schools, the survey over represents graduate students and under represents undergraduates. UPPR is the most significant case, since graduate students were over represented by 24% and undergraduates under represented by 26%. RCM was the only exception were undergraduate students were over represented and graduate students under represented by about 5% each. In general, the undergraduate population was under represented by only 2% and the graduate population over represented by 3% indicating a fairly representative population.

Table 4.3: Survey Response by Student Classification (%)

University		Undergraduate	Graduate
USC	Survey	86.3	13.7
	Population	92.1	7.9
	% Difference	*-5.7*	*5.7*
UPPR	Survey	67.0	33.0
	Population	91.0	9.0
	% Difference	*-24.0*	*24.0*
UPR	Survey	80.7	19.3
	Population	83.2	16.8
	% Difference	*-2.5*	*2.5*
UMET	Survey	79.1	20.9
	Population	87.8	12.2
	% Difference	*-8.7*	*8.7*
RCM	Survey	49.4	50.6
	Population	44.6	55.4
	% Difference	*4.8*	*-4.8*
Total	**Survey**	**77.0**	**23.0**
	Population	**79.7**	**20.3**
	% Difference	***-2.7***	***2.7***

About 15% freshmen responded to this survey. This might be a low percentage of freshmen when compared to the freshmen population in general. Table 4.4 shows the percentage of freshmen students that responded the survey.

Table 4.4: Freshmen Response Rate (%)

University	Freshmen (%)
USC	11.5
UPPR	1.6
UPR	20.5
UMET	17.5
RCM	1.1
Total	**14.8**

UPR shows the largest freshmen population completing the survey with 20.5%, while UPRR and RCM only exhibits about 1% of freshmen survey respondents. This may be a misrepresentation of the freshmen population at each school, but this information is not available. As UPR freshmen profile study (mentioned in section 2.7) indicated, freshmen are more likely to drive less and ride more transit than other upperclassmen, therefore the misrepresentation of the freshmen population might have an influence in the survey results about the anticipated usage of Tren Urbano.

4.1.4 Academic Load

Each university classifies students into full-time or part-time based upon credit load. Generally, for undergraduates, 12 or more credits is considered full time while 9 or more credits for a graduate student is considered full-time. Any student registered for fewer credits in any academic program is considered a part-time student. Table 4.5 shows the survey results broken down by full-time and part-time students.

Table 4.5: Survey Response by Academic Load (%)

University		Full-Time	Part-Time
USC	Survey	80.7	19.3
	Population	71.4	28.6
	% Difference	*9.3*	*-9.3*
UPPR	Survey	74.3	25.7
	Population	54.0	46.0
	% Difference	*20.3*	*-20.3*
UPR	Survey	89.8	10.2
	Population	80.4	19.6
	% Difference	*9.5*	*-9.5*
UMET	Survey	74.8	25.2
	Population	74.7	25.3
	% Difference	*0.1*	*-0.1*
RCM	Survey	97.8	2.2
	Population	N/A	N/A
	% Difference		
Total	**Survey**	**85.5**	**14.5**
	Population	**70.1**	**29.9**
	% Difference	***15.4***	***-15.4***

The results indicate that the survey response by academic load is the least fair representation of the university population. In three of the schools (USC, UPPR and UPR) the full-time students were over represented and the part-time students under represented. Information for the current population in RCM is not available at the moment. UMET was the only school that had an exact representation by academic load. In general, the full-time student population was over represented and the part-time under represented by 15% each. This may have an effect on the results since part-time students may be more likely to behave like other going-to-work riders, who are less likely attracted to transit and therefore, bias the results toward the anticipated usage of Tren Urbano.

4.1.5 Employment Status

Survey results indicate that 54% of the student population is employed while being enrolled in classes. Results indicate that UPPR and UMET have the highest percentage of students employed with 77% and 67% respectively. RCM has the lowest with 31%. Table 4.6 shows the percentage of student employment at each university.

Table 4.6: Student Employment at each university (%)

University	% Employed
USC	59.1
UPPR	77.0
UPR	47.7
UMET	66.9
RCM	30.7
Total	**54.2**

For the purpose of this project, any respondent working 30 or more hours per week is considered a full-time employee. Any respondent working less than 30 hours per week is considered a part-time employee. Table 4.7 indicates that 64% of the students are part-time employees.

Table 4.7: Full-Time and Part-Time Employed Students (%)

Employment	USC	UPPR	UPR	UMET	RCM	Total
Part-time	62.1	25.4	82.1	52.4	86.2	**64.1**
Full-time	37.9	74.6	17.9	47.6	13.8	**35.9**

Three quarters of the UPPR students work full-time as opposed to the other schools were the majority of the working students are part-time employees, especially in UPR and RCM where over 80% of the employed students are part-time employees. The results also indicate that those employed part-time students are most likely to be undergraduates (74%), while the majority of full-time employees are graduate students (63.5%). Table 4.8 shows this percentage breakdown.

Table 4.8: Full Time and Part Time Employees by Academic Program (%)

Employment	Undergraduates	Graduates	Total
Part-time	73.8	36.5	**63.9**
Full-time	26.2	63.5	**36.1**

Women tend to work part-time while men tend to work more hours a week. Seventy one percent of women that work while enrolled in school are part-time employees. Fifty six percent of men are full-time employees. Table 4.9 indicates these results.

Table 4.9: Full-Time and Part-Time Employees by Gender (%)

Employment	Female	Male	Total
Part-time	71.0	55.9	**64.2**
Full-time	29.0	44.1	**35.8**

4.1.6 Age Distribution

More than three-quarters of the university population is 25 years old or younger. A 39% of the students are between the ages of 19 and 21 years old, while a 26% is between the ages of 22 and 25 and a 21% is 18 years old or younger. USC, UPR and UMET have a younger population compared to UPPR and RCM. More than half of the students in USC (67%), UPR (74%), and UMET (57%) are 21 years old or less. In contrast, UPPR and RCM students, with 75.5% and 77.5% respectively, are mostly 22 years old or older. Table 4.10 shows this age distribution by university and for the total university population.

Table 4.10: Survey Response by Age (%)

Age	USC	UPPR	UPR	UMET	RCM	Total
18 yrs or less	19.4	3.8	28.3	22.5	0.0	**20.9**
19-21 yrs	47.9	20.7	45.3	34.2	22.5	**39.3**
22-25 yrs	21.8	36.4	20.0	23.3	57.3	**25.7**
26-30 yrs	6.1	28.3	4.2	9.2	12.4	**9.1**
31-40 yrs	4.2	8.2	1.2	9.2	6.7	**3.8**
41-50 yrs	0.6	2.7	0.9	1.7	1.1	**1.2**
51 yrs or more	0.0	0.0	0.1	0.0	0.0	**0.1**

As mentioned before, over 75% of the student population is 25 years old or younger. This young population is representative of the high percentage of undergraduate students at each school. As Table 4.11 indicates, 74% of the undergraduate students are between the ages of 18 years or less and 21 years old. However, the other quarter of the population that is 25 years old or more, is largely due to the graduate student population at each school. Seventy five percent of the graduate students are between the ages of 22 and 30 years old.

Table 4.11: Age Distribution by Student Classification (%)

Age	Undergraduate	Graduate	Total
18 yrs or less	26.0	2.8	**20.7**
19-21 yrs	48.0	9.5	**39.2**
22-25 yrs	19.4	47.7	**25.9**
26-30 yrs	3.6	27.6	**9.1**
31-40 yrs	2.3	8.8	**3.8**
41-50 yrs	0.6	3.2	**1.2**
51 yrs or more	0.0	0.4	**0.1**

4.1.7 Civil Status

Almost 90% of the university population surveyed is single or not married. UPPR and UMET reported the largest married population with about 23% each. Table 4.12 shows this distribution.

Table 4.12: Survey Response by Civil Status (%)

Civil Status	USC	UPPR	UPR	UMET	RCM	Total
Single	95.2	76.5	92.4	75.4	85.4	**88.3**
Married	4.2	23.0	6.4	22.0	13.5	**10.6**
Other	0.6	0.5	1.2	2.5	1.1	**1.1**

Other *includes separated, divorced, widowed or other.*

4.1.8 Income

Forty one percent of survey respondents revealed that the majority of the university population's annual family income is between $5,000 and $24,999. Forty six percent have family incomes larger than $25,000 with a high percentage of those students (USC, UPPR, UPR and RCM) with annual family incomes of more than $50,000. Only 2% of the UMET students reported an income of more than $50,000. These results are somewhat questionable due to the difficulty of clearly identifying student's income or their parent's income. Table 4.13 presents the income distribution.

Table 4.13: Survey Response by Income Distribution (%)

Income	USC	UPPR	UPR	UMET	RCM	Total
Less than $1000	7.3	0.6	3.1	6.8	1.2	**3.5**
$1000-$4999	13.3	2.2	8.0	17.5	11.1	**8.9**
$5000-$14999	16.7	21.2	20.1	32.0	18.5	**20.8**
$15000-$24999	22.0	16.2	21.2	19.4	22.2	**20.4**
$25000-$34999	10.0	15.6	17.1	15.5	11.1	**15.4**
$35000-$49999	12.7	16.8	12.1	6.8	14.8	**12.6**
More than $50000	18.0	27.4	18.5	1.9	21.0	**18.5**

4.1.9 Housing Arrangement

Sixty one percent of students still live with their parents while enrolled in school. The next largest population is the students that live in student housing with 13%. About 10% of students own or rent an apartment. The housing arrangement of students depends on where they live, as it will be presented later. Across schools, a high percentage of their students live with their parents, however, RCM and UPR show a large percentage of students living in student housings (*"hospedajes"*) with 25% and 17% respectively, when compared to the other schools. USC, UPPR, and UMET have 10%, 29%, and 20% of students living in their own apartment or home and a low percentage of students living in student housings. The percentage breakdown of the housing arrangement is shown in Table 4.14.

Table 4.14: Survey Respondents by Housing Arrangement (%)

Housing	USC	UPPR	UPR	UMET	RCM	Total
Live w/parents	69.7	44.0	64.8	59.3	48.9	**60.7**
Student housing	5.5	8.8	16.0	3.4	25.0	**13.0**
w/family relative	7.3	3.8	3.4	4.2	3.4	**4.0**
Own apt/home	10.3	28.6	5.3	19.5	14.8	**11.4**
Rent apt/home	6.7	14.8	9.7	12.7	8.0	**10.2**
Other	0.6	0.0	0.9	0.8	0.0	**0.6**

The large amount of single student population (88%) provokes the high percentage of students living with their parents. Sixty eight percent of single students still live with their mother and/or father. The second largest housing arrangement in USC, UPPR, and UMET is students that live in their own apartment or home and this is induced by sixty four percent of students that are married. Table 4.15 shows these results.

Table 4.15: Housing Arrangement by Civil Status (%)

Housing	Single	Married	Other	Total
Live w/parents	68.0	6.2	0.0	**60.7**
Student housing	14.4	1.6	7.1	**13.0**
w/family relative	4.4	0.0	14.3	**4.1**
Own apt/home	4.9	63.6	35.7	**11.4**
Rent apt/home	7.6	28.7	42.9	**10.2**
Other	0.7	0.0	0.0	**0.6**

4.2 Student Travel Patterns

This section includes how, when and where students travel. It includes the students' availability of a car, if they own a car, their weekly transportation costs, the origin and destination of their university trips, their trip patterns, and their school's arrival and departure times.

4.2.1 Availability of an Automobile

The majority of respondents (74%) indicated having an automobile available for trips to the university regularly. Table 4.16 shows that ninety percent of the graduate students have a car available to go to school compared to seventy percent of undergraduates. The high percentage of graduate students with a car available to go to school might be overestimated since the graduate student population was over represented in the survey analysis. However, graduate students are older than undergraduates are and it is expected that as students get older they are more likely of having a car available to go to school.

Table 4.16: Auto Availability by Academic Program (%)

Academic Program	Auto Availability
Undergraduates	69.9
Graduates	90.0
Total	**74.5**

UPPR seems to be the most car-dependent campus along Tren Urbano corridor since 94% of its students have a car available to go to school and UPR seems to be the least with 67.5%. Again, the high percentage of UPPR might be a result of the overrepresentation of graduate students in this school. Table 4.17 shows these results by university.

Table 4.17: Auto Availability by University (%)

University	Auto Availability
USC	73.5
UPPR	94.0
UPR	67.5
UMET	77.5
RCM	83.1
Total	**74.3**

Students that work while enrolled in school also show a high percentage of auto availability given their travel patterns from work to school or vice versa. This might be another reason why UPPR shows the highest auto availability percentage, since 77% of their student population are employed. Table 4.18 demonstrates this tendency of auto availability by student employment.

Table 4.18: Auto Availability by Employment (%)

Employment	Auto Availability
Employed	61.6
Not employed	38.4
Total	**74.4**

Almost all students (96%) have at least one auto available at their home. Fifty nine percent of the university population indicated that they have at least two (35%) or three (24%) autos at home. Only 4% of the university population said that they have no car available. These conditions imply that college campuses have a serious auto dependency and that many students drive to school every day. Table 4.19 shows the percentage breakdown of the number of autos by household.

Table 4.19: Number of Autos Available by Household (%)

Autos	USC	UPPR	UPR	UMET	RCM	Total
None	5.5	0.5	4.1	5.1	2.3	**3.7**
One	20.1	15.8	20.0	25.4	17.0	**19.7**
Two	34.1	39.1	33.4	38.1	37.5	**35.1**
Three	22.6	23.4	25.0	19.5	23.9	**23.8**
Four	10.4	13.6	13.1	7.6	13.6	**12.3**
More than four	7.3	7.6	4.4	4.2	5.7	**5.3**

4.2.2 Auto Ownership

Fifty six percent of the students that have a car available to go to school reported owning their automobile. UPPR has the highest percentage of students owning their automobile with 84%,

while the other school percentages range between 48% and 56%. Table 4.20 shows the percentage breakdown of students owning their automobile.

Table 4.20: Auto Own by Students (%)

University	Auto Ownership
USC	48.8
UPPR	83.8
UPR	47.7
UMET	55.0
RCM	56.0
Total	**56.0**

For the other 44% of students that do not own the auto they have available to go to school, the auto is own by their parents, their girl/boyfriend or spouse or others.

Table 4.21: Auto Not Own by Students (%)

Owner	Single	Married	Other	Total
Parents	83.7	39.3	33.3	**80.3**
Family Relative	8.9	3.6	0.0	**8.5**
Girl/Boyfriend or Spouse	2.6	50.0	0.0	**5.8**
Friend	3.4	3.6	66.7	**3.9**
Other	1.3	3.6	0.0	**1.5**

A high percentage of parents own the car that students have available to go to school. This suggests that students might be given a car to go to school and may not pay the variable costs generated by the car usage like gas, toll, fare and parking fees. Fifty one percent of married students that do not own an auto, the car available is own by their spouse. However, 39% still reports that the car is own by their parents, which is a large percentage. Results are shown in Table 4.21.

4.2.3 Weekly Transportation Costs

According to the survey respondents, 49% consider they spend between $11 and $25 in transportation variable costs (29% spend between $16 - $25). UPPR and RCM have more than half of their students spending from $16 to $50 in transportation costs (31% spend between $16 and $25). These results, shown in Table 4.22, might be underestimated since students might not estimate correctly their transportation costs. Also, given the large amount of students that live with their parents or have available a car own by their parents, they might not know how

much they spend in transportation since their parents might pay part or all of their transportation costs.

Table 4.22: Weekly Transportation Costs by University (%)

Expenses	USC	UPPR	UPR	UMET	RCM	Total
Less than $5	12.0	2.2	17.4	12.5	3.4	**12.9**
From $5 to $10	18.4	7.7	15.0	17.0	10.3	**14.2**
From $11 to $15	18.4	12.2	23.4	21.4	17.2	**20.4**
From $16 to $25	25.9	30.9	28.9	25.9	31.0	**28.7**
From $26 to $50	18.4	27.6	11.0	17.0	29.9	**16.4**
More than $50	7.0	19.3	4.3	6.3	8.0	**7.4**

4.2.4 Origin and Destinations

Students were asked to indicate where their trip to the university normally originates along with their normal destination after leaving the university. Nearly 82% originate their trip to school in the metropolitan area, which includes San Juan, Carolina, Trujillo Alto, Guaynabo, Bayamón, Toa Alta or Cataño. Table 4.23 shows these results.

Table 4.23: Trip Origin Area (%)

Area	USC	UPPR	UPR	UMET	RCM	Total
SJ Metro Area *	88.5	64.8	82.7	86.7	87.6	**81.6**
Outside of the SJMA	11.5	35.2	17.3	13.3	12.4	**18.4**

** SJMA includes San Juan, Carolina, Trujillo Alto, Guaynabo, Bayamón, Toa Alta and Cataño.*

UPPR has the lowest percentage of students that originate their trips to school in the metropolitan region. This may be due to the fact that many UPPR students work, and maybe they originate their trip to school from their work place instead of their home. Seventy percent of the total university population originates their trip at home, 19% at their student housing, and 9.5% from work. Table 4.24 shows the percentage breakdown for origins by university.

Table 4.24: Trip Origin before Attending University (%)

Origin	USC	UPPR	UPR	UMET	RCM	Total
Home (off campus)	77.5	49.2	73.4	71.7	69.0	**69.9**
Student Housing	11.3	13.4	23.7	4.2	28.7	**19.0**
Place of Work	10.6	36.9	1.3	20.0	1.1	**9.5**
Child Care Location	0.0	0.0	0.1	0.0	0.0	**0.1**
Shopping/Other	0.6	0.6	1.5	4.2	1.1	**1.5**

Each of the schools, except UPPR, show that about 70% of its students leave to school from home. UPPR and UMET show that 37% and 20% respectively of the survey respondents originate their trip to school after work. RCM shows the highest population of students (28%) originating their trip from their student housing.

Sixty five percent of the survey respondents informed returning to their home after attending the university. Table 4.25 indicates these results.

Table 4.25: Trip Destination after Attending University (%)

Destination	USC	UPPR	UPR	UMET	RCM	Total
Home (off campus)	66.0	79.8	59.0	78.2	64.7	**65.3**
Student Housing	9.4	15.8	22.6	4.2	24.7	**18.2**
Place of Work	17.6	2.7	13.2	8.4	5.9	**11.2**
Child Care Location	0.6	0.0	1.5	3.4	1.2	**1.3**
Shopping/Other	6.3	1.6	3.7	5.9	3.5	**3.9**

Five percent less of students that originated their trips at home, return home after school. A small increase in the percentages of place of work, childcare location, and shopping/other as destinations after attending school shows that few students have a complex trip pattern. Regardless, the majority of the students have a simple trip pattern of leave home, attend school, and return home.

Comparing Tables 4.24 and 4.25, UPPR shows that 49% of students start their trip at home but 80% end up their trip at home. This means that students, before going to school, come from a different place than home. As Table 4.24 indicates, about 30% go to school from work. UPR respondents reveal that 73% start their trip at home but only 59% return home after school. The students that leave school to go to work, as Table 25 shows, represent the difference of about 14% between home as an origin and as a destination in UPR.

4.2.5 Trip Patterns

The survey provided information as to the complexity of student travel patterns. For the purpose of this report, a simple trip pattern is defined as a person leaving from their home or student housing before attending the university and returning home or to the student housing immediately after leaving school. A complex trip pattern is defined as any trip that originates or ends at a location other than a person's home. Table 4.26 shows approximately three quarters

of the student population have simple trip patterns. UPPR being the school with least simple trip patterns, and UPR and RCM with the simplest trip patterns among the university population.

Table 4.26: Student Trip Patterns (%)

Trip Pattern	USC	UPPR	UPR	UMET	RCM	Total
SIMPLE						
Home*-School-Home	64.7	57.9	80.4	60.5	88.1	**73.7**
COMPLEX						
Home-School-Work	16.9	2.7	12.9	8.4	5.9	**11.0**
Work-School-Home	9.4	36.9	1.2	20.0	1.1	**9.3**
Work-School-Work	0.6	0.0	0.1	0.0	0.0	**0.2**
Other**	8.3	2.5	5.4	11.1	4.9	**5.9**

** Home includes home (off campus) and student housing.*

*** Includes trips to locations other than home or work (i.e., shopping, child care and others)*

Analysis of respondents with complex trip patterns showed that 11% of students come to school from their home and then travel to work upon leaving the university. USC and UPR with 17% and 13% respectively are the dominant population with this trip pattern. Nine percent indicated their trip to school originates at a place of employment and then ends at their home after leaving campus. UPPR and UMET with 37% and 20% respectively show the large population of employers they have at their schools. Less than 1% of students said their trip to school starts at a place of employment as well as returning to their place of employment upon leaving the university. Nearly 6% of respondents indicated their trip to the university either originated or ended at a location such as a shopping center or child care location or other. UMET (11%) and USC (8%) have the majority of this complex trip pattern. In general, it depends on the school, but a great number of students travel in a simple pattern to and from school.

4.2.6 Arrival and Departure Times

Students were asked to indicate their arrival and departure times for university trips. Results indicate that the peak arrival time of respondents was between 7:00am and 8:00am and the peak departure time is at 4:00pm. These results were fairly consistent Monday through Thursday. Fridays show different arrival and departure patterns as fewer students are traveling to school. The peak arrival time is at 8:00am while there is not a clear peak departure time on Fridays. Students depart evenly -about 12%- every hour from 10:00am to 1:00pm. The number of students that attended school during the weekend is very small and therefore, not significant for this study. Figures 4.1 to 4.4 represent the arrival and departure times and the accumulation

of students on-campus during a given weekday. Over 60% of the students that attend the universities on a given day are on-campus between 10:00am and 11:00am. Before this time, the number of students on campus is increasing. After this time, students on campus start decreasing.

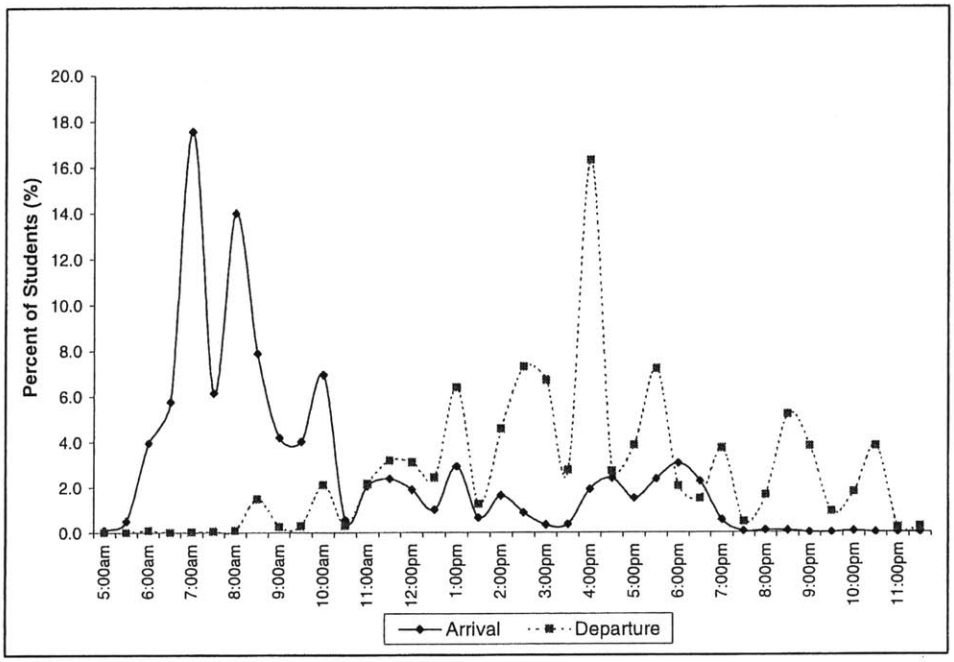


Figure 4.1: Student Arrival and Departure Times – MONDAY through THURSDAY

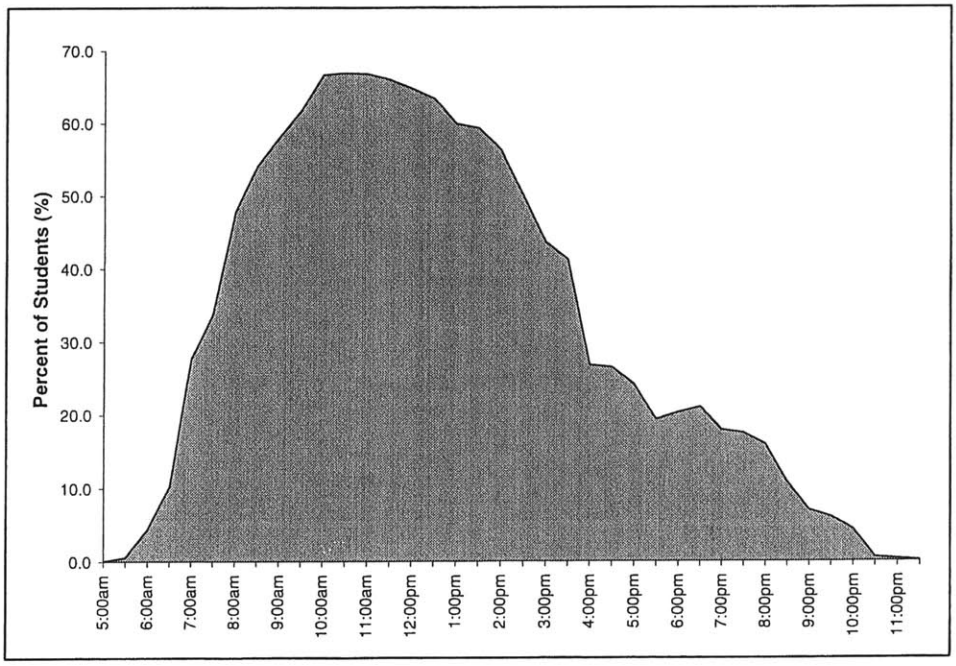


Figure 4.2: Student on Campus – MONDAY through THURSDAY

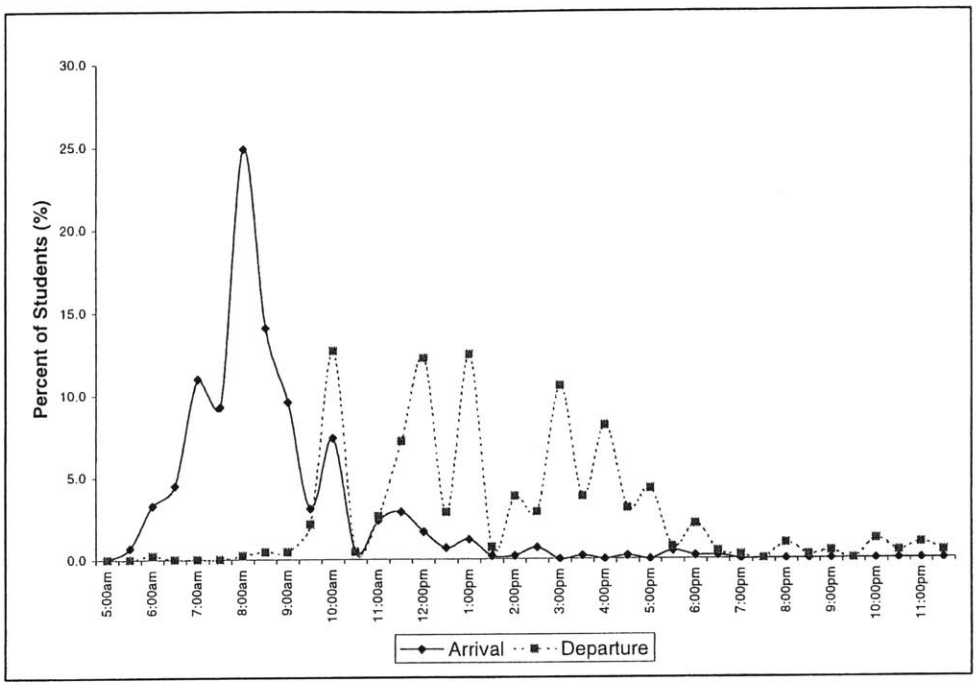


Figure 4.3: Student Arrival and Departure Times – FRIDAY

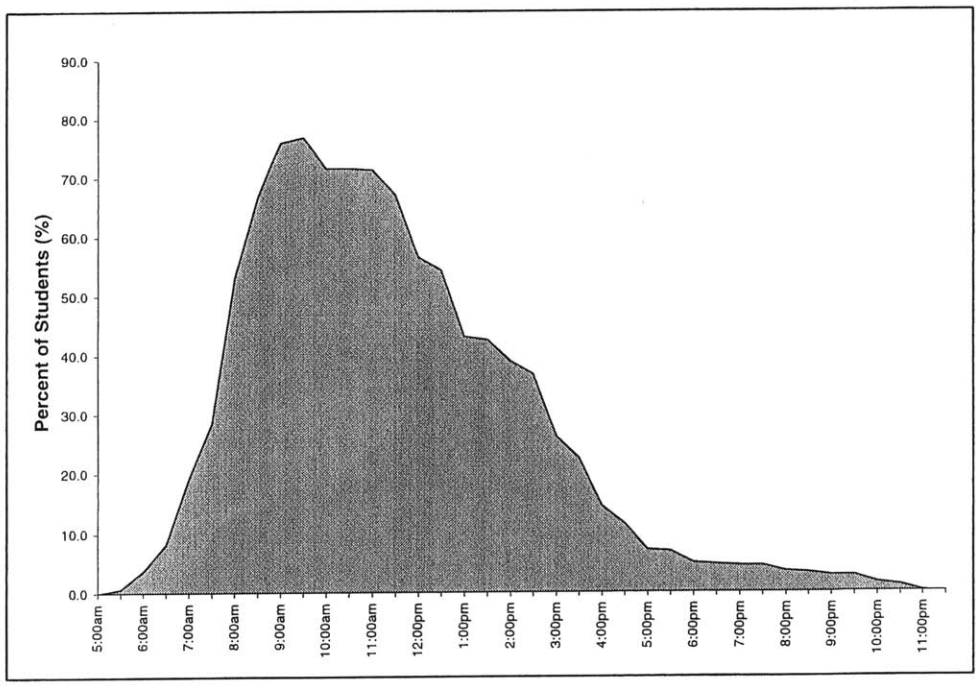


Figure 4.4: Students on Campus – FRIDAY

4.3 Attitudes towards Transportation Services

This section illustrates the students' responses about the parking situation at their school and the use and opinion of the current transit services in the SJMA.

4.3.1 Solutions to Parking Situation

The parking situation in the universities of the SJMA is serious. The demand for parking is high but the universities report they have little space and money to build new parking spaces. Students were asked to rank in order of importance the solutions they thought would improve the parking situation at their schools.

Students from all schools ranked more parking spaces, improve transit services, and provide transit incentives as the top three options to solve the parking situation at their universities. More parking spaces was the most important solution with an average rating of 1.68 on a scale of 1 (Most Important) to 7 (Least Important). The second most important solution was to improve the transit services that serve the university with a rating of 2.98. Provide transit incentives was the third highest rated solution with a rating of 3.38.

The fact that a high percent of students (71%) in all schools answered that more parking spaces is the most important solution to the parking situation, shows that students think that providing more parking is the most obvious solution. However, the fact that improved transit services and transit incentives are the second and third most important solutions show that students may believe transit could help alleviate the situation of parking at each school. This is very significant to Tren Urbano, since students have no doubt transit could solve the parking problem, and therefore Tren Urbano should take advantage of this positive attitude towards transit.

Severe parking rules (3.96), priority to carpooling (4.41), and other solutions (4.98) were rated less important and ranked after the top three. Students that answered other included solutions like a multilevel parking structure, eliminate parking for staff and professors, and better organization of class schedule among others. A variety of answers were reported as other and this is why the variation of this response is the highest (standard deviation or SD = 2.31) when compared to the other variations of less than 1.5. Respondents indicated that charging a parking fee was the least important solution with a rating of 5.67, demonstrating that students

are very sensitive to price schemes. Table 4.27 shows the importance level respondents placed upon each possible solution.

Table 4.27: Preferred Solutions to Parking Situation in Rank Order
Scale: 1 = Most Important, 7 = Least Important

Preferred Solutions to Parking Situation	Ranking Order
More parking spaces	1.68
Improve transit services	2.98
Provide transit incentives	3.38
Severe parking rules	3.96
Priority to carpooling	4.41
Other	4.98
Charge a parking fee	5.67

Other *include solutions like multilevel parking, eliminate parking for staff and professors, and others.*

Table 4.28 shows the student's response when asked how the parking situation would be affected if a transit incentive was provided. Fifty four percent answered the parking situation will improve. Twenty four percent think it will stay the same and 21% indicated that they do not know how it will affect. Only 1% of respondents believes the situation will get worst. Analyzing each university, UMET and RCM are the most optimistic with 61% of survey respondents believing that transit incentives will improve the parking situation at their schools. The focus group discussions conducted in UPR also indicated that students think TU might help the existing parking problem at the university (Malavé and Giménez, 2000).

Table 4.28: Effect of Transit Incentives in Parking Situation (%)

Effect	USC	UPPR	UPR	UMET	RCM	Total
Improve	54.0	56.3	51.2	61.0	61.4	**54.0**
Same	20.5	24.0	26.2	16.1	18.2	**23.6**
Worst	1.9	1.6	1.0	1.7	2.3	**1.4**
Do not know	23.6	18.0	21.6	21.2	18.2	**21.1**

4.3.2 Use of Current Transit Services

Metrobus, AMA and Publicos are the current transit services available in the SJMA. Metrobus serve only three schools: USC, UPPR and UPR since it is a service only through Ponce de Leon Ave. where these three schools are located. AMA is the major transit provider in the SJMA and serves all schools with more than one route. Publico vans also serve all universities with different routes.

Table 4.29 shows the frequency of usage of the transit services in the SJMA by university. Less than 13% of students use the public transportation services more than once a week or are considered frequent transit riders. In general, AMA is the most used while Metrobus is the least. This was expected since AMA has more coverage than Metrobus and serves more schools. More than 57% of the students surveyed have never used any of the systems and between 15% to 20% had used them sometimes a year. These percentages show that more than 75% of the student population can be considered not users of public transportation. About 10% indicated that they use the system but not on a regular basis (i.e., once a week to sometimes a month or once a month). Figure 4.5 summarizes these results for the general university population.

Table 4.29: Use of Transit Services (%)

Frequency of Use	Transit Service	USC	UPPR	UPR	UMET	RCM	Total
REGULARLY							
Every day	*Metrobus*	4.6	2.2	3.2	3.0	2.4	**3.2**
	AMA	6.6	2.8	7.6	4.8	4.8	**6.3**
	Publico	6.1	2.3	4.0	8.3	2.4	**4.3**
More than once a week	*Metrobus*	7.3	2.2	5.1	5.0	1.2	**4.7**
	AMA	9.9	1.7	7.3	12.5	1.2	**6.8**
	Publico	2.7	1.7	4.8	8.3	0.0	**4.1**
OCCASIONALLY							
Once a week to sometimes a month	*Metrobus*	4.6	4.5	6.6	2.0	2.4	**5.3**
	AMA	7.2	4.0	7.9	4.8	4.8	**6.7**
	Publico	2.0	1.1	5.8	6.4	6.0	**4.7**
Once a month	*Metrobus*	2.6	1.7	3.6	5.0	1.2	**3.1**
	AMA	1.3	1.7	3.9	2.9	1.2	**3.0**
	Publico	2.0	1.7	3.1	5.5	1.2	**2.8**
RARELY							
Sometimes a year	*Metrobus*	13.9	15.7	14.4	14.9	14.5	**14.6**
	AMA	15.1	20.3	20.9	23.1	22.6	**20.4**
	Publico	19.0	18.6	19.3	21.1	16.7	**19.1**
Never	*Metrobus*	66.9	73.6	67.1	70.3	78.3	**69.1**
	AMA	59.9	69.5	52.4	51.9	65.5	**56.8**
	Publico	68.0	74.6	63.0	50.5	73.8	**65.0**

UMET seems to be the one that more rides Publicos, while UPR and USC make more use of AMA. UPPR and RCM show the highest percentages of never using the services with more than 70% and 65% respectively and the lowest percentages of using public transportation on a frequent basis with 13% and 12% each. USC, UPR, and UMET indicate that about 16% of their student population make use of transit (especially AMA) on a regular basis.

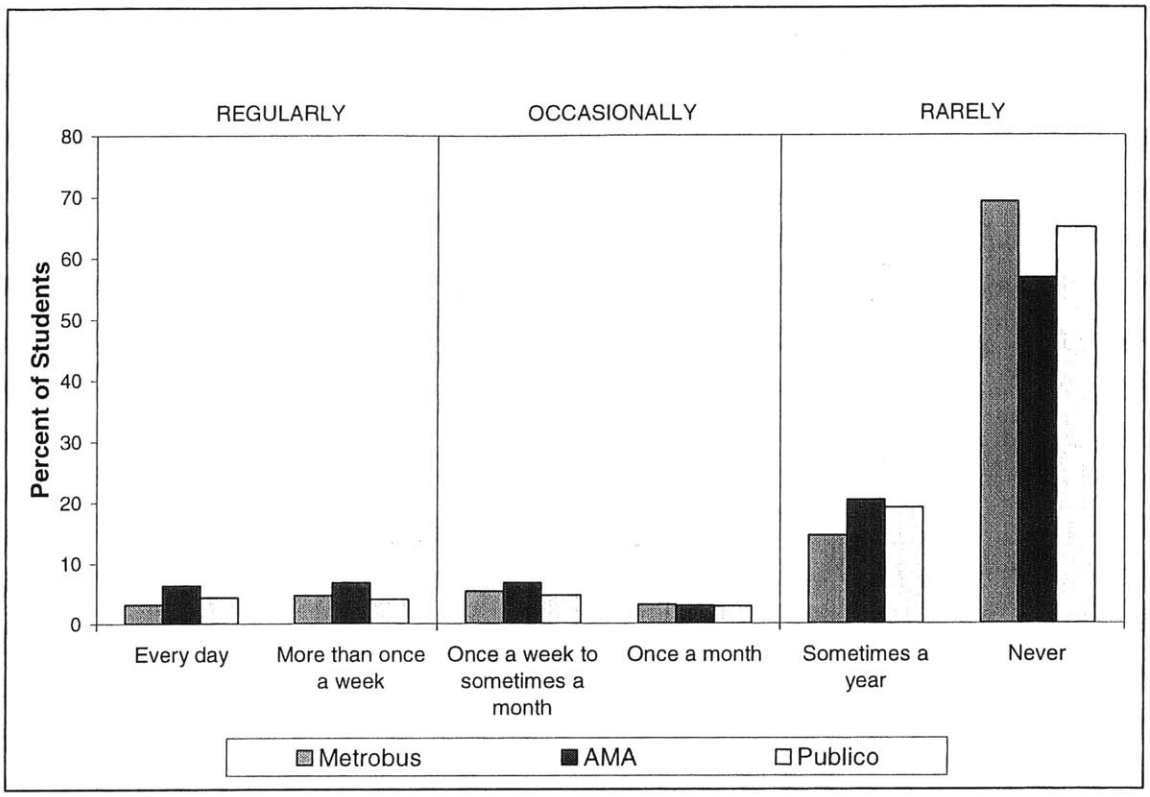


Figure 4.5: Students Use of Current Transit Services occasionally

4.3.3 Opinion about Current Transit Services

Students were asked to rate their opinion about Metrobus, AMA and Publicos on a scale of 1 (Very Efficient) to 4 (Inefficient). The results indicate respondents had a fair attitude toward the transit systems. Metrobus received the highest rating of 2.18. AMA followed with a score of 2.34, while Publicos service received the lowest rating (2.66). None of the services were rated in average little efficient or inefficient, which shows that students have a fairly positive perception of the efficiency of these public transportation services. Figure 4.6 shows these ratings.

A considerable percentage of students reported that they do not know how to rate these services. Table 4.30 shows these percentages and a summary of the student's opinion by university. Over 30% of students reported that did not know how to rate the transit services. In almost all cases, this percentage was higher than the percentage of responses on efficiency,

indicating that students have never used the system and therefore, can not rate their service, or that students are very undecided.

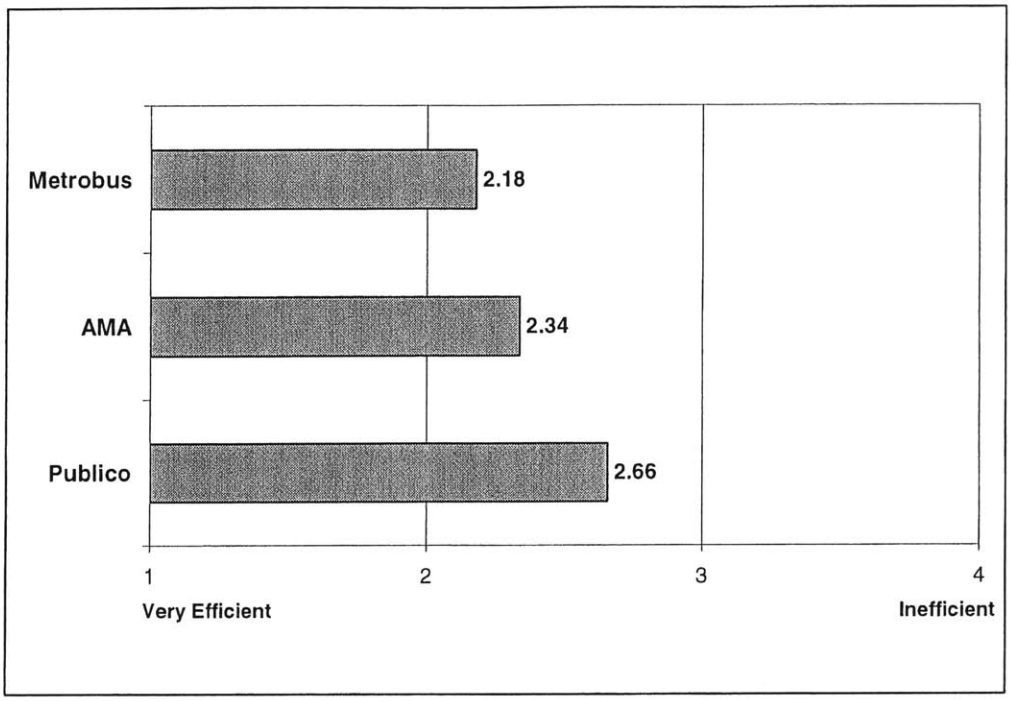


Figure 4.6: Opinion about Current Transit Services

Table 4.30: Attitude towards Current Transit Services (%)

Transit Service	Efficiency	USC	UPPR	UPR	UMET	RCM	Total
Metrobus	Efficient	42.3	42.5	41.0	44.6	27.9	**40.8**
	Inefficient	19.2	15.5	14.5	19.6	19.8	**16.1**
	Don't know	38.5	42.0	44.6	35.7	52.3	**43.1**
AMA	Efficient	43.7	35.9	44.1	50.9	35.6	**42.9**
	Inefficient	25.9	24.3	25.6	28.1	24.1	**25.6**
	Don't know	30.4	39.8	30.3	21.1	40.2	**31.6**
Publico	Efficient	23.9	20.6	26.8	37.1	16.1	**25.7**
	Inefficient	35.5	35.6	35.3	42.2	36.8	**36.1**
	Don't know	40.6	43.9	37.9	20.7	47.1	**38.1**

Note: Efficient *includes Very Efficient and Efficient, and* Inefficient *includes Little Efficient and Inefficient.*

UMET reports the highest positive attitude towards the transit services with 45% of respondents characterizing Metrobus service as efficient, 51% indicating AMA service is also efficient, and 37% denoting Publico service as efficient. However, RCM exhibits the most negative attitude towards Metrobus, AMA and Publicos as efficient with percentages of 28%, 36%, and 16% respectively. RCM also shows the highest percentage of undecided with over

40% for the three transit services. USC, UPPR, and UPR show similar attitudes as presented in Table 4.30.

4.4 Mode Choice

Students were asked to indicate their regular method of travel to the university, to work, to shopping, and to other locations by choosing the mode of transportation mostly used. The choices for modes of transportation were: (1) Automobile, (2) Ride with someone, (3) AMA, (4) Metrobus, (5) Publicos, (6) Bike or Motorcycle, (7) Taxi, (8) Walk, (9) Other, and (0) if the question did not apply.

4.4.1 Mode Choice to University

Students were asked to indicate the primary mode of transportation used to go to their university. The majority of students indicated they are driving to the university. Table 4.31 shows that 68% of survey respondents are driving an automobile to campus. About 10% of students ride with someone, while 14% of students walk to school. Approximately 8% of respondents indicate using transit, where AMA is the most used (4.5%). Surprisingly, there are no students riding a bike to school.

Table 4.31: Mode Choice to University (%)

Mode Choice	USC	UPPR	UPR	UMET	RCM	Total
Drive alone	72.5	89.0	58.3	77.2	73.9	**67.7**
Ride w/ someone	11.3	3.3	11.6	13.2	5.7	**10.0**
TRANSIT	***7.5***	***2.2***	***10.3***	***7.0***	***3.4***	***7.9***
AMA	3.8	0.5	6.3	3.5	2.3	**4.5**
Metrobus	3.8	1.1	1.2	0.0	0.0	**1.3**
Publico	0.0	0.5	2.8	3.5	1.1	**2.1**
Walk	8.1	4.9	19.5	1.8	15.9	**13.9**
Other*	0.6	0.5	0.3	0.0	0.0	**0.5**

** Includes other modes of transportation like roller blades, scooters, or others.*

Survey responses indicate the high percentage of auto dependency in the university population. UPPR shows the highest drive mode share among all schools with 89% of its students driving to school. USC, UMET and RCM indicate over 70% drive a car to go to campus. UPR has the lowest automobile use percentage with 58%, but it still represents that the majority of the student population drives a car to campus.

USC, UPR and UMET indicate over 11% ride with someone while RCM and UPPR indicate that less than 6% take a ride to school. These percentages represent more vehicle trips to school in addition to the share that drive to school alone. Walking to classes is another important mode choice among students in UPR and RCM with 19.5% and 16% respectively compared to less than 8% in the other schools.

The use of transit among survey respondents is low. Only 8% of the whole university population use transit to go to school. UPR students use transit more than other schools with 10% of students getting to school by bus or publicos. USC and UMET show about 7% of students riding transit and UPPR and RCM reveal less than 3%.

4.4.2 Alternate Mode Choice for University Trips

Students were asked how would they travel to the university if their normal mode of transportation were unavailable. Table 4.32 shows the percentage breakdown of the alternate mode choice among students.

Table 4.32: Alternate Mode Choice to University (%)

Alternate Mode Choice	USC	UPPR	UPR	UMET	RCM	Total
Drive alone	5.1	6.2	6.0	9.1	8.0	**6.4**
Ride w/ someone	50.6	48.9	43.2	50.0	54.5	**46.9**
TRANSIT	***17.7***	***11.2***	***19.3***	***22.7***	***11.4***	***17.5***
AMA	9.5	3.4	7.0	8.2	4.5	**6.5**
Metrobus	2.5	3.9	1.8	0.9	2.3	**2.2**
Publico	5.7	3.9	10.4	13.6	4.5	**8.8**
Bike	1.3	2.8	0.5	1.8	0.0	**1.0**
Taxi	3.8	0.6	0.9	0.0	0.0	**1.0**
Walk	5.7	5.6	7.4	1.8	11.4	**6.4**
Other	5.1	8.4	4.1	4.5	2.3	**4.9**
N/A	10.8	16.3	18.7	10.0	12.5	**15.9**

The predominant choice when the regular mode of transportation to go to school is unavailable is to ride with someone. Transit is the second alternative with 17.5%. Publicos has the largest share of this percentage with 9% of survey respondents reporting publicos are their alternative, while AMA and Metrobus have a 6% and a 2% share, respectively. Sixteen percent of respondents think this question do not apply maybe because they think their mode of transportation would never be unavailable. Six percent would walk to school and only 1% of survey respondents would bike to school or would get to school in taxi.

Table 4.33 shows a more detailed analysis of the alternate mode choice. Ride with someone is the predominant alternate mode choice because from all current modes of transportation, the majority of the survey respondents indicated they would ride with someone if their preferred mode choice is not available. Sixty one percent who normally drive would ride with someone, while over 38% of transit users would also ride with someone.

Table 4.33: Alternate Mode Choice if Current Mode is Unavailable (%)

FROM: *Current Mode*	TO: *Alternate Mode*							
	Drive alone	**Ride w/someone**	**AMA**	**Metrobus**	**Publico**	**Bike**	**Taxi**	**Walk**
Drive alone		61.4	5.3	2.5	8.6	1.1	0.8	2.7
Ride w/someone	13.9		20.0	2.6	18.3	0.9	2.6	3.5
AMA	7.5	37.7		5.7	13.2	0.0	1.9	5.7
Metrobus	21.4	35.7	7.1		14.3	0.0	7.1	0.0
Publico	4.2	54.2	4.2	0.0		0.0	0.0	0.0
Walk	5.6	2.5	2.5	0.0	1.2	1.2	0.0	

For those that ride with someone to go to the university, transit is their first alternative. Forty one percent of survey respondents indicated transit as their alternate mode choice. This is the largest percentage of students who would shift to transit. Twenty percent would use AMA, 18% would use publicos, and only 3% would use Metrobus. Only 16% of the regular drivers to school see transit as their alternate mode choice with 9% using publicos if they are unable to drive to school.

Over 36% of transit users would ride with someone if they could not ride a bus or a publico. However, 21% of Metrobus riders would drive to school if they were unable to use the bus. This 21% indicates that even students with access to an automobile are choosing to ride Metrobus over driving to the university, indicating that 21% of Metrobus student users are choice riders. Unfortunately, students are not choosing AMA or publicos over driving as with Metrobus, since 7.5% of AMA riders and 4% of publico users would drive alone when the transit service is unavailable.

4.4.3 Mode Choice from University

Survey respondents' mode choice from the university is not different from the mode choice to the university. An increase of 3% in transit usage from school is observed in Table 4.34 meaning that a small shift to transit was achieved from the other modes used to go to the university.

Table 4.34: Mode Choice from University (%)

Mode Choice	USC	UPPR	UPR	UMET	RCM	Total
Drive alone	70.8	89.6	57.1	71.9	69.7	**66.1**
Ride w/ someone	6.2	3.8	10.9	12.3	5.6	**8.9**
TRANSIT	***11.8***	***2.2***	***12.5***	***14.0***	***7.9***	***10.7***
AMA	6.8	0.5	6.8	7.0	4.5	**5.7**
Metrobus	3.7	1.1	1.6	0.9	2.2	**1.8**
Publico	1.2	0.5	4.0	6.1	1.1	**3.1**
Walk	10.6	4.4	19.2	1.8	15.7	**14.0**
Other	0.0	0.0	0.1	0.0	1.1	**0.2**
N/A	0.6	0.0	0.1	0.0	0.0	**0.2**

4.4.4 Mode Choice to do Errands while at School

Students were asked that if they had to do some errands during their time in school what mode of transportation they would use. Errands are considered household activities like going to the bank, to the post office, or to any school-related activity during a class break. Again, driving is the predominant choice among survey respondents. However, a significant percentage of students (28%) answered that they would walk to do these errands, especially those students from UPR and RCM. Transit also shows an increase in usage to do errands when compared to the mode choice to go to the university, especially in USC, UPRR, UMET and RCM, as Table 4.35 indicates.

Table 4.35: Mode Choice to do Errands (%)

Errands Mode Choice	USC	UPPR	UPR	UMET	RCM	Total
Drive alone	74.0	78.0	42.6	68.7	54.1	**55.2**
Ride w/ someone	5.3	2.7	4.3	6.1	1.2	**4.2**
TRANSIT	***12.0***	***4.4***	***10.3***	***8.7***	***5.9***	***9.2***
AMA	9.3	2.7	7.5	4.3	5.9	**6.6**
Metrobus	1.3	1.1	1.3	0.0	0.0	**1.1**
Publico	1.3	0.5	1.5	4.3	0.0	**1.5**
Bike	0.0	0.0	0.1	0.0	0.0	**0.1**
Walk	4.7	8.8	39.4	12.2	38.8	**27.8**
Other	1.3	0.0	1.0	1.7	0.0	**0.9**
N/A	2.7	6.0	2.1	2.6	0.0	**2.7**

4.4.5 Mode Choice for Work Trips

Survey results indicate that 54% of all respondents were employed while attending the university. About 80% of these employed students indicate they normally drive to their work

place. Approximately 6% indicated transit was their primary mode choice for work trips and about 6% reported they ride with someone to work. Table 4.36 shows the percentage breakdown of the journey to work mode choice.

Table 4.36: Mode Choice for Work Trips (%)

Work Mode Choice	USC	UPPR	UPR	UMET	RCM	Total
Drive alone	78.7	93.6	73.1	75.6	74.1	78.6
Ride w/ someone	6.4	2.8	6.9	11.5	7.4	6.5
TRANSIT	***8.5***	***1.4***	***9.1***	***3.8***	***0.0***	***6.4***
AMA	5.3	1.4	5.9	0.0	0.0	3.9
Metrobus	3.2	0.0	1.6	0.0	0.0	1.2
Publico	0.0	0.0	1.6	3.8	0.0	1.2
Walk	3.2	1.4	7.2	3.8	3.7	4.8
Other	0.0	0.7	0.0	0.0	0.0	0.2
N/A	3.2	0.0	3.8	5.1	14.8	3.5

4.4.6 Mode Choice for Shopping Trips

Students were asked to indicate on the survey their primary mode of transportation used for shopping trips or any other social or cultural travel. Table 4.37 represents the mode choice for all survey respondents.

Table 4.37: Mode Choice for Shopping Trips (%)

Shopping/Other Mode Choice	USC	UPPR	UPR	UMET	RCM	Total
Drive alone	81.7	95.6	74.4	78.4	87.4	**79.9**
Ride w/ someone	13.1	3.3	14.3	17.2	6.9	**12.2**
TRANSIT	***3.3***	***0.5***	***9.2***	***2.6***	***3.4***	***6.1***
AMA	2.6	0.5	6.5	0.0	2.3	**4.2**
Metrobus	0.7	0.0	0.9	0.0	1.1	**0.7**
Publico	0.0	0.0	1.8	2.6	0.0	**1.2**
Bike	1.3	0.0	0.0	0.0	0.0	**0.2**
Taxi	0.7	0.0	0.3	0.0	0.0	**0.2**
Walk	0.0	0.0	1.1	0.0	1.1	**0.7**
Other	0.0	0.0	0.2	0.9	1.1	**0.2**
N/A	0.0	0.5	0.6	0.9	0.0	**0.5**

Driving is the principal mode choice for shopping trips and other social and cultural trips with over 80% of respondents in each school. It is followed by a 12% of survey respondents indicating they take a ride with someone. Around 6% use transit for shopping trips. The 2% left either bike, take a taxi or walk to do their shopping.

4.5 Attitudes towards Tren Urbano

This section shows the students' perception and preferences towards Tren Urbano. It includes how much they know about it, their proximity to a station, their preferences in service characteristics, purpose of their trip, their expected use, their perception of the effect in the parking situation, their reasons to ride it, their willingness to pay, and their attitude toward a student fare discount.

4.5.1 Knowledge about Tren Urbano

Students were asked how much they think they know about the Tren Urbano project. The majority of survey respondents (72%) indicate they know little or very little about the system. Fifty one percent report they know little and 21% indicate they know very little about it. Three percent of the survey respondents answered they know nothing about the project. This is an indication of the serious need of information to the public about Tren Urbano. One quarter of the student population surveyed indicate they know much or very much about the project. About 22% answered they know much while a 3% indicated they know very much about Tren Urbano. Table 4.38 shows the percentage breakdown of these results.

Table 4.38: Knowledge about Tren Urbano (%)

Knowledge about TU	USC	UPPR	UPR	UMET	RCM	Total
Very much	3.0	5.5	2.2	2.5	5.6	3.1
Much	20.6	33.3	20.2	19.3	19.1	22.0
MUCH	***23.6***	***38.8***	***22.4***	***21.8***	***24.7***	***25.1***
Little	53.3	46.4	54.2	42.0	40.4	50.8
Very little	19.4	13.7	21.1	29.4	31.5	21.3
LITTLE	***72.7***	***60.1***	***75.3***	***71.4***	***71.9***	***72.1***
NOTHING	***3.6***	***1.1***	***2.3***	***6.7***	***3.4***	***2.8***

UPPR seems to be the school were students know more about the project with 39% knowing much about it. UPPR is a school very oriented to engineering and being Tren Urbano the largest infrastructure project in the island, many students know about the project due to its magnitude and because it is an engineering project as well. Many UPPR students work as interns in the project, giving them better understanding of the project than in other schools that are not as oriented to engineering as is UPPR.

Students were also asked if they knew that a Tren Urbano station was located close to their university. Sixty three percent of the complete university population surveyed knew about

it, however not at all schools the majority of the respondents knew they had a station close to campus. Table 4.39 shows the percentage breakdown by university.

Table 4.39: Tren Urbano Station Close to Campus (%)

Knowledge	USC	UPPR	UPR	UMET	RCM	Total
YES	48.5	64.5	71.3	40.8	58.0	**63.4**
NO	51.5	35.5	28.7	59.2	42.0	**36.6**

UMET and USC indicate that over half of the survey respondents did not know a Tren Urbano station is walking distance from their school. Seventy one percent of UPR respondents indicated they know about a Tren Urbano station close to campus. So many students seem to know about the project given the construction of the station in front of the main entrance of the campus not because of a public information campaign. Even though a 63% know there is a station close to their school, a 37% does not know and this is a substantial amount that needs information about the project.

4.5.2 Proximity of Tren Urbano Stations

Students were asked how close they lived from a Tren Urbano station and their perception is detailed in Table 4.40. The majority of survey respondents indicate they could only get to a Tren Urbano station by car. This twenty six percent of students perceive they would have to drive to access a Tren Urbano station. Another 21% have no Tren Urbano station close to their place of living. However, a 31% of respondents indicate they have a Tren Urbano station fifteen minutes walking distance or less. About 10% have a station five minutes walking close to their home, while 15% can access Tren Urbano walking from six to ten minutes. Then, approximately 7% have to walk between eleven to fifteen minutes or more than fifteen minutes. A remarkable proportion of survey respondents does not know where the stations are located or do not know the alignment at all. This percentage is of 14%, which is a considerable proportion.

Table 4.40: Proximity to a Tren Urbano Station (%)

Proximity	USC	UPPR	UPR	UMET	RCM	Total
Less than 5 min. walk	9.2	12.6	9.5	4.2	14.0	**9.7**
6-10 min. walk	15.3	16.9	14.3	11.9	14.0	**14.6**
11-15 min. walk	10.4	6.6	5.9	5.1	8.1	**6.7**
More than 15 min. walk	3.1	6.0	7.9	6.8	9.3	**7.0**
Only by car	24.5	20.8	27.5	32.2	26.7	**26.5**
None close	19.6	30.6	19.6	22.9	15.1	**21.3**
Do not know where stations are	17.8	6.6	15.3	16.9	12.8	**14.3**

Over 30% of the student population surveyed perceive they can walk (less than fifteen minutes walking) from their place of living and access a Tren Urbano station, except UMET's survey respondents where only 21% of students' home are close to Tren Urbano. This is why UMET shows the highest percentage of respondents (32% compared to 21% - 28% in the other schools) that can only access Tren Urbano by car, since Tren Urbano is not that accessible to the UMET students by walking as the other schools' results indicated.

These results also indicate that almost one third (31%) of UPPR students have no Tren Urbano station close to their domicile. This is a large percentage if compared to the other schools' responses, which were less than 23%. Between 13% and 18% of survey respondents do not know where Tren Urbano stations are located. UPPR is the exception, since only 7% do not know about the Tren Urbano stations' location. However, these percentages are important since they represent another manner of measuring the knowledge students have about Tren Urbano. This seems to indicate that about one of every 10 students does not know the location of Tren Urbano. Again, UPPR shows that it is the most knowledgeable about Tren Urbano given it is an engineering project and UPPR is an engineering school, as mentioned before.

4.5.3 Student Perception of Tren Urbano Service Characteristics

Students were asked to rate various characteristics of Tren Urbano service on a scale of 1 (Very Important) to 4 (Not Important). Table 4.41 shows these service attributes ratings. The results indicate that respondents give plenty of importance to all the Tren Urbano service characteristics presented in the survey. Survey respondents indicate that personal safety is the most important service attribute of Tren Urbano with a rating of 1.36. This indicates that students are very concerned about their personal safety in this new transit system and they place a high value in how safe they feel in the system.

Schedule adherence or how true the service is to its schedule was rated second most important with a rating of 1.39. Students surveyed want Tren Urbano to provide a reliable service. How easy is for the survey respondents to access the places they visit regularly is the third attribute the student population surveyed perceives as very important with a rating of 1.44, followed by cleanness of the trains with a rating of 1.45. UPR focus group discussions also indicated that the most important factors to consider using TU were security, efficiency, service reliability and accessibility of stations (Malavé and Giménez, 2000). Therefore, it is not

surprisingly that the student population surveyed also found very important security, on-time service and accessibility.

Service in the evenings and later at night, savings in time and savings in costs were rated slightly below the top attributes mentioned before with a rating around 1.6. Having a comfortable place to wait for the train or a seat available while the trip lasts received the lowest scores with 1.72 and 1.8 respectively. However, it is worth to mention that all attributes included in the survey were ranked in the important range, which indicates that all these TU service characteristics are considered important to the student population surveyed.

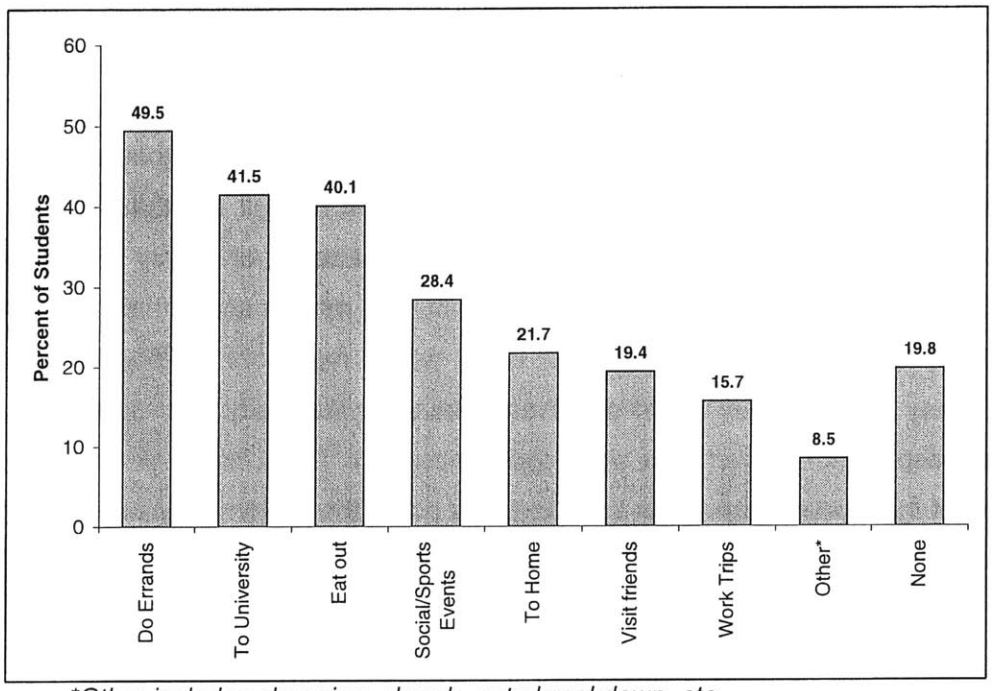
Table 4.41: Importance of Tren Urbano Service Characteristics Rank Ordered
Scale: Very Important = 1 to Not Important = 4

TU Service Characteristics	Level of Importance
Personal Security	1.36
Schedule Adherence	1.39
Access to frequent places	1.44
Cleanness	1.45
Night Service	1.61
Time Savings	1.62
Cost Savings	1.66
Comfortable Place to Wait	1.72
Availability of Seat	1.80

4.5.4 Student Use of Tren Urbano by Trip Purposes

Given that a Tren Urbano station is going to be located close to the universities, students were asked to indicate their primary purpose or purposes of using Tren Urbano. About one fifth of the students surveyed indicate none. These students are those that most likely would not ride Tren Urbano or will hardly ever ride it. However, the main purpose of using Tren Urbano with 50% of the responses is to do errands while at school. These errands are any personal or school related activity that can be done during a break between classes. To go to the university is the second trip Tren Urbano would be used for and to eat in a place other than home is the third with 42% and 40% of responses respectively. Over 22% think they would use Tren Urbano to go to social activities or sport events or to go home. Less than 19% will use it to visit friends or for their journey to work. Nine percent responded other purposes. These other purposes to use Tren Urbano include go shopping, go to church, when car is broken down, and many others. Figure 4.7 shows Tren Urbano trip purposes responses.

Table 4.42 shows that UPPR and UPR survey respondents would mainly use Tren Urbano to do errands, while in USC, UMET and RCM Tren Urbano would be used to go to the university primarily. USC shows the highest percentage of respondents, with 31%, that perceive they would not use Tren Urbano. RCM exhibits the highest percentages in all trip purposes included in the survey demonstrating that it is the student population that perceives to make more use of Tren Urbano.



Other includes shopping, church, auto breakdown, etc.

Figure 4.7: Tren Urbano Trip Purposes

Table 4.42: Tren Urbano Trip Purposes (%)

Trip Purpose	USC	UPPR	UPR	UMET	RCM	Total**
Do Errands	36.4	43.5	56.8	37.5	46.1	**49.5**
To University	38.2	38.8	41.4	43.3	51.7	**41.5**
Eat out	29.1	41.3	44.2	23.3	49.4	**40.1**
Social/Sports Events	18.2	28.3	31.9	20.0	32.6	**28.4**
To Home	21.2	19.7	21.4	22.5	28.1	**21.7**
Visit friends	17.6	17.9	20.9	15.0	20.2	**19.4**
Work Trips	13.9	10.9	17.0	12.5	22.5	**15.7**
Other*	10.3	7.6	9.2	6.7	3.4	**8.5**
None	30.9	22.3	16.0	26.7	13.5	**19.8**

Other includes shopping, church, auto breakdown, etc.

*** Total exceeds 100% due to multiple responses.*

4.5.5 Anticipated Usage of Tren Urbano

Students were asked to indicate how many times they perceive they would use Tren Urbano. Their perception of how frequently they will use the train is presented in Figure 4.8. One out of every ten students surveyed indicates it would use Tren Urbano every day. In addition, 27% indicate they would use it more than one day of the week. This 37% represents the anticipated share of regular riders that can be expected from the university population, based in the survey conducted. The fact that more than one third of the population surveyed can be considered regular riders is positive for Tren Urbano and its ridership goals. However, approximately the same proportion of respondents indicates they would rarely use Tren Urbano. Twenty seven percent indicate they would ride it sometimes a year, while an 11% says they would never use it. These share of responses represent those that may be difficult to attract to Tren Urbano because either they "love to drive", have complicated trip patterns, or simply think Tren Urbano will not work as a mode of transportation for them. But the market share that Tren Urbano has more possibility to attract is the occasional rider, which represent a 26% of the surveyed population. They perceive they would use Tren Urbano occasionally and represent one fourth of the survey respondents, which is a significant amount. If Tren Urbano is able to attract this market share of the student population and they start riding the system regularly, over half of the population would become potential riders of Tren Urbano.

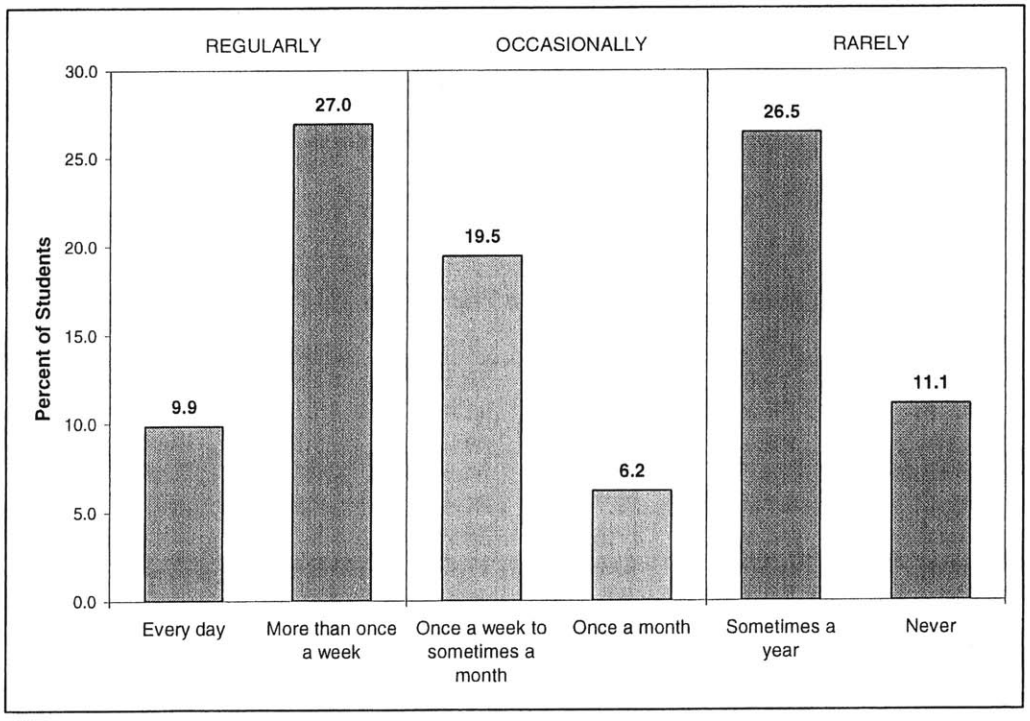


Figure 4.8: Anticipated Use of Tren Urbano

Table 4.43 confirms the assumptions made before, RCM population seems to be the school that most likely would use Tren Urbano in a regular basis, while USC shows they rarely would use the train. Forty seven percent of RCM survey respondents indicate they would ride Tren Urbano regularly, and 52% of USC surveyed students reported they rarely would make use of Tren Urbano. UPPR and UPR show about the same percentage of regular riders (38%), however UPR indicates more occasional riders (28%) than UPPR (22%), which shows the majority of its respondents would rarely ride the train (41%). UMET also indicates that a greater number of survey respondents would ride Tren Urbano rare times (48%).

Table 4.43: Anticipated Usage of Tren Urbano by University (%)

Frequency	USC	UPPR	UPR	UMET	RCM	Total
Every day	4.3	7.7	10.2	10.0	21.3	**9.9**
More than once a week	23.0	29.1	29.0	18.3	25.8	**27.0**
REGULARLY	*27.3*	*36.8*	*39.2*	*28.3*	*47.2*	***36.8***
Once a week to sometimes a month	16.8	17.6	20.7	17.5	21.3	**19.5**
Once a month	4.3	4.4	7.1	6.7	5.6	**6.2**
OCCASIONALLY	*21.1*	*22.0*	*27.8*	*24.2*	*27.0*	***25.7***
Sometimes a year	33.5	29.7	24.6	32.5	13.5	**26.5**
Never	18.0	11.5	8.4	15.0	12.4	**11.1**
RARELY	*51.6*	*41.2*	*33.0*	*47.5*	*25.8*	***37.5***

4.5.6 Tren Urbano Effect in Parking Situation

Students were asked what they perceive would be the effect in their school's parking situation given a Tren Urbano station is close to their campus. Almost half of the survey respondents (49%) indicate that the situation of parking at their schools would improve. Twenty eight percent believe the situation would not change, and about 1% believes it would deteriorate. However, 21% are undecided and therefore the results are not conclusive since this fifth of the population surveyed represents a significant amount that could change the results when decided. Table 4.44 shows the percentage breakdown of the results.

Table 4.44: Tren Urbano Effect in Parking Situation (%)

Effect	USC	UPPR	UPR	UMET	RCM	Total
Improve	43.6	54.4	48.1	50.0	58.4	**49.4**
Same	30.1	28.6	29.8	16.7	29.2	**28.3**
Worst	0.6	0.0	1.5	3.3	2.2	**1.4**
Do not know	25.8	17.0	20.7	30.0	10.1	**21.0**

4.5.7 Reasons for Using Tren Urbano

Students were asked why they would consider Tren Urbano as their mode of transportation. Their reasons were ranked in a scale of 1 (Most Important) to 10 (Least Important). Parking and driving were an important consideration for using Tren Urbano. The main reason for students responding the survey to use Tren Urbano is to avoid heavy traffic. With a ranking of 2.40, respondents indicate this was the most important reason that would make them consider Tren Urbano as their mode choice. Secondly, with a score of 3.62, they would ride Tren Urbano to avoid finding a parking space. Costs are also another substantial consideration since savings in travel time was the third reason indicated by students with a ranking of 4.03, followed by reduction in transportation expenses with a rating of 4.40. All these motivations to use Tren Urbano are related to personal convenience. Table 4.45 shows these ratings.

Table 4.45: Reasons to Ride Tren Urbano in Rank Order
Scale: Most Important = 1 to Least Important = 10

Reasons to Ride Tren Urbano	Ranking Order
Avoid Heavy Traffic	2.40
Avoid Finding Parking	3.62
Travel Time Savings	4.03
Reduce Transportation Expenses	4.40
Reduce Environmental Impacts	5.40
Avoid Stress of Driving	5.41
Have No Car Available	6.48
Safe Mode of Transportation	6.52
Get to Many Places	6.86
Other	8.88

Other *includes reasons like commodity, curiosity, less devaluation of car, and others.*

The next two reasons to ride Tren Urbano were to reduce the environmental impacts with a score of 5.40 followed with to avoide the stress of driving with a ranking of 5.41. These two reasons imply that students would use Tren Urbano to improve their personal quality of life and the quality of the environment. Therefore, two main reasons can be identified from these results. The main reason students would use Tren Urbano is for their personal convenience like to avoid traffic, parking, save time and money. But they also would consider riding the system if it improves the environment and their quality of life.

Some students indicated that the least important reason they would consider Tren Urbano would be because they can get to many places. These results may indicate that students rank the accessibility given by Tren Urbano very low since some probably do not know

where are the stations located, or simply know Tren Urbano cannot give them access to the places they visit frequently. When the service characteristics of Tren Urbano were analyzed, accessibility was among the three top answers. This means that students place a lot of importance in that Tren Urbano should be able to get them to many places. However, when asked about the reasons why they would ride it, that is not one of the main motivations because they assume they can not get to many places as they would like if they ride Tren Urbano. Analysis across the five schools indicated the same results, that the three most important considerations to use Tren Urbano are to avoid heavy traffic, avoid finding a parking space, and save travel time.

4.5.8 Attitudes Towards Tren Urbano Cost

When students were asked how much they are willing to pay for a one-way trip in Tren Urbano, about three of every four students reported they are willing to pay less than one dollar. Figure 4.9 shows these results.

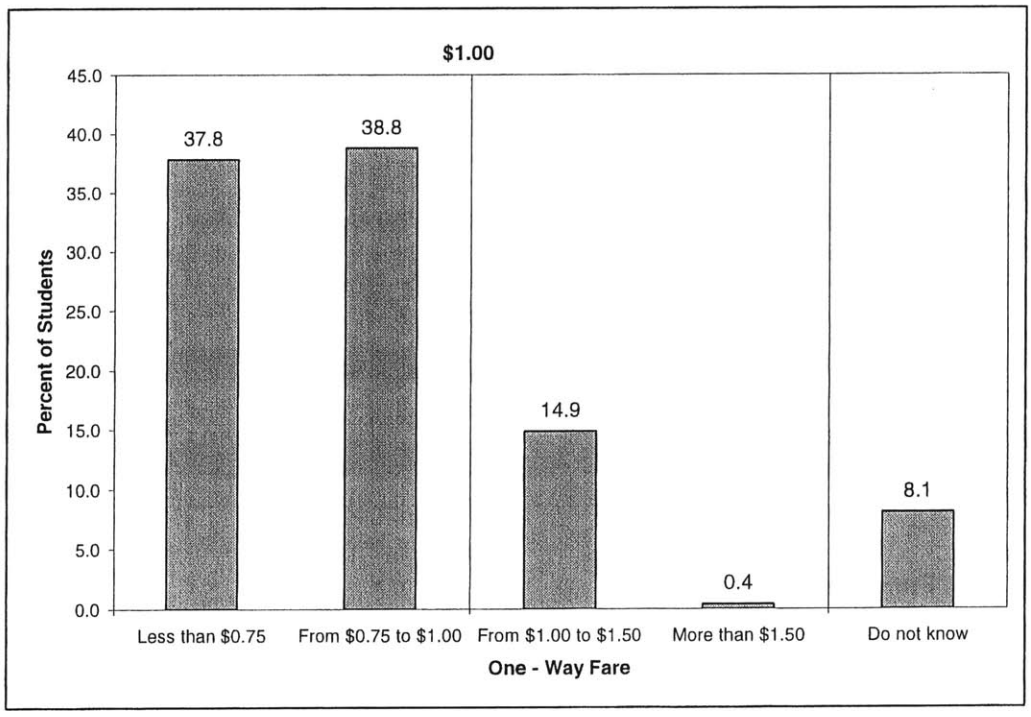


Figure 4.9: Student Perception of Acceptable Cost

Thirty eight percent are willing to pay less than $0.75 for a one-way trip. Thirty nine percent would pay from $0.75 up to one dollar. Comparing these two ranges of prices, they indicate that students are not particularly sensitive to pay less than $1.00. However, when comparing paying less than a dollar and more than a dollar, a drop of about twenty five percent in the responses indicates that students are sensitive to a fare of more than one dollar. A reduction of 24% is observed in Figure 4.9 between paying less than one dollar and paying more than $1.00.

Unfortunately, the questionnaire design did not measure the willingness to pay one dollar since $1.00 was included in two choices: from $0.75 to $1.00 and from $1.00 to $1.50. This error in the survey cannot be corrected and therefore it is unknown specifically how students feel about paying exactly one dollar for a one-way trip in Tren Urbano. Certainly it is known that students are willing to pay less than one dollar and not more than $1.00.

Table 4.46 indicates the willingness to pay Tren Urbano fare by university. The majority of students of all schools indicate they are inclined to pay from $0.75 to $1.00, except UPR respondents who are more willing to pay less than $0.75. A small percentage of students are willing to pay more than one dollar, being UPPR the most willing to pay over $1.00 with 19%.

Table 4.46: Willingness to Pay Fare by University (%)

One-way Fare	USC	UPPR	UPR	UMET	RCM	Total
Less than $0.75	28.7	35.5	41.1	34.2	39.8	**37.8**
From $0.75 to $1.00	39.0	38.8	38.1	40.0	42.0	**38.8**
Less than $1.00	**67.7**	**74.3**	**79.2**	**74.2**	**81.8**	**76.6**
From $1.00 to $1.50	16.5	18.6	13.9	15.0	11.4	**14.9**
More than $1.50	0.6	0.5	0.4	0.0	0.0	**0.4**
More than $1.00	**17.1**	**19.1**	**14.4**	**15.0**	**11.4**	**15.3**
Do not know	15.2	6.6	6.5	10.8	6.8	**8.1**

4.5.9 Student Fare Discount

Students were asked how motivated to ride Tren Urbano they would feel if a fare discount is provided. About three-quarters of the population surveyed report they would feel very motivated to use Tren Urbano if a fare discount is offered to university students. Twenty two percent feel barely motivated to use Tren Urbano and only 4% does not feel motivated at all to ride Tren Urbano if a fare discount is offered. Table 4.47 shows the percentage breakdown of these results.

Table 4.47: Attitude towards a Student Fare Discount (%)

Motivation	USC	UPPR	UPR	UMET	RCM	Total
Very much	32.7	40.1	41.5	45.8	56.8	**41.6**
Much	30.9	32.4	34.5	31.7	23.9	**32.7**
MUCH	***63.6***	***72.5***	***75.9***	***77.5***	***80.7***	***74.3***
Little	20.0	14.3	16.1	9.2	8.0	**15.1**
Very little	6.7	9.9	5.0	9.2	10.2	**6.7**
LITTLE	***26.7***	***24.2***	***21.0***	***18.3***	***18.2***	***21.8***
NOTHING	***9.7***	***3.3***	***3.1***	***4.2***	***1.1***	***4.0***

These results demonstrate once more that RCM is the university population that feels more motivated to use Tren Urbano and USC is the lest. Eighty one percent of RCM respondents are motivated while only 64% of USC students feel motivated. In addition, about 10% of USC students are not motivated at all to use Tren Urbano with a discount, compared to less than 4% on the other schools. UPPR, UPR, and UMET have similar perception, over 72% of their survey respondents would feel motivated to use Tren Urbano if a fare discount is provided to students.

4.6 Attitudes towards UPASS

Unlimited transit passes, or UPASS, offer individuals with free transportation any time, anywhere they want to go in the system for a fixed, prepaid price. This idea was presented to the university students and they were asked to assume they have a UPASS when answering the following questions.

4.6.1 Would UPASS Motivate Tren Urbano Use?

If the students surveyed had the opportunity to own a UPASS, 91% say they would feel motivated to use Tren Urbano. This figure is very positive and represents the potential unlimited passes have to stimulate and encourage individuals to transit. Table 4.48 shows the results by university.

Table 4.48: UPASS Motivation for Tren Urbano Use (%)

Motivation	USC	UPPR	UPR	UMET	RCM	Total
YES	86.6	90.2	92.6	90.0	88.5	**90.9**
NO	13.4	9.8	7.4	10.0	11.5	**9.1**

In this case, UPR (and not RCM) is the most motivated school to use Tren Urbano if an unlimited transit pass exclusively for university students is provided with 93% of respondents indicating that YES they will feel motivated. USC is again the least motivated school with 87%. These results are very positive and encouraging since they mean that nine out of every ten students surveyed think having an unlimited pass will motivate them to ride Tren Urbano, and this is exactly what Tren Urbano wants and what transit passes promote, an increase in transit ridership.

4.6.2 Would UPASS Make You Consider Use Your Car Less?

Students were asked if they would use their car less and ride transit more having a UPASS, and 67% of the student population surveyed think they would largely consider driving less and taking transit instead. This percentage is also another encouraging figure for Tren Urbano since it shows that two thirds of the surveyed population is willing to shift to transit instead of driving their cars. About one quarter of the population would consider it barely, while only 7% would not consider it at all. Table 4.49 shows the percentage breakdown of students by university.

Table 4.49: UPASS Consideration to Drive Less (%)

Consideration	USC	UPPR	UPR	UMET	RCM	Total
Very much	18.8	32.2	29.7	29.4	44.9	29.7
Much	33.9	34.4	39.7	35.3	29.2	37.0
MUCH	***52.7***	***66.7***	***69.4***	***64.7***	***74.2***	***66.7***
Little	22.4	17.5	21.3	17.6	11.2	19.8
Very little	10.3	9.3	4.3	10.9	6.7	6.6
LITTLE	***32.7***	***26.8***	***25.6***	***28.6***	***18.0***	***26.5***
NOTHING	**14.5**	**6.6**	**5.0**	**6.7**	**7.9**	**6.9**

Again, RCM shows the highest percentage (74%) of students that would largely consider driving less and riding transit more, while USC shows the lowest percentage (53%). USC also shows that 15% of its population would not consider to any extent leaving their car, being the one with the highest percentage, while only 5% of UPR population would not consider at all driving less. Ninety three percent in total would at least consider driving less and use transit, which is a positive outcome.

4.6.3 Would You Like to Use UPASS in the Integrated Transit System?

UPASS could provide unlimited rides not only in Tren Urbano, but also in AMA buses, Metrobus, and the publicos. Students were asked how would they like to be able to use their UPASS and ride unlimitedly in all these transit systems, including Tren Urbano. Over three-quarters of the population (77%) indicated they would like to use their UPASS in the integrated transit system including AMA buses, Metrobus, Publicos, and Tren Urbano. About 19% would hardly like to obtain unlimited rides in buses and publicos, while around 5% would not like it at all. Table 4.50 presents these results by university.

Table 4.50: Likelihood of Using UPASS in the Integrated Transit System (%)

Likelihood	USC	UPPR	UPR	UMET	RCM	Total
Very much	39.3	41.5	46.8	41.7	50.0	44.7
Much	24.5	35.5	32.6	35.8	26.1	31.8
MUCH	**63.8**	**77.0**	**79.4**	**77.5**	**76.1**	***76.6***
Little	21.5	12.0	13.0	11.7	11.4	13.7
Very little	6.1	7.1	4.1	5.0	5.7	5.0
LITTLE	**27.6**	**19.1**	**17.1**	**16.7**	**17.0**	***18.7***
NOTHING	**8.6**	**3.8**	**3.5**	**5.8**	**6.8**	***4.7***

UPR survey respondents like the idea of having the UPASS also available to use the other transit systems in addition to Tren Urbano the most with 79% favoring the idea enormously. USC shows again the least interest in having the UPASS available for AMA, Metrobus and publico usage with 64%, fifteen percent less than UPR respondents. These results by university and for the total population surveyed represent another encouraging determinant for Tren Urbano. Ninety five percent in total would at least like (some more, other less) to have an unlimited transit pass that motivates them not only to use Tren Urbano, but give them the opportunity to ride the buses and the publicos as well.

4.6.4 Would You Like to Obtain Special Discounts with Your UPASS?

Businesses may offer special discounts to UPASS holders giving extra value to the pass in addition to unlimited travel. These discounts allow businesses to reach thousands of college students, while encouraging students to use Tren Urbano for discretionary travel. An overwhelming majority of 95% favors the intention of offering special discounts in stores,

restaurants, sport events, museums, and other locations with the UPASS. Table 4.51 shows the survey responses by university.

Table 4.51: Likelihood of Special Discounts with UPASS (%)

Likelihood	USC	UPPR	UPR	UMET	RCM	Total
YES	93.2	97.3	95.7	90.8	94.4	**95.1**
NO	6.8	2.7	4.3	9.2	5.6	**4.9**

UPPR shows the highest percentage (97%) of respondents that like the concept of including discounts in the UPASS if compared with the other schools. UMET exhibits the lowest percentage with 91% enjoying the idea of discounts.

4.6.5 Anticipated Benefits for Using UPASS

Students were asked to rate a series of possible benefits they perceive could be obtained having a UPASS on a scale of 1 (Most Important) to 8 (Least Important). Table 4.52 shows the results, which indicate the most important benefit for using UPASS was for the dollar savings. This benefit received a rating of 1.87. The reduction in the student's transportation costs is an important advantage that students see in using UPASS.

Secondly, students understand that with a UPASS they would use their car less. This benefit received a rating of 2.97 and it is a strong argument in favor of this type of transit programs, since indicate the high possibility of reducing vehicle trips to campuses, and therefore, decreasing the demand for parking.

Table 4.52: Anticipated UPASS Benefits Rank Ordered
Scale: Most Important = 1 to Least Important = 8

Anticipated UPASS Benefits	Ranking Order
Reduce Transportation Expenses	1.87
Use Car Less	2.97
Do Errands While in School	3.52
Get a Job While in School	4.57
Visit Friends More Often	4.80
Access to Lower-Cost Housing	5.12
Effect Decision of Buying a Car	5.48
Other	6.90

Other *include benefits like avoid traffic, help the environment, convenience, and others.*

Another benefit for using UPASS according to the survey respondents is that it gives the opportunity to do errands while at school. Students ranked this response number three with a score of 3.52, indicating that UPASS makes trips between classes and outside of school more convenient. When students were asked what mode choice they normally use to do errands between classes, 55% is choosing to drive. The results indicate that students think UPASS will help them do their errands between classes using Tren Urbano, instead of driving.

Other benefits considered somewhat important were the opportunity to get a job while at school, the possibility of visiting friends more often, and the accessibility of lower-cost places to live. The least important benefit students surveyed see when using UPASS is effecting their decision to buy a car.

4.6.6 What Would be a Reasonable Price per Semester/Trimester for UPASS?

An unlimited transit pass is possible after a negotiation mainly between the university and/or students and the transit agency. The price of the pass depends on the negotiations these institutions resolve. Students were asked what do you think would be a reasonable price for UPASS in a semester/trimester basis. Approximately 85% believe UPASS should cost less than $50 per semester or trimester. Fifty two percent believe the price should be less than $25, while 33% consider the price should be between $25 and $50. Figure 4.10 shows students opinion about UPASS cost per semester/trimester.

When comparing responses, a reduction of almost 30% is observed from the 33% that think cost is between $25 and $50 per semester /trimester to those that believe cost should be over $50. This is an indication that students are very sensitive to a price higher than $50 per semester or trimester. Also, only 5.5% of the survey respondents indicate they consider over $50 a reasonable price for the UPASS. About 10% are undecided in how much the pass should cost, which would not change results significantly given the high percentage of survey respondents that think UPASS cost should be less than $50.

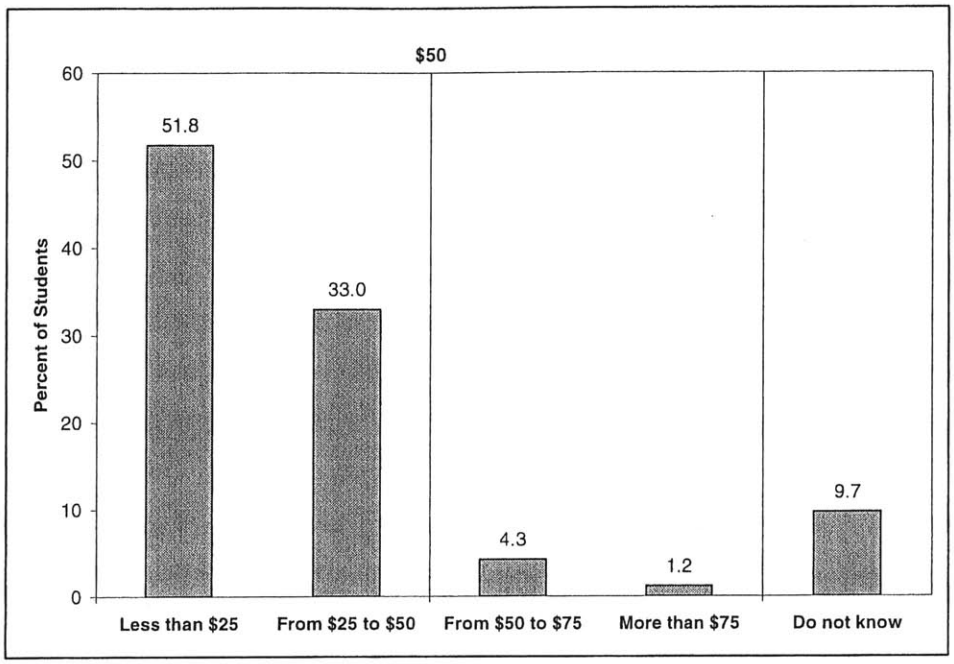


Figure 4.10: UPASS Cost per Semester/Trimester

Unfortunately, the survey design failed to measure what students thought of paying $50 per semester or trimester for UPASS. Fifty dollars was included in two choices, from $25 to $50 and from $50 to $75, and this error cannot be corrected. Therefore, the survey was unable to measure student's likelihood to pay exactly $50 per semester/trimester. Certainly it is known that students consider UPASS cost should be less than $50 and not over $50 per semester/trimester.

UMET shows the highest percentage of students that responded the UPASS cost should be less than $25 with 65%. This figure indicates that UMET population seems to be very sensitive to a price higher than $25. Nine percent of RCM survey respondents indicate they think UPASS cost could be from $50 to $75, being the highest percentage in that price range. Table 4.53 shows these results by university.

Table 4.53: UPASS Cost per Semester/Trimester (%)

Cost per semester/trimester	USC	UPPR	UPR	UMET	RCM	Total
Less than $25	54.3	56.0	48.6	65.0	44.9	**51.8**
From $25 to $50	32.9	35.7	33.6	19.2	41.6	**33.0**
Less than $50	**87.2**	**91.8**	**82.2**	**84.2**	**86.5**	**84.8**
From $50 to $75	1.2	3.3	5.3	0.8	9.0	**4.3**
More than $75	0.6	0.5	1.5	2.5	0.0	**1.2**
More than $50	**1.8**	**3.8**	**6.8**	**3.3**	**9.0**	**5.5**
Do not know	11.0	4.4	11.0	12.5	4.5	**9.7**

4.6.7 How Would You React if UPASS Cost is Included in Your Tuition Fees?

One way of paying the UPASS cost is to include it in the student's tuition fees. This way, every semester or trimester the cost of the UPASS is included in the tuition and the students receive it and make use of it during the whole school term. The results indicate student's reactions are very close and that a majority can not be perceived. Forty eight percent agree to include UPASS cost in their tuition fees. However, 43% disagree and 9% are undecided. Table 4.54 shows these results by school.

Results across all schools are similar, with the exemption of USC, which indicate that 53% of survey respondents agree to include the cost of UPASS in their tuition. However, they also have the highest percentage of undecided with 14%. Therefore, no definitive outcome can be perceived from this question and further analysis is needed on this issue.

Table 4.54: Reaction Towards UPASS Cost Included in Tuition (%)

Reaction	USC	UPPR	UPR	UMET	RCM	Total
Totally agree	25.8	25.0	18.8	23.3	22.5	21.4
Agree	27.0	24.5	29.0	20.8	20.2	26.6
AGREE	**52.8**	**49.5**	**47.8**	**44.2**	**42.7**	***48.0***
Disagree	16.6	23.4	21.9	21.7	30.3	22.0
Totally disagree	17.2	19.0	21.5	24.2	19.1	20.6
DISAGREE	**33.7**	**42.4**	**43.4**	**45.8**	**49.4**	***42.6***
Do not know	13.5	8.2	8.8	10.0	7.9	**9.4**

4.6.8 Who Should Take the Initiative of Implementing UPASS at Your University?

Students were asked whom they think should initiate the implementation of a transit pass program at their university. Students could choose more than one institution, this is why percentages do not add 100%. Sixty seven percent of the students surveyed indicate the university should take the initiative. Sixty five percent also indicate that the transportation

agency (Highway and Transportation Authority) should take the initiative. Analyzing who think both should take the initiative, results indicate that 43% of the survey respondents think both the university and the transportation agency should initiate the program.

One third of the population surveyed believes the Student Council should initiate the program. Twenty six percent of students think the students, through the Student Council, with the university should work towards the implementation of a transit pass program. About 22% believe both the Student Council and the transportation authority should work together for the implementation of the program. About 11% think a private enterprise should take the initiative. Table 4.55 shows the percentage breakdown of these results.

Table 4.55: Responsible of Implementing UPASS (%)

Institution	USC	UPPR	UPR	UMET	RCM	Total
University	59.4	68.5	73.6	65.8	65.2	**69.6**
Highway & Transp. Authority	58.2	66.3	66.7	64.2	66.3	**65.2**
Student Council	26.1	23.9	38.1	27.5	38.2	**33.3**
Private Entity	6.7	13.0	12.8	10.0	5.6	**11.2**
Other	1.2	1.6	2.8	5.8	0.0	**2.5**

4.6.9 Who Should Cover UPASS Costs?

Different institutions can cover UPASS costs but it all depends on the agreement achieved between the university officials and the transit agency. Student's answers indicate that 57% of the respondents think the university should cover the UPASS costs. Forty nine percent of the respondents also think the Highway and Transportation Authority should cover the costs. Thirty two percent think both should cover the costs of the UPASS program.

Forty five percent suggest the students should cover the costs of the transit pass program. Twenty one percent think students and the university should both pay for the UPASS, while 15% consider students and the transportation authority should cover the program costs. Sixteen percent contemplate that a private entity would want to cover the costs of the UPASS program. Table 4.56 presents these results by university.

Table 4.56: Responsible of Paying for UPASS (%)

Institution	USC	UPPR	UPR	UMET	RCM	Total*
University	58.2	65.8	57.0	54.2	43.8	**57.2**
Highway & Transp. Authority	47.3	48.4	50.0	52.5	40.4	**48.9**
Students	37.0	39.7	50.1	34.2	46.1	**45.0**
Private Entity	13.3	16.3	16.9	12.5	16.9	**15.9**
Other	3.0	1.6	3.3	3.3	1.1	**2.8**

* Total exceeds 100% due to multiple responses.

4.6.10 Who Should Benefit from UPASS?

UPASS could be available to all students or to only those who want it. Students were asked who they think should benefit from this program. The results indicate that 54% of the survey respondents consider that only those that are interested in having a UPASS should benefit from the program. However, 45% believe that all students equally should obtain an unlimited transit pass. With only 2% of undecided respondents, the results are close and therefore a more detailed analysis should be pursued on this issue. Table 4.57 shows the results by university.

Table 4.57: Students Benefiting from UPASS (%)

Benefit	USC	UPPR	UPR	UMET	RCM	Total
All students	52.7	47.8	40.8	49.6	48.3	**44.8**
Only those interested	44.8	51.6	58.0	46.2	48.3	**53.5**
Do not know	2.4	0.5	1.2	4.2	3.4	**1.7**

UPR is the school where the majority of the respondents indicate the UPASS should be available to only those interested in the program with 58%. In the other hand, USC show that the majority of its respondents think all students equally should benefit from the program with 53%. RCM exhibits the same proportion of students indicating that all students and only those interested should benefit with 48% each.

4.6.11 What is Your General Attitude toward UPASS?

The general attitude toward UPASS is extremely positive. About 96% of the complete population surveyed are in favor of the UPASS program. Sixty percent are completely in favor, indicating that over half of the survey respondents support UPASS in their universities. About 4% indicate they are undecided about their opinion about UPASS, but this percentage is very small. Table 4.58 indicates these results.

Table 4.58: General Attitude toward UPASS (%)

Attitude toward UPASS	USC	UPPR	UPR	UMET	RCM	Total
Completely in favor	55.8	70.1	58.6	53.8	67.4	60.1
In favor	33.9	26.6	38.5	39.5	27.0	35.4
IN FAVOR	89.7	96.7	97.1	93.3	94.4	***95.5***
Against	0.6	0.5	0.3	0.0	0.0	0.3
Completely against	1.2	0.5	0.1	0.8	0.0	0.4
AGAINST	1.8	1.1	0.4	0.8	0.0	***0.7***
Do not know	8.5	2.2	2.5	5.9	5.6	**3.8**

UPR students are the most positive about the program with 97% of its survey respondents in favor of the program. USC are the least positive since 90% are in favor compared to over 93% in the other schools, and 8.5% are undecided, the highest percentage among all schools. In general, these results are very positive and encouraging for Tren Urbano and the idea of implementing a transit pass program exclusively for university students, since almost all students support this transit pass program, better called as UPASS.

Chapter 5: Survey Analysis and Implications

This chapter analyzes the findings presented in the preceding chapter and focuses its attention on two aspects: (1) the anticipated usage of Tren Urbano by the university students; and (2) in what manner the findings affect Tren Urbano, the universities and the possible implementation of the UPASS concept. First, the use of Tren Urbano was anticipated analyzing the result of this variable based on other important variables gathered in the survey. This analysis was conducted using two statistical methods. Descriptive statistics using cross tabulations are presented first. From them, tendencies on who is most likely to ride Tren Urbano were determined. A linear regression analysis was conducted then, to predict the anticipated usage of Tren Urbano depending on a series of independent variables gathered in the survey that were assumed to be meaningful in predicting the usage of Tren Urbano by the student population. The tendencies determined in the descriptive analysis were confirmed or denied with the regression analysis. Some profiles of potential users of Tren Urbano are described as a consequence of the regression analysis.

The survey findings presented before suggest a number of implications to Tren Urbano, the universities and the possible implementation of a UPASS program and are presented in the second section of this chapter. These implications are based on the findings about the student population attitudes towards the parking situation at their schools, their attitudes towards Tren Urbano, and finally, their attitudes towards the idea of UPASS. Finally, the feasibility of implementing a university pass program for Tren Urbano will be detailed based on the survey results and these implications and recommendations will be specified.

5.1 Anticipated Usage of Tren Urbano

The university population in San Juan possess a great potential in becoming transit riders given the proximity to Tren Urbano stations at each school and the need to give students an alternative to the car to reduce auto dependency, parking demand, and student's transportation expenses. Therefore, it is important to analyze how students responded to the question on how frequent they would use Tren Urbano. According to the survey, 38% indicated they would use Tren Urbano almost never. About the same proportion (37%) reported they would ride Tren Urbano regularly (i.e., every day or more than once a week). Twenty six percent expect to use Tren Urbano occasionally, or not on a regular basis (i.e., once a week to sometimes a month).

In order to understand each of these markets (regular, occasional, and rare users) two statistical analyses were conducted with the objective of describing who is most likely to use Tren Urbano and who is less likely and then, analyze the implications.

5.1.1 Cross tabulations

Cross tabulations are two-way tables where you can describe the relationship of two subgroups. Table 5.1 shows the proportion of responses to the anticipated use of Tren Urbano cross tabulated by a series of different variables in order to identify what attributes determine who is most or least likely to use Tren Urbano. The following will be a discussion of the results cross-tabulated in Table 5.1 and an initial suggestion about who is most likely to use Tren Urbano.

- Gender: The results suggest that men are more likely to use Tren Urbano than women. This is demonstrated by comparing the anticipated usage of TU percentages by female and male. The majority of men (39%) indicated they would ride TU regularly, while the majority of women (40%) reported they would ride TU rarely.

- Age: Looking at the age distribution, older students are less likely to ride Tren Urbano. The results indicate that a greater number of students 18 years or younger (44%) are more likely to ride Tren Urbano, than the number of students 19 years old or older. The percentage of students expecting to use TU rarely increases as student's age increases, suggesting that the older a student is, less times he or she will use Tren Urbano.

- Civil Status: Married students are less likely to ride Tren Urbano than single students. The majority of students who are married (45%) indicated they would ride TU rarely, compared to 37% of students who are single which reported they would also use it rarely.

- Income: Lower income students are more willing to use TU than higher income students. Students with annual income less than $15,000 are more likely to regularly use Tren Urbano than students with annual income between $15,000 and $34,999. A greater number of students with annual income of less than $5,000 (44%) and the majority of students with annual income between $5,000 and $14,999 (38%) are more likely to use TU. Meanwhile, the high percentage of students with annual income between $15,000 and $24,999 (40%) and the maximum number of students with annual income between $25,000 and $34,999 (39%) are less likely to ride the train. Comparing results for annual incomes between $35,000 and $50,000 and over $50,000, they suggest that the majority of the students with annual income over $50,000 (42%) are less likely to ride it. However, results indicate that a greater number

of students with annual income between $35,000 and $50,000 (43%) are more likely to use Tren Urbano.

- Housing Arrangement: Students living with parents are less likely to ride Tren Urbano than students that live in student housing or rent an apartment. Forty percent of the students living with their parents think they would ride TU rarely. This may result because if they still live with their parents, they probably have accessibility to their parent's car or their parents may buy them one, therefore they will be more attractive to driving than to taking transit. Thirty nine percent of students living in student housing will use it occasionally or more than the ones that live with their parents. Students that live in student housing have their permanent home outside the metropolitan area, therefore a big number do not have a car while in school making them more likely to use Tren Urbano sometimes. It can be assumed that this segment of the population (i.e., who live in student housing) would not use Tren Urbano regularly because they walk to school regularly and all their daily activities are close to their school domicile. Students who own an apartment or a house are also less likely to ride Tren Urbano (45%). It these students own an apartment or a house, it is most likely that they own a car too, therefore less likely they will ride Tren Urbano. On the other hand, students who rent an apartment or a home would ride it more (42%).

- Auto Availability at Home: Not having a car available at home or at least one, suggest that students are more likely to use Tren Urbano than students that have two or more cars available at their home. Over half of the students that do not have a car available at home indicated they would ride Tren Urbano on a regular basis. Forty percent of the students that have only one car available also indicated they would ride TU regularly. However, the more cars you have available at home, the least likely you are to ride Tren Urbano as evidence by the percentage increase as you increase the numbers available at the student's house.

- Employment Status: If the student does not work (39%) or works less than 10 hours a week (46%), it is more likely to ride TU regularly than a student who works more than 10 hours a week. Results indicate that as the hours worked per week increases the percentage of students indicating that they would rarely ride Tren Urbano also increases.

- Academic Program: Undergraduates are likely to use TU more than graduate students. Results indicate that a great number of undergraduates (37%) reported they would ride TU regularly, while 44% of the graduate students indicated they would ride it rare times.

- Academic Load: Full-Time students are more willing to use Tren Urbano than part-time students, according to results. Forty seven percent of part-time students indicated they would rarely use Tren Urbano, while a slight majority of full-time students would regularly ride it (37%). Part-time students will ride it less times because their trip chain might be complicated (i.e., home-school-work-home) since they do other matters in addition to go to school. Transit does not offer them the flexibility they need; therefore they are less likely to ride Tren Urbano.

- Metrobus, AMA, and Publico Use: Use of the current transit services (Metrobus, AMA and Publico) are directly related to the anticipated usage of Tren Urbano. The more usage of the current transit services, the more usage of Tren Urbano is expected. The majority of students, who indicated they use Metrobus, AMA and Publico services rarely, reported they would also use Tren Urbano rare times (about 40%). Those that reported they use these transit services regularly, would also use Tren Urbano most of the time (over 53%).

- Origin to University: Students originating their trip to school in the San Juan Metropolitan region are more likely to ride Tren Urbano than students coming from outside the metropolitan region. Fifty two percent of students traveling from outside of the metro area would rarely use TU. In contrast, 40% of the students coming from the metropolitan region could become regular riders for Tren Urbano.

- Mode Choice to University: The results indicate that those students driving alone to school (44%) are the least likely to ride Tren Urbano if compared to the other students that ride with someone, take transit or walk to school. Students that ride with someone (42%) and that take transit (60%) are the most likely to ride Tren Urbano, given the high percentage of regular riders reported. Those surveyed students that walk to school are more likely to become occasional riders (42%) than regular riders, because probably live close to school and they can get to their regular activities walking. They would use TU in certain occasions where they can not walk.

- Weekly Transportation Costs: The less a student spend in transportation, the more likely the student is to use TU. Results indicate that 49% and 40% of students that spend less than $5 and $5 to $10 in transportation expenses in a week are likely to become regular users. Meanwhile, over 40% of the students that reported spending more than $16 expect to use TU rarely.

- Knowledge about TU: The least knowledge a student has of the TU project, the less likely he or she is to ride it. The results suggest that a direct relationship exist between knowledge

about TU and frequency of use. Forty four percent of those that indicated knowing much about the project could become regular users, while 39% of those that reported knowing less, expect to ride the train rarely. However, results show that the majority of the students (41%) that responded knowing nothing about the project, would become regular users. This suggest that student with no knowledge about TU at all believe TU will be a transportation alternative for them.

- Proximity of TU station to home: The closer a station of Tren Urbano is to the student's home, more likely they are to use Tren Urbano. For those students that a TU station is less than five minutes away from their home, fifty two percent indicated they would ride Tren Urbano regularly. As the walking distance increases, the percentage of students indicating they would ride Tren Urbano regularly decreases. However, those than can walk to the station are more likely to use TU than those that can only get there by car or that do not have a station close to their area. Thirty seven percent of students that could only get to the station by car indicate they would ride TU rarely and 56% of those that have no TU station close to their area would ride also seldom. The majority of the students (46%) that reported not knowing where the stations are located, or the alignment of Tren Urbano, indicated that they would ride Tren Urbano regularly. This may demonstrate that students without knowledge on Tren Urbano, when described to them in the survey, believe it will be a transportation alternative for them.

- TU Trip Purpose: A great number of students responding to the question about with what purpose they would use Tren Urbano, indicated they would use Tren Urbano regularly to make those trips. The trip purposes with the highest percentages of regular riders are trips to home (79%), trips to the university (70%) and trips to the workplace (74%). Trips to home are difficult to interpret, since they can be trips from the university to the student's home while at school. It may also mean trips to the student's permanent home, which is different to where the student lives while at school. Also, students may have interpreted trips going home from different origins, like work, shopping, special events, etc.

- UPASS included in tuition: Students that responded they agree to have the cost of the UPASS included in their tuition are more likely to become regular riders than those that responded they disagree. Forty five percent of students agreeing that UPASS could be included in their tuition responded they would become regular riders, while forty five percent of students disagreeing responded they would ride Tren Urbano rarely.

- UPASS motivation to use Tren Urbano: Students not motivated by the UPASS to use Tren Urbano are less likely to ride Tren Urbano than those that feel motivated to use Tren Urbano having a UPASS. This is demonstrated by the ninety two percent of students not motivated by UPASS that indicated they would ride Tren Urbano rarely, compared to only a 32% of students that feel motivated and reported that they would ride TU also rarely.

Table 5.1: Anticipated Usage of Tren Urbano by Different Variables

Survey Respondents		*-----> Most likely to ride Tren Urbano*			All respondents
		Rarely	Occasionally	Regularly	
	All respondents	**37.50%**	**25.70%**	**36.80%**	
Gender	**Female**	**39.50%**	25.20%	35.30%	60.80%
	Male	34.50%	26.40%	**39.10%**	39.20%
Age	**< 18 yrs**	26.60%	29.00%	**44.40%**	20.90%
	19-21yrs	**38.70%**	27.00%	34.30%	39.30%
	22-25 yrs	**40.90%**	22.70%	36.40%	25.70%
	26-30 yrs	**46.00%**	21.20%	32.70%	9.10%
	31-40 yrs	**47.80%**	19.60%	32.60%	3.80%
	> 40 yrs	25.00%	37.50%	37.50%	1.30%
Civil Status	**Single**	36.70%	26.20%	**37.10%**	88.30%
	Married	**45.40%**	20.00%	34.60%	10.60%
Annual Income	**Less than $5,000**	31.88%	24.64%	**43.48%**	12.30%
	$5,000-14,999	31.50%	30.30%	**38.20%**	20.80%
	$15,000-24999	**40.40%**	26.10%	33.50%	20.40%
	$25,000-34,999	**39.20%**	27.30%	33.50%	15.40%
	$35,000-49,999	38.60%	17.90%	**43.40%**	12.60%
	Over $50,000	**41.90%**	22.90%	35.20%	18.50%
Housing Arrangement	**Live w/parents**	**39.70%**	23.80%	36.60%	60.70%
	Student housing	24.70%	**39.20%**	36.10%	13.00%
	Own apt/home	**45.40%**	22.70%	31.90%	11.40%
	Rent apt/home	30.90%	27.60%	**41.50%**	10.20%
Auto Availability at Home	**None**	27.30%	18.20%	**54.50%**	3.70%
	One	28.60%	31.10%	**40.30%**	19.70%
	Two	**40.10%**	25.10%	34.80%	35.10%
	Three	**37.50%**	25.40%	37.10%	23.80%
	Four	**44.00%**	24.00%	32.00%	12.30%
	More than four	**46.20%**	18.50%	35.40%	5.30%
Employment Status	**Do not work**	32.40%	28.30%	**39.30%**	45.00%
	< 10 hrs/wk	32.80%	20.90%	**46.30%**	5.50%
	10-20 hts/wk	**37.70%**	27.00%	35.30%	18.20%
	21-30 hrs/wk	**35.40%**	30.80%	33.80%	11.00%
	31-40 hrs/wk	**49.60%**	16.30%	34.10%	10.20%
	> 40 hrs/wk	**51.70%**	17.50%	30.80%	10.10%
Academic Program	**Undergraduate**	35.80%	27.70%	**36.50%**	77.00%
	Graduate	**43.60%**	19.10%	37.20%	23.00%
Academic Load	**Full Time**	35.80%	27.40%	**36.70%**	85.50%
	Part Time	**46.90%**	15.30%	37.90%	14.50%

Metrobus Use	**Rare**	**42.40%**	25.20%	32.40%	83.70%
	Occasional	15.60%	41.70%	**42.70%**	8.40%
	Regular	14.80%	15.90%	**69.30%**	7.80%
AMA Use	**Rare**	**44.40%**	24.00%	31.60%	77.20%
	Occasional	14.20%	**51.30%**	34.50%	9.70%
	Regular	15.40%	17.40%	**67.10%**	13.10%
Publico Use	**Rare**	**40.70%**	24.90%	34.30%	84.10%
	Occasional	20.20%	**44.00%**	35.70%	7.50%
	Regular	27.40%	20.00%	**52.60%**	8.40%
Origin to University	**SJ Metro Area**	34.30%	25.18%	**40.52%**	81.60%
	Outside SJMA	**51.98%**	27.31%	20.70%	18.40%
Mode Choice to University	**Drive alone**	**44.10%**	23.00%	32.80%	66.50%
	Ride w/someone	29.20%	28.30%	**42.50%**	10.00%
	Take Transit	22.30%	18.10%	**59.60%**	7.90%
	Walk	24.10%	**41.60%**	34.30%	13.90%
Weekly Transportation Costs	**< $ 5**	24.00%	27.30%	**48.70%**	12.90%
	$5-10	30.70%	29.50%	**39.80%**	14.20%
	$11-15	37.00%	26.70%	36.20%	20.40%
	$16-25	**43.10%**	24.80%	32.20%	28.70%
	$26-50	**41.10%**	22.90%	35.90%	16.40%
	> $50	**42.50%**	19.50%	37.90%	7.40%
Knowledge about TU	**Much**	32.80%	23.70%	**43.50%**	25.10%
	Little	**39.30%**	26.50%	34.20%	72.10%
	Nothing	35.30%	23.50%	**41.20%**	2.80%
Proximity of TU station to home	**< 5 min walk**	23.70%	24.60%	**51.70%**	9.70%
	6-10 min. walk	30.30%	24.20%	**45.50%**	14.60%
	11-15 min. walk	30.90%	25.90%	**43.20%**	6.70%
	> 15 min. walk	33.30%	27.20%	**39.50%**	7.00%
	Get only by car	**36.80%**	28.30%	34.90%	26.50%
	Not close to my area	**56.20%**	26.40%	17.40%	21.30%
	Don't know where stations are	33.90%	20.50%	**45.60%**	14.30%
TU Trip Purpose	**University**	10.00%	20.00%	**69.90%**	41.60%
	Home	5.60%	15.40%	**79.00%**	21.80%
	Work	7.90%	18.30%	**73.80%**	15.60%
	Errands	20.50%	32.10%	**47.40%**	49.30%
	Eat Out	23.40%	31.80%	**44.90%**	39.90%
	Visit friends	15.40%	29.10%	**55.60%**	19.10%
	Entertainment	15.90%	37.60%	**46.50%**	28.30%
	None	**92.70%**	6.50%	0.80%	20.00%
Agree UPASS cost included in tuition?	**Agree**	28.70%	25.90%	**45.40%**	48.20%
	Disagree	**45.50%**	25.60%	28.90%	51.80%
UPASS motivates TU use?	**YES**	32.10%	27.60%	**40.40%**	90.90%
	NO	**92.00%**	7.10%	0.90%	9.10%

5.1.2 Regression Analysis

In order to predict the anticipated usage of Tren Urbano a regression analysis was conducted. Regression analysis is concerned with estimating the components of a mathematical model that

reflects the relationship between the dependent and independent variables in the population (Fink, 1995). To make the estimate, the relationship between variables is assumed to be linear and that a straight line can be used to summarize the data. The complete results of this analysis are presented in Appendix D, where the mathematical model is detailed including the constant term, all the independent variables, and its coefficients. Table 5.2 shows the regression results. The statistically significant variables that are meaningful to predict TU use among university students and its coefficients are presented.

Table 5.2: Regression Results

Significant Variables Coefficients (N = 896)			
Gender	0.110 **	University Trips	0.706 ***
Employment Status	-0.030 *	Home Trips	0.250 ***
Weekly Transportation Costs	0.041 *	Entertainment Trips	0.115 *
AMA Patronage	0.152 **	Work Trips	0.178 **
Knowledge about TU	-0.088 *	Visit Friends	0.126 *
Stations not close to home	-0.191 **	None	-0.411 ***
Agree UPASS cost in tuition	0.144 ***	UPASS will motivate TU use	0.323 ***
Dependent Variable: Anticipated Usage of TU (rarely, occasionally, regularly)			

Note: *All independent variables are included in table in Appendix. These variables are statistically significant because p value (significance) is less than 0.05. The following criteria was used to indicate the level of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.*

The regression coefficient measures the change in the anticipated usage of Tren Urbano (from rarely, to occasionally, to regularly) for each unit change in the independent variables. (The values of each independent variable are included in the code book included in the Appendix C). If the coefficient is positive, a unit increase in the independent variable increases the anticipated use of TU, which means that students are more likely to ride TU. If the coefficient is negative, a unit decrease in the independent variable decreases the anticipated use of TU, meaning that students are less likely to ride TU or ride it rarely. For example, Table 5.2 shows that gender (independent variable) has a positive coefficient (0.110). Since this variable is coded 0 for females and 1 for male, a unit increase in this variable, in other words from female to male, increases the value of the dependent variable, which is coded 0 for rare use, 1 for occasional use, and 2 for regular use. This means that males are most likely to use Tren Urbano than females.

Statistical significance occurs when the null hypothesis is rejected (suggesting that a difference between two variables does exist) (Fink, 1995). The null hypothesis is a statement

that no difference exists in the means (numerical values) obtained by two groups. In this analysis, it is assumed that no variance exist between the independent variables and the dependent variable (i.e., anticipated Tren Urbano use). The level of significance between the two groups is given by alpha. The alpha gives the probability of rejecting the null hypothesis when it is actually true. Tradition keeps the alpha value small (0.5, 0.1, or 0.01) to avoid rejecting the null hypothesis when in fact is true and there is no difference between groups means (Fink, 1995). The null is rejected if the *p* value, or observed significance, is less than alpha. The *p* value is the probability of obtaining the results of a statistical test by chance. Consequently, analyzing the output of the regression, the variables presented in Table 5.2 are those that have a *p* value less than the 0.05, the alpha value. This means that these independent variables are significant in predicting the expected use of Tren Urbano. In addition, the sign of this variables' coefficients show the relationship between each significant variable and who is most likely to use Tren Urbano and who is not. Table 5.3 shows the interpretations of these relationships.

Table 5.3: Tren Urbano Student User Profile

Anticipated Usage of Tren Urbano	
Most likely to ride it	*Least likely to ride it*
• Men than women • Higher transportation costs • AMA users than other transit users • For university trips • For home trips • For entertainment trips • For work trips • To visit friends • Agree to include UPASS cost in tuition • Feel motivated to use TU with UPASS	• More hours worked per week • Less knowledge about TU • Have no TU station close to home • Indicated no intention to use TU

This table summarizes the variables that are statistically significant and predict the usage of Tren Urbano. Comparing these results with the initial suggestions obtained with the cross tabulation study, it is important to note that for the regression analysis all the variables presented in the cross tabulations were included as independent variables. However, other variables like opinion of the transit services, willingness to pay TU, expected UPASS cost and general attitude towards UPASS were included. (A complete list of the independent variables included in the regression analysis is presented in Appendix D).

Most likely to use TU: The regression results confirmed some hypotheses obtained from the cross tabulation analysis. Men are most likely to ride Tren Urbano than women. This might be because women may feel less secure riding Tren Urbano. According to the survey results, personal security is the service attribute of Tren Urbano that students consider as the most important, therefore it can be assumed that females are less likely to ride Tren Urbano because they may feel less secure compared to men. Another reason might be because the trip pattern that women do is more complex than men, and is not convenient to use TU. This result is important in terms of the university population, since more women go to university than men and results are indicating that women are less likely to use TU than men. Comparing this result with the Luntz Research Co. market research of 1995, both analyses concluded that men are more likely to ride TU on a frequent basis. According to Luntz research, men 18 to 34 years old (university students belong to this age group) are more likely to ride TU in a regular basis (27%). However, APTA transit facts indicate that women are a greater proportion of transit users. Since APTA facts does not specify between bus or rail, maybe men are more likely to ride rail and women buses.

The cross tabulations suggested that as students spent more in their transportation expenses in a week, the percentage of rare users was larger than regular users. The regression result indicates the opposite. This indicates that students spending higher transportation costs are most likely to ride TU. This is possible, since students with elevated weekly expenses might see Tren Urbano as a cheaper mode of transportation and are willing to use it because it will reduce their weekly transportation expenses.

Current users of AMA are very likely to become TU users according to regression results and the cross tabulations. However, Metrobus and Publico users did not result statistically significant in predicting Tren Urbano use. This means that a deep look should be done to Metrobus and Publico users in order to attract them to Tren Urbano and careful analyze the impact of attracting AMA users to Tren Urbano in AMA ridership. The Luntz Research Co. market research conducted in 1995 also indicated that bus riders (28%) are also more likely to ride Tren Urbano on a regular basis.

Regression also indicates that students who would be willing to use Tren Urbano to go to the university, to go home, for their journey to work, for social or sport events (entertainment)

and to visit friends would most likely use the train regularly. Those that indicated they would use the train to do errands while at school or to eat out did not result statistically significant which mean that they would use Tren Urbano occasionally not on a regular basis.

Regression results show that students that reported they would agree to have included in their tuition the cost of UPASS are more likely to ride Tren Urbano than those that disagree about it. Also, they confirmed that those that would feel motivated to ride Tren Urbano if they had a UPASS are more probable to use Tren Urbano than those that do not feel motivated at all. These results are very encouraging for Tren Urbano if a UPASS program is implemented. First, 48% of all respondents indicated they agree to have included the cost of UPASS in their tuition and regression results are indicating that they are very likely to use TU regularly. This may suggest that if a consult with the students is done to approve the UPASS cost to be included in tuition, 48% would agree and with a strong marketing campaign a majority can be obtained. In addition, 90% of the population surveyed feels7 motivated to use TU if they are provided with a UPASS and regression results indicate that they are most inclined to ride the system on a regular basis. Therefore, the implementation of a university transit pass program is a win-win situation for Tren Urbano since students are most likely to use the system thanks to the pass.

Least likely to use TU: Regression showed that employed students are less likely to use Tren Urbano than students that do not work while enrolled in school and the more hours these respondents work, the least likely they are to ride Tren Urbano. This statement was also observed in the cross tabulations and it was totally expected. Workers need a reliable, flexible and convenient mode of transportation and a worker's trip pattern gets more complex if more hours per week are worked. Maybe employed students would not use Tren Urbano regularly to go to work because their workplace is not served by Tren Urbano or their simply believe Tren Urbano is not a convenient mode of transportation to go to work.

As it was expected, students that reported to know little about the Tren Urbano project are very likely to ride Tren Urbano rarely. According to the regression model, this demonstrates the direct relationship that exists between knowledge and the anticipated usage of Tren Urbano. The more a student perceives to know about the project, the more likely the student is to use Tren Urbano. Therefore, Tren Urbano's public information campaign needs to be very effective

and comprehensible, especially to the university student population, since the usage of the system directly depends on how much students know and understand the system.

Students that responded that they do not have a TU station close to their place of living while in school are least likely to ride TU. Regression indicates that not having a TU station close to home make students do not anticipate they could use Tren Urbano. In other words, accessibility to the train and anticipated usage of TU are directly related. Therefore, the less accessible a station is to a student, the less likely the student would be to ride Tren Urbano. Another definite variable in predicting usage of Tren Urbano is those students indicating that they have no purpose to use Tren Urbano. As their answers indicate and as expected, these students are the least likely to ride Tren Urbano.

5.1.3 User Profile

A series of regression analysis by selected variables were performed to better describe the user profile for Tren Urbano. The selected variables used were gender (men vs. women), employment status (unemployed vs. employed), academic program (undergraduates vs. graduates), and civil status (single vs. married). The same methodology explained before to identify the statistical significant variables was used for this analysis. Therefore, the most likely users of Tren Urbano among the student population would be:

- Employed men
- Single unemployed men
- Undergraduates living in student housing
- Unemployed students living in student housing
- Graduate students that walk to school
- Unemployed graduate students

The user profiles mentioned above are the segments of the student population that more likely would become regular users or not rare users of Tren Urbano. To make this point clear, Figure 5.1 shows the anticipated usage of Tren Urbano for the population surveyed and the percentage of students that indicated they would ride Tren Urbano regularly, occasionally or rarely.

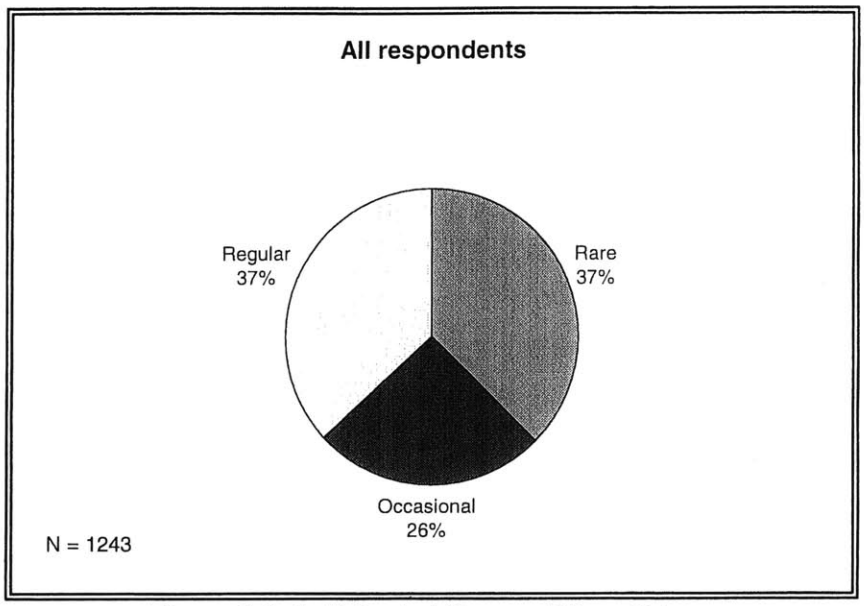


Figure 5.1: Anticipated Usage of Tren Urbano

Thirty seven percent of the students surveyed responded they would ride Tren Urbano every day or more than once a week (regulary) and twenty six percent indicated they would use TU sometimes in the month or once a month (occasionally). The profile groups mentioned above are those that indicated they would use Tren Urbano more than the percentages of the actual population. In other words, these groups are those that show a higher percentage in regular use or occasional use. Figure 5.2 show the profile groups and all denote an increase in the percentage of regular or occasional riders. In other words, it suggests that they are more willing to use Tren Urbano when compared to the complete population surveyed, since a shift from rare users to either regular or occasional riders is observed in all of these groups.

Employed men: This is the only segment of the population that even though resulted significant according to the regression analysis, maintained the same proportion of regular (37%), occasional (25%) and rare (38%) users as all respondents indicated. However, employed men are more likely to ride Tren Urbano if compared to employed women. Forty five percent of employed women indicated they would be rare users, while only 38% employed men would become rare users.

Single unemployed men: This group showed that 43% would ride regularly and 30% occasionally. An increment in regular and occasional use of Tren Urbano is observed if

compared to the population at large, indicating that single unemployed men are a significant segment of the student population and it deserves detailed study. This group seems to have a great potential to ride Tren Urbano frequently because single and unemployed students tend to have simple trip patterns than married or employed men.

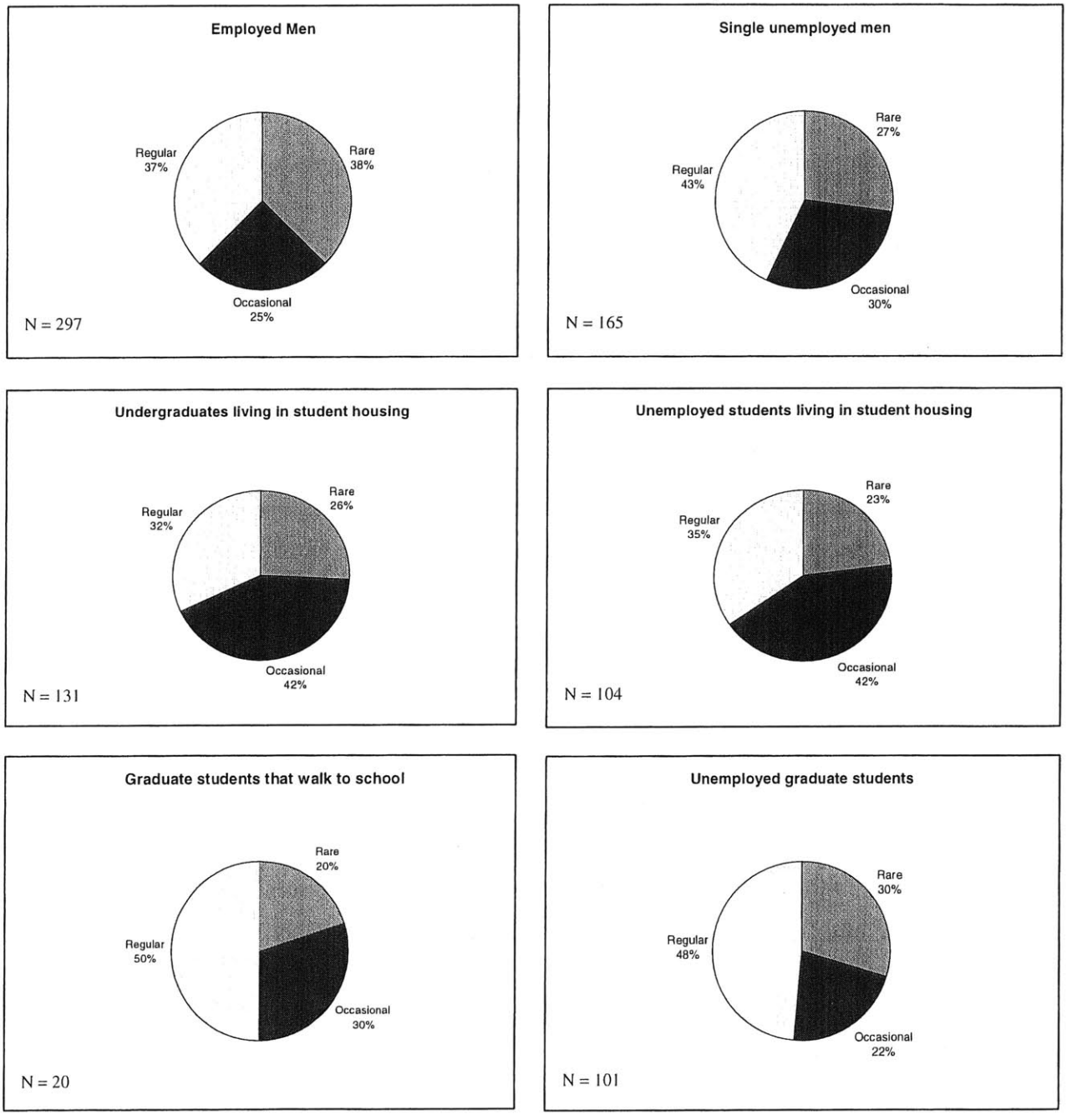


Figure 5.2: User profiles by anticipated usage of Tren Urbano

Undergraduates living in student housing: Thirty two percent of this segment of the population indicates they would ride Tren Urbano regularly while 42% will ride it occasionally. A considerable increase in occasional travel is observed among students that are undergraduates and live in a student housing. Their use of Tren Urbano is more occasional than regular because students that live in a student housing tend to walk to school given the closeness of the housing to the campus. Therefore, they will not be using Tren Urbano to go to school every day or on a regular basis, but will use it in a more occasional manner like to do errands, visit friends, go shopping or others. In addition, traditionally students that live in student housing have no car available to school and this is why they have to rent a room close to campus and walk to school, which improves their probability of using transit.

Unemployed students living in student housing: The percentage of regular and occasional users among this group also increased. Thirty five percent indicated they would ride TU regularly while 42% said they would ride it occasionally. Again, a considerable increase in occasional travel is observed for the same reasons mentioned above. Students living in student housing live very close to campus and walk to school, therefore they do not need a transportation mode to take them to school everyday. However, they would use the train for occasional travel. The fact that they also do not work while enrolled in school, favors Tren Urbano, since they have simple trip patterns that Tren Urbano most likely is able to fulfill. Also, if compared to employed students, they do not need a reliable, flexible and convenient mode of transportation as employed students need.

Graduate students that walk to school: This is the profile group that presented the highest shift to regular and occasional riders, since half of all respondents indicated they would ride Tren Urbano on a regular basis while 30% expect to use TU occasionally. A reduction of 18% in rare users is observed if compared to the anticipated usage indicated by all respondents. Graduate students that walk to school tend to be students that rent an apartment or live in student housing close to campus. They are indicating that they would ride Tren Urbano more in a regular basis than in an occasional basis, which is very encouraging for TU. One reason for this result is that graduate students are more knowledgeable about Tren Urbano (as survey results indicate) and the more a student know about the project, the more likely is to ride it. The share of graduate students that walk to school is 2% of the population surveyed. This does not indicate that they could not be considered potential users of Tren Urbano. It only indicates that they represent a

small amount of regular users and that Tren Urbano needs to attract other profile groups in order to increase its anticipated usage.

Unemployed graduate students: Again, employment status is crucial in determining regular use of Tren Urbano. Graduate students that do not work (or work very few hours a week) are very likely to use TU on a frequent basis. Forty eight percent indicated they would use it reguarly and 22% responded they would ride it occasionally. A 10% increase in regular users is observed indicating the potential this group has in becoming regular users for Tren Urbano.

In summary, one important variable stand out from this profile analysis. Employment status is the characteristic in the university student population that influences the most the anticipated usage of Tren Urbano. The least hours a student work per week or if he or she does not work at all is better for TU ridership goals. Also students that can walk or live close to school are more likely to ride TU.

5.2 Implications for Tren Urbano and Universities

How the student travel patterns, their preferred solutions to the parking situation, their attitudes toward Tren Urbano and towards the idea of having a UPASS impact Tren Urbano (Operations and Marketing) and the universities is the reason why all these data was collected and analyzed. The implications of these findings will be detailed and what Tren Urbano and the universities have to do to consider these implications will be explained. Tables 5.4 to 5.7 summarize these implications and a detailed explanation follows each table.

5.2.1 Implications of the Student Travel Patterns

The most significant implications of the student's travel patterns and how Tren Urbano Operations and Marketing departments are affected with the finding as well as the universities are summarized in Table 5.4.

Table 5.4: Implications of the Student Travel Patterns

Student Travel Patterns	
Finding	**Implications (O: TU Operations, M: TU Marketing, U: Universities)**
Peak arrival and departure times occur at peak hours of TU service.	**O**: Peak hours of service will receive heavier demand. **M**: Encourage TU use during off peak hours like lunchtime, early afternoon, and in the evenings. **U**: Academic hours could be rescheduled in order to offer more classes at off peak hours.

Student peak arrival and departure times from school occur also during the peak hours expected in Tren Urbano (i.e., around 7:30am and at 4:00pm, see Figure 4.1-4.4). TU needs to prepare itself to receive a heavier demand at peak hours since the majority of students would ride TU to go to school or to leave from school and a large number arrive and depart at the same peak hour along with commuters. The capacity of the system might be reached at the peak scenarios if a large amount of students decide to ride Tren Urbano at these hours. In order to attract students to use TU during off peak hours, more effort should be placed in the marketing campaign promoting the use of the system during lunch hours, in the early afternoon, and in the evenings and later. It should emphasize that TU gives access to places where students can have more opportunities. For example, they will have more restaurants for lunch, they can go shopping after school, and can go out with friends at night to the movies, to a bar, to a club, etc. If these places are located close to a TU station or even if some are located in the station as concessions, students would be attracted to use the system also during off peak hours. In addition, universities should review their academic hours since they could be rescheduled in order to offer more classes at off peak hours, instead than early in the morning or early in the afternoon, which causes arrival and departure times at peak hours. Since numerous classes start during the commuting peak hour in the morning, many students leave their home an hour earlier, in order to avoid traffic and find a parking space. They get to school very early, even though they may not have classes until mid morning; indicating that the parking situation affects the arrival time of students. Therefore, TU will increase the probability to have more students arriving at off peak hours since traffic and finding a parking space would not be a problem if they use the train.

5.2.2 Implications of the Solutions to the Parking Situation at Schools

Student respondents indicated the three most important solutions to the situation of parking at their schools. The implications of these solutions are presented in Table 5.5.

Table 5.5: Implications of the Solutions to the Parking Situation at Schools

Solutions to the Parking Situation at Schools	
Finding	**Implications (O: TU Operations, M: TU Marketing, U: Universities)**
Three top solutions to the parking situation at schools were: *1- More parking spaces* *2- Improve transit services* *3- Provide transit incentives*	**O**: TU has to provide efficient service since transit expectations are high. **M**: Marketing campaign should give emphasis to the merit that transit is seen as a possible solution to the parking situation. **U**: Universities are limited in space and in resources to increase parking demand. Transit use should be promoted extensively, since students ranked this solution as the second and third most important in improving the parking situation.

According to the survey, students believe that providing more parking spaces the situation of parking at their schools would be solved. Students are demanding more parking spaces and universities are limited in space and in resources to increase this demand. Improving the parking situation should be a priority for the university, since students considered this issue very important and it is an indicator of the urgent need for an alternative to driving. Therefore, they should provide students with more parking spaces where possible (e.g., charging faculty and staff for parking to concede more spaces to students). But, these should be done at the same that incentives to discourage auto use are provided (e.g., parking privileges to those that carpool, promote the use of alternatives to the car like walking, bicycles, and transit). Transit use should be promoted extensively, since students ranked this solution as the second and third most important in improving the parking situation. Students believe transit could improve the parking situation, therefore it is important that TU provides efficient service since expectations of transit are high. TU marketing campaign should target the merit that transit is seen as a possible solution to the parking situation, and effectively persuade students to use TU because it will improve the parking situation.

5.2.3 Implications of the Attitudes towards Tren Urbano

Attitudes towards Tren Urbano were collected including knowledge about the project, proximity to a TU station, purpose of riding it, perception of service attributes, expected frequency of use,

effect in school's parking situation, reasons to ride it, and willingness to fare. All these attitudes and its implications to Tren Urbano itself and the universities are presented in Table 5.6.

Table 5.6: Implications of the Attitudes towards Tren Urbano

Implications of the Attitudes towards Tren Urbano	
Finding	**Implications (O: TU Operations, M: TU Marketing, U: Universities)**
Seventy two percent (72%) perceive they know little about Tren Urbano project	**M**: A massive public information campaign targeted to university students exclusively is necessary to increase the probability of students riding TU. **U**: Should be ambassadors of the project at all school activities including orientation week, open houses, registration day, and others.
Students that do not have a station close to home are least likely to ride TU.	**O**: Buses and publicos need to feed the train efficiently since these integrated services cover more area than TU. **M**: Marketing campaign should promote buses and publicos service since they are important for TU.
Do errands and go to the university are the top trip purposes of TU	**O**: Usage of TU to go to school means that university students have the potential to become regular riders of Tren Urbano. **M**: Occasional travel (do errands) is the top trip purpose, therefore marketing efforts should be focused in promoting a more frequent use of TU, primarily to go to school. **U**: It is important that schools promote TU to go to school in order to make university trips the top trip purpose of TU among university students because this will reduce demand for parking.
Three top attributes of TU service were: *1- Personal security* *2- Schedule adherence* *3- Accessibility to places student visit*	**O**: Needs to be a secure environment, provide on-time service, and be accessible to the places students frequent in order to satisfy students' expectations and be able to retain them as riders. **U**: Security is very important for students, therefore the campus needs to be a secure for students to walk to the station. **M**: Marketing campaign has to portray that TU is a secure, on-time and accessible mode of transportation.
Anticipated usage of Tren Urbano indicates that 26% would be occasional riders and 37% would be rare riders.	**M**: Specific marketing strategies for the segment of rare users need to be effectively executed in order to convert them into occasional or regular riders. Occasional users need to be impressed with TU service since the first time. **U**: Thirty seven percent (37%) of students that would regularly use TU, means less traffic, more parking spaces available, and more accessibility to students.
Forty nine (49%) perceive TU will improve the parking situation at their schools	**M**: Needs to be emphasized to students in the marketing campaign to convince them to use TU because of would improve the parking situation. **U**: Cooperation with TU in promoting the system among the student population is necessary for TU help be able to improve the parking situation.
Three top reasons to ride TU were: *1- To avoid heavy traffic* *2- To avoid finding parking* *3- Savings in travel time*	**M**: These benefits of TU should be heavily emphasized in the marketing campaign targeted to university students, especially those that drive to school. **U**: Should get this message across to students on its promotional campaign about TU because students may drive less and ride TU more.

Students are not willing to pay more than $1.00 for a one-way trip in TU	**O**: Fare should not be more than $1.00. Transfer fee should be low since students are very sensitive to pay more than $1.00 for their trip. **M**: Marketing needs to promote special fare incentives, so students feel they are getting a lot more for what they are paying.

Knowledge about TU: Regression results indicate that the less a student knows about the project, the least likely is to use TU. Therefore, a massive public information campaign targeted to university students exclusively is necessary to increase the understanding of the project and the probability of students riding TU. Universities can educate students about TU as well, compromising to start an educational campaign, effectively and well organized, and becoming ambassadors of the project in all classes and at all school activities, including promotional material during orientation week, registration day, open houses or any other school event. This effort should be carried on with the support of the student association groups.

Proximity to a Station: Students that do not have a station close to home are least likely to ride TU. Since TU alignment is limited, buses and publicos need to feed the train efficiently since these services cover more area than TU. Transfers among these systems need to be easy and convenient to the student. Not only TU should be promoted and explained in detailed in the marketing campaign, but buses and publico service should be emphasized too since they are crucial for TU.

Trip Purpose: Do errands and go to the university are the top trip purposes of TU. Students that would use TU do errands will use it occasionally, while those that use it to go to school would use in a more frequent basis, therefore university students have the potential to become regular riders of Tren Urbano. However, usage of TU to go to the university should be the first trip purpose of college students. The fact that occasional travel (do errands) is the top trip purpose, indicates that marketing efforts should be focused in promoting a more frequent use of TU, primarily to go to school. Furthermore, the use of TU to do errands while in school is not positive for the universities because it means that students are parking their cars in school and then using TU, therefore is not reducing parking demand. It is important that schools promote TU to go to school, in order to make university trips the top trip purpose of TU among university students.

TU Service Attributes: Personal security, schedule adherence and accessibility to places student visit are the three top attributes of TU service according to survey respondents. For this reason, TU needs to be a secure setting (maybe with security guards, surveillance cameras,

proper illumination, etc.) and provide on-time service in order to satisfy students' expectations and be able to retain them as riders. It needs to be accessible to the places students frequent. It should investigate which are these places and try to locate them close to the stations or as concessions. Again, emphasis on bus and publico service is necessary to make the system more accessible to student needs. Since security is very important for students, the campus needs to be a secure one too. Appropriate illumination is important in the walkways to the TU stations and security guards circulating in school at night might be a good idea. The marketing campaign has to make sure it emphasizes and portrays that Tren Urbano is secure, on-time and accessible. If these attributes are not accentuated in the marketing efforts, students will not feel motivated to ride it because are not sure Tren Urbano will have the attributes they want to see in a transportation service.

TU Anticipated Usage: Anticipated usage of Tren Urbano responses indicates that 26% would be occasional riders and 37% would be rare riders. Rare users, especially drivers, need to be attracted to TU in order to convert them in occasional or regular riders. Specific marketing strategies for this segment of rare users need to be effectively executed. Occasional users need to be impressed with TU service when they ride it for the first time so they enjoy it and be willing to use it again. First impression is very important. For the universities, the thirty seven percent (37%) of students that would regularly use TU means less traffic, more parking spaces available to those that have no other choice than to drive to school, and more accessibility to their students.

Effect in Parking: Forty-nine (49%) perceive that TU will improve the parking situation at their schools. This perception needs to be emphasized to students in the marketing campaign to convince them to use TU because of its benefits, like improving the parking situation. But, TU will help the university on its parking situation only if the university cooperates with TU in promoting the system among the student population.

Reasons to ride TU: The three top reasons to ride TU are to avoid heavy traffic, to avoid finding parking, and save in travel time, as indicated by students. These benefits of TU should be heavily emphasized in the marketing campaign targeted to university students, especially to those that drive to school, since they would not stress in traffic, have to find a parking, and probably would take less time to get to school if they ride TU. Universities should get this message across to all its students on its promotional campaign about TU because it could mean that fewer students would drive to school and more would ride TU.

Fare Willingness to pay: Students are not willing to pay more than $1.00 for a one-way trip in TU, therefore fare should not be more than $1.00. If a transfer fee is going to be charged, it should be low since students are very sensitive to pay more than $1.00 for their trip. Therefore, marketing efforts should promote special fare incentives like discounts on stores, frequent user passes, affinity programs (the more you ride, the more you save), so students feel they are getting a lot more from the fare they are paying.

5.2.4 Implications of the Attitudes towards UPASS

The implications that student's attitudes towards UPASS have in Tren Urbano and in the universities are very important to recommend a university pass program for Tren Urbano. These implications are summarized in Table 6.7. In the next chapter, the final recommendations for a UPASS program for San Juan's university population will be detailed and it will be based on the implications presented below and the experience of these unlimited access programs in other cities and universities.

Table 5.7: Implications of the Attitudes towards UPASS

Attitudes towards UPASS	
Finding	**Implications (O: TU Operations, M: TU Marketing, U: Universities)**
Ninety one percent (91%) feel motivated to use TU if they own a UPASS	**O**: Implementing UPASS is very positive for TU ridership and transit image in general since almost all students would feel motivated to use it, creating a constituency for the future. **U**: Knowing TU would benefit the university in different ways, universities should get involved in a partnership with TU in order to provide this pass to students.
Sixty seven percent (67%) consider using their car less if they have a UPASS	**M**: Excellent news for TU, since UPASS could attract drivers to the system, therefore TU needs to convince them that TU is a true alternative to the car. **U**: If a reduction in the vehicle trips done to school is possible, it would mean good news to the university since the traffic and parking situation would improve.
Seventy seven percent (77%) would like to use their UPASS in buses and publicos too	**O**: Integrating buses and publicos is crucial in order to attract students to the transit system in general. **M**: UPASS would make the integration among the systems more convenient to students, therefore it is important to promote this benefit.
Ninety five percent (95%) would like to receive special discounts with UPASS	**M**: Partnership with businesses is crucial to market the idea and promote its use among students. **U**: Could provide discounts in books, food, or other university services.

Three top benefits of UPASS were: *1- Reduce transportation expenses* *2- Use car less* *3- Do errands while in school*	**M**: These benefits should be accentuated on the promotion of the UPASS idea to students, and also in the marketing campaign of Tren Urbano. **U**: Schools need to promote these benefits as well because if more students agree to participate in a UPASS program, the program is approved faster and more students would be willing to pay for the cost of this pass.
UPASS cost should be less than $50 per semester or trimester.	**O**: TU needs to analyze the revenue expected if UPASS is provided to all students or only to those interested. It is important to calculate where TU will break even or loose the less amount of fare revenue. However, the cost decided should not be more than $50 per semester/trimester, since the majority of students considered this a fair cost for the pass. **U**: UPASS should be promoted as another service of the university that exclusively benefits the students. The cost of UPASS should be negotiated with TU in order to agree in a reasonable cost for students.
Forty eight percent (48%) agree to include UPASS cost in their tuition	**O**: Almost half of the population is willing to pay for it in their tuition therefore, the possibility of providing a direct subsidy decreases. **M**: Since the other half disagrees, major marketing efforts are needed in order to increase the possibility of having more students willing to pay for the pass in their tuition. **U**: Need to clearly explain to students and parents that, if cost of pass is included, the increase in tuition is because of the pass and not for any other fees. The fact that almost half of the population is willing to include the cost in their tuition is positive since students need to approve it through an election process.
Over 60% indicated that university or government should take the initiative of implementing UPASS	Both, TU and universities need to coordinate efforts in initiating a UPASS program because it will benefit the university and TU, as well as the university students.
Over 50% expect that either the university or the government should pay the cost of the pass	A subsidy from both, TU and the universities might be necessary to start the program, since only half of the students are willing pay the cost of UPASS in their tuition.
Fifty four percent (54%) feel that only those interested should participate in the program	**O**: This reduces the probability of producing a positive effect in transit ridership. Since fewer students are paying for it, the unit cost of the pass would be higher. **U**: Schools have the responsibility of distributing UPASS, record and document all the process of distribution and charge the cost of UPASS to only those enrolled in the program.
Ninety six percent (96%) are in favor of the program	Both, TU and universities should take full advantage of this opportunity and effectively plan, coordinate and implement this idea that will result in a win-win situation for TU, the universities and the students.

Motivate use of TU: According to the survey respondents, implementing a transit pass program exclusively for university students would motivate almost 91% of the students to use TU, therefore this is very positive for TU ridership and for transit image general. If nine out of ten students feel motivated to use TU with a UPASS and knowing that TU would benefit the university in different ways, universities should get involved in a partnership with TU in order to

provide this pass to its student population since it will help to create a constituency of Tren Urbano users.

Consider using car less: Sixty seven percent (67%) would consider using their car less if they have a UPASS. This is excellent news, because if UPASS could attract drivers to the system, TU marketing efforts need to convince them that TU is a true alternative to the car. If a reduction in the amount of vehicle trips done to school is possible, it would mean good news to the university since the traffic and parking situation could improve.

Use in Integrated transit system: Seventy seven percent (77%) would like to use their UPASS in buses and publicos too. Therefore, integrating buses and publicos is crucial in order to attract students to the transit system in general. Revenue allocation when UPASS is used among the systems is a major issue and it needs further analysis. UPASS would make the integration among the systems more convenient to students, therefore it is important to promote this benefit at each school.

Special Discounts: Ninety five percent (95%) of student respondents would like to receive special discounts with UPASS. Therefore, partnership with businesses is crucial to market the idea and promote its use among students. This will be an extra incentive that the UPASS would provide them in addition to unlimited travel in TU. Universities could provide discounts to UPASS holders in books, food, or other university services.

Benefits of UPASS: Students indicated that the three top benefits of UPASS were that it reduces transportation expenses, would use car less, and would do errands while in school. These benefits should be accentuated on the promotion of the UPASS idea to students, since are the three benefits that they consider most important of UPASS. Schools need to promote these benefits as well because if more students agree to participate in a UPASS program, the program is approved faster and more students would be willing to pay for the cost of this pass.

UPASS Cost: UPASS cost should be less than $50 per semester or trimester, according to survey findings. TU needs to analyze the revenue expected if UPASS is provided to all students or only to those interested. It is important to calculate where TU will break even or loose the least amount of fare revenue. However, the cost decided should not be more than $50 per semester/trimester, since the majority of students considered this a fair cost for the

pass. Universities should promote UPASS as another service of the university that exclusively benefits the students, however the cost of UPASS should be negotiated with TU and with the students in order to agree in a reasonable price for students.

Included in Tuition: Forty eight percent (48%) of surveyed students agree to include the UPASS cost in their tuition. This is good for TU since almost half of the population is willing to pay for the pass in their tuition therefore, the possibility of providing a direct subsidy decreases. However, the other half is not willing to pay for the UPASS in their tuition. Therefore, major marketing efforts are needed to explain the benefits of UPASS to this segment of the population in order to increase the possibility of having more students willing to pay for the pass in their tuition. If the cost of the pass is included in the tuition, the university needs to clearly explain to students and parents that the increase in tuition is because of the pass and not for other fees. Students need to approve the inclusion of the cost in their tuition through an election process, and the fact that almost half of the population is willing to include it, is good news.

Initiate the program: Over 60% indicated that the university or the government should take the initiative of implementing the UPASS program. Both, TU and universities need to coordinate efforts in initiating the program, but they have to absolutely believe that UPASS will benefit the two institutions, but most importantly, that it will benefit the students.

Cost the program: Over 50% of student respondents expect that either the university or the government will pay the cost of the pass. In this case, a subsidy from both, TU and the universities might be necessary to start the program, since only half of the students are willing to pay the cost of the UPASS with their tuition. External funding (e.g., private sponsorship, federal aid, alumni, or others) should be requested in order to cover the costs of implementing and managing the program that will benefit TU, the universities, and the students.

Participants: Students surveyed indicated that fifty four percent (54%) feel that only those interested should participate in the program. If only those interested would sign up for the pass, this reduces the probability of producing a positive effect in transit ridership. The unit cost of the pass would be higher since fewer students are paying for it, meaning that a higher subsidy could be necessary. Since schools have the responsibility of distributing the UPASS, they have

to record and document all the process of distribution and charge the cost of UPASS to only those interested and enrolled in the program.

General Opinion: Ninety six percent (96%) of survey respondents are in favor of the program. Both, TU and universities should take full advantage of this opportunity and effectively plan, coordinate and implement this idea that could result in a win-win situation for TU, the universities and the students as well. Since a significant number support the idea of a UPASS, it is very important to have the student body involved in the process of implementing this idea.

Chapter 6: Summary and Recommendations

The following chapter provides a brief summary of the research conducted on the university population of San Juan. It also discusses the most relevant research findings and implications about the attitudes, preferences and knowledge of students towards transit in general and towards Tren Urbano. Given these, both promises and challenges arise. Several strategies are recommended to leverage these promises and manage these challenges. The chapter concludes by indicating the limitations of the research conducted but designating the opportunities to extend this research in the future.

6.1 Importance of the University Population of San Juan

The university student population of San Juan definitely represents a significant and potential market for Tren Urbano. Nearly 39,000 students attend the five major universities that are close to a Tren Urbano station. Given this proximity, university students represent a unique market opportunity for transit. AMA, Metrobus and publicos currently serve these university communities; however, this patronage is very low. The introduction of Tren Urbano represents a perfect occasion to target this untapped market segment of the San Juan population and create a constituency of transit users among university students. Hopefully, they will change the usual travel behavior in San Juan, making more use of transit and less use of the car. Market research efforts are necessary to better understand university students' attitudes and preferences towards transit. Knowing transit's customers better will provide Tren Urbano with the right tools to target this population and attract or retain them as riders.

6.2 Transit Market Research

Market research tools allow gathering information so that Tren Urbano can be better adapted to the needs of the customers. In order to attract effectively the university population to transit, it is essential that marketing research techniques be used to identify and define the marketing opportunities this segment of TU market represents and to generate and refine marketing actions that would be appropriate for the university student population.

This study provides a comprehensive market analysis of the university population of the San Juan metropolitan area and serves as a baseline of data to understand the attitudes, knowledge and preferences of the university students. Since no quantitative study on the university population has been done before, this thesis can be considered a cornerstone study.

A survey was conducted and thousands of university students were surveyed and asked about their attitudes, preferences, and knowledge about Tren Urbano, but also about transit in general, the parking situation at their school, and the concept of an unlimited transit pass. This information collected will help Tren Urbano better understand the university population and know how informed are the students about the project, their preferences in terms of service characteristics, proximity of stations, trip purpose, frequency of use, fare, and motives to ride it.

The survey also collects the students' attitudes about the idea of having an unlimited access transit pass or UPASS. With this information, Tren Urbano and the universities will know if having a transit pass would motivate students to ride transit. They would also know if it will make the students use their car less, how much they think it should cost, if they would like to have it included in their tuition, who should implement and pay for it, and who should benefit from it. All the information collected with the survey generates important details of the university population in terms of their travel behavior and their expectations towards Tren Urbano. These are important to know if transit wants to effectively attract the university population and encourage this segment of the population to become a regular market of Tren Urbano and transit in general in San Juan. Therefore, the most meaningful results are detailed in the following section.

6.3 Attitudes and Preferences Towards Transit

Survey results indicate that university students prefer driving a car than taking transit.

- 74% have accessibility to a car to go to the university.
- 68% drive alone to campus to go to classes.
- 8% take transit to go to school.
- 57% or more have never used the current transit services of San Juan.

About three-quarters of the university population have a car accessible to go to school. This encourages students to drive to school since the more accessibility people have to a car, the more likely they are to drive it. This is demonstrated in the high percentage of students that drive alone to go to school. Sixty eight percent of students choose to drive to go to their classes, while only 8% are taking transit. These figures may be because of two reasons. First, students may like driving more than taking transit to go to school because the car is convenient, flexible, and they feel more independent. If they ride transit, they depend on a schedule, the accessibility is limited, and they are sharing their journey with others. Second, transit may not

be an alternative to many students because it does not serve the area where they live or travel, the service is unreliable that they do not trust it, or they are not well informed about the transit services available and its benefits.

However, university students have hope in transit.. When the students surveyed were asked what would be their solutions to the parking situation at their schools, the primary response was to build more parking. Regardless, the next solution for students was to improve the transit services and to provide students with incentives to use transit. This demonstrates that students have faith in transit, but only if the services improve and an incentive is provided to them in order to encourage choosing transit over driving. Therefore, transit services, as they are right now, do not encourage students to leave their car, or to simply do not buy a car, and take transit to school. Maybe university students see Tren Urbano as an opportunity to improve the transit system and therefore, change their attitude about transit services of San Juan in general.

Then, what are the attitudes of students about Tren Urbano? The most significant results about Tren Urbano were:

- 72% perceive they know little about Tren Urbano project.
- 27% would only get to a Tren Urbano station by car, while 21% perceive TU do not serve their area.
- 50% would use Tren Urbano to do errands while in school, while 42% would use it to go to school.
- Personal security, schedule adherence, and accessibility to the places students visit more often are the three attributes students consider very important in Tren Urbano service.

Over 70% of university student feel they know little or very little about the Tren Urbano project. This percentage indicates the level of information university students have about this new transportation system of San Juan. This perception of the students surveyed may indicate that students have heard about the project but do not know important details about it. Twenty seven percent also perceive that they would only get to the TU station closer to their home by car. Maybe the station is only accessible if they drive to the station. However, it may be the case that students perceive that they can only access the station driving when in fact they can walk. In addition, twenty one percent understand there is no station close to their home,

indicating that there is a fifth of the population surveyed that Tren Urbano does not serve and will be difficult to attract to use the train regularly.

Survey results show that about half of the population surveyed indicated that if they were going to make use of Tren Urbano, they would use it to do errands. Forty two percent indicated they would use it to go to the university. These answers are both promising and preoccupying. If about half of the population of students will use Tren Urbano to do errands while in school, this means that students will probably drive their cars to campus and use the system to do their errands while in school. This is not positive for the universities that want to decrease the number of cars that enter the campus everyday. The favorable thing about this is that these type of trips are occasional and not on a regular basis. The good news is that about 42% of students indicated that if they were going to ride Tren Urbano, they would use to go to school. This means that students would make use of Tren Urbano on a regular basis to go to classes.

Another important finding about the university population preferences about Tren Urbano are the service attributes. University students consider personal security as the most important attribute in Tren Urbano service. If they feel unsecured, they probably would not use it. They also placed a lot of importance in schedule adherence, indicating that students expect Tren Urbano service to always be on time. In other words, they do not want to stand in the platform and wait several minutes until the train comes. They anticipate a very punctual service. Students would also like to visit places they frequent a lot with Tren Urbano. However, Tren Urbano alignment is limited and fixed and this is why the current transportation services, Metrobus, AMA and publicos, play such an important role for Tren Urbano, since they would increase the accessibility of the stations it these transit services also offer maximum personal security and on time service.

6.4 Promises and Challenges for Tren Urbano

Given these preferences in choice of travel and attitudes towards Tren Urbano service, many promises and challenges arise. These are the following:

- 37% perceive they would use Tren Urbano regularly (i.e., everyday or more than once a week) given the proximity of the university to a TU station.
- 63% is unsure to use Tren Urbano regularly.

- The top reasons to consider using Tren Urbano are to avoid traffic, to avoid finding parking, to save travel time, and to reduce transportation costs.
- Nine out of ten (91%) university students would feel motivated to use the system if they had a UPASS.
- 68% of students with a UPASS would highly consider using their car less and taking transit more.
- 77% feel largely interested in using UPASS also in Metrobus, AMA and publicos.
- 43% of the single unemployed men surveyed would ride Tren Urbano regularly.
- 50% of the graduate students that walk to school would ride Tren Urbano on a regular basis.
- 48% of the unemployed graduate students would ride Tren Urbano regularly.

6.4.1 Promises

Students surveyed indicated that the top reasons for them to use Tren Urbano were to avoid traffic, to avoid finding parking, to save travel time, and to reduce transportation costs. These reasons indicate that all are considerations of university students that drive. In some manner, it shows that they see Tren Urbano as an alternative to the car because they do not have to be stuck in traffic, they do not have to waist time finding parking, and they would reduce their travel time and save in their transportation expenses. This is very promising for Tren Urbano since these are the reasons that students have identify that would make them ride the system and at the same time are the arguments to persuade university students to leave their car at home and take transit.

The UPASS or university transit pass program was included in the survey and presented to the university students to gather their opinion about it. Overwhelmingly, nine out of every ten students surveyed indicated that having a UPASS would motivate them to use Tren Urbano. This fare-free incentive and transit marketing strategy might be the approach necessary to capture the 63% of university students that perceive they would not make use of Tren Urbano regularly. Based on this survey result, Tren Urbano could be able to attract that segment of the university student population that is not sure of using the system or do not want to use it at all. If all students have this pass, even if they consider using the system occasionally or rarely, with the unlimited access transit pass, they would feel encouraged to try it. Once they ride the system and they experience its benefits, they would continue making use of it, hopefully becoming regular riders of the system.

In addition to this benefit of having a UPASS program, survey findings show that 68% of the students surveyed would highly consider using their car less and taking transit more. This is very favorable for Tren Urbano, the university and the UPASS concept because providing students with a UPASS would not only encourage traditional non-transit users but also motivate drivers to leave their cars and use transit. Seventy seven percent of the university students surveyed show considerable interest in using the UPASS not only in Tren Urbano, but also in Metrobus, AMA and the publicos. This is very important for Tren Urbano and the public transportation system in general, because in order to increase the accessibility of Tren Urbano, it has to be well integrated with the other transit services of the San Juan metropolitan area. Integration among these systems will be more effective if users can use the same fare medium to access them all. UPASS offers students this convenience since they do not have to pay a fare every time they use one of the integrated transit services. This is very promising for the public transportation systems of San Juan, since this convenience that UPASS offers will encourage the use of not only Tren Urbano, but of Metrobus, AMA, and publicos too.

Regression results identify specific market segments of the university student population that are promising for Tren Urbano or more likely to ride it. The most significant segment of the university student population market are single unemployed men, graduate students that walk to school and unemployed graduate students. These three segments indicate the higher shift of rare users and occasional users to regular riders. Marketing campaign of Tren Urbano needs to generate marketing strategies to these segments of the university population because are the most likely to ride Tren Urbano regularly and more often.

In conclusion, this thesis work has presented the attitudes and preferences of the university student population and its promises and challenges to Tren Urbano. Auto dependency among students is high, however students have faith in transit. A strong marketing effort is needed to inform them about the benefits of transit and to make them believe that transit is a real alternative to the car. Tren Urbano faces several challenges, as mentioned before, however the most significant one is the vague level of information university students have of the TU project. It is important to continue the marketing research efforts presented in this work to understand what attributes of Tren Urbano are important to the customer, in this case the university students. This way the marketing or informational campaign will be effective. It will be giving the message students want to hear and care about the new transportation mode being built in Puerto Rico.

6.4.2 Challenges

There is a need to capture over 60% of university students that indicated that they would ride Tren Urbano occasionally or rarely. It can be assumed that this segment of the university student population surveyed are not sure about how many times they would ride Tren Urbano. This premise may be a result of different factors. First, the fact that university students prefer to drive than to take transit, as mentioned earlier, may be a reason why students do not feel they would use Tren Urbano on a regular basis. In addition, maybe the Tren Urbano alignment limited extent affects the decision of the students to use it on a regular basis, since it would not provide them with the accessibility they need to move to the places they frequent. Another factor could be the little level of knowledge university students have about the project. Students may not know where the stations are located, the role it plays for the transportation system of San Juan, or the benefits and costs of riding it. This may create skepticism among the students, making them indecisive about using it. For whatever reason they might have, it is important to attract this 63% of doubtful university students to Tren Urbano. In other words, the challenge is to develop marketing strategies that would encourage this segment of the university student population to make more use of Tren Urbano in the future.

6.5 Recommendations for Tren Urbano

The survey findings and analysis suggests a series of follow up actions for Tren Urbano. These include instituting a:

- Continuing and sustained market research effort;
- Piloting UPASS program (demonstration project); and
- Integrating market research and UPASS program with AMA, Metrobus and publicos.

Continuing and sustained market research effort: Market research tools are very important to understand what attributes of a product or service are important to customers, in other words, their preferences. Tren Urbano is in a unique opportunity of becoming a customer-oriented transit system. It is a new system that has the opportunity before it starts operations to conduct market research studies in order to understand its potential markets and generate effective and specific marketing actions that will attract these markets to Tren Urbano. Once Tren Urbano starts operations, the market research efforts should not stop. It should continue and be sustained since new markets will be emerging and current market needs will change over time.

It is important that Tren Urbano market research efforts monitor these changes and adapt their marketing actions (promotions, service, fare, etc.) to the new needs and preferences of their customers.

The university student population market research efforts should continue. This thesis work produced an initial and unique baseline about the university population along the Tren Urbano corridor. However, the methodology presented here should be adapted, improved and adjusted to obtain an ongoing database that better studies the university population, its needs, preferences and attitudes towards transit and identifies student users profiles. University students are a dynamic population that each year is different with each incoming class. Attitudes and preferences change over time and it has been demonstrated in this thesis that university students represent a potential market for transit agencies when provided with fare incentives. Therefore, in order to maintain the potentiality of this market, attitudes and preferences need to be monitored over time and market research studies should be conducted regularly in order to retain the university students as customers and attract them more.

UPASS pilot program: It has been demonstrated in this thesis work the positive impact providing a UPASS program in the universities along Tren Urbano corridor have for the universities, the students, and Tren Urbano. Ninety one percent of the student population surveyed indicated they would feel motivated to use Tren Urbano if they have a UPASS. Based on the success these unlimited access programs have had in large urban areas of the United States that serve university communities (i.e, Chicago, Pittsburgh, and Seattle), the benefits presented in this thesis for the San Juan;s university population, and the overwhelming number of students that would feel motivated to use Tren Urbano if they have a UPASS, it is recommended to implement a UPASS program for Tren Urbano and universities.

However, this implementation should be done in phases. The program should be adopted as an experimental program first, where it can be implemented and later evaluated and analyzed. The implementation in phases allows for lower start-up costs and better acceptance of the program since it is a demonstration project. If the results are not the expected, the program can be canceled and it is said that the experiment failed. However, if the results are the expected, the program can be developed even further since the experiment was a success. This way Tren Urbano, universities and students would be less skeptical about it and supportive of the program. One possible implementation plan could be described in three phases: short, medium and long-term phase.

- Short-term Phase: Engage the University of Puerto Rico (UPR) to enter into a UPASS agreement with Tren Urbano. UPR is the largest university student population of the San Juan metropolitan area (53%) and the best served by transit (TU station is in front of the main entrance and several AMA and publico routes and the Metrobus serve the area). University officials and students are seeking alternatives to the automobile because the parking situation at the campus is very critical. Therefore, offering a UPASS to UPR students could provide a good opportunity to test the program and see its results and impact.

- Medium-term Phase: This phase would be an evaluation of the first phase and the chance to demonstrate the effectiveness of the program to the other schools. Marketing efforts to engage other universities should be accomplished during this phase. Other incentives for having UPASS could be adapted in order to gain more acceptance of the program. For example, store or special events discounts or priority in school processes like registration.

- Long-term Phase: This last phase would be when the other schools join the program. This is the long-term goal of the UPASS concept, to have as many students participating in the program and taking advantage from it. Because the short-term benefit is for the students, but the long-term benefits are for the university and Tren Urbano (i.e, reduced demand for parking and ridership growth respectively).

This phase implementation plan depends on many issues that need to be discussed prior to the implementation of a UPASS program. These are eligibility, funding, cost reimbursement, fare media, and marketing among others issues. The plan presented in this thesis should serve as an initial and possible recommendation but not as a final implementation plan because these other implementation issues have to be resolved first and agreed among Tren Urbano, the university officials and the students.

Integrate market research and UPASS program with AMA, Metrobus and publicos: Given the importance AMA, Metrobus and publicos play in enhancing Tren Urbano accessibility, it is very important that they are also included in the market research efforts and in the UPASS program. It is important to know the students' attitudes and preferences towards these other transit services. If students do not feel attracted to these other systems because they do not satisfy

their preferences, they would not use them. Therefore, it is important to know the students' opinion of these services so they can adapt to the students' attitudes and better serve them. The survey conducted demonstrated that university students are very interested in being able to ride unlimitedly AMA, Metrobus and publicos if they had a UPASS. Therefore, it is crucial that the systems are effectively integrated because the potential to increase student patronage in these other transit systems of San Juan exists with an integrated system and the implementation of an unlimited transit pass.

In summary, these recommendations for Tren Urbano are not decisive. There are other areas in which the research presented and the recommendations given could be extended.

6.6 Suggestions for Future Research

There are several ways this comprehensive market study can be expanded. First, the market research efforts and the UPASS idea could be extended to faculty and staff of the universities. They are also part of the university community and also represent a possible market for Tren Urbano since their workplace is the university and the universities are well served by Tren Urbano. A fare incentive may also encourage them to take transit to work, therefore the idea of the UPASS could be offered to faculty and staff in addition to students, enhancing the benefits of this marketing strategy not only to a certain group of the university community (i.e., the students) but to the community in general.

Another way to further continue with this research is to completely analyze the concept of implementing a UPASS program and the issues it involves. The eligibility, funding, cost reimbursement method, distribution, marketing, administration, and other issues need to be analyzed specifically in order to effectively implement a UPASS program. Also each school needs to be analyzed individually since each of the schools is a particular case and considered different segments of the university students population market of Tren Urbano. The market research conducted indicates that preferences and attitudes among schools vary. Since the recommendations presented in this study are for the general university population of the San Juan metropolitan region, therefore it would be more effective if each school is analyzed particularly and specific marketing actions or recommendations are presented for each school.

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Appendix A: Focus Group Discussion Guide

Introduction

Welcome, I am a master's student in the Center for Transportation Studies at MIT. I am studying the transportation needs of the university population in the San Juan metropolitan area. I would like to know about your typical travel day, your travel options, and your expectations with Tren Urbano. The information gathered today will be used to develop a survey that later will be distributed to a larger population of students in each university. *I will ask some questions to generate the discussion, but I am a moderator, the discussion is among you.* Let's get started with the discussion...

Travel day

- ✓ Introduce yourself indicating your name, where you live during school, your major, the university you attend, and how you get to school?
- ✓ What is like for a university student like you, get around in the metropolitan area? Is it easy or difficult? Why?
- ✓ How serious is the traffic and parking situation at your university? What do you think of its parking policy? How would you improve it?
- ✓ What is your typical day like?
  - From where, to where, at what time of the day, and why you need to travel?
  - How many trips to school you make in a day? In a week? Why?
  - Do you make any trips while in school (go out and comeback)? Do you need to go somewhere else than to your home before/after school? Why?
  - What places do students frequently visit? How often you go to these places? Do you go alone or with someone?

Travel options

- ✓ What mode of transportation you primarily use to go to school?
  - Which one you prefer? Why?
  - What other transportation modes you use? In what circumstances? Why?
  - If something happens to your primary transportation mode, what alternative transportation mode you use? Why?
  - How much do you spend in transportation in a week? What do you think of this amount?
- ✓ *For the drivers*, why you drive to school?
  - Who owns the car you drive? Who pays for it? Who gives maintenance regularly to the car?
  - How many times in the week do you drive? To what places?
  - How far you drive to/from school? What other alternatives to drive have you considered, if any? Why?
  - Do you enjoy driving? Why? What you like/dislike about it?
  - How much money you spent in parking? How much time you spent looking for a parking spot? How do you feel about this cost (if any) and the time you spent?
  - What do you think of public transportation? Have you ever use it? Why?
- ✓ *For the transit users*, why you use transit to get to school?
  - What type of public transportation service you use: AMA, Metrobus, or públicos? Why?

- What to do you like about them? What do you dislike? Why?
- For what other trip purposes, other than school, you use transit? Why?
- What do you think about public transportation? Is it something beneficial to the community? Why? *Do you consider it an alternative to the automobile?*
- What are the advantage/disadvantages of getting around using transit?
- What do you think of the public transportation system in general in the SJMA? What do you think could improve it?

✓ *For the other students that walk, bike or are driven*, why you use this mode?
- How often do you use it? For what trip purposes? Why?
- What do you like about it? What you dislike?
- When do you use other transportation modes? Why?
- What are the advantages/disadvantages of transporting using the mode you choose?

Tren Urbano

✓ How familiar are you with heavy rapid rails? (Show pictures of TU: vehicles, interior, fare collection equipment) Have you ever ridden one? Where and when?
✓ What do you think about it? (After looking at the pictures) or what was your experience?
✓ How familiar are you with Tren Urbano? (Show stations, alignment-map of TU) What do you know about Tren Urbano so far?
✓ What do you expect with Tren Urbano as *a new option in the transportation system of the SJMA*?
- Are you aware that a TU station will be a walking distance (less than ¼ mile) from your university? Is this beneficial to the student population? Why?
- Is your home or work place close to any TU station? Which one? How close? Is this beneficial to you? Why?
- How will TU help meet your need of transporting to the places you frequent? Would it be an alternative to you? Why?
- Even if you do not use TU to get to school, would it still be an alternative for trips made while at school? Why? What other trips you think you will be able to make with TU?
- What do you think of TU as a link that provides access to the five major universities in the SJMA? What is the benefit to you? To others?
- What fare are you willing to pay to use Tren Urbano? Why?
- How do you think will TU help ameliorate the traffic and parking problems some of the university face? Why?
- Do you think students will be willing to transfer to other modes (buses and públicos) in order to get to their final destination? How important is to you that TU is effectively integrated with the other systems? Why?

✓ What kind of incentives are you expecting from TU or your university to motivate you to use the train?
- What do you think of student passes, given free by TU or the university, and gives you access to the train at any time to any place? Why?
- What do you think of discounted fares for students (half-price) given when you show your student ID? Why?
- What do you think of a frequent shuttle service to/from the station/university?
- What do you think of students employed by the train as operators, attendants, or customer's assistants? Why?
- What other incentive you might think will motivate you use TU? Why?

✓ What kind of disincentives to the automobile do you think the student population will accept in order to stimulate TU use?

- What do you think of making more restrictive the parking policies, increasing the parking fee, or limiting the parking spaces? Why?
- What do you think of giving parking privileges to the student population that commutes from areas outside the metropolitan area, and none to the ones that live close to TU stations, can walk, or have another alternative to drive? Why?
- What do you think about a publicity campaign in your university discouraging auto use? How do you think students would respond?

✓ What do you think is the major advantage of TU? Why?
✓ What do you think is the main disadvantage of TU? Why?

Appendix B: Survey Questionnaire (in Spanish)

Survey Cover Letter

Agosto de 2000

Estudiante universitario:

¡Saludos! Mi nombre es Jessica Y. Vargas y actualmente estudio una maestría con concentración en transporte público en el Massachusetts Institute of Technology. Como parte de mi tésis de grado estoy realizando un estudio sobre la población universitaria del área metropolitana y sus necesidades de transportación. El propósito de este cuestionario es entender mejor tus patrones, características y preferencias al viajar, conocer tu sentir acerca del sistema de transportacion pública, y evaluar una opción que te motive a utilizar el sistema de transportación pública a la vez que facilite tu movimiento por el área metropolitana.

El cuestionario puede resultarte algo extenso, pero el mismo es necesario para entender cabalmente tus necesidades y tu opinión. Al completar el cuestionario, estás aceptando ser parte de este estudio. Toda la información recopilada es voluntaria, anónima y será utilizada solamente para mi proyecto de tésis. Por favor, contesta todas las preguntas haciendo referencia a un día regular de clases y marcando con una equis, X, o una marca de cotejo, ✓, tu alternativa preferida o escribe tu contestación en el espacio provisto. De tener cualquier duda, no vaciles en preguntarme.

¡Gracias por cooperar con mi investigación! Espero que la misma sea de mucho beneficio para la población universitaria del área metropolitana en un futuro cercano. Gracias por tu tiempo y ayuda.

Sinceramente,

Jessica Y. Vargas
Estudiante Graduada
Massachusetts Institute of Technology
jyvargas@mit.edu
617-441-9434

Survey Questionnaire

1. ¿Dónde estudias actualmente?
[ ] USC [ ] UPPR [ ] UPR [ ] UMET [ ] RCM

2. ¿Dónde está ubicado el lugar del cual tú sales antes de ir a tu universidad?
[ ] Area metropolitana, municipio: _____
[ ] Fuera del área metro, municipio: _____

3. ¿Es este lugar:
[ ] tu hogar [ ] tu trabajo
[ ] tu hospedaje estudiantil [ ] el cuido de niños
[ ] otro: _____

4. ¿Cuánto tiempo te toma llegar a tu universidad desde este lugar (pregunta 3)?
[ ] Menos de 15 min. [ ] De 46 min. a una hora
[ ] De 15 – 30 min. [ ] Más de una hora
[ ] De 31 – 45 min.

5. ¿A dónde usualmente vas cuando sales de tu universidad?
[ ] Hogar [ ] Trabajo
[ ] Hospedaje estudiantil [ ] Cuido de niños
[ ] Otro: _____

6. ¿Cuánto tiempo te toma llegar a este lugar (pregunta 5) desde tu universidad?
[ ] Menos de 15 min. [ ] De 46 min. a una hora
[ ] De 15 – 30 min. [ ] Más de una hora
[ ] De 31 – 45 min.

7. Contesta las siguientes preguntas circulando el medio de transportación que regularmente utilizas de acuerdo a estas opciones:

1 AUTOMOVIL	**6** MOTORA/BICICLETA
2 TE LLEVAN Y BUSCAN	**7** TAXI
3 AMA	**8** CAMINAS
4 METROBUS	**9** OTRO
5 VEHICULO PUBLICO	**0** NO APLICA

7a. ¿Cómo usualmente llegas a la universidad?
1 2 3 4 5 6 7 8 9 0

7b. Si tu medio regular de llegar a la universidad no está disponible, ¿cómo llegas?
1 2 3 4 5 6 7 8 9 0

7c. ¿Cómo usualmente te vas de la universidad?
1 2 3 4 5 6 7 8 9 0

7d. Si tienes que realizar alguna diligencia (ej: ir al banco, almorzar, ir de compras) entre alguna de tus clases, ¿cómo te mueves para hacerla?
1 2 3 4 5 6 7 8 9 0

7e. ¿Cómo usualmente llegas a tu trabajo?
1 2 3 4 5 6 7 8 9 0

7f. ¿Qué modo utilizas cuando sales a hacer compras u otro tipo de viajes (ej: diversión, cultural, otros)?
1 2 3 4 5 6 7 8 9 0

8. ¿A qué hora regularmente llegas y te vas de tu universidad en este semestre? Déjalo en blanco si no asistes ese día.

Lunes	llego a las _____	me voy a las _____
Martes	llego a las _____	me voy a las _____
Miércoles	llego a las _____	me voy a las _____
Jueves	llego a las _____	me voy a las _____
Viernes	llego a las _____	me voy a las _____
Sábado	llego a las _____	me voy a las _____
Domingo	llego a las _____	me voy a las _____

9a. ¿Tienes un carro disponible, regularmente, para ir a tu universidad?
[ ] SI, pasa a la (b) [ ] NO, pasa a la pregunta 10

9b. ¿Eres tú el dueño(a) de ese carro?
[ ] SI
[ ] NO, ¿quién es el dueño entonces?: [ ] Padre/Madre
[ ] Novio(a)/Esposo(a) [ ] Familiar
[ ] Amigo(a) [ ] Otro:_____

10. ¿Cuánto dinero gastas en transportación a la semana? Incluye: gasolina, peaje, tarifa y estacionamiento, y excluye mantenimiento, mensualidad y seguro.
[ ] Menos de $5 [ ] $11 - $15 [ ] $26 - $50
[ ] $5 - $10 [ ] $16 - $25 [ ] Más de $50

11. Contesta las siguientes preguntas si llegas en automóvil a tu universidad. De lo contrario, pasa a la pregunta 12.

11a. ¿Pagas por un permiso por estacionar?
[ ] SI, pasa a la (b) [ ] NO, pasa a la (c)

11b. ¿Cuánto te cuesta el permiso de estacionamiento?
[ ] Menos de $25 por semestre o trimestre
[ ] Entre $25 - $35 por semestre o trimestre
[ ] Entre $36 - $50 por semestre o trimestre
[ ] Más de $50 por semestre o trimestre

11c. ¿Dónde te estacionas regularmente?
[ ] En un estacionamiento de la universidad
[ ] En un estacionamiento privado [ ] En la calle
[ ] Otro: _____

11d. ¿Cuánto pagas a diario por estacionar en este lugar (pregunta 11c)?
[ ] Nada [ ] $0.51 - $0.75/hr.
[ ] Menos de $0.25/hora [ ] $0.76 - $1.00/hr.
[ ] $0.25 - $0.50/hr. [ ] Más de $1.00/hora

11e. ¿Cómo tú describes el proceso de conseguir este estacionamiento?
[ ] Consigo estacionamiento en 5 minutos o menos
[ ] Tardo de 6 min. a 15 min. en estacionar
[ ] Tardo de 16 min. a media hora (30 min.) en estacionar
[ ] Estoy más de media hora buscando estacionamiento

12. ¿Cuáles crees serían tus soluciones para la situación de estacionamiento en tu universidad? En orden de preferencia del 1 al 7 indica las soluciones, siendo la 1 la de mayor importancia y la 7 la de menos. Utiliza todos los números una sola vez.

	Más espacios de estacionamiento
	Cobrar por estacionar o Aumentar precio del permiso
	Ser más estrictos con las normas de estacionamiento
	Proveer incentivos o ayudas para el uso de la transportación pública
	Mejorar el sistema de transportación pública
	Dar prioridad de estacionamiento a los vehículos con dos (2) o más pasajeros
	Otra: _____

13. Si se proveyeran incentivos o ayudas para el uso del sistema de transportación pública en tu universidad, ¿cómo crees que se afectaría la situación de estacionamiento?

[ ] Mejoraría [ ] Empeoraría
[ ] Se mantendría igual [ ] No sé

14. ¿Cuál o cuáles de los siguientes sistemas de transportación pública están accesibles a tu universidad? Marca todos los que apliquen.

[ ] Metrobus [ ] Vehículo Público
[ ] AMA [ ] No sé

15. ¿Cuántas veces usas los siguientes sistemas de transporte público? Circula tu contestación según las siguientes opciones:

1 TODOS LOS DÍAS DE LA SEMANA
2 MÁS DE UN DÍA DE LA SEMANA
3 UNA VEZ A LA SEMANA HASTA ALGUNAS VECES AL MES
4 UNA VEZ AL MES
5 ALGUNAS VECES AL AÑO
6 NUNCA

15a. Metrobus	1	2	3	4	5	6
15b. AMA	1	2	3	4	5	6
15c. Vehículo Público	1	2	3	4	5	6

16. ¿Cuál es tu opinión sobre los siguientes sistemas de transporte público? Circula tu contestación según las siguientes opciones:

1 MUY EFICIENTE **4** INEFICIENTE
2 EFICIENTE **5** NO SE
3 POCO EFICIENTE

16a. Metrobus	1	2	3	4	5
16b. AMA	1	2	3	4	5
16c. Vehículo Público	1	2	3	4	5

El Tren Urbano es un sistema de transporte colectivo nuevo que servirá al área metropolitana en los próximos años. Este sistema proveerá servicio a Bayamón, Guaynabo, Centro Médico, Río Piedras, Hato Rey y Santurce.

17. ¿Cuánto conoces sobre el proyecto del Tren Urbano?
[ ] Muchísimo [ ] Poco [ ] Nada
[ ] Mucho [ ] Muy Poco

18. ¿Cuán cerca está una estación del Tren Urbano del lugar donde vives regularmente?
[ ] Menos de 5 minutos caminando
[ ] De 6 a 10 minutos caminando
[ ] De 11 a 15 minutos caminando
[ ] Más de 15 minutos caminando
[ ] Sólo llegaría si voy en carro
[ ] No hay ninguna cerca (Tren Urbano no sirve mi área)
[ ] No sé dónde están las estaciones de Tren Urbano

19. ¿Cuán importante serían para ti los siguientes beneficios potenciales en el servicio que te brindará el Tren Urbano? Circula tu contestación según las siguientes opciones:

1 MUY IMPORTANTE	**4** NO IMPORTANTE
2 IMPORTANTE	**5** NO SE
3 POCO IMPORTANTE	

19a. Ahorro en tiempo de viaje	1	2	3	4	5
19b. Ahorro en gastos de transportación	1	2	3	4	5
19c. Disponibilidad de asiento	1	2	3	4	5
19d. Comodidad en el lugar de espera	1	2	3	4	5
19e. Opere siguiendo un horario fijo	1	2	3	4	5
19f. Máxima seguridad personal	1	2	3	4	5
19g. Limpieza y cuidado	1	2	3	4	5
19h. Servicio en las noches	1	2	3	4	5
19i. Facilite el acceso a lugares que visito regularmente	1	2	3	4	5

20. ¿Sabías que el Tren Urbano tendrá una estación muy cerca (menos de 400 metros o de 5 a 10 minutos caminando) de tu universidad?
[ ] SI [ ] NO

21. Ya que habrá una estación del Tren Urbano cerca de tu universidad,

21a. ¿Con qué propósito utilizarías principalmente el Tren Urbano? Marca todos los que apliquen.
[ ] Ir y venir a la universidad [ ] Ir y venir al trabajo
[ ] Ir y venir a mi casa [ ] Visitar amistades
[ ] Ir a actividades recreativas sociales o deportivas
[ ] Ir a almorzar o comer fuera de la universidad o mi casa
[ ] Realizar diligencias personales y/o relacionadas a la universidad
[ ] Ninguno [ ] Otro: _____

21b. ¿Cuántas veces utilizarías el Tren Urbano?
[ ] Todos los días de la semana
[ ] Más de un día de la semana
[ ] Una vez a la semana hasta algunas veces en el mes
[ ] Una vez al mes
[ ] Algunas veces en el año
[ ] Nunca

21c. ¿Qué impacto tú crees que tendrá el Tren Urbano en la situación de estacionamiento en tu universidad?
[ ] Mejoraría [ ] Empeoraría
[ ] Se mantendría igual [ ] No sé

22. ¿Por qué tú considerarías al Tren Urbano como un modo para transportarte? En orden de preferencia del 1 al 10 indica tus razones, siendo la 1 la de mayor importancia y la 10 la de menos. Utiliza todos los números una sola vez.

	Evito el tapón
	No tengo que buscar estacionamiento
	No tengo un vehículo
	Ahorro en tiempo de viaje
	Reduzco mis gastos en transportación
	Evito el estrés al conducir
	Reduzco el impacto al ambiente
	Es un modo seguro de transporte
	Puedo llegar a muchos lugares (accesibilidad)
	Otro: _____

23. ¿Cúanto es la tarifa máxima que estarías dispuesto a pagar por un viaje en una sola dirección en el Tren Urbano?
[ ] Menos de $0.75 [ ] Más de $1.50
[ ] De $0.75 a un dólar ($1.00) [ ] No sé
[ ] De un $1.00 - $1.50

24. Si se ofreciera un descuento para estudiantes en la tarifa del Tren Urbano, ¿te motivaría esto a utilizar el Tren Urbano?
[ ] Muchísimo [ ] Poco [ ] Nada
[ ] Mucho [ ] Muy Poco

En algunas universidades de Estados Unidos existe un pase ilimitado para el uso del transporte colectivo dirigido exclusivamente a estudiantes universitarios. Como parte de mi proyecto de tésis, estoy estudiando la posibilidad de implementar un pase similar para las universidades del área metropolitana. El mismo te permitiría utilizar, por un precio fijo, el Tren Urbano ilimitadamente (a donde quieras, cuantas veces quieras y sin pagar tarifa cada vez) mientras dure el semestre escolar. Las siguientes preguntas se basan en la idea de este pase especial.

25. Si tuvieras la oportunidad de tener este pase ilimitado para el Tren Urbano,

25a. ¿Te motivaría éste a utilizar el Tren Urbano?
[ ] SI [ ] NO

25b. ¿Considerarías utilizar el automóvil menos y usar el transporte colectivo más?

[ ] Muchísimo [ ] Poco [ ] Nada
[ ] Mucho [ ] Muy Poco

25c. ¿Te gustaría que el pase te permitiera utilizar el sistema integrado de transporte público: Tren Urbano, AMA, Metrobus y los vehículos públicos?

[ ] Muchísimo [ ] Poco [ ] Nada
[ ] Mucho [ ] Muy Poco

25d. ¿Te gustaría que este pase te ofreciera descuentos, sin costo adicional, en distintos establecimientos del área metropolitana como tiendas, restaurantes, juegos, museos y otros?

[ ] SI [ ] NO

26. ¿Cuál o cuáles tú crees serán los beneficios que te brindará este tipo de pase? En orden de preferencia del 1 al 8 indica los beneficios, siendo el 1 el de mayor importancia y el 8 el de menos. Utiliza todos los números una sola vez.

	Reduciría mis gastos de transportación
	Usaría mi carro menos
	Afectaría mi decisión de comprar un carro
	Buscaría hospedaje más económico o en areas más distantes
	Visitaría a mis amigos, o saldría a divertirme con más frecuencia
	Conseguiría un trabajo mientras estudio
	Realizaría mis diligencias mientras estoy en la universidad
	Otro: _____

27. ¿Quién o quiénes tú crees deben tomar la iniciativa para implementar este pase ilimitado en tu universidad? Marca los que apliquen.

[ ] La universidad
[ ] El consejo de estudiantes
[ ] La Autoridad de Carreteras y Transportación
[ ] Alguna entidad privada
[ ] Otro: _____

Este pase ilimitado se logra luego de un acuerdo financiero principalmente entre la universidad y/o los estudiantes y la agencia de transportación pública. El precio del pase depende de las negociaciones entre ellos y otras entidades interesadas.

28. ¿Cuál sería un costo razonable al semestre o trimeste para este pase ilimitado?

[ ] Menos de $25 [ ] De $50 a $75
[ ] De $25 a $50 [ ] Más de $75 [ ] No sé

29. ¿Estarías de acuerdo o en desacuerdo en que el costo del pase especial sea incluído en tu pago de matrícula?

[ ] Totalmente de acuerdo
[ ] De acuerdo [ ] Totalmente en desacuerdo
[ ] En desacuerdo [ ] No sé

30. ¿Quién crees que debe costear este pase ilimitado exclusivo para estudiantes universitarios? Marca todas las que apliquen.
[ ] La universidad
[ ] La Autoridad de Carreteras y Transportación
[ ] Los estudiantes
[ ] Una entidad privada
[ ] Otro: _____

31. ¿Quién crees debe beneficiarse de este pase ilimitado?
[ ] Todos los estudiantes por igual
[ ] Sólo los estudiantes que deseen el servicio
[ ] No sé

32. En general, ¿cómo te sientes acerca de este pase ilimitado para estudiantes universitarios?
[ ] Completamente a favor
[ ] A favor [ ] Completamente en contra
[ ] En contra [ ] No sé

33. Por favor, permíteme saber más de ti:
33a. Sexo:
[ ] Femenino [ ] Masculino

33b. Edad:
[ ] 18 años o menos [ ] 31 – 40 años
[ ] 19 – 21 años [ ] 41 – 50 años
[ ] 22 – 25 años [ ] 51 años o más
[ ] 26 – 30 años

33c. Estado Civil:
[ ] Soltero(a) [ ] Casado(a)
[ ] Otro: _____

33d. ¿Dónde o con quién vives?
[ ] Con mi(s) madre/padre(s) [ ] Apto./Casa propia
[ ] Hospedaje estudiantil [ ] Apto./Casa rentada
[ ] Con algún familiar [ ] Otro: _____

33e. ¿Trabajas durante el semestre?
[ ] SI, pasa a la (f) [ ] NO, pasa a la (g)

33f. ¿Cuántas horas a la semana trabajas?
[ ] Menos de 10 horas [ ] 31 – 40 horas
[ ] 10 – 20 horas [ ] Más de 40 horas
[ ] 21 – 30 horas

33g. Ingreso Familiar Anual:
[ ] Menos de $1,000 [ ] $25,000 - $34,999
[ ] $1,000 - $4,999 [ ] $35,000 - $49,999
[ ] $5,000 - $14,999 [ ] Más de $50,000
[ ] $15,000 - $24,999

33h. ¿Cuántos carros hay disponibles en tu hogar?
[ ] Ninguno [ ] Dos (2) [ ] Cuatro (4)
[ ] Uno (1) [ ] Tres (3) [ ] Más de cuatro

33i. Programa de Estudios:
[ ] Grado Asociado [ ] Bachillerato
→ si eres estudiantes de primer año , marca aquí [ ]
[ ] Maestría [ ] Certificado
[ ] Doctorado [ ] Otro: _____

33j. Carga Académica:
[ ] Tiempo Completo (Regular)
[ ] Tiempo Parcial (Irregular)

33k. Facultad:

[ ] Humanidades	[ ] Arquitectura
[ ] Educación	[ ] Ingeniería
[ ] Ciencias Naturales	[ ] Agrimensura
[ ] Ciencias Sociales	[ ] Medicina
[ ] Adm. de Empresas	[ ] Enfermería
[ ] Comunicación Pública	[ ] Farmacia
[ ] Derecho	[ ] Salud Pública
[ ] Planificación	[ ] Profesionales Salud

[ ] Otro: _____

Como parte de mi trabajo de tésis el próximo paso será discutir en grupos los resultados de esta encuesta. Si te interesa participar de esta dinámica de grupo, agradecería me indicaras tu nombre, teléfono y/o e-mail.

Nombre: _____
Teléfono: _____
E-mail: _____

Comentarios:

_____
_____
_____
_____

¡Muchas gracias por cooperar con mi investigación!

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Estudiante de Maestría
Massachusetts Institute of Technology
jyvargas@mit.edu

Appendix C: Code Book (in Spanish)

- Entra solo los codigos y, en donde sea necesario, escribe la contestacion provista
- Entra solo las preguntas que estan a continuacion, las demas no seran analizadas
- Codifica las no contestadas o dejadas en blanco como 99

	Var 1	Numero de ID de la pagina principal del cuestionario	
		Nombre	ID NUM
Q - 1	Var 2	Nombre	UNIVERSIDAD
		Codigo :	1 USC
			2 UPPR
			3 UPR
			4 UMET
			5 RCM
Q - 2	Var 3	Nombre	ORIGEN
		Codigo:	1 METRO: SJ (Santurce, Rio Piedras, Cupey, Condado, Viejo San Juan), Carolina, Trujillo Alto, Guaynabo, Bayamon, Toa Baja, Cataño.
			2 NO METRO
			11 SAN JUAN
			12 CAROLINA
			13 TRUJILLO ALTO
			14 GUAYNABO
			15 BAYAMON
			16 TOA BAJA
			17 CATANO
Q - 3	Var 4	Nombre	LUGAR ORIGEN
		Codigo:	1 HOGAR
			2 HOSPEDAJE
			3 TRABAJO
			4 CUIDO
			5 OTRO --> Escribe lo que hayan contestado
Q - 4	Var 5	Nombre	TIEMPO ORIGEN
		Codigo:	1 MENOS 15 MIN
			2 15 - 30 MIN
			3 31- 45 MIN
			4 46 MIN - 1 HORA
			5 MAS DE 1 HORA
Q - 5	Var 6	Nombre	LUGAR DESTINO
		Codigo:	1 HOGAR
			2 HOSPEDAJE
			3 TRABAJO
			4 CUIDO
			5 OTRO --> Escribe lo que hayan contestado

Q - 6	Var 7	Nombre	TIEMPO DESTINO	
		Codigo:	1	MENOS 15 MIN
			2	15 - 30 MIN
			3	31 - 45 MIN
			4	46 MIN - 1 HORA
			5	MAS DE 1 HORA

Q - 7 Lista de opciones; escribe el numero del 1 - 0 segun las siguientes opciones:

	Codigo:	1	AUTOMOVIL
		2	TE LLEVAN Y BUSCAN
		3	AMA
		4	METROBUS
		5	VEHICULO PUBLICO
		6	MOTORA/BICICLETA
		7	TAXI
		8	CAMINAS
		9	OTRO
		0	NO APLICA
Var 8	Nombre	MODO LLEGA	
Var 9	Nombre	MODO ALTERNO	
Var 10	Nombre	MODO IDA	
Var 11	Nombre	MODO DILIGENCIAS	
Var 12	Nombre	MODO TRABAJO	
Var 13	Nombre	MODO COMPRAS	

Q - 8 Escribe la hora a la que llega y a la que se va; en intervalos de 30 min:

Codigo:	1	5:00 - 5:30AM
	2	6:00 - 6:29AM
	3	6:30 - 6:59AM
	4	7:00 - 7:29AM
	5	7:30 - 7:59AM
	6	8:00 - 8:29 AM
	7	8:30 - 8:59AM
	8	9:00 - 9:29AM
	9	9:30 - 9:59AM
	10	10:00 - 10:29AM
	11	10:30 - 10:59AM
	12	11:00 - 11:29AM
	13	11:30 - 11:59AM
	14	12:00 - 12:29PM
	15	12:30 - 12:59PM
	16	1:00 - 1:29PM
	17	1:30 - 1:59PM
	18	2:00 - 2:29PM
	19	2:30 - 2:59PM
	20	3:00 - 3:29PM
	21	3:30 - 3:59PM
	22	4:00 - 4:29PM
	23	4:30 - 4:59PM
	24	5:00 - 5:29PM
	25	5:30 - 5:59PM
	26	6:00 - 6:29PM
	27	6:30 - 6:59PM
	28	7:00 - 7:29PM
	29	7:30 - 7:59PM

			30	8:00 - 8:29PM
			31	8:30 - 8:59PM
			32	9:00 - 9:29PM
			33	9:30 - 9:59PM
			34	10:00 - 10:29PM
			35	10:30 - 10:59PM
			36	11:00 - 11:29PM
			37	11:30 - 11:59PM
			38	12:00 - 12:29AM
			39	12:30 - 1:00AM
	Var 14	Nombre	LUNES LLEGA	
	Var 15	Nombre	LUNES SE VA	
	Var 16	Nombre	MARTES LLEGA	
	Var 17	Nombre	MARTES SE VA	
	Var 18	Nombre	MIERCOLES LLEGA	
	Var 19	Nombre	MIERCOLES SE VA	
	Var 20	Nombre	JUEVES LLEGA	
	Var 21	Nombre	JUEVES SE VA	
	Var 22	Nombre	VIERNES LLEGA	
	Var 23	Nombre	VIERNES SE VA	
	Var 24	Nombre	SABADO LLEGA	
	Var 25	Nombre	SABADO SE VA	
	Var 26	Nombre	DOMINGO LLEGA	
	Var 27	Nombre	DOMINGO SE VA	
Q - 9a	Var 28	Nombre	CARRO DISPONIBLE	
		Codigo:	1	SI --> Salta a la Q - 9b
			2	NO --> Salta a la Q - 10
Q - 9b	Var 29	Nombre	DUENO SI O NO	
		Codigo:	1	SI --> Salta a la Q - 10
			2	NO --> Salta a la Q - 9c
Q - 9c	Var 30	Nombre	QUIEN DUENO	
		Codigo:	1	PADRE/MADRE
			2	FAMILIAR
			3	NOVIO(A)/ESPOSO(A)
			4	AMIGO(A)
			5	OTRO --> Escribe lo que hayan contestado
Q - 10	Var 31	Nombre	GASTOS SEMANAL	
		Codigo :	1	MENOS DE $5
			2	$5 - $10
			3	$11 - $15
			4	$16 - $25
			5	$26 - $50
			6	MAS DE $50
Q - 11a	Var 32	Nombre	PERMISO ESTACIONA	
		Codigo:	1	SI --> Salta a la 11-b
			2	NO --> Salta a la 11-c

Q - 11b Var 33	Nombre	PRECIO PERMISO ESTACIONAMIENTO	
	Codigo:	1	MENOS DE $25/SEM
		2	$25 - $35 /SEM
		3	$36 - $50 /SEM
		4	MAS DE $50
Q - 11c Var 34	Nombre	LUGAR ESTACIONAMIENTO	
	Codigo:	1	ESTAC. DE LA UNIVERSIDAD
		2	ESTAC. PRIVADO
		3	CALLE
		4	OTRO --> Escribe lo que hayan contestado
Q - 11d Var 35	Nombre	PAGO DIARIO ESTACIONAMIENTO	
	Codigo:	1	NADA
		2	MENOS DE 0.25/HR
		3	0.25 - 0.50/HR
		4	0.51 - 0.75/HR
		5	0.76 - UNA HORA/HR
		6	MAS DE UNA HORA/HR
Q - 11e Var 36	Nombre	PROCESO ESTACIONAMIENTO	
	Codigo:	1	5 MINUTOS O MENOS
		2	6 - 15 MIN
		3	16 - 30 MIN
		4	MAS DE 30 MIN

Q - 12 Lista por preferencia; escribe el numero del 1 - 7 en que ordenaron esa opcion.

Var 37	Nombre	MAS ESTACIONAMIENTO
Var 38	Nombre	COBRAR ESTACIONAMIENTO
Var 39	Nombre	ESTRICTA NORMAS
Var 40	Nombre	INCENTIVOS TRANS. PUBLICA
Var 41	Nombre	MEJORAR TRANS. PUBLICA
Var 42	Nombre	PRIORIDAD VEH. DOS PASAJEROS O MAS
Var 43	Nombre	OTRO --> Escribe lo que hayan contestado

Q - 13 Var 44	Nombre	INCENTIVO EFECTO EN ESTACIONAMIENTO	
	Codigo:	1	MEJORARIA
		2	IGUAL
		3	EMPEORARIA
		4	NO SE

Q - 14 Escribe 1 si esta marcada y 2 si no.

Var 45	Nombre	ACCESO METROBUS
Var 46	Nombre	ACCESO AMA
Var 47	Nombre	ACCESO PUBLICO
Var 48	Nombre	NO SE

Q - 15 Lista de opciones; escribe el numero del 1 - 6 segun las siguientes opciones:

Codigo:	1	TODOS DIAS SEMANA
	2	MAS UN DIA SEMANA
	3	UNA VEZ SEMANA - ALGUNAS VECES MES
	4	UNA VEZ MES
	5	ALGUNAS VECES ANO
	6	NUNCA

	Var 47	Nombre	USO METROBUS
	Var 48	Nombre	USO AMA
	Var 49	Nombre	USO PUBLICO

Q - 16 Lista de opciones; escribe el numero del 1 - 5 segun las siguientes opciones:

		Codigo:	1 MUY EFICIENTE
			2 EFICIENTE
			3 POCO EFICIENTE
			4 INEFICIENTE
			5 NO SE
	Var 50	Nombre	OPINION METROBUS
	Var 51	Nombre	OPINION AMA
	Var 52	Nombre	OPINION PUBLICO

Q - 17	Var 53	Nombre	CUANTO CONOCES TU
		Codigo:	1 MUCHISIMO
			2 MUCHO
			3 POCO
			4 MUY POCO
			5 NADA

Q - 18	Var 54	Nombre	CERCA ESTACION TU
		Codigo:	1 MENOS DE 5 CAM
			2 6 - 10 CAMINANDO
			3 11 - 15 CAMINANDO
			4 MAS DE 15 CAMINANDO
			5 SOLO LLEGO EN CARRO
			6 NO HAY NINGUNA CERCA
			7 NO SE DONDE ESTAN

Q - 19 Lista de opciones; escribe el numero del 1 - 5 segun las siguientes opciones:

		Codigo:	1 MUY IMPORTANTE
			2 IMPORTANTE
			3 POCO IMPORTANTE
			4 NO IMPORTANTE
			5 NO SE
	Var 55	Nombre	AHORRO TIEMPO
	Var 56	Nombre	AHORRO GASTOS
	Var 57	Nombre	DISPASIENTO
	Var 58	Nombre	COMODA ESPERA
	Var 59	Nombre	HORARIO FIJO
	Var 60	Nombre	SEGURIDAD
	Var 61	Nombre	LIMPIEZA
	Var 62	Nombre	SERVICIO NOCHE
	Var 63	Nombre	ACCESIBLE

Q - 20	Var 64	Nombre	ESTACION CERCA UNIV
		Codigo:	1 SI
			2 NO

Q - 21a Escribe un 1 si esta marcada y un 2 si no.

Var 65	Nombre	IR UNIV
Var 66	Nombre	IR CASA
Var 67	Nombre	IR ACT. SOCIALES
Var 68	Nombre	COMER FUERA
Var 69	Nombre	DILIGENCIAS
Var 70	Nombre	IR TRABAJO
Var 71	Nombre	VISITAR AMIGOS
Var 72	Nombre	NINGUNO
Var 73	Nombre	OTRO --> Escribe lo que hayan contestado

Q - 21b Var 74 Nombre FREQUENCIA USO TU

Codigo :
1 TODOS DIAS SEMANA
2 MAS UN DIA SEMANA
3 UNA VEZ SEMANA - ALGUNAS VECES MES
4 UNA VEZ MES
5 ALGUNAS VECES ANO
6 NUNCA

Q - 21c Var 75 Nombre IMPACTO ESTACIONAMIENTO TU

Codigo: 1 MEJORARIA
2 IGUAL
3 EMPEORARIA
4 NO SE

Q - 22 Lista por preferencia; escribe el numero del 1 - 10 en que ordenaron esa opcion.

Var 76	Nombre	EVITO TAPON
Var 77	Nombre	NO BUSCO ESTACIONAMIENTO
Var 78	Nombre	NO TENGO VEHICULO
Var 79	Nombre	AHORRO EN TIEMPO
Var 80	Nombre	REDUZCO GASTOS
Var 81	Nombre	EVITO ESTRES
Var 82	Nombre	AMBIENTE
Var 83	Nombre	MODO SEGURO
Var 84	Nombre	ACCESIBILIDAD
Var 85	Nombre	OTRO --> Escribe lo que hayan contestado

Q - 23 Var 86 Nombre TARIFA MAXIMA

Codigo:
1 MENOS DE $0.75
2 $0.75 - $1.00
3 $1.00 - $1.50
4 MAS DE $1.50
5 NO SE

Q - 24 Var 87 Nombre MOTIVA DESCUENTO

Codigo:
1 MUCHISIMO
2 MUCHO
3 POCO
4 MUY POCO
5 NADA

Q - 25a Var 88 Nombre TE MOTIVA PASE

Codigo:
1 SI
2 NO

Q - 25b Var 89	Nombre	USO CARRO MENOS	
	Codigo:	1	MUCHISIMO
		2	MUCHO
		3	POCO
		4	MUY POCO
		5	NADA
Q - 25c Var 90	Nombre	USO INTEGRADO	
	Codigo:	1	MUCHISIMO
		2	MUCHO
		3	POCO
		4	MUY POCO
		5	NADA
Q - 25d Var 91	Nombre	DESCUENTOS EN PASE	
	Codigo:	1	SI
		2	NO

Q - 26 Lista por preferencia; escribe el numero del 1 - 8 en que ordenaron esa opcion.

Var 92	Nombre	REDUCE MIS GASTOS
Var 93	Nombre	USO CARRO MENOS
Var 94	Nombre	AFECTA COMPRA CARRO
Var 95	Nombre	HOSPEDAJE ECONOMICO
Var 96	Nombre	VISITARIA AMIGOS
Var 97	Nombre	CONSIGO TRABAJO
Var 98	Nombre	DILIGENCIAS MIENTRAS UNIV
Var 99	Nombre	OTRO --> Escribe lo que hayan contestado

Q - 27 Escribe un 1 si esta marcada y un 2 si no.

Var 100	Nombre	UNIVERSIDAD IMPLEMENTA
Var 101	Nombre	CONSEJO ESTUDIANTES IMPLEMENTA
Var 102	Nombre	AUTORIDAD CARRETERAS IMPLEMENTA
Var 103	Nombre	ENTIDAD PRIVADA IMPLEMENTA
Var 104	Nombre	OTRO --> Escribe lo que hayan contestado

Q - 28 Var 105	Nombre	COSTO PASE	
	Codigo:	1	MENOS DE $25
		2	$25 - $50
		3	$50 - $75
		4	MAS DE $75
		5	NO SE
Q - 29 Var 106	Nombre	PAGO EN MATRICULA	
	Codigo:	1	TOTALMENTE DE ACUERDO
		2	DE ACUERDO
		3	EN DESACUERDO
		4	TOTALMENTE EN DESACUERDO
		5	NO SE

Q - 30 Escribe un 1 si esta marcada y un 2 si no.

Var 107	Nombre	UNIVERSIDAD COSTEA
Var 108	Nombre	ESTUDIANTES COSTEAN
Var 109	Nombre	AUTORIDAD CARRETERAS COSTEA
Var 110	Nombre	ENTIDAD PRIVADA COSTEA
Var 111	Nombre	OTRO --> Escribe lo que hayan contestado

Q - 31 Var 112

Nombre: QUE ESTUDIANTES BENEFICIA

Codigo:
1 TODOS POR IGUAL
2 DESEEN EL SERVICIO
3 NO SE

Q - 32 Var 113

Nombre: SENTIR SOBRE PASE

Codigo:
1 COMPLETAMENTE A FAVOR
2 A FAVOR
3 EN CONTRA
4 COMPLETAMENTE EN CONTRA
5 NO SE

Q - 33a Var 114

Nombre: SEXO

Codigo:
1 FEMENINO
2 MASCULINO

Q - 33b Var 115

Nombre: EDAD

Codigo:
1 MENOS DE 18
2 19 - 21
3 22 - 25
4 26 - 30
5 31 - 40
6 41 - 50
7 51 O MAS

Q - 33c Var 116

Nombre: ESTADOCIVIL

Codigo:
1 SOLTERO
2 CASADO
3 OTRO --> Escribe lo que hayan contestado

Q - 33d Var 117

Nombre: VIVIENDA

Codigo:
1 CONPADRES
2 HOSPEDAJE
3 CONFAMILIAR
4 APTO/CASA PROPIA
5 APTO/CASA RENTADA
6 OTRO --> Escribe lo que hayan contestado

Q - 33e Var 118

Nombre: TRABAJA

Codigo:
1 SI --> Salta a la Q - 33f
2 NO --> Salta a la Q - 33g

Q - 33f Var 119

Nombre: HORAS A LA SEMANA

Codigo:
1 MENOS DE 10
2 10 - 20
3 21 - 30
4 31 - 40
5 MAS DE 40

Q - 33g Var 120	Nombre	INGRESO	
	Codigo:	1	MENOS DE $1000
		2	$1000 - $4999
		3	$5000 - $14999
		4	$15000 - $24999
		5	$25000 - $349999
		6	$35000 - $49999
		7	MAS DE $50000
Q - 33h Var 121	Nombre	CARROS DISPONIBLES HOGAR	
	Codigo:	1	NINGUNO
		2	UNO
		3	DOS
		4	TRES
		5	CUATRO
		6	MAS DE CUATRO
Q - 33i Var 122	Nombre	PROGRAMA ESTUDIOS	
	Codigo:	1	GRADOASOCIADO
		2	BACHILLERATO
		3	MAESTRIA
		4	CERTIFICADO
		5	DOCTORADO
		6	OTRO --> Escribe lo que hayan contestado

Q - 33ii Escribe un 1 si esta marcada y un 2 si no.

Var 123	Nombre	PRIMER ANO

Q - 33j Var 124	Nombre	CARGA ACADEMICA	
	Codigo:	1	REGULAR
		2	IRREGULAR
Q - 33k Var 125	Nombre	FACULTAD	
	Codigo:	1	HUMANIDADES
		2	EDUCACION
		3	CIENCIAS NATURALES
		4	CIENCIAS SOCIALES
		5	ADMINISTRACION EMPRESAS
		6	COMUNICACION PUBLICA
		7	DERECHO
		8	PLANIFICACION
		9	ARQUITECTURA
		10	INGENIERIA
		11	AGRIMENSURA
		12	MEDICINA
		13	ENFERMERIA
		14	FARMACIA
		15	SALUD PUBLICA
		16	PROFESIONALES SALUD
		17	ADMINISTRACION PUBLICA
		18	OTRO --> Escribe lo que hayan contestado

Appendix D: Regression Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	0.888	0.518		1.715	0.087
Gender	**0.110**	0.041	0.063	2.669	**0.008**
Single	-0.145	0.207	-0.056	-0.697	0.486
Married	-0.141	0.211	-0.053	-0.666	0.506
Housing	0.146	0.080	0.056	1.832	0.067
Age	0.006	0.025	0.008	0.231	0.817
Income	-0.003	0.012	-0.007	-0.270	0.787
Employment Status	**-0.030**	0.013	-0.064	-2.267	**0.024**
Academic Program	-0.094	0.053	-0.048	-1.763	0.078
Academic Load	0.009	0.059	0.004	0.147	0.883
Metropolitan Area	0.069	0.061	0.031	1.131	0.259
Drive along	-0.563	0.415	-0.295	-1.356	0.176
Ride with someone	-0.527	0.419	-0.174	-1.259	0.209
Take transit	-0.450	0.423	-0.127	-1.063	0.288
Walk	-0.427	0.417	-0.167	-1.025	0.306
Weekly Transp. Costs	**0.041**	0.016	0.068	2.513	**0.012**
Metrobus Patronage	-0.036	0.053	-0.020	-0.675	0.500
AMA Patronage	**0.152**	0.050	0.108	3.069	**0.002**
Publico Patronage	-0.002	0.046	-0.001	-0.041	0.967
Metrobus Efficiency	-0.002	0.065	-0.001	-0.029	0.976
AMA Efficiency	0.063	0.072	0.035	0.881	0.378
Publico Efficiency	-0.044	0.055	-0.025	-0.799	0.425
Knowledge about TU	**-0.088**	0.043	-0.049	-2.055	**0.040**
Station less than 5min walk	-0.021	0.077	-0.007	-0.267	0.789
Station less than 6-10min walk	-0.066	0.066	-0.027	-1.007	0.314
Station less than 11-15min walk	0.062	0.084	0.018	0.734	0.463
Station more than 15min walk	-0.110	0.080	-0.034	-1.381	0.168
Stations not close to home	**-0.191**	0.061	-0.092	-3.151	**0.002**
Don't know where the stations are	0.005	0.068	0.002	0.079	0.937
University Trips	**0.706**	0.053	0.404	13.283	**0.000**
Home Trips	**0.250**	0.060	0.121	4.182	**0.000**
Entretainment Trips	**0.115**	0.050	0.061	2.284	**0.023**
Eat Out	-0.075	0.047	-0.043	-1.583	0.114
Do errands whiie in school	0.080	0.049	0.047	1.628	0.104
Work Trips	**0.178**	0.060	0.074	2.973	**0.003**
Visit Friends	**0.126**	0.057	0.057	2.216	**0.027**
None	**-0.411**	0.066	-0.193	-6.224	**0.000**
Willingness to pay fare	-0.042	0.035	-0.029	-1.220	0.223
Cost of UPASS	0.034	0.036	0.023	0.947	0.344
Agree UPASS cost in tuition	**0.144**	0.040	0.084	3.606	**0.000**
General Attitude towards UPASS	0.006	0.108	0.001	0.056	0.956
UPASS will motivate TU use	**0.323**	0.075	0.109	4.312	**0.000**

Dependent Variable: Frequency of use of TU (rarely, occasionally, regularly)

Appendix E: Acknowledgments

Special thanks to the **university students** that participated in the focus group discussion:

Armando D. Torres	(USC)	José A. Maldonado	(RCM)
María Ortiz	(UMET)	Nyrma Ortiz	(UPR)
Germán Díaz	(UMET)	Armando Soto Torres	(UPR)
Tania L. Alvarez Cruz	(RCM)	Olga González	(UPR)
Mervaní Correa Santiago	(RCM)	Katherine M. Padilla	(UPR)
Rebecca Camacho	(RCM)	Annabel Sepúlveda	(UPR)
Leyra Figueroa Hernández	(RCM)	Liz M. Sánchez	(UPR)
Lucila Cartagena Castillo	(RCM)	Héctor A. Acosta	(UPR)

Special thanks also to all the **professors** that allowed me to distribute the survey in their classrooms:

Universidad del Sagrado Corazón

Prof. Yaritza Medina
Prof. Nina Torres Vidal
Dra. Irma Hernández Torres
Mr. Carlos Ayala
Prof. Virgilio Dávila
Sra. Zoraida Cruz

Universidad Politécnica de Puerto Rico

Prof. Héctor Cruzado
Dr. Carlos J. González
Prof. Herbert Jaramillo
Prof. Diana C. Marín
Prof. Amado Vélez
Prof. Raúl Matos
Ing. Ramiro Rodríguez

Universidad de Puerto Rico

Dra. Marie-Helene Delmestre
Arq. Esteban Sennyey
Dr. Carlos Alá Santiago
Dra. Alicia Pousada
Prof. Javier Baella
Dra. Lillian Sánchez
Dra. Emily Krasinski
Dr. Rubén Maldonado
Dra. Patricia A. Burrowes
Dr. T. Mitchell Aide
Plan. Gabriel Rodríguez
Dra. Alicia Rodríguez
Prof. Lizette Córdova
Dr. John H. Stinson Fernández
Dra. Lourdes Lugo Ortiz
Dr. Miguel Vescovacci
Lcdo. Luis Villaronga
Prof. Mabel Rodríguez
Dra. Ivette Pérez

Universidad Metropolitana

Dr. Juan Musa
Dr. Jorge Padín
Prof. Miriam Falero
Prof. Daniel Malavé
Prof. Aida Pagán
Prof. Nilsa Rivera
Dra. Doris García

Recinto de Ciencias Médicas

Mr. Carlos A. Valero Viruet
Dra. Annette Pérez
Dr. Antonio Méndez
Dra. Suane Sánchez

Also, special thanks to all the **university officials and administrators** that provided me with information about their campuses and discussed with me important aspects of this research.

Universidad del Sagrado Corazón

Prof. Manuel de Jesús, Associated Dean of Student Affairs
Mr. Héctor Román, Statistician
Ms. Irene Flores, Office of the Dean of Administrative Affairs
Ms. Zoraida Cruz, Assistance to the Students Program

Universidad Politécnica de Puerto Rico

Mr. Rafael León, Dean of Students
Ms. Mayra López, Registrar
Ms. Omayra Rivera, Planning Office
Mr. Ramón Rosario, Director of the General Services Office
Ms. Yanira Santiago, Assistant to the Director of the General Services Office

Universidad de Puerto Rico

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