

WPI

EVALUATION OF WRTA SERVICE

An Interactive Qualifying Project Report

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Abstract

This project examined the use of public transportation by college students in Worcester. The team conducted focus groups and utilized recent surveys administered by college transportation providers to evaluate student transportation needs. Interviews with key staff at WPI were conducted to evaluate that school's transportation needs. Drawing upon successful transit systems in Providence, RI and Curitiba, Brazil, the team proposed modifications to both funding mechanisms and route designs of the WRTA.

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Executive Summary

The **Worcester Regional Transit Authority (WRTA)** is in charge of Worcester's public transit services. The WRTA expressed interest in finding ways to increase its college student ridership, since college students make up a small part of the system's users. The team approached the WRTA in spring of 2009 to help accomplish this goal.

Methodology Overview

The team assessed the transportation needs of college students as well as the various forms of transportation available. To accomplish this, this IQP analyzed ridership data on some of these services, such as the Woo Bus, the Consortium Shuttle, and S4feride. With this data it was possible to deduce to what locations college students travel most frequently.

It was also necessary to ascertain what factors are considered by college students when they decide what forms of transportation, if any, they will use. To help this end, this IQP acquired past satisfaction surveys about the Woo Bus conducted by the **Colleges of Worcester Consortium (COWC)**. The team conducted two distinct focus groups at WPI in order to verify the accuracy of the survey results. The first group included first year students living in an on-campus residence hall. The second group consisted of upperclassmen working on a project in an off-campus site in Worcester. The site was about one mile away from campus, meaning that these students needed to commute to the project location every weekday.

After consolidating the information, the IQP group proposed a new conceptual route structure that would better fulfill student needs. Routes within this structure would be run separately from the WRTA's base routes, going to a different transfer location where other buses could be boarded. Such a route structure would need funding from interested parties. The team

interviewed some key figures at WPI and at the COWC to assess the feasibility and need for such a route structure, whether or not colleges would have a reason and a motivation to subsidize it. Through these interviews other needs for the route structure were determined.

Finally, all this information was presented to those interviewed at WPI and at the COWC, as well as to the WRTA personnel. The findings and recommendations were consolidated and summarized, allowing all the parties who would need to be involved to see the “big picture” and start possible cooperation between them, as well as indicating what future work would need to be done to implement the system.

Key Findings

This project looked at literature about public transportation improvement methods. It points out five fields in transit service that are important to success: safety, reliability, convenience, courtesy, cleanliness.

The project presents public transportation of two different cities as case studies on effective systems of public transit. The first case presented is the city of Providence, Rhode Island. Providence’s public transit authority, RIPTA, has a UPASS program available for any college in Rhode Island, primarily for colleges in Providence. Through this program, different colleges can subsidize transportation for their students. Each of these colleges can get different benefits as well. Students of some colleges enjoy 50% discounts off of one-month passes while students of other colleges receive full discounts for all transportation.

The IQP compares Providence and Worcester to assess how feasible it would be to imitate the UPASS program as it is. It notes several key differences that would make such a

program more difficult to implement in Worcester. Primarily, colleges in Worcester are far more spread out than colleges in Providence, and they each have fewer students.

This project also presents a second case study, the city of Curitiba, Brazil. Curitiba is a well known city for its innovative solutions to traffic problems. Such innovations were studied with the fields stated above. The IQP found that Curitiba's Bus Rapid Transit system shows great development over all five fields, justifying its great success.

Through analysis of the satisfaction surveys and focus groups the team was able to see some aspects of the way students think about transportation. This project found five common factors that deter students from using public transportation, as follows:

- Little need to leave campus
- Time lost waiting for the bus or arriving to destination earlier than needed
- The inconvenience of getting to the bus stop
- Low awareness of WRTA routes and services
- Perceived lack of safety from crime in buses

This IQP found that the first two factors apply to other public forms of transportation such as the Woo Bus and the Consortium Shuttle.

Most students stated that they would have a greater interest in using public transit if it provided a cost advantage and were easy to use. It was found that many students have never used public transit before, and do not know what the procedure for entering and paying is, or if they need to make their payment with coins. Additionally, students expressed that environmental concerns would not be sufficient to convince them to ride the bus.

The project group learned more about what motivates students to use transportation through its interviews with Emily Perlow, Associate Director of Student Activities Office at WPI and Karen Manson, Director of Student Affairs for the COWC. Karen Manson mentioned that a key reason why WPI students don't use WRTA transportation is because they "learn by doing". They would be more likely to use it more if they were given more chances to ride the buses, rather than just being told about its services. Emily Perlow made similar statements, emphasizing the need for incentives with local businesses and neighborhoods and thus encouraging students to leave campus and explore the city. Colleges that use the Consortium Shuttle each pay \$22,333.59 a year for its services. In the same way colleges that receive the Woo Bus service each pay \$12,015 a year.

The latter set of interviews was conducted with personnel in the WPI Facilities and Sustainability Office, Elizabeth Tomaszewski (Facilities Systems Manager/Sustainability Coordinator) and Alfredo DiMauro (Assistant Vice President). These interviews made the team aware of future parking problems that might occur on campus with the construction of the new Recreational Center, as well as how the institution is currently planning on mitigating these issues. One solution being considered is to relocate Quad parking to the Gateway parking facility and use this lot as the main parking garage for WPI staff, students and faculty. Another possible solution is the car-pooling program just recently implemented by the President's Task Force on Sustainability, helping to decrease the number of cars on campus while creating a cleaner environment.

This IQP uses these findings to suggest changes that can be made in the WRTA route structure to provide more student-oriented transportation. The team proposes a conceptual design for a new route structure. This route structure could make a Worcester UPASS viable by

replacing the Consortium Shuttle for inter-college transportation in Worcester. Additionally, routes can be added to provide transportation to locations of student interest such as Union Station, Greendale Mall, and Blackstone Valley Mall.

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Chapter 1: Introduction

An efficient, convenient, and cheap method of transportation is essential for the success of any urban city. By establishing a transportation system, the city provides its residents with a means of commuting to and from work or school, for example, on a daily basis; a fundamental societal need. Additionally, it creates room for potential economic growth, which results from a continuous use of the transit system, leading to an increase in profits of local businesses.

The city of Worcester is no different; it is home to a large and steadily increasing college student population, spread across twelve college campuses, each having its own specific demands for transportation. Despite recent initiatives in addressing college students' needs for transportation, the current transit system available to them does not meet their expectations as a whole. There are many factors that contribute to students' current feelings toward public transit, such as crime incidents in the city, lack of advertisement of services, lack of appropriate service infrastructure, the convenience of private transportation, time inefficiency of current services, among others. For example, a satisfaction survey conducted by the Colleges of the Worcester Consortium (COWC) evaluating the Woo Bus service (a local service designed for college students) showed that roughly 40% of students were unaware of this service's existence.

As a result of the clear need for assessing and redesigning transportation services for college students in the Worcester area, the Worcester Regional Transit Authority (WRTA) and the Central Massachusetts Regional Planning Committee (CMRPC) have been interested in studying the current route system and services in the city and determining what changes need to be made to make it more appealing to the college population. To accomplish this, an assessment

of today's student's needs is essential, as well as hearing their opinion on the major issues they see in the services offered to them and services they'd like to see that aren't currently available.

With that in mind, this Interactive Qualifying Project assessed WPI student's needs and expectations in regards to transportation by conducting focus groups, directed both to freshmen and upperclassmen. Additionally, interviews with key WPI and COWC staff were also conducted with the goal of assessing the efficiency and determining the needs of today's transit services offered to students. Finally, both research results were combined in order to determine how the WRTA can be used to improve on the transportation services currently available, as well as to meet the remaining transportation needs derived from the research material. A conceptual route design for the WRTA was then formulated, exemplifying a possible way of solving these issues and thus facilitating and encouraging student travel in the city of Worcester.

Chapter 2: Background Research & Analysis

This section examines different forms of transportation for college students in the city of Worcester. Before doing so, it presents a system of standards present in successful public transportation systems in order to establish values by which different transportation systems can be measured and compared. It then looks at successful public transit systems and measures them against these standards in order to find the qualities of the transit systems that made them successful.

2.1: Comparing Public Transportation Systems

While quantitative values such as throughput, cost efficiency, and pollution can be considered to measure and compare transit systems, some values that are more qualitative in nature may be useful as well. The standards suggested by the Transit Cooperative Research Program have been chosen as the evaluation criteria for this project.

2.1.1: Customer-Oriented Service Standards:

The Transit Cooperative Research Program (TCRP) is a program commissioned by the Federal Transit Authority (FTA) to research various aspects of transit. Their 97th report indicates research that was conducted across various businesses and successful public transportation authorities to understand the paradigms under which these organizations operate. It states that a major dimension in which Public Transportation Authorities (PTAs) may want to consider change for better service is in developing a “new ‘obsession’ for the customer”. They describe how the Dallas Area Rapid Transit (DART) system in Dallas came up with a Customer Satisfaction Index. This index is obtained by three feedback mechanisms, a Customer Complaint system, a periodic Customer Satisfaction Survey, and a continuous Quality Assessment Data

(QAD) system. According to the report, “The QAD system records field observations about service quality from a customer standpoint. Observations are made by DART personnel on a daily basis and are now being entered into the system instantly through the use of wireless personal digital assistants, allowing immediate, continuing analysis. Customer survey data are gathered through surveys conducted twice a year.” These feedback systems are used to compile an index for customer satisfaction across five fields:

- Safety
- Reliability
- Convenience
- Courtesy
- Cleanliness

In 2004, IndyGo in Indianapolis commissioned a task force to investigate ways to combat a social stigma then associated with the use of public transportation. Among other things, this task force recommended that IndyGo adopt service standards to evaluate itself against, a similar action to that taken by DART. Standards recommended were in the fields of:

- Convenience
- Reliability
- Added Value

These two examples illustrate standards that people use to decide whether to board the bus or not. The TCRP’s report indicates that positive ratings of these factors help the success of public transit. In the same way, the lack of these factors discourages the use of public transit.

Metrics that consider these values can be useful in finding ways to improve ridership. When trying to determine why public transit isn't used by a targeted population, one can ask questions about each of these factors. Some examples are as follows:

- *Safety*: Does it feel safe to use the bus system?
- *Reliability*: How often are buses late? How often are they on time?
- *Convenience*: How easy is the bus system to use? Do people have to go out of their way to use it successfully? Does it fit their schedule?
- *Courtesy*: How does the bus service interface with the population? Are all its representatives well-mannered?
- *Cleanliness*: How presentable are buses of the fleet, inside and outside?
- *Added Value*: What added value does riding the bus give? Are there extra reasons to take the bus, other than just getting from point A to point B?

2.2: Transportation Services for Worcester College Students

A key component to analyzing potential changes to the public transportation system is to assess what transportation services are available to students today, in all colleges in Worcester, and to assess their popularity based on surveys done in the past. Below is a summary of the most applicable and relevant services researched. These are either offered to a few or all of the colleges in the Worcester region. Some independent college services were examined, particularly at WPI, Clark, Assumption and Holy Cross.¹

¹ All colleges in the Worcester Consortium were researched, but WPI, Clark, Assumption and Holy Cross had more relevant and applicable transportation services for the purpose of this project.

2.2.1: Worcester Consortium Services

The Colleges of the Worcester Consortium (COWC), Inc. is a not-for-profit association of 12 public and private accredited colleges and universities located in central Massachusetts. It is committed to “furthering the missions of the member institutions individually, advancing higher education regionally, assisting middle and high school students and low-income adults in selecting appropriate education programs and learning about financial aid, and informing residents and visitors of the region's rich educational, cultural and economic vitality” (cowc.org)

Member colleges are: Anna Maria College, Assumption College, Becker College, Clark University, Holy Cross, Massachusetts College of Pharmacy and Health Sciences, Nichols College, Quinsigamond Community College, Tufts Cummings School of Veterinary Medicine, University of Massachusetts Medical School, Worcester State College, and WPI.

The Worcester Consortium partners with local organizations such as The Hannover Theatre for the Performing Arts, the Shrewsbury Street Merchants Association, and the Worcester Cultural Coalition to help promote events throughout the year, geared towards college students.

The Consortium offers transportation services to students and faculty of its member colleges.

Consortium Shuttle

The Consortium Shuttle connects students from WPI, Clark, Assumption, Holy Cross, Worcester State, and Becker via a shuttle system that runs Monday through Friday from 7 AM to 7 PM. It provides college students the opportunity to take classes at other institutions in the region and conduct research at other campuses’ libraries. It also encourages students to attend

athletic and social events outside their campus and to meet other college students. In addition to transporting college students from campus to campus, the shuttle links them to popular downtown destinations, such as the Worcester Public Library, the Worcester Art Museum, and Union Station. The service is free of charge to students and is operated by AA Transportation Company, Inc. of Shrewsbury.

In an effort to stimulate use of other bus systems in the city, the shuttle's stop signs indicate the direction to the nearest WRTA public bus stop, even though no formal partnership currently exists between the Consortium and the WRTA.

Woo Bus

Anna Maria College, Holy Cross, Assumption College, Becker College, and WPI offer the Woo Bus service. This service runs on Friday and Saturday nights throughout the school year and connects local colleges with downtown Worcester, stopping at popular destinations such as Park Avenue, Shrewsbury Street, and Main Street. There are two separate routes that run on Friday and another three that run on Saturdays. The service is provided by Atlantic Express in partnership with the Worcester Consortium.

The Woo Bus service is convenient for students because it offers transportation on weekends, with rides up to 1 AM on certain routes. On top of that, the service is free of charge. Its routes cover the majority of popular destination points for college students, and a good portion of other attractions are within a half-mile radius of each of their stops, such as the Blackstone Valley shops in the nearby town of Millbury, restaurants on Highland and Shrewsbury streets in Worcester, and the Target Plaza on Lincoln Street.

Survey on the Woo Bus

The Worcester Consortium conducted a survey in April 2008 to hear directly from the students what they thought of the Woo Bus service and what would they like to see changed or improved. They sampled 528 students, with 42.4% being from Worcester State College and 8.3% from WPI. The majority of students were freshmen, roughly 31%, and the others were evenly distributed among sophomore, junior and senior years. The survey showed that, out of the selected participants, 58.3% had never taken the Woo Bus. The most common response was that they had never heard about the service (roughly 40% of them) and that it was very poorly advertised by the colleges. When asked about which places were most desirable to go to, the top-rating destinations were Lincoln Plaza and Shrewsbury Street. Places where the students would like to go, but were not covered by the Woo Bus at the time were Blackstone Valley Mall, the DCU center, and Greendale Mall. In response to the survey, the Consortium added a new stop at Blackstone Valley Mall to all their Saturday routes in 2009, with the last ride leaving the mall at 12:20 AM.

2.2.2: Independent College Transportation Services

WPI

Red Cab Taxi Company

WPI partnered with the Red Cab taxi service through the Student Government Association (SGA) in October 2009 to provide discounted fares for students. Every Thursday starting at 10 PM and going until 6 AM on Sunday, Red Cab offered a fixed \$4.00 group fare for transportation to any location within a 6-mile radius of WPI, with a maximum of four students per group. For every trip made, Red Cab recorded the total cost as well as the number of students

in each ride, and added that to their database. SGA paid Red Cab \$5,000.00 in advance to cover the difference in these fare costs, and once this quota had been reached the company planned to gather all collected ridership data and present it to SGA officers. SGA would then study the possibility of renewing the contract for the following academic year.

Zipcar

“Zipcar is an internet-based service that rents hybrid cars for an hour or two or for an entire day. It is a turnkey program that includes everything - vehicles parked right on campus, online reservation system, gasoline, insurance coverage, and billing” (wpi.edu). Zipcar is open to students, faculty and staff at WPI and is available for use every day. There is a membership fee of \$35 to join; the hourly rate is \$7 and the daily rate is \$60. This is one of the initiatives WPI has recently undertaken in an effort to “go green,” providing cleaner means of transportation to students via hybrid cars and encouraging them to leave their own cars at home.

Studies have shown that car-sharing programs like Zipcar have reduced the amount of driving among members by as much as 50%. They have also shown that “over 40% of Zipcar members decide against purchasing a car, or end up selling their car. A Zipcar replaces more than 15 privately-owned cars” (wpi.edu).

SNAP Van

WPI’s Security Night Assistance Patrol (SNAP) service provides students with a free escort service to and from residential locations within a 1-mile radius of the campus. It operates daily from 6 PM to 4 AM during first and fourth quarters, and from 4 PM to 4 AM during second and third quarters. It is provided by a partnership between WPI’s Police Department and the Office of Residential Services. The service is completely student led, with WPI students trained

to become drivers and navigators for the vans, as well as managing the phone calls from the Police dispatch, all under supervision from the WPI Police Department.

Clark University

In addition to the Consortium Shuttle service, Clark also offers what they call the Student Council Van shuttle, which gives its students free rides from campus directly to Solomon Pond Mall in Marlborough on Fridays from 3:30 PM to 10:30 PM, and to the Shoppes at Blackstone Valley on Saturdays, running from 2:30 PM to 10:30 PM. The vans can take up to 12 students per trip. When they are not in use for the shuttle service, students can rent them at a rate of \$25 per day and travel to events within a 250-mile radius of Clark.

Assumption College

Complementing the Woo Bus provided by the Consortium, Assumption offers its own free shuttle to Solomon Pond Mall, operating every Friday from 5 PM to 12 AM, coupled with \$8 discounted movie tickets to the students through the Student Activities Office. This service is a great way to get students off campus easily, providing them free transportation to one of the most frequented malls in the region, and using the discounted movie tickets as an extra incentive.

Holy Cross

Holy Cross offers its students an escort service that runs Monday through Friday from 6 PM to 10 PM and Saturday through Sunday from 1 PM to 5 PM, anywhere within 15 minutes of campus.

It also has free shuttle transportation to Boston that runs almost every Friday and Saturday throughout the academic year, making one round trip on Fridays and two round-trips on Saturdays. The service is completely free of charge to Holy Cross students. A similar shuttle is

also available for trips to Providence Place Mall in Rhode Island, operating on Fridays and Saturdays with one round trip per day, and for the Shoppes at Blackstone Valley on Fridays.

2.2.3: Worcester Regional Transit Authority (WRTA)

Another way to get around the city of Worcester is through the use of the WRTA. The WRTA was founded in September of 1974, “pursuant to the provisions of Chapter 161B of the General Laws of the Commonwealth of Massachusetts. The Authority is given general responsibility to develop, finance, and contract for the operation of mass transportation facilities and services within its territory” Its leadership consists of an Administrator and an Advisory Board, composed of member community officials and leaders. Its mission is “to provide convenient, comfortable, safe, reliable, cost-effective mobility services contributing to the economic vitality of the region” Being a public agency of the Commonwealth of Massachusetts, the WRTA is “funded by federal, state and local monies, as well as farebox and advertising revenue” with an annual operating budget of \$20 million. “Federal funds must be used for what are called capital projects, meaning, the funds can only be spent on tangible items such as equipment, preventive maintenance of vehicles, facilities and equipment, ADA services, facility improvements and purchasing vehicles” (therta.com).

Today, the WRTA operates 46 buses, 35-footers and 40-footers, as well as 50 vans, on 23 different routes, with over 500,000 people residing in its delivery area and approximately 180,000 just in Worcester. On an average weekday, WRTA buses carry more than 14,000 passengers. Surveys conducted recently by the WRTA indicated that: 57% of passengers use the WRTA 5 times a week or more, 53% use the WRTA to travel to work, 17% use the WRTA to travel to school, and 30% use the WRTA to get to medical appointments, shopping etc. (therta.com).

The WRTA has a system to accommodate elderly passengers as well as people with disabilities. With proper identification, any elderly or disabled person can ride the bus for half the fare price. In addition, the WRTA offers Paratransit service to any person with disabilities and who qualifies for the service under the Americans with Disabilities Act (ADA). One can simply call the WRTA and ask for the Paratransit service to a certain location, provided it is during WRTA operating hours.

Unfortunately, over the past few years “public transportation has suffered from cutbacks in funding, which has translated to cutbacks in available service” (CMMPO IV-1), and this has also affected the WRTA. As an example, due to lack of funding all WRTA buses now operate only until 10pm. Coupled with the general increase in gasoline and diesel fuel prices, the WRTA has steadily increased their fare prices over the past two decades. Table 1 shows fare changes from 1980 to 2006, as presented in the CMMPO 2007 Regional Transportation Plan.

Table 1: WRTA Fare History

<u>Fiscal Year</u>	<u>Adult Fares (\$)</u>	<u>Student Fare (\$) ²</u>	<u># of Fare Zones</u>	<u>Transfer Fee (\$)</u>
'80-'81	0.50-1.15	0.10	5	0
'82	0.60-1.25	0.30	5	0
'83	0.60-1.25	0.30	4	0.10
'84-'89	0.60-1.25	0.45	4	0.10
'90	0.75-1.75	0.45	5	0.25
'92-'96	0.75-1.75	0.75	5	0.25
'97-'01	1.00-1.75	0.75	4	0.25
'02-'06	1.25-2.00	N/A	4	0.25

During fiscal year (FY) 2003, the fare prices increased from \$1.00 to \$1.25, with diesel fuel at a rate of \$0.86 a gallon. During FY 2008, the diesel prices were \$3.18 per gallon. The WRTA had to increase fare prices once again in order to account for such drastic fluctuations on the fuel market, adding another \$0.25 to the price, effective January 2009 (this increase also affected the Paratransit services, by the same amount). "Fuel is the WRTA's third largest cost driver behind Labor and Fringe Benefits," and so they have budgeted \$1.2 million (7.25% of total budget) as fuel expenses for FY 2009 (therta.com).

² This Student Fare does not refer to college students, but to middle and high school students in the Worcester region.

The WRTA has conducted an assessment along with the CMRPC (Central Massachusetts Regional Planning Committee) identifying areas in their service that need to be improved upon or completely changed. These include:

- Extend service span to 1 AM on certain routes to accommodate late-night travel (which will require the extension of ADA service hours to 1 AM as well)
- General route modifications to expand service to other areas of Worcester
- Weekend service span assessment

These areas were broken up into a five-year plan for implementation, but as the CMRPC report states, “the key to meeting the additional service needs of the various regional transit authorities...is a significant increase in the annual operating funds for the RTA program” (CMMPO IV-32).

2.3: Public Transportation Systems of Other Cities

In order to examine what works and what doesn't work in public transportation systems, it is useful to examine other public transportation systems that have had some degree of success. Rhode Island's public transit (with particular focus on their efforts to reach college students) and the public transit of Curitiba, Brazil are presented for analysis.

2.3.1: Rhode Island Public Transportation Geared for College Students

Rhode Island's public transit is of interest due to its special services provided to college students. The Rhode Island Public Transit Authority (RIPTA) has implemented a program called UPASS. UPASS is a service where colleges and universities help subsidize the use of RIPTA transportation at a discounted or free price for its faculty, students, and/or staff.

Different colleges gain different benefits from the use of this program. Table 2 shows the colleges in Rhode Island and benefits purchased by each college, taken from the RIPTA website.

Table 2: RIPTA/UPASS Participation

<u>COLLEGE</u> ³	<u>BENEFIT</u>
Brown University	Free by swiping student ID card
Community College of Rhode Island (Providence)	50% off of passes. Passes are sold at bookstore
Roger Williams	50% off of 15 ride passes
Rhode Island School of Design	Free by swiping student ID card
Rhode Island College	Half price
New England Institute of Technology	Passes sold at bookstore
Community College of Rhode Island (Newport, Warwick, and Lincoln)	Not part of the program
Bryant University	Not part of the program
Lincoln Technical Institute	Free by swiping an ID student must buy
University of Rhode Island	Free with swipe. On campus transport provided
Johnson and Wales	Free by showing student ID card
Gibbs College	Free by swiping student ID card
Providence College	Free by showing student ID card
Salve Regina	Free by swiping student ID card

³ Colleges with name in bold are located in Providence, Rhode Island.

Besides these benefits, RIPTA also provides special routes for some students. RIPTA's Route 55 has a late night service. This route passes close to Rhode Island College and Providence College and goes to Downtown Providence. The late-night inbound bus destined to downtown Providence departs around 12:30 AM, starting at the Providence College stop; the last outbound bus destined back leaves at around 1 AM. During these times, the bus stops and starts after Rhode Island College, and hence does not pass by it. These late-night services are only provided on Thursdays, Fridays, and Saturdays while college fall and spring semesters are in session. It is evident that the late-night service was designed with Providence College students in mind.

2.3.2: Worcester and Providence

According to the U.S. Census 2000 and as shown in Table 3, Worcester's population is 172,648. It currently has 23,411 full time students, from 12 different colleges. However, three of those colleges have very small populations, with 200 students or less. ("Worcester, MA", citytowninfo). The populations of the other colleges in Worcester are of comparable size to those of colleges in Providence. Providence's population in 2000 was close to Worcester's, at 173,618. However, its student population is higher: 31,382 full time students from 6 different colleges. ("Providence, RI", citytowninfo). In terms of land, Worcester has a land area of 37.6 square miles, while Providence has a land area of 18.5 miles. ("Worcester, MA Profile", "Providence, RI Profile", idcide).

Table 3: Worcester-Providence Comparison

	Worcester	Providence
Total Population	172,648	173,618
College Student Population	23,411	31,382
Number of Colleges	12	6
Small Colleges⁴	3	0
Land Area (square miles)	37.6	18.5
Student Density⁵	623 students per square mile	1700 students per square mile

The data implies that Worcester and Providence are cities of nearly identical populations. However, Worcester spans twice as much land area. Additionally, Worcester has 8,000 less students at more colleges. As such, the density of Worcester's student population is far smaller than that of students in Providence.

As illustrated in Figure 1 - Providence, RI, and Figure 2 - Worcester, MA, the colleges of Providence are more strategically placed for bus service. Six of Providence's colleges are all arranged in adjacent blocks, filling a very compact area. On the other hand, colleges in Worcester are far apart, making efficient bus service more difficult.

⁴ Colleges with 200 students or less.

⁵ Student Population divided by Land Area

These figures were produced with Google Earth (earth.google.com). The college locations were found using the tool's search feature. The location was then recorded by using a marker. Finally, the width and height of the viewing area were taken using the tool's ruler function.

Figure 1 is of the colleges of Providence that are closely clustered together. The scale of the image is approximately 0.5 miles by 0.7 miles.

Figure 2 is of six colleges of Worcester. The scale of the image is approximately 4.0 miles by 5.5 miles.

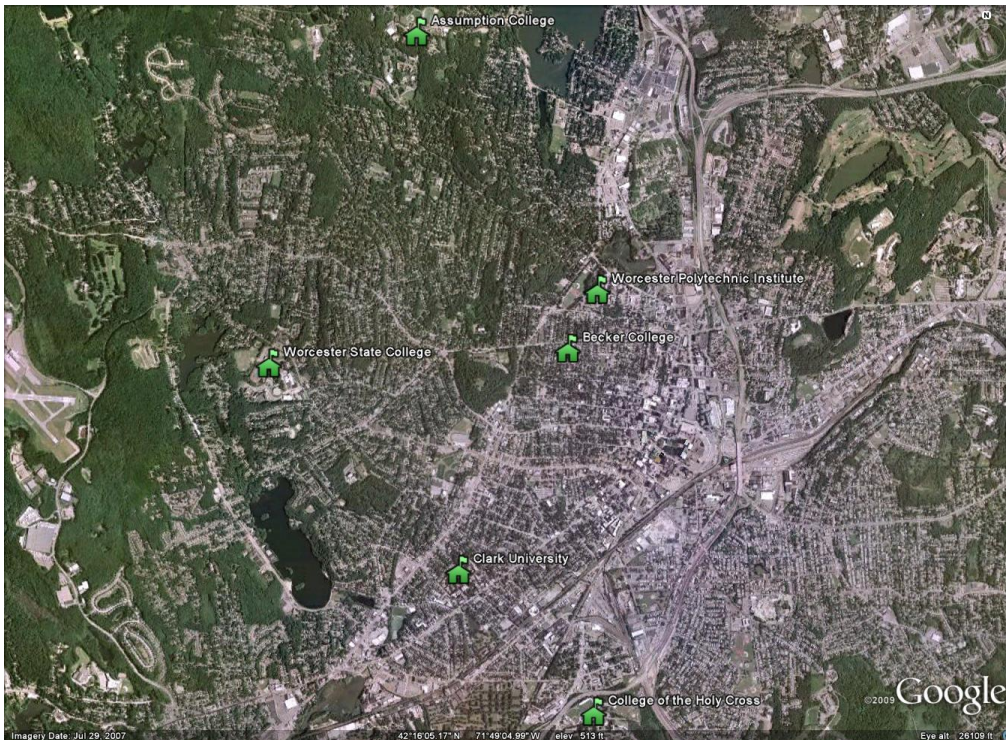
0.7 mile



0.5 mile

Figure 1 - Providence, RI

5.5 miles



4.0 miles

Figure 2 - Worcester, MA

Despite the differences between Providence and Worcester, some aspects of RIPTA's service are independent of the advantages Providence has over Worcester. Both Salve Regina and Providence College don't fit the "college block" of Providence and still take part of the program.

In terms of the service standards discussed perviously, the following qualities have been evaluated for the UPASS program.

- *Safety:* Route 55's late-night service is an attempt at providing students with safety and convenience. Students of age who go downtown may not be in a proper state to drive home. Thanks to Route 55, they don't have to.
- *Convenience:* RIPTA provides colleges with nearby bus routes for added convenience. Because the colleges of Providence are so close together, RIPTA is able to provide them with nearby service with only a few routes. Additionally, the RIPTA website has instructions for what routes to take for students who want to go from a particular college to common locations such as airports.

2.3.3: Curitiba, Brazil

The city of Curitiba is a popular case study for urban planners. Over the last 40-50 years it has implemented various innovative solutions to problems it was facing, and has shown great success. It implemented a Bus Rapid Transit (BRT) system that was highly successful. According to Demery's article "Bus Rapid Transit in Curitiba, Brazil – An Information Summary," Curitiba's public transit ridership nearly doubled between 1980 and 1989. By 1991 its system had the highest annual transit revenue passengers per capita of any city in Brazil. According to a 2007 article in *Race, Poverty, & the Environment* titled "Curitiba's Bus System is

Model for Rapid Transit”, by 1991 the BRT had caused a reduction of 27 million car trips per year. By 2007, the BRT was serving 50 times as many passengers as it had been on 1980.

During 1965 Curitiba was growing rapidly. City officials adopted a new master plan. In this plan, rather than allowing the city to grow in all directions, they chose five axes for the city to grow along. Each axis had lanes reserved specifically for bus movement, allowing buses to avoid traffic congestion (Goodman).

The plan was carried out, and as time went on other strategies were implemented to allow for more efficient service. To improve time efficiency special bus stations were implemented, sometimes known as “tube” stations.



Figure 3 - <http://opiodopovo.wordpress.com/2008/09/14/68/tubo-onibus-curitiba-fora-da-copa-2014/>

Besides protecting waiting passengers from the weather, these stations improve time efficiency. Passengers looking to ride a bus don't pay their fare at the bus; they pay at the tube-station before entering. Passengers then wait for their next incoming bus and board it. The bus

operator doesn't need to worry about charging fares. Another advantage tube stations offer is that they are lifted to the buses' level. This means that buses don't need to have stairs or "kneeling" functionality or wheelchair lifts, just a ramp that extends from the door to the station. This also speeds up passenger entry and exit. These two factors combined mean that buses only spend about 15 to 19 seconds per stop (Goodman).

According to an article in the *Horizon Solutions* site titled "Efficient transportation for successful urban planning in Curitiba", as Curitiba's BRT evolved various fare structure changes were attempted. At first, passengers had to pay a fare to ride routes - known as feeder routes - made to travel into the center of the city. They then had to pay to transfer to ride main routes, known as trunk routes. However, this system favored the wealthy, since in Curitiba the rich live near the trunk routes while the poorer sections of the city are further out, in places known as *favelas* (*Horizon Solutions* site article). This meant that the richer population only had to pay fare once when riding on trunk routes, while the poorer populations had to pay the same fare twice – once for the feeder route and once for the trunk route. In an attempt to fix this, the city made feeder routes free of charge. Shortly thereafter, the city received complaints of low levels of bus cleanliness. They had become sleeping places for the homeless.

At this point the city decided to charge a single fare, and built fences connecting feeder routes to trunk routes. This way people could transfer from feeders to routes without paying an additional fare. However, as the system became more overcrowded these fenced locations became highly unsanitary.

To solve this, terminal stations were constructed. The FTA document "Issues in Bus Rapid Transit" states the following about Curitiba's terminals:

“Transfers are accomplished at terminals where the different services intersect. Transfers occur within the prepaid portions of the terminals so transfer tickets are not needed. In these areas are located public telephones, post offices, newspaper stands, and small retail facilities to serve customers changing buses.”

These terminals attracted retail facilities such as newsstands and flower shops (*Horizon Solutions* site article), increasing the aesthetic appeal of the system rather than detracting from it the way previous solutions had.

The practicality of directly imitating some of the innovations implemented by Curitiba in first world countries such as the United States has been discussed extensively amongst various associations of urban planners. Rather than discuss its feasibility, we present Curitiba to see what can be learned from it in terms of the service standards stated above. If the standards above truly reflect the qualities of appealing bus service, then applying them to the successful improvements Curitiba implemented should show that it improved in safety, reliability, convenience, courtesy, cleanliness, and/or added value.

- *Safety*: Curitiba’s public transit improvements have improved the system’s safety for passengers. All waiting on buses happens at terminals or tube-stations. Both are closed spaces, protecting passengers from outside problems such as weather and traffic.
- *Reliability*: Increasing time-efficiency tends to make systems more predictable and reliable, since by eliminating potential time-delays, it is less likely that buses will be late. Curitiba’s BRT system eliminates traffic delays by having buses run on separate lanes. Additionally, to reduce potential delay in traffic interactions, Curitiba’s traffic signals

give preference to buses over general traffic (FTA). Curitiba's system further increases reliability by removing the need to wait for passengers to pay on buses.

- *Convenience:* Curitiba's transfer system is very convenient for passengers. All they have to do to transfer is get off a bus and enter a new one. No transfer slips or additional payments are necessary. Additionally, as stated above, Curitiba's system eliminates many forms of delays. This adds to the system's convenience.
- *Courtesy:* Curitiba's system changes over the last few years seem to have had little inherent impact on the courtesy of the system. Not enough data was found to know whether it improved or not.
- *Cleanliness:* As stated above, bus terminals created the potential for more aesthetic transfers, improving the customer experience.
- *Added Value:* The Curitiba BRT provides added value. Since buses run on their own lane and are given preference by traffic signals, they are not subject to traffic congestion. That means that in hours with peak traffic, one can save time by using the public transit system.

2.4: Analysis

2.4.1: Woo Bus Surveys

The consortium administered a survey in 2008 to students in all colleges that participate in the Woo Bus program. Certain conclusions can be reached looking at the Woo Bus surveys.

- The main desired locations include malls, restaurants, plazas, and Boston.
- Transportation services to these desired locations should operate predominantly on weekends.

Additionally, it can be seen that there is not enough marketing of the transportation services offered at universities, this being one of the main reasons why students are not using it.

2.4.2: Rhode Island

One valuable lesson from the case of Rhode Island is that it shows that colleges can be willing to subsidize a bus system as long as the service is good enough to meet their needs. It shows that since different colleges have different needs, they may interact with a public transit provider in different ways. Some colleges subsidize the use of public transit enough to grant all students and faculty free access, such as Salve Regina and the University of Rhode Island. Some colleges choose to subsidize less for less service, such as in the case of Roger Williams University and the Providence Community College of Rhode Island where they grant students and faculty 50% off of select passes.

Rhode Island also shows the creation of schedules designed for college students. Route 55's late-night service exists to provide students of Providence College with transportation to and from downtown Providence late at night. This kind of design is unlike the normal considerations taken for designing schedules, at least in the case of the WRTA (see attached WRTA standards document). This kind of design targets a specific subset of the population rather than trying to serve the general population, and may be part of the incentive that colleges have for subsidizing their transportation needs.

2.4.3: Curitiba

Curitiba's BRT implementations added to the six different service standards. These implementations were successful in greatly improving ridership. This, along with the TCRP's

research and case studies stated in its document, supports the TCRP's suggestion that pursuing improvements in those areas leads service that is more appealing.

2.4.4: Closing Remarks

Through the example of UPASS at Rhode Island, it has been shown that public transportation providers can have effective relationships with colleges. Colleges, public transportation provider, students, faculty, and staff all benefit from these relationships.

Such a relationship may also be beneficial for the Worcester area. It can be more cost-effective for each college to leave transportation needs to the WRTA rather than hire other services for the consortium shuttle or individual campus services. Increased use of public transportation among faculty, staff, and students can open up the city of Worcester to them and give them more options in places to visit.

In order for such relationships to happen, the system would need to be more appealing than current modes of transportation available to students. Using the customer-oriented values pointed out in the introduction, changes can be made to the system in order to fulfill that requirement.

Chapter 3: Methodology

3.1: Overview

In view of the possible advantages gained through enhanced collaboration between the WRTA and colleges of the area, this project began the development of new route designs for the WRTA that may help start these collaborations.

Figure 4 gives a very succinct overview of the methodology steps which were taken in order to reach this goal.

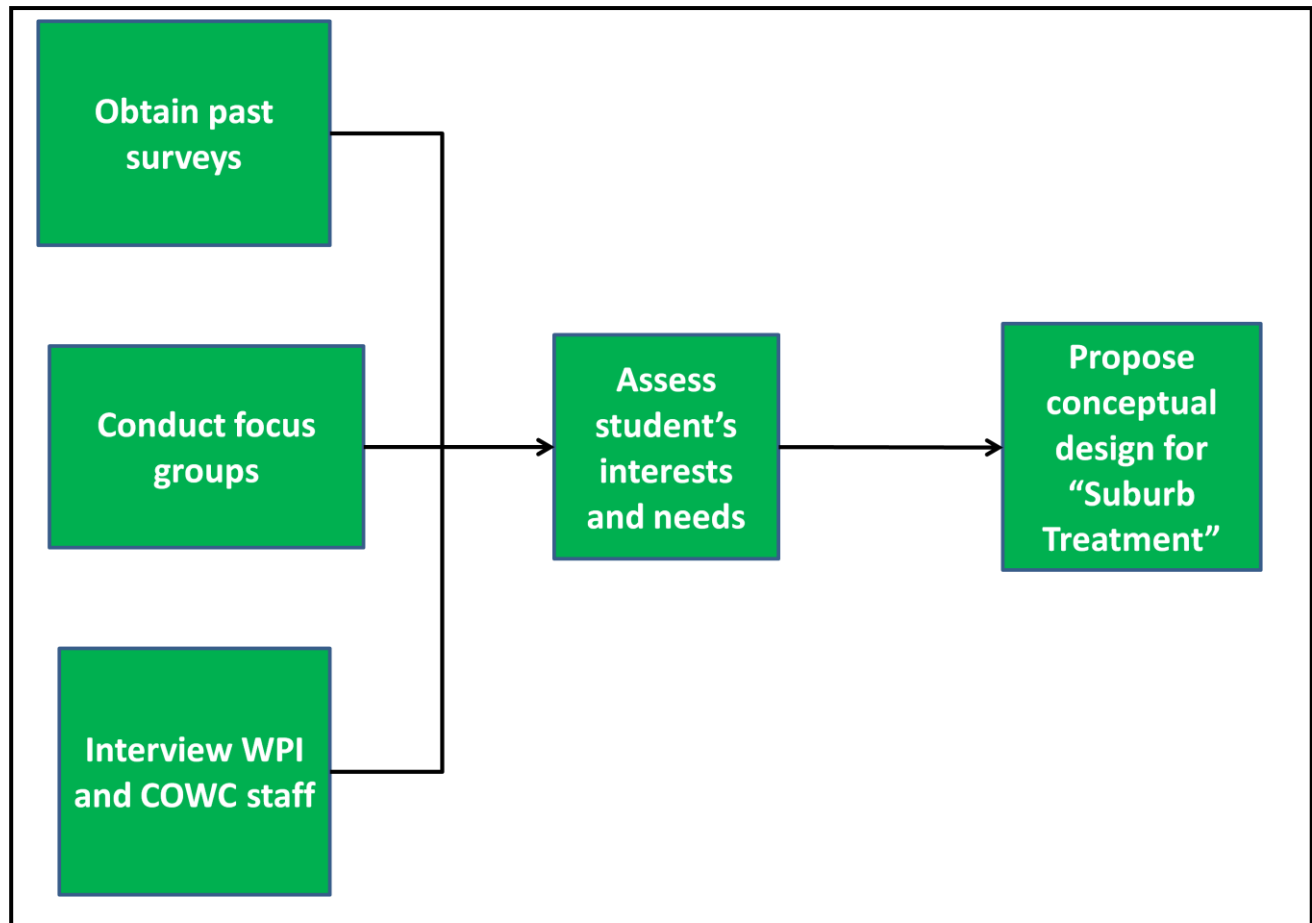


Figure 4- Methodology Flow Chart

In order to assess student's transportation needs and interests, the team conducted focus groups targeting WPI students. The results were then analyzed and compared to the surveys obtained from the COWC regarding the Woo Bus to see if they were still valid. The team also conducted several interviews with key WPI staff to understand student transportation and what student's needs are from the administrative perspective⁶.

3.2: Surveys and Ridership Data

The first step in assessing student needs involved finding data already collected by other parties. The team sought out surveys about student transportation, as well as any data about the ridership of local transportation available to students.

The results of a previously-administered survey regarding the Woo Bus were obtained. The COWC conducted the surveys in April of 2008. Surveys were sent out to all students of colleges that were then participants of the Woo Bus program – Clark University, WPI, Assumption College, Worcester State College, and College of the Holy Cross. These surveys asked questions about locations in Worcester where students use the Woo Bus to get to as well as locations students would like the Woo Bus to take them. Combining the results of these questions, the IQP determined the most frequently visited stops.

Ridership data for the Woo Bus was also made available. COWC collected this data between the dates of May 9, 2008 and April 4, 2009. The Student Government Association (SGA) provided ridership data for the RedCab S4feride program as well, collected and analyzed during fall of 2009. These statistics were used to rank locations of Worcester by popularity.

⁶ All focus group and interview reports can be found in Appendices C and D.

3.3: Focus Groups

In addition to the satisfaction and ridership surveys, the team conducted focus groups in order to verify whether the survey results were still valid, since the COWC surveys obtained were conducted the previous academic year. The focus groups sought to find the following:

- Areas of Worcester students have an interest of going to
- Whether current transportation options were sufficient for students to reach each of those areas
- WPI College students' opinions toward public transportation.

Two different focus groups were conducted, one composed of upperclassmen and one composed of first year students.⁷

3.4: Interviews

The team found additional information on student interests by interviewing Emily Perlow, Associate Director of Student Activities Office at WPI, and Karen Manson, Director of Student Affairs for the Colleges of the Worcester Consortium.

Information gathered in the focus groups indicated that many students prefer private transportation. To investigate the state of private transportation at WPI, the team interviewed personnel in the WPI Facilities and Sustainability Office, Elizabeth Tomaszewski (Facilities Systems Manager/ Sustainability Coordinator) and Alfredo DiMauro (Assistant Vice President).

⁷ Reports on these focus groups can be found in Appendix C.

Chapter 4: Findings

4.1: Surveys and Ridership Data

This section summarizes the results obtained from the satisfaction survey COWC conducted in April 2008 in regards to their Woo Bus service.

A total of 528 students from all five participating institutions completed the survey, being fairly distributed among all four college years. 58.3% of those students have never ridden the Woo Bus and only 3% claimed to use it weekly. The most common responses justifying these statistics were that students had never even heard of the service, hadn't seen it around their campus at all, and because they owned cars on campus (48.5%). The most frequent choices regarding student's favorite stops were Lincoln Plaza and Shrewsbury Street. When asked to what other destinations students wish the Woo Bus would take them, the most popular response was Blackstone Valley Mall. As a consequence of this demand, the COWC decided to add Blackstone Valley Mall to all their routes for the 2009-2010 academic year.

According to the survey, 39.8% students did not use the Woo Bus because they weren't aware the service existed (39.8%), and 8.9% claimed to be uncomfortable taking public transportation in Worcester due to safety concerns. Additionally, 48.9% affirmed that Woo Bus advertisement was "fair" on their campus, meaning that much more advertising could be done.

The Woo Bus ridership data obtained from the COWC for the 2008-2009 academic year confirmed these results, clearly showing that the most popular destinations were in fact Lincoln Plaza and Shrewsbury Street. It also showed that compared to the 2007-2008 academic year ridership to other areas such as Main Street and Park Avenue decreased significantly (from 409 in 2007-2008 to 163 in 2008-2009).

4.2: Focus Groups

Much information was gained through conducting focus groups. Two focus groups were conducted at WPI, a group of upperclassmen and a group of first year students.

It was evident in both groups that timing and schedule are elements that carry great weight for students. Most, if not all students, made it clear that a major reason they don't use public transportation is because "it's all about not wasting time". Students stated that a major problem they saw in using public transportation is that its schedule might not line up with theirs. Students did not want to have to wait for the bus to arrive, or arrive at their destination early and have to wait there. Some students mentioned that going to a location on a bus takes longer than by other methods of transportation. Buses need to make stops for people to get on and off, and usually travel more slowly than traffic. Thus, these students stated that taking a bus is less time-efficient than taking a car or even walking. These schedule-related concerns were evident in both groups.

Additionally, it was found that students did not perceive taking a WRTA bus as safe. This was more evident in the upperclassmen than the freshmen. Students stated that they did not feel comfortable riding the bus with strangers from Worcester. The upperclassmen group perceived Worcester as a city with high crime rates, and so with a high risk of being assaulted while using public transportation.

Both focus groups confirmed that participants were unaware of the WRTA's structure, bus stop locations, or schedules. No member of either group had ever used the WRTA before or looked up its schedule. However, both groups were confident that if they wanted to find the schedules to a route they could use a search engine to find it. Some participants stated that they

were unsure about how to ride the bus. They did not know how payment should be done, how much money should be paid, and whether exact change is necessary.

Participants of the group stated that they would be willing to utilize public transportation if it were cost-effective for them and simple to use. They mentioned that environmental concerns are not a strong enough motivator to convince them to ride the bus.

Finally, the team found that students do not know much regarding places of interest in Worcester, or had much motivation to find out. When asked about places of interest in Worcester, participants could not think of many more places than the Shoppes at Blackstone Valley, Solomon Pond Mall, and the DCU Center. Other locations of interest such as the rest of downtown Worcester and Shrewsbury Street were not mentioned.

4.3: Interviews

4.3.1: Elizabeth Tomaszewski

The interview with Ms. Tomaszewski informed the team about the parking situation at WPI. Through the interview the team learned that parking spots around campus are in high demand. Ms. Tomaszewski mentioned that it is hard to find an available parking spot if one does not arrive early in the morning. The interview also provided the team with other transportation options currently under study by the institution in order to make WPI more environmentally friendly, and in a way helping to mitigate the parking problems. Ms. Tomaszewski emphasized the new Car-pooling initiative put on by the President's Task Force on Sustainability and how using it would make WPI less car-populated and thus mitigate the parking issues.

4.3.2: Fred DiMauro

The interview with Mr. DiMauro made the team aware of a potential problem WPI might face in the near future. With the construction of the new Recreational Center scheduled to begin immediately after 2010 commencement, a total of 120 parking spaces will be lost in order to accommodate construction vehicle traffic. This will greatly magnify the parking issues WPI faces today and will force students, staff, and faculty to find other ways of travelling to and around campus. After construction is completed (estimated to be Fall of 2012), only 60 of those parking spaces will be restored. WPI is also planning on building a new parking garage next to the Recreational Center, but that will only commence at least seven years from now.

In an attempt to find ways of mitigating this possible parking crisis, the Office of Facilities and the WPI Police Department are studying the possibility of using the Gateway parking garage as the main parking facility for WPI students, faculty and staff. This could potentially bring more parking restrictions for those parking inside the campus (primarily the Quad) and possibly higher costs for parking permits/decals. A problem that WPI might face as a consequence of such operation is students might start parking their cars on city streets, and thus complaints from neighbors might become a lot more frequent. In any case, to keep up with the demand for parking at Gateway, WPI will need to provide more transportation to and from the parking facility, so that everyone can get back on campus quickly, and thus the trade-off for WPI staff is worth it.

4.3.3: Karen Manson

This interview gave the team more details into how the different colleges subsidize the Woo Bus and the Consortium Shuttle services, as well as the prices involved with the funding. Ms. Manson mentioned that each of the colleges pay a fixed amount of \$22,333.59 for the shuttle

service as well as \$12,015 for the Woo Bus service. Ms. Manson also pointed out that the WRTA used to operate the Consortium Shuttle a few years back, but since organizations like the COWC and WRTA bid every year on who will take up the service and the COWC has done a very effective job in recent years, they continue to manage operations.

Ms. Manson also made several suggestions to improve the visibility and effectiveness of the WRTA in reaching college students. These include: extending operation hours to later at night, more extensive service during weekends (when students are more likely to use the bus), provide incentives such as promotions in restaurants and local businesses, and create events that will literally get students on the bus and exploring Worcester.

4.3.4: Emily Perlow

The interview with Ms. Perlow provided this IQP with more ideas on how to get students to venture into the city and to use public transportation as their means of travelling. She suggested the WRTA prepare a program similar to the Amazing Race done for first-year students at WPI last academic year. The idea of the program would be to basically have a day where WRTA buses will be on campus, students can take it for free anywhere in the city, and would get the chance of exploring Worcester as soon as they arrive on campus and before classes start.

Ms. Perlow also gave the team ideas in comparing the ridership results from the S4feride program with the Woo Bus and Consortium Shuttle routes, thus concluding whether or not students are travelling to places already covered by these services. She also mentioned that WPI is now in the process of determining whether or not to renew the contract with Red Cab for the S4feride program, since it is a large investment that could be used towards cheaper and more efficient means of transportation, such as public transit systems.

Ms. Perlow mentioned that if the WRTA is interested in working with WPI to get more college students using their buses, there is a possibility that the institution could create a “transportation fee” which would be built into each student’s tuition and would thus be able to subsidize free or high-discounted bus fares for students. Although tuition will not increase over the next year, it is something to consider for the near future.

4.4: Conceptual Design

Through what was learned about motivators for student-usage of public transit and the transportation needs of WPI, the team determined possible changes the WRTA could make to its structure to supply students with appropriate transportation.

A conceptual route structure was designed. In the design, colleges will be treated as though they were suburbs of a smaller city-system. Because suburb routes rarely pass by locations of interest, the WRTA designs routes that travel to and from suburbs, feeder routes, with the primary function of feeding into a central location designated for transfers to commonly used routes, known as trunks.

The team determined that a transfer location situated such that it minimizes transportation time between colleges would be most effective. The rationale for this is that by its nature, the proposed route structure enables inter-college transportation, a function currently handled by the Consortium Shuttle. A route structure that does this more efficiently than the Shuttle could eventually replace it. Such a transfer location should be situated somewhere along the black square marked in Figure 5. Possible stops for the route structure are marked with a black star, these being colleges that currently use the Consortium shuttle service and Gateway Park.

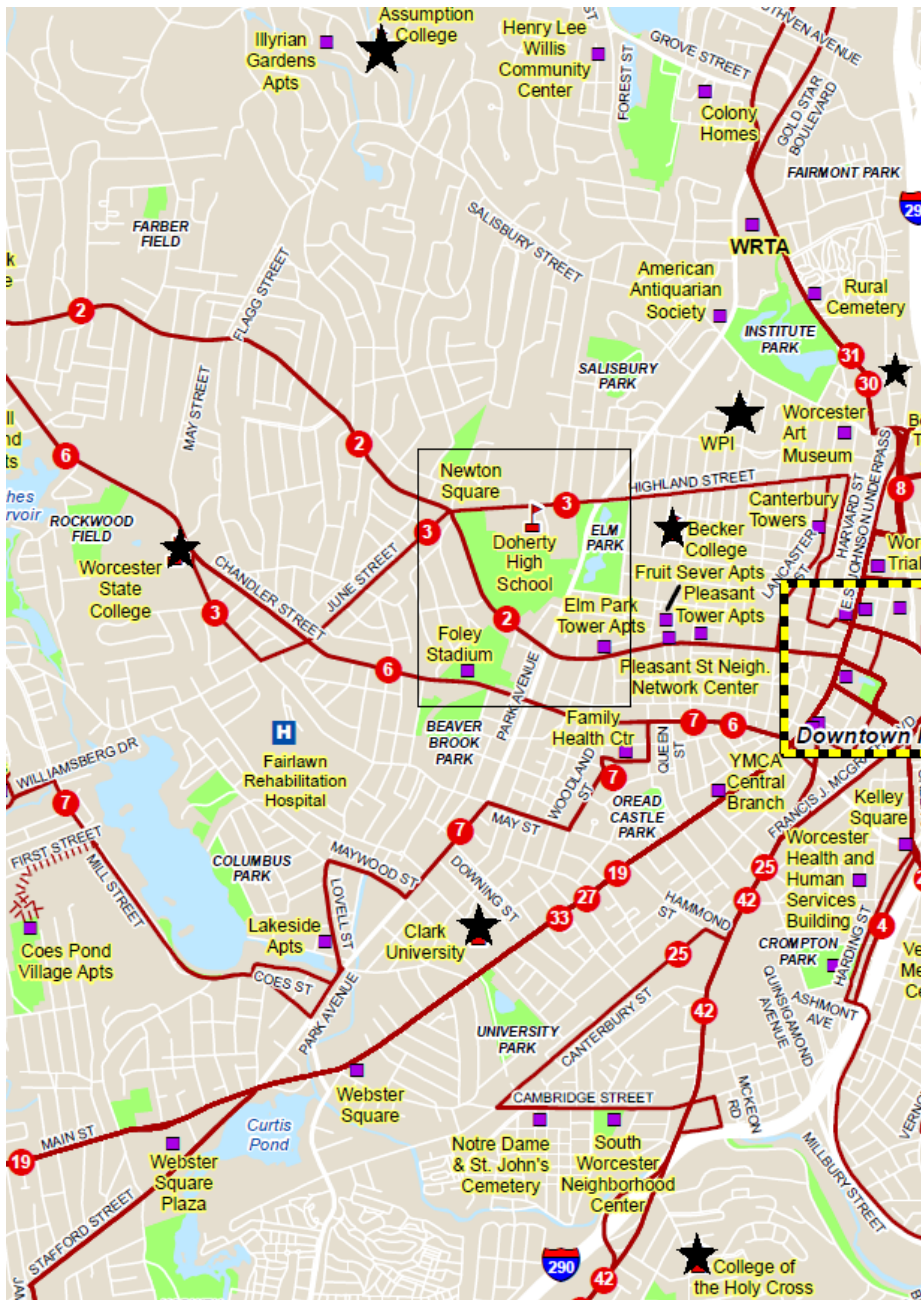


Figure 5: Conceptual Route Design

From this transfer location, routes going to other areas of Worcester interesting to students, such as Union Station and Greendale Mall, can be implemented. This route structure will be referred to as the *Suburb Treatment*.

4.5: System Design Criteria

After gathering information, requirements for the transportation system were defined. Different factors that were important for students to consider public transportation were determined.

The primary factors found that affect student's choices of transportation were:

- The proximity of the bus stop.
- How closely the route's schedule matches the student's schedule.
- How aware students are of public transportation, where it goes and how to use it.
- The extent to which students feel they need to go off-campus.
- The level to which students perceive public transportation as safe.

Routes should provide transportation to various locations to which students clearly desire transportation. These locations include: the Shoppes at Blackstone Valley in Millbury, Worcester's Union Station, and potentially the Solomon Pond Mall in Northborough. Other locations that should be considered include Shrewsbury Street, Greendale Mall, and recreational facilities (such as the golf club or ice skating rinks) in Worcester.

Additional requirements were defined. If the routes and schedules were designed such that they are a more time-efficient service than the current consortium shuttle route design then the Consortium colleges would have more incentive to help fund them. Thus an additional requirement becomes the time efficiency of inter-college travel using the routes. In the same way, other transportation needs could be covered by these routes, such as travel to and from Gateway Park.

General requirements were also developed. The standards mentioned in the literature review were employed. Considerations included the route's safety, reliability, convenience, and added value (cleanliness and courtesy were not to be considered, since these depend more on vehicle maintenance and staff, respectively).

With the above considerations in mind, the following design criteria were developed:

- What are some places nearby the transfer location that passengers would want to go to?
- What headway will there be between buses?
- How time-efficient is it to go from one campus to another?
- How does this improve convenience for college students to take the bus? Does it conform to their expectations for convenience?
- Will students feel safe taking this route? Does it conform to their expectations of safety?
- What possibilities for delay does this route have? Does it pass through any traffic areas?
- Does it intersect with traffic?
- How easy will transfers be?
- How long will passengers need to wait before transferring?

Chapter 5: Further Work

5.1: Overview

This chapter indicates the further work needed to make college-oriented transportation a reality in Worcester. The following flowchart demonstrates the steps that need to be taken to finish the conceptual design proposed in Section 4.5.

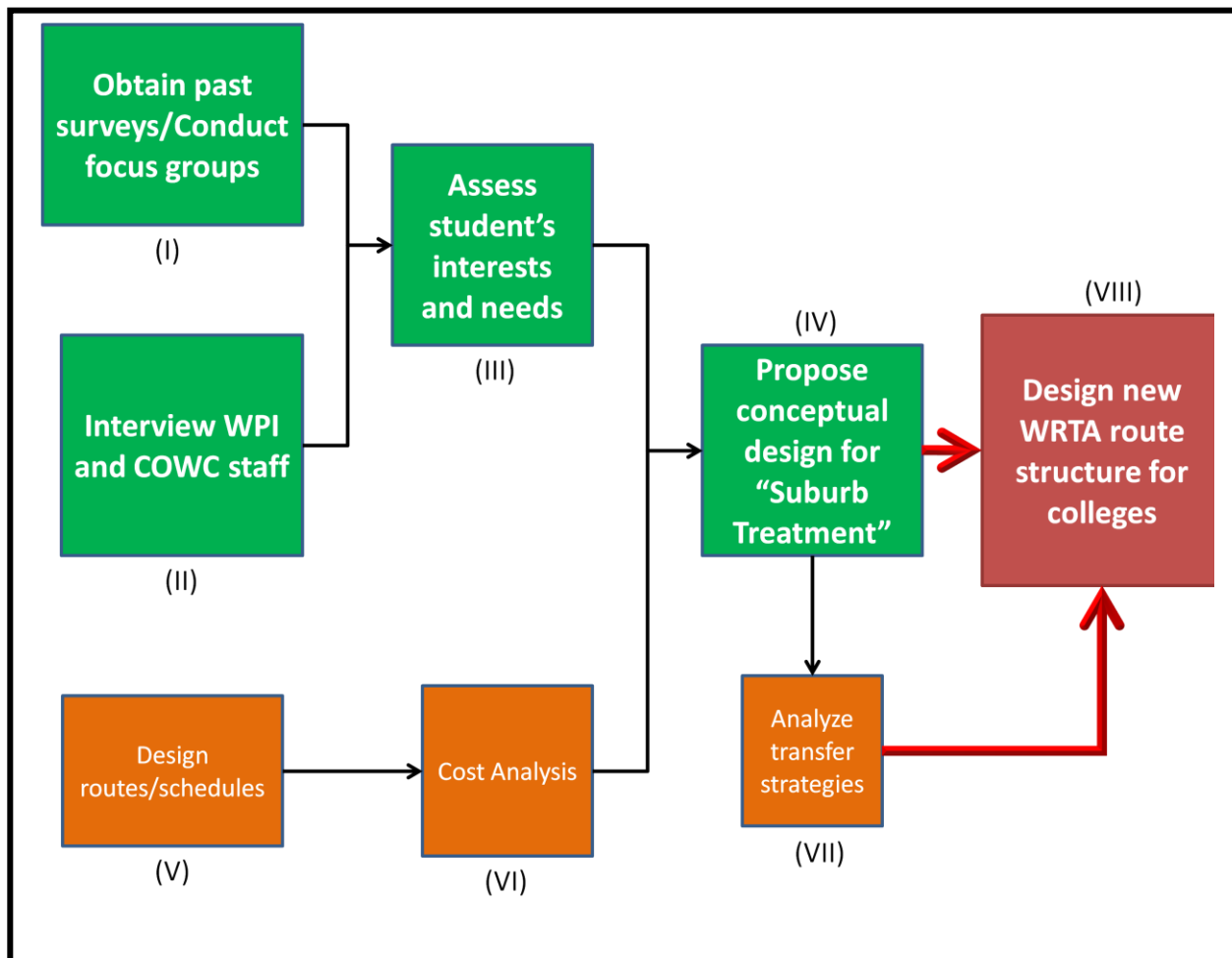


Figure 6 - Future Work Flowchart

From the chart, items I, II, and III have been addressed throughout this report and have been used to develop a rough conceptual design for the WRTA (item IV).

In order to complete the route structure, specific routes and schedules need to be designed. Collaboration with each college of the area will be essential. Placing bus stops in a location as convenient to the students as possible increases the likelihood that a student would use it, thus on-campus locations would be most effective. Additionally, routes can be designed such that they fulfill other transportation needs colleges may have, such as shuttle services. Such transportation needs have to be determined. Planning route schedules such that they fit in with student schedules is also essential, considerations should include the times at which most classes start and at which they finish.

Future work will involve doing cost analysis on each route designed. These cost analyses should take into account the money colleges save by the different transportation services that each route can replace. For example, part of the cost for a route feeding from WPI to the transfer location can be covered by the money saved if the route is designed in such a way that it is a viable replacement to the Gateway Shuttle service.

The route structure relies heavily on transfers between buses at the central transfer location. For this reason, passenger transfer strategies should be assessed in future work to ensure that passengers find transferring between buses simple and natural.

The conceptual design proposed does not cover all factors that deter students from using public transportation. The main factors not covered are lack of student awareness about the WRTA and low need to leave campus. Addressing these factors would increase the new routes' cost-efficiency by increasing their use. Programs and events should be developed to teach Worcester students about the WRTA and how to use it. Events raising awareness of local places

of interest, such as the Shrewsbury Street Shuffle, should be designed. Such events can motivate students to leave their campus more often, prompting them to find ways to do so.

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Appendix A – Meeting Dates

Term A

27 August 2009 – First Meeting with Advisors

3 September 2009 – Meeting with Advisors

10 September 2009 – Meeting with Advisors; Meeting with Stephen O’Neil (WRTA) and Jonathan Church (CMRPC); Meeting with Christine Drew on library research tools

17 September 2009 – Meeting with Advisors

24 September 2009 – Meeting with Advisors

1 October 2009 – Meeting with Advisors

8 October 2009 – Meeting with Advisors; Meeting with Stephen O’Neil and Jonathan Church

15 October 2009 – Meeting with Advisors

Term B

3 November 2009 – Meeting with Advisors

5 November 2009 – Upperclassmen focus group

6 November 2009 – Interview with Elizabeth Tomaszewski (WPI Office of Sustainability)

10 November 2009 – Meeting with Advisors

12 November 2009 – Freshmen focus groups

13 November 2009 – Interview with Fred DiMauro (WPI Office of Facilities)

17 November 2009 – Meeting with Advisors

19 November 2009 – Meeting with Stephen O’Neil and Jon Carney (WRTA), Jonathan Church

30 November 2009 – Interview with Karen Manson (Colleges of the Worcester Consortium)

1 December 2009 – Interview with Emily Perlow (WPI Student Activities Office)

1 December 2009 – Meeting with Advisors

7 December 2009 – Meeting with Stephen O’Neil

8 December 2009 – Meeting with Advisors and final presentation dry-run

9 December 2009 – Final IQP Presentation

15 December 2009 – Meeting with Advisors

21 January 2010 – Presentation to WRTA Advisory Board and to WPI Student Activities Office staff

Appendix B – Focus Group Reports

Freshmen group – 12 November 2009, 8 PM

This focus group was conducted with the goal of gathering transportation interests and needs from freshmen at WPI. It was conducted in Salisbury Hall 106.

Present for this focus group were eight freshmen residents from Stoddard C3, Professor John Delorey, Adrian Mejia, and Nathan Horvath.

The discussion began by determining if students travel in Worcester at all, and if so, where do they like to go. Most responses were malls (Greendale, Auburn, Blackstone), as well as restaurants, CVS, stores and fast-food places on Park Avenue, and Clark University. To get there, students walked most times, used WPI's SNAP van service, or just rode in a car with friends.

When asked about the Woo bus service, most students replied that they don't know the bus schedule, or where it stops. A general common response was that they prefer to go home and borrow a car because it is much more convenient to have one.

Students have been using the SNAP service very regularly, but they do have reservations in regards to it. One resident compared this service to a similar escort shuttle at Clark University which is not limited to residential destinations, but also takes you to commercial locations, and has a larger radius of operation. That might be a good suggestion for WPI. On top of that, students expressed their interest in more drivers, because waiting time can also be an issue.

When asked where the nearest WRTA bus stop is located, students did not have an answer. They admitted to not being familiar at all with WRTA bus routes and services, and

because they don't see WRTA buses very often, they assumed not many people use it. For the students that have seen WRTA bus stops, they mentioned that there isn't a schedule on them, which makes it hard if you have to find your way back home using a city bus. Professor Delorey expressed his concerns with buses not being always on time. He's had occasions where buses were more than a half hour late. None of the students knew where to go find out the WRTA schedules.

When asked what places in Worcester students would like to go if service was provided for them, most popular responses were: Blackstone and Solomon Pond malls, Lincoln Plaza, Union Station, Shrewsbury Street, White City, and the DCU center.

Students also mentioned that since they don't know where things are located in the city, they often feel unsecure taking public transportation. They agreed that more advertising is needed so they can be informed of popular places to go as well as how to get there. Most of them said yes when asked if they'd be willing to use public transportation if it met their needs and was convenient and appealing.

Generally, the students were not concerned with the safety factor, mostly because they would not be using the buses very late at night (at least this group).

A good suggestion for incentives that was brought up is to offer special discounts at select restaurants in Worcester to anyone using WRTA bus passes. According to the students, this would make them more likely to use public transportation when going to Shrewsbury or Main Streets, for example. Other incentives discussed include Wi-Fi on all WRTA buses, newspapers available on seats for all passengers (London has a similar program, where as you walk into a bus station you can pick up free daily newspapers and take it on the bus with you, as

long as you leave it on the seat when you get off), and have TVs on all buses. Another suggestion that was brought up is setting up electronic displays at every stop. This way passengers would know how long until the next bus arrives.

One student brought up the fact that public transportation in Worcester is not as attractive to people as it is in Europe, for example. He mentioned that in Europe taking the bus is more “routine-like” for most people, and it is also more appealing because of its cleanliness.

Most of the students said they walk very regularly in the city, having walked to several stores and restaurants on Park Avenue. They also mentioned that if they were allowed to have cars on campus, they would bring them, simply because it’s more convenient for traveling. When asked if they use public transportation back home, all of them said no, mostly because it is non-existent where they live. Although they mentioned that they use it when going to Boston.

Distance is the primary deciding factor when it comes to transportation for them. “It’s all about not wasting time!” Students look at the distance to their intended place of travel and determine if they can walk there. If not, generally they seek a friend that has a car and could possibly drive them.

Overall, students are open to exploring public transportation, but there has to be something more than just the convenience factor stimulating them to use it. Any type of incentives or promotions would most likely attract their attention and might be a good starting point. Also, more advertising is needed; students need to know of these promotions, and be able to talk about it with each other. That way, the chances of them picking public transportation to go places versus a car are a lot higher, and it will be beneficial for them, as well as for the Institution and the WRTA.

Upperclassmen – 5 November 2009, 4 PM

The focus group explored different forms of transportation WPI students use in Worcester, why they use them, and whether or not they use public transportation. The focus group was conducted in the WPI Worcester Project Center nearby City Hall. Present were five upperclassmen taking part of the B-term Worcester IQP project, Professor Baller, Adrian Mejia and Nate Horvath.

Various forms to get around the city of Worcester were discussed. These included the use of cars (along with carpooling), the consortium shuttle, SNAP, the red cab program recently done, walking, biking, and using public transportation.

It was determined that the use of personal cars is convenient. Students can go where they want, when they want. However, a concern students have about the use of cars is parking. Participants talked about the difficulty that they sometimes find in acquiring a good parking space. Using parking meters is inconvenient as well because students need to have small change at hand. A method mentioned used to lessen the parking problem is to do carpools. When taking part in carpools, a group of people needs less cars, and thus has less trouble finding enough parking spaces. Additionally, parking fees can be split amongst all the people in the carpool. Most participants with cars park their car on off-campus locations because they were unwilling to pay WPI parking fees.

The consortium shuttle was discussed briefly as a form of transportation. Its fixed schedule was declared to be inconvenient. Many events start on the hour, but because of the way the shuttle works, most of the stops do not arrive to a place on the hour. Participants stated that if

the shuttle's timing were different so that they didn't have to wait before or after using it, they would use it.

Some of the participants walk and ride bicycles to some parts of Worcester. A major concern other participants had about taking such forms of transportation is safety. They stated they would not feel comfortable taking such a form of transportation in certain parts of Worcester or at night-time. Additionally, participants did not like the idea of riding a bike in the winter or uphill.

Finally, public transportation was discussed. None of the participants had ridden on a WRTA bus before. Some of them knew one of its stops is at city hall, however, none of the participants knew the bus schedules or other stops. When asked how they would go about finding out, they all said they could probably "google the information accurately." Some of the participants had safety concerns about riding a WRTA bus. They mentioned that they do not fully trust some of the more suspicious-looking characters they sometime see around bus stops, and they're afraid those characters may get on the bus with them. Additionally, they felt that buses fill up often and become uncomfortable. Participants mentioned that the WRTA bus schedule is inconvenient for college students; transfer times are a long wait.

It was found among the participants that they did not go to parts of Worcester other than campus and the project location. Most participants could not think of many places they like to go to other than Blackstone Valley Mall. It became apparent that the participants were not too knowledgeable about any attractions Worcester might have to offer. However, there were some places participants wished they could go to more often: Solomon Pond Mall, Worcester State College, and the golf club.

Appendix C – Interview Reports

Elizabeth Tomaszewski interview – 6 November 2009, 3 PM

Present: Elizabeth Tomaszewski, William Baller, Adrian Mejia, Nathan Horvath

- Started discussing parking situation on campus
 - Liz: “Parking is tight – at best”
 - Best time to park for faculty: 7-7:30 AM; later becomes a problem
 - Weather affects greatly
 - Snow, parking bans – limits parking even more
 - One-sided parking on streets: forces the use of campus parking
- Discussed consequences/implications on parking with the new Recreational Center
 - Will affect street that runs above Alumni field (virtually all parking on it will be removed)
 - Overall, will decrease space for parking
 - Liz was not sure if there will be new parking spaces created along with the Recreational center
- Suggested “Carpooling” as a viable solution
 - Today not as used as could be
 - Difficulty lies in coordinating schedules – make it more flexible
- Bicycling is another possible solution
 - Liz would like to see more people biking to/around campus
- Adrian brought up the possibility of WPI/other campuses subsidizing bus service to students and faculty/staff

- Liz was very excited and would like to see more partnerships between the WRTA and college campuses
- Mentioned the possibility of charging more money for parking spaces on the quad
 - Might decrease car ridership and encourage use of other means
- It is the Board of Trustees that makes executive decisions concerning parking on campus
- Nate asked if there is anybody Liz would recommend we talk to in order to get more details about parking at WPI
 - Fred DiMauro, director of facilities

Fred DiMauro interview – 13 November 2009, 3 PM

This interview was conducted in Mr. DiMauro's office at the WPI Facilities house.

Present in the room were Mr. Fred DiMauro, Professor William Baller, Adrian Mejia, and Nathan Horvath.

This interview was recorded with the permission of Mr. DiMauro under the condition that any personal remarks made by him not be included in our final report.

The first topic explored was the current parking situation on campus, its problems and issues, as well as how the construction of the new Recreational Center will affect parking. Mr. DiMauro used a large map of the WPI campus to answer this question. He mentioned that the Institution expects to lose 120 parking spaces on campus during the construction phase, and regain 60 of those once construction is completed. During construction, the street above Alumni Field will be completely blocked and about half of it lies on the footprints for the Recreational Center. Also during construction, about half of the parking spaces on the quad will be unusable, and part of the First Baptist Church and Higgins House lots will be lost in order to create a pathway for

construction vehicles to and from the site. Mr. DiMauro also mentioned that the University has plans to reduce parking and car access around the quad in the long run, possibly limiting traffic only for buses, admissions office staff, visitors, and emergency vehicles.

To accommodate the need and desire for parking as a result of the new Recreational Center, the plan is to build a 600-car parking garage underneath the baseball field. Construction for this project will start in 7 to 10 years. The initial campus-wide renovation plan was composed of five stages:

1. Replacement of Alumni Field turf (implemented 2 years ago)
2. Construction of parking garage
3. Construction of Recreational Center
4. Renovation of Harrington Auditorium
5. Construction of new baseball field in Salisbury Estates.

Considering the logistics of the construction process for the Recreational Center, the Institution decided to wait on the parking garage. The Recreational Center is scheduled to begin construction right after this year's commencement, and should be completed during fall of 2012. However, the construction to the parking garage is estimated to begin anywhere between 2016 and 2019, which means there will be at least 4 years where parking will be a major issue as the Recreational Center attracts students, faculty and alumni. To solve this issue, Mr. DiMauro stressed his desire to make more use of the Gateway Parking facility, which WPI has just recently acquired full ownership. Mr. DiMauro has been working with Chief Cheryl Martunas on creating incentives for WPI faculty, staff, and students to use the Gateway parking as an alternative. Chief Martunas will be analyzing the efficiency of the Gateway Shuttle service and

the possibility of increasing its use in order to make parking at Gateway more convenient. Mr. DiMauro believes that if students, especially, park their cars at Gateway, they will be more likely to use public transportation to get around the city because of the distance from campus to the parking garage. This will, however, cause more concern for faculty who are very accustomed to parking “up on the hill”, close to their office.

Adrian brought up the possibility of using public transportation as the primary advertised means of transport to college students next school year. With the construction beginning after commencement, according to Mr. DiMauro there is a great possibility of blocking all traffic around the quad and all parking spaces being jeopardized. A great alternative is to offer bus transportation services to the freshmen as soon as they arrive on campus. This way, they’ll be highly encouraged to take use of the services and, with all the construction happening, not even bother using cars as their means of transport.

In conclusion, the team asked Mr. DiMauro if his office would be willing to subsidize WRTA/WPI partnerships in the future, encouraging students to use the bus. He said his office is not in a position to provide financial support, but recommended we talk with the Student Affairs office, Vice President Janet Richardson, and Chief Martunas.

Karen Manson interview – 30 November 2009, 3 PM

This interview was conducted in the Mid-Century Room at the WPI Campus Center.

Present for the meeting were Karen Manson, Director of Student Affairs at the Colleges of the Worcester Consortium, Inc. (COWC), Nathan Horvath and Adrian Mejia.

This interview was recorded with the interviewee's permission.

The interview started with an overview of this IQP's goals.

When asked if the COWC conducts ridership surveys for the Consortium Shuttle, Ms. Manson said the COWC keeps track of ridership numbers but does not conduct satisfaction surveys, as they do for the Woo Bus. The reason for this is that the service needs for the shuttle haven't changed over the years. One common question the COWC receives in regards to the shuttle is whether or not there is a possibility of having another shuttle running at the same time as the original one but in opposite direction. Her answer was simple: yes, but it will cost the colleges double. All schools involved in the shuttle program pay the same amount to cover COWC operating expenses, and subsidizing another shuttle would be too costly for colleges.

The COWC has not received any complaints in regards to the Consortium shuttle, but has thought of the possibility of creating system where students can send a text message to a specific number and receive info on what time the next shuttle will be available at the designated college stop. The service itself would cost about \$20,000.00 per year, and thus it is not financially feasible today. As of today, there are currently no plans to change or modify the shuttle routes.

The Woo bus was created just three years ago and has undergone changes to its route every year. Two years ago stops at the Worcester Arts Museum and Union Station were created. The COWC is willing to make as many changes to the system as students would like, provided they have the funding from the colleges. A common complaint received in regards to the Woo bus is that the waiting time on weekends is too long, but overall students are very much pleased with the service.

When asked if the COWC has considered partnerships with the WRTA in the past, Ms. Manson mentioned that in fact the WRTA used to run the Consortium shuttle a few year back, but since the COWC, WRTA and others go out to bid for the service every year, the COWC had the lowest operating price and so for the past years has been operating the shuttle. AA Transportation is the private company paid by COWC to offer the service. One of the goals of the COWC is for “students to enjoy what Worcester has to offer”, and because of that the COWC doesn’t just limit their marketing campaigns to their own services, but encourages students to make use of the city’s transportation resources. Problems Ms. Manson sees with the WRTA today are: 1) website is not very user-friendly – she compared it to the MBTA website, where one can map out a route, with how long it would take, price, locations, etc; 2) be more “destination oriented” – students aren’t very comfortable finding their way around alone, so more detailed and informative maps would be needed; 3) service hours are very limited, especially weekend hours when students would like to leave campus.

When asked which departments in the different colleges subsidizes the Woo bus and the Shuttle, Ms. Manson said she is not too sure about the shuttle, but the Woo Bus is funded by SGA at WPI, Student Activities Office at Assumption, Holy Cross, Becker, and partly by Admissions Office and the Student Activities at Anna Maria.

In terms of getting students to explore the city, Ms. Manson believes that the COWC needs to continue providing their services, promoting events such as the Shrewsbury Street Shuffle and the Canal Fest, as well as use a more intentional marketing strategy seeking to appeal to student’s interests. In her opinion the colleges need to instruct the WRTA in how to use these strategies and implement them to their system.

Lastly, when asked if there is enough advertising for these services, Ms. Manson mentioned that that is up to students at each institution to promote it, talk about it, ask higher authorities for more incentives to use, etc. She gave the example of Assumption College, who had the highest ridership numbers. In this case, the university created a series of campaigns/promotions for seniors, providing them a chance to go off campus and have fun, while not having to worry about driving back to campus but simply taking the Woo bus. She also mentioned that another powerful tool to get students on the bus and exploring the city is through the Resident Advisors. By getting to the freshmen and showing them that transportation in Worcester is easy, convenient and safe, they will most likely continue to use it their other years at college, and thus not having the need for a car.

Emily Perlow interview – 1 December 2009, 1:30 PM

This interview was conducted on Tuesday, December 1, 2009 at 1:30 PM in Ms. Emily Perlow's office at WPI.

Present for this interview were Ms. Emily Perlow, Associate Director of Student Activities and Greek Life Programs, Nathan Horvath and Adrian Mejia.

This interview was audio recorded, with the interviewee's permission.

The interview began with a conversation on the Safe Ride program. When asked if there exists a possibility of bringing the program back, Ms. Perlow said it is very likely to come back next fall. SGA, who financed the entire service, is studying possible improvements for next year. Although the demand for the service was very high, it is an expensive program to maintain. SGA

is looking into using tuition money to subsidize part of the service, or maybe increasing the fee to \$8 per trip, or even stipulate a fixed fee per person in the cab, instead of per ride. Her worry is that although it is highly cost efficient for students and is good use of fee money, it might not be as cost efficient for SGA itself.

When asked if college students have lots of transportation needs, Ms. Perlow said yes, and the school does its best in meeting those needs. Simply analyze ridership data for shuttle; students are definitely using it, and most of them are freshmen. But on the other hand, Ms. Perlow reaffirmed that one can never meet all of student's transportation needs.

Ms. Perlow mentioned that students have been going to Union Station a lot more than they were in the past, but unfortunately the timing of the Woo bus and the train schedules doesn't line up and students decide to take a cab instead of public transportation. She suggested that maybe the WRTA can fill this gap with their service.

When asked if SAO does or has done incentive programs to get students exploring Worcester, Ms. Perlow said they put together a program last year called the Amazing Race, which Community Advisors used as programs for their residents, with the goal of exploring Worcester and what attractions it offers college students. The event was successful, but students still chose not to venture off campus. Ms. Perlow believes a main factor is that students have everything they need to live at college within walking distance, and thus see no need to venture into the city. She believes one of the most effective tools to change this situation is getting RAs and CAs involved, encouraging their residents to explore Worcester and doing programs off campus. She suggested that maybe the WRTA could put together an "Amazing Race" type of program in the beginning of the year, targeting freshmen, and maybe give them an entire day to

ride the bus for free and explore the city. If freshmen are comfortable riding the bus, they will most likely continue to ride it in the future.

Ms. Perlow also mentioned the possibility of having a “transportation fee” built into every WPI student’s tuition, possibly subsidizing discounted or free bus rides to them. She also mentioned that the WRTA would like to keep track of who and how many college students use their system via a tracking chip on student’s college ID. WPI wouldn’t be able to implement that in at least 5 years since all ID cards were purchased in batches ahead of time.

Ms. Perlow sees socio-cultural differences as another factor that keeps students from riding buses. Most students have never ridden a bus in their lives before coming to college and it’s very hard to change that. They are also not comfortable riding with “different” people; they feel threatened, unsafe, even though buses are safe environments. Other barriers include lack of advertising of services and just being educated about transportation. WPI students are unique in the sense that they learn from experience and not just being given the information; they like to practice what they hear.

Ms. Perlow seemed very interested in this project and asked us to present for her office in C term.