



**Assessing the Effectiveness of the Worcester Regional Transit Authority**

**(WRTA) Student Incentive Program**

**An Interactive Qualifying Project**

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## **Abstract**

The Worcester Regional Transit Authority (WRTA) offered a free semester bus pass as an incentive for freshmen at WPI and Clark in order to increase bus ridership and awareness of the bus system. This project assessed the effectiveness of the program by analyzing ridership data from the WRTA and conducting surveys among the freshmen. While the program successfully increased awareness of the WRTA among students, modifications to the program and to the bus system itself are necessary to increase consistent college ridership.

## Acknowledgements

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## Chapter 1 – Introduction

Public transportation is an important part of any city. Public transportation is generally cheaper and more efficient than driving. It is used for daily routines, including work, school, and shopping. For college students, public transportation offers a way to get off-campus without needing a car.

Worcester, MA has a very large college community. As of 2007, there were about 28,262 full time and part time students (Worcester Colleges, Schools and Universities). As such, the public transit system could be a very useful source for getting around the city. The Worcester Regional Transit Authority (WRTA) is the public transportation provider in Worcester and the surrounding communities. Unfortunately, a previous IQP determined that students do not use the bus system very often. Reasons included lack of awareness, price, and not having reasons to go off-campus.

In response to the lack of student ridership, the WRTA implemented an incentive program to raise awareness and build ridership. The WRTA gave out free, semester-long, unlimited bus passes to freshmen on three college campuses; Worcester Polytechnic Institute (WPI), Clark University, and Mass College of Pharmacy (MCPHS).

This project assessed the effectiveness of the free bus pass incentive program. Issues examined included whether the passes were enough incentive for students to use the bus system, or whether there were factors other than the reasons listed above that went into a student's decision to not use the bus. The effectiveness was determined through analyzing ridership data from the WRTA as well as conducting surveys of freshmen at WPI and Clark. The surveys included questions about the program and the bus system as well as questions about future use of the bus.



Throughout the project, the team worked closely with the WRTA. As stated above, the WRTA sent the team the ridership data, and was in frequent communication with the project team.

After the survey data and ridership data were collected and analyzed, the results showed that while awareness did increase, consistent ridership did not increase, as most of the freshmen used the pass only a few times. Awareness was increased from the WRTA being present on campus and sending out emails advertising the program. In addition, awareness was boosted by students using the passes and taking the survey.

Lastly, the project team developed an oral and visual presentation and presented it to the WRTA advisory board. This presentation summarized the project in its entirety (i.e. how it was formed, goals and objectives, methods, results etc.) and listed several recommendations for the WRTA to take concerning the program.

## Chapter 2 – Background

### 2.1 – Bus System Overview

Public transit involves many forms of transportation; the two most common being buses and trains. As such, these two are often compared when analyzing a public transit system. Bus systems are not as fast as rail systems, but are much cheaper to operate and install, and are much more versatile, considering they can use roads already placed, instead of needing to build new rails. (Lew) There are many route setups for bus systems, but the most common is the trunk and feeder (or hub-and-spoke) system. (Factors Influencing Bus System Efficiency / Route Planning) In this system, there is usually one or more “hubs” located in the centers of the system. “Feeder” bus routes radiate out from these hubs like spokes. The separate hubs are usually connected by

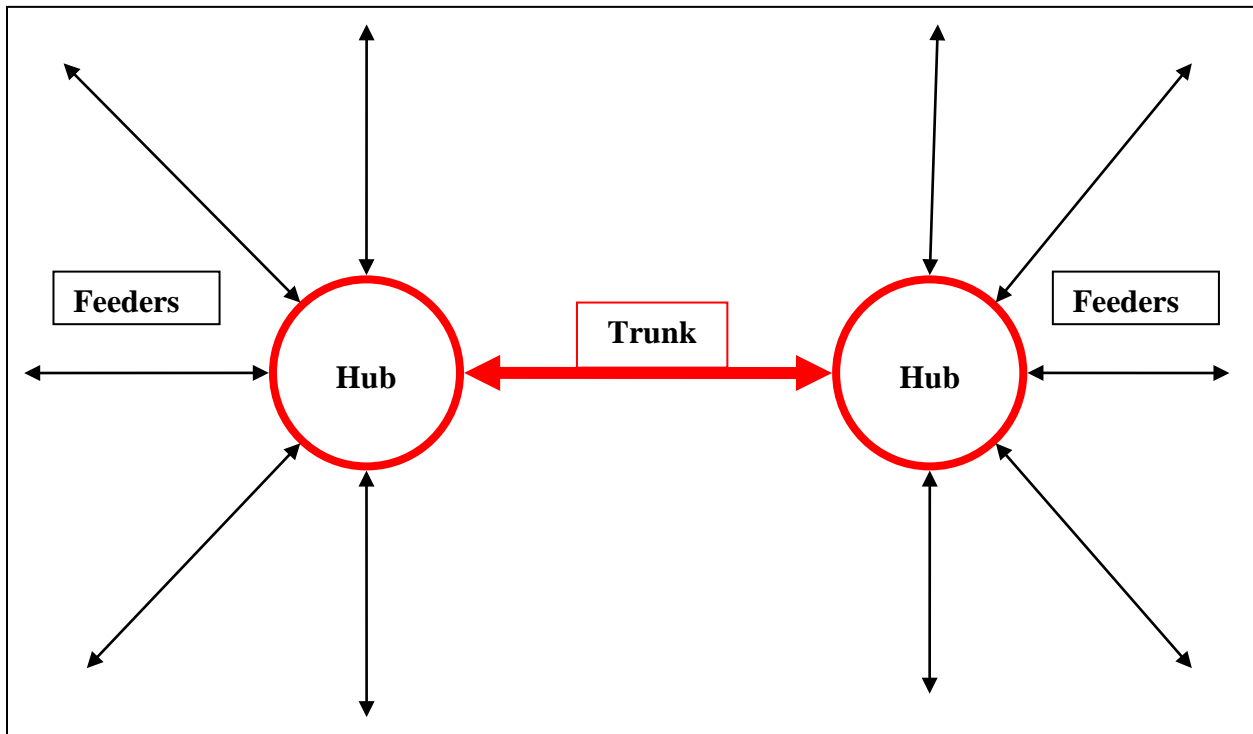


Figure 1. Simplified Bus Route System

“trunks” which is where most of the bus traffic occurs.

There are many components that make up a useful, effective bus system. First and foremost is the willingness of the passengers to use the bus. According to the Transit Cooperative Research Program, there are several fields that can be used to assess the satisfaction (and therefore willingness to use buses) of the passengers. (TCRP) These fields include:

- **Safety** – passengers need to feel safe while waiting for and riding the bus.
- **Reliability** – buses need to be on time most of the time.
- **Convenience** – buses and routes need to go where passengers want to go.
- **Courtesy** – passengers need to feel valued by the bus system.
- **Cleanliness** – buses, stops, stations, and transfer locations need to be clean.
- **Added Value** – riding the bus needs to be easier, cheaper, and/or quicker than other means of transportation.

Some or all of these factors should be taken into account when designing and redesigning any bus system. In addition to passenger satisfaction, the bus system needs to be cost effective and efficient for the bus system to succeed. (United States Federal Transit Administration) An IQP conducted in 2009 assessed the Worcester Regional Transit Authority’s bus system based on these factors and how they related to Worcester college students.

## **2.2 – Worcester Regional Transit Authority (WRTA)**

The Worcester Regional Transit Authority (WRTA) is the public transportation for the Worcester area. According to their website:

“The WRTA was created in September 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 the territory.” (WRTA)

The WRTA operates a fleet of 48 buses, including 4 hybrid diesel-electric buses. (WRTA) There are 23 routes that serve the city of Worcester, as well as many of the surrounding towns and communities. In addition to the regular bus service, the WTRA runs a Paratransit service that provides curb-to-curb service for passengers with disabilities.

## **2.3 – Previous Work**

An IQP conducted in 2009 by Adrian Mejia and Nathan Horvath “examined the use of public transportation by college students in Worcester” and “proposed modifications to both funding mechanisms and route designs of the WRTA.” (Horvath and Mejia)

The IQP researched the reasons why and how college students use the bus in Worcester. Through the use of past surveys, focus groups with students, and interviews with key staff at WPI, it was found that most students do not use the bus. Some reasons include not needing to leave campus, bus stops being too far from campus, not knowing about the bus, being concerned about the safety of buses, and buses not going where the students wanted to go.

The IQP conducted several focus groups with students about how they use the bus. Most students said they didn’t use the bus, while those that did reported that it was mainly to get to local malls, the DCU center, or other colleges. Inter-college transportation is currently provided by the Consortium Shuttle during the weekdays and is subsidized by the participating Worcester colleges.

Another service currently offered by many of the Worcester colleges is the Woo Bus, which takes students during the evening and weekends to and from their college campuses (Anna Maria College, Holy Cross, Assumption College, Becker College, and WPI) and various local

spots for food, shopping and entertainment. These include Shrewsbury St., Union Station, Blackstone Valley Mall, and the Target Plaza.

The IQP also looked at the bus systems in two other locations: Curitiba, Brazil and Providence, Rhode Island. Curitiba has a very good BRT system in place, utilizing most aspects of the BRT so the bus system almost rivals a light rail system. Rhode Island's public transportation RIPTA has been subsidized by many of the local colleges, allowing students to get bus passes at reduced or even free rates. The Providence case study is summarized with the other case studies as part of this report (See Section 2.5.6).

The IQP then proposed several changes to the WRTA. The main change was a new conceptual route system that treated the colleges as city suburbs. In this design, there would be a central transfer location for all the college bus stops. Students could then branch out to wherever they wanted to go, including the other colleges.

The other major finding from this IQP was that the majority of college students did not know about the bus system or how to use the bus at all. This finding was very influential to the WRTA.

## **2.4 – Effects of the IQP**

As a result of the IQP in 2009, the WRTA implemented an incentive program for incoming college freshmen. At the activities fairs for Clark University, Worcester Polytechnic Institute (WPI), and Mass College of Pharmacy and Health Services (MCPHS), the WRTA handed out free semester-long bus passes to all freshmen. (Bock) In addition, the WRTA did travel training sessions for the RAs and CAs of Clark and WPI, and gave them the free bus passes. The travel training is a service the WRTA offers for free to teach passengers how to use

the bus system. (WRTA) The WRTA believes that if the RAs and CAs know how to use the bus, they are more likely to have programs for their residents that use the bus.

These bus passes provide unlimited use until the end of the semester, at which point students can renew them at almost half the retail value. A normal semester-long (4-month) bus passes costs \$192, while students will be able to purchase them for only \$100.

## **2.5 – Case Studies**

The free bus pass program of the WRTA is not the only one of its kind. Several similar programs exist across the country. Like the WRTA program, these student incentive programs seek to increase awareness and use of public transportation, while offering said transportation at a more affordable price. This is very convenient as some students may not have access to a car, or may lack the money to regularly pay for public transportation. In some cases, the bus passes come at no charge. In other cases, the bus passes are priced at a small fee, or are free for a certain time and then require payment for continued use of the passes. Nevertheless, there is a clear effort to get college students on the buses.

### **2.5.1 – Mt San Jacinto College, San Jacinto, CA**

The Riverside Transit Agency (RTA) bus pass program, which is in the pilot stage for this college, offers student free bus passes during the 2010-2011 academic year. (WESSON) The Riverside County and 11 cities in the area are funding the program (which costs \$18,500) with air-quality improvement funds. A Go-Pass sticker is attached to a student's ID, and then the student can go anywhere the bus route will take them. However, the free pass expires at the end of the year, after which a fee will be required for continued use (which is unspecified). This fee would have to be approved by both students and college trustees. Also, in addition to the

program being in the pilot stage, the number of students using the buses is very low, which raises questions as to whether the program is effective and should be continued. Approximately 103 out of 21,000 students use the bus, which represents approximately 0.5% of the student population.

### **2.5.2 – Regional Transport District-Denver**

This program has been successful for the most part. (College Pass) The program, called the College Pass program, allows students with their college ID to utilize the bus and rail (train) for a reduced fee. This fee is good for one semester, and is non-negotiable. The pass itself is voted on by the student body, because the pass applies to all students. The vote is implied to be a yes/no vote. A major indicator of the program's success is that more than 60,000 students use the bus system through this program.

### **2.5.3 – De Anza College, San Francisco, CA**

This incentive program is also in the pilot stage. (Banchik) Of the 50 students who applied for the program, 30 were selected to be the test subjects. It began in August 2010, and students were given free bus tokens. The tokens were the equivalent of a day pass and they allowed the students use of the Valley Transportation Authority (VTA) buses. The program was funded by the 2009-2010 DASB (De Anza Student Body) Special Allocations Fund. One of the main goals of the program is to target students who actually need use of the bus. Some of the criteria for selecting students for the program included financial need for the bus as well as class load and academic success. The program was advertised and information was distributed near the De Anza library.

#### **2.5.4 – Cornell University**

The bus pass program at Cornell gives free passes to all registered students. (Cornell University) Students need their ID's to board the Tompkins Consolidated Area Transit (TCAT) buses using the free pass. The passes provide unlimited use of the buses after 6pm on weekdays and at all times on the weekends. New students to Cornell (freshmen and transfer) also get free passes for the year, but without any time restrictions. This privilege is called Omni-Ride, and it is available to returning students as well for the price of \$125 for the fall and \$200 for the year, if purchased in September. The prices decrease each month as the school year goes on. Cornell is responsible for paying for the passes, although how much they pay is unknown.

#### **2.5.5 – Maryland Transport Administration (MTA)**

The MTA program is called the MTA All Access College Transit Pass. (MTA) It is a monthly pass that is priced at \$39, which is \$25 less than the full price (\$64). The passes are given to the participating schools by the MTA for distribution, and students pay the \$39 mentioned above for the passes. Through the pass, along with student ID's like most programs in this section, students can use the bus, train, and subway without any restrictions. A big sign of its success is that 31 schools/colleges in the area have enrolled in the program.

#### **2.5.6 – Providence Case Study**

This study was from a previous IQP. (Horvath and Mejia) Providence is an example of a city with colleges that utilize the bus system. Many of the colleges subsidize the cost of bus passes, anywhere from half off to free passes. This service is called UPASS and also provides additional benefits to students, including late-night bus service on Thursdays, Fridays, and Saturdays during the school year.



## 2.5.7 – Summary Table

Table 1 is a summary of the previous case studies. It shows the different college incentive programs, as well as the cost to the students and how the program is funded.

Program	Cost (if any)	Funding
San Jacinto	free for 1st year, then fee is required	Air quality improvement funds
RTD	semester fee	none
De Anza	free	DASB special allocations fund
MTA	\$39 per month	none
Cornell	free for normal pass, \$125-\$200 for OmniRide	none
Providence	free or half-price	Colleges

## 2.6 – Measuring Effectiveness of Incentive Programs

According to the Transit Cooperative Research Program (TCRP) report 107, there are three types of measuring effectiveness of incentive programs. (TCRP) They are activity or output indicators, outcome indicators, and cost-effectiveness indicators.

Activity indicators “focus on the activities and processes associated with a program.” These focus on strategies used to achieve certain objectives. In the case of the WRTA, this would be giving freshmen free semester-long bus passes in order to achieve greater ridership.

Outcome indicators “focus on the results of program activities and are closely tied to the goals and objectives of a program.” These focus on the results of the activity indicators. In this case, indicators would include the actual ridership data, as well as responses to surveys.

Cost-effectiveness indicators “focus on comparing a program’s outputs or outcomes with the costs of outcome production.” These focus on whether the activities are cost-effective. In this case, indicators would be how many freshmen renew the bus passes.

The goals for the program, as defined by the WRTA, were to increase general ridership among the college students, as well as to increase awareness of the WRTA itself. Increased ridership would be attained if a student (or students) plans to consistently ride the bus after the pass expired. Increases in awareness would be attained by more students becoming aware of the WRTA than before the pass program started.

## **Chapter 3 – Methodology**

The primary method of investigating the effectiveness of the WRTA free semester bus pass program was through a survey to the freshmen at WPI and Clark. This survey, distributed online, contained questions about the pass program as well as questions regarding the students' knowledge and awareness of the WRTA bus system. The other method of determining the effectiveness of the WRTA free semester bus pass program was analyzing weekly ridership data of the buses, which monitored use of the bus passes.

### **3.1 – Survey**

A survey is one way to measure the effectiveness of the incentive program. It is a very useful tool in obtaining information from many people on their own time (as opposed to a focus group or an interview, where all the respondents must be present at the meeting). Having the survey online allows students from multiple colleges to be able to take the survey without needing to go anywhere.

#### **3.1.1 – Respondents.**

Since the students who were given the free semester bus passes were the freshmen at WPI, Clark University, and Mass College of Pharmacy and Health Services (MCPHS), these groups were the reasonable survey audience. At WPI, the number of freshmen in 2010 was 910 (WPI). At Clark University, the number of freshmen in 2010 was 578 (Clark University). It was decided that the freshmen at MCPHS would not be included in the survey. MCPHS has a total of three campuses, with a total of approximately 4252 students, 685 of them freshmen (MCPHS website). Only 225 freshmen are part of the Worcester campus, and there are only 612 students in total at the Worcester campus. Therefore, the Worcester MCPHS students were only about 1/7

of the total population (612/4252), and the freshmen at the Worcester campus were only about 5.3% of the population (225/4252). Also, many of the students commuted to class, and may have already used the bus regardless of being offered the pass or not, which would have interfered with the results. In addition, from the 11/4/2010 WRTA weekly data, of the 225 freshmen, only 32 of them have used the pass, compared with 93 freshmen from WPI and 163 from Clark. In summary, of the 685 freshmen enrolled in MCPHS, the survey would have only considered 4.7% of all MCPHS freshmen (32/685), 14.2% of all Worcester MCPHS freshmen (32/225), and 5.2% of all Worcester MCPHS students (32/612). This percentage of students was not significant enough to be included in the survey.

Since the WRTA also gave free semester bus passes to the WPI Resident Advisors and Community Advisors, they were also surveyed. This is especially important since all the RAs and CAs from WPI participated in WRTA's travel training program. This program has expert trainers from the WRTA teach participants how to use the bus. However, as of 10/12/2010, none of them had used the passes, and the WRTA management is concerned and wanted to know why this was the case.

The age of the respondents was 18-22. They were all college students, and ethnic background of the students was diverse. The IRB form that needed to be completed before sending the survey ensured the students would be participating anonymously, and would be under no obligation to start or complete the survey.

### **3.1.2 – Sampling Design.**

The sampling frame was compiled using all the freshmen from WPI and Clark, as well as all of the WPI RAs and CAs. The size of the sample was determined using 10% as a measuring

stick. This meant that if 10% or more of each group (WPI freshmen, Clark freshmen, WPI RAs and CAs) responded to the survey, the sample size number would be high enough for our data to be statistically significant. Simple random sampling was employed in this survey.

### **3.1.3 – Questionnaire Design.**

A survey is one way to measure the effectiveness of the incentive program. It is a very useful tool in obtaining information from many people on their own time (as opposed to a focus group or an interview, where all the respondents must be present at the meeting). Having the survey online allows students from multiple colleges to be able to take the survey without needing to go anywhere.

A survey needs to be easy to understand and fill out and have relevant questions. There are many qualities of a good survey question. Questions should (StatPac):

- Evoke the truth
- Accommodate all possible answers
- Have mutually exclusive answers
- Produce variability in the answers
- Not imply a desired answer
- Follow well from the last question

In addition to the specific survey question qualities, the survey as a whole should have certain qualities. It should not be too long and it should require as little respondent free response as possible, while still keeping the question qualities.

The purpose of this project is to measure the effectiveness of the WRTA's incentive program, so the questions in the survey should be useful in measuring that. Specifically, the survey should address whether or not students have used the bus before, whether they have used

the bus after receiving the free semester passes, and whether they plan to renew the pass when it expires. The survey should also examine why students are not using the bus. Finally, the survey should make respondents aware of the WRTA website and the Wachusett Mountain UPass. The UPass is a season long Wachusett Mountain ski pass for college students. (Wachusett Mountain Ski) The WRTA runs a shuttle to Wachusett Mountain. Using a semester pass, students can ride for free as well as save \$10 on the UPass itself. (WRTA) The WRTA wants to know if students will use their service.

### **3.1.3.1 – Survey Questions for the Freshmen at WPI and Clark**

- Did you know that there is a bus service in Worcester, MA?
- The Worcester Regional Transit Authority (WRTA) provides the bus service in Worcester. Have you used the WRTA buses since becoming a college student in Worcester?
  - ◆ If yes, what do you use them for? (Getting to class, getting to Union Station/other public transportation, going shopping, other-specify)
  - ◆ If no, why? (Inconvenience of walking to bus stop, did not know bus service exists, did/do not know how to use the bus, bus does not go to desired locations, little need to leave campus, concern for safety, other-specify)
- (WPI students only) Are you aware that the WRTA issued free semester bus passes for all freshmen at the activities table on August 27, 2010?
  - ◆ If yes, did you receive a pass?
- (Clark students only) Are you aware that the WRTA issued free semester bus passes for all freshmen at the freshman resource fair on August 23, 2010?

- ◆ If yes, did you receive a pass?
- Since receiving the passes, have you used them?
  - ◆ If yes, how often do you use them? (Once per week, twice per week, once per month, other-specify)
  - ◆ If no, why? (Inconvenience of walking to bus stop, did not know bus service exists, did/do not know how to use the bus, bus doesn't go to desired locations, little need to leave campus, concern for safety, other-specify)
- Are you aware of the WRTA website ([www.therta.com](http://www.therta.com))?
  - ◆ If yes, what do you use it for? (Location of destinations, bus schedules, fares, other-specify)
- Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?
  - ◆ If no, why? (Write own response)
- Were you aware that Wachusett Mountain offers a seasonal ski pass for students? (The ski pass is called the Wachusett Season UPass)
  - ◆ If yes, are you planning to buy the UPass this year?
- Are you aware that purchasing any multi-ride bus pass (e.g. 10-ride, monthly, or semester) gets you a discount on the UPass?

- ◆ If no, might that change your mind about renewing your semester pass or buying the UPass?

### **3.1.3.2 – Survey Questions for the Resident Advisors and Community Advisors at WPI**

- The Worcester Regional Transit Authority (WRTA) provides bus service in Worcester. The WRTA issued free semester bus passes to freshmen, RAs, and CAs. Since receiving the passes, have you used the bus system?
  - ◆ If yes, how often do you use the bus? (Once per week, twice per week, once per month, other-specify)
  - ◆ If no, why not? (Inconvenience of walking to bus stop, did not know bus service exists, did/do not know how to use the bus, bus does not go to desired locations, little need to leave campus, concern for safety, other-specify)
- Have you used the WRTA website ([www.therta.com](http://www.therta.com))?
  - ◆ If yes, what do you use it for? (Location of destinations, bus schedules, fares, other-specify)
- Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?
  - ◆ If no, why? (Write own response)
- Were you aware that Wachusett Mountain offers a seasonal ski pass for students? (The ski pass is called the Wachusett Season UPass)
  - ◆ If yes, are you planning to buy the UPass this year?



- Are you aware that purchasing any multi-ride bus pass (e.g. 10-ride, monthly, or semester) gets you a discount on the UPass?
  - ◆ If no, might that change your mind about renewing your semester pass or buying the UPass?

The survey was organized the way that it is because the questions flowed logically from question to question. The sequential nature of the questions meant that each question built upon the last question, making them easy to follow. The survey included these questions and no others because the group took into consideration all possible responses to the questions and selected the ones above. The debugging procedure used for question wording was to go through each question and make sure it was completely understandable and unable to be misinterpreted. All questions were either multiple choice or yes/no questions. The survey was pretested and the pretests showed it was ready for distribution.

### **3.1.4 – Procedure.**

Multiple online survey options were researched, including Google forms, Survey Monkey, and Qualtrics. A comparison of these survey tools has been compiled by the Academic Technology Center (ATC) and is shown in Figure 2. (Desilva) One change from the ATC's information is that Qualtrics has 350 maximum responses, instead of 50.

In determining which survey tool to use, several factors were taken into account, including number of survey questions, number of responses required, and who the recipients are. With unlimited questions and 350 responses per survey, as well as impressive question logic and in depth analysis tools, Qualtrics was picked as the survey tool for this project. (Qualtrics Survey

Website) The project team decided to have a separate survey for each college so that up to 350 responses from each college can be collected.

After getting approval from the IRB and permission from both WPI and Clark, the survey was activated on Qualtrics. Emails were sent to the freshmen at WPI through Student President Chris Noble using the alias [freshmen@wpi.edu](mailto:freshmen@wpi.edu), the freshmen at Clark University through Clark University's Dean of Students Denise Darrigrand, and to the RAs and CAs through RA coordinator Kristin Murphy and CA coordinator Connie Peppes. The emails had a link to each of the respective survey websites.

	Survey Monkey	Google Docs	Qualtrics	Zoomerang	SharePoint
Number of Questions	10	Unlimited	Unlimited	30	Unlimited
Types of Questions	Multiple Choice Textbox Matrix Rating Essay Demographics Image	Multiple Choice Textbox Paragraph Checkboxes Drop-down Scale Grid	Multiple Choice Textbox/Graphic Matrix Table Slider Constant Sum Rank Pick/Group Drill Down	Multiple Choice Textbox Date/Time Image Demographics Rating Rank Yes/No	Multiple Choice Textbox Rating Scale Number Date/Time Yes/No WPI Person (username)
Survey Flow	No Options	No Options	Skip Logic	No Options	Branching
Maximum response #	100	Unlimited	50	100	Unlimited
Post-survey Data Evaluation	No Export	Automatically Fed to Spreadsheet; Can be Exported to Excel	Export to <a href="#">.csv</a>	No Export	Export to Access or Excel
Look and Feel	15 Templates Survey Monkey Landing Page	20 Themes Can customize Thank You Page	20 Templates, plus two for Mobile Devices	17 Themes Customizable message on <a href="#">Zoomerang Page</a>	Not customizable
Recipients	Anyone	Anyone	Anyone	Anyone	People with @wpi.edu email addresses only
Website	<a href="http://www.surveymonkey.com">www.surveymonkey.com</a>	<a href="http://www.google.com/docs">www.google.com/docs</a>	<a href="http://www.qualtrics.com/">http://www.qualtrics.com/</a>	<a href="http://www.zoomerang.com">www.zoomerang.com</a>	<a href="http://www.wpi.edu/+sharepoint">www.wpi.edu/+sharepoint</a>

Figure 2. Survey Comparison (Desilva)

The survey was administered on November 11, 2010 and the first run ended on November 25, 2010. The survey was sent again to get more responses. The response rate for WPI freshmen was  $(69/910) = 7.6\%$ . For Clark freshmen, the response rate was  $(95/578) = 16.4\%$ . For the WPI RAs and CAs, the response rate was  $(17/84) = 20.2\%$

### **3.1.5 – Limitations.**

There were several limitations on the project. The limitations included the number of survey respondents, which turned out to be low. The response rate was 11.5% (combining all 3 groups of subjects), so the answers may not accurately represent the total population. However, since the response rate is above 10%, it is statistically significant, and thus the results carry weight. There was also little sampling error in the survey. Sampling error is error from surveying only a sample instead of the whole target population. As the survey was sent to the entire target population (all the freshmen at WPI and Clark, as well as the WPI RAs and CAs), there should be very little sampling error.

## **3.2 – WRTA ridership data**

Another method of investigating the effectiveness of the bus pass program was the actual ridership data from the WRTA. The WRTA kept a record of when and how many student passes were used. The passes were numbered so that the WRTA could track when students were using the passes. However, the passes were not named, so the identities of the students were not known to the project team. This data was compiled bi-weekly by the WRTA and sent to the project team. This data, along with the survey results, was used to determine effectiveness in terms of increased ridership. If the ridership data indicates usage among the students was high, the program was effective. If the ridership data indicates usage among the students was low, the program was not as effective.

The data gathered by the WRTA recorded the number of trips taken per week and totaled them up by month. The data was grouped by school and pass ticket number, and also showed how many trips were taken on each pass. This data could then be used by the project team to determine if the passes were effective in terms of increased ridership by looking at how often a student used his or her pass. If many students use a pass a few times, that can correlate to increased awareness among students. If a student uses a pass many times, that can correlate to an increase in ridership for the WRTA.

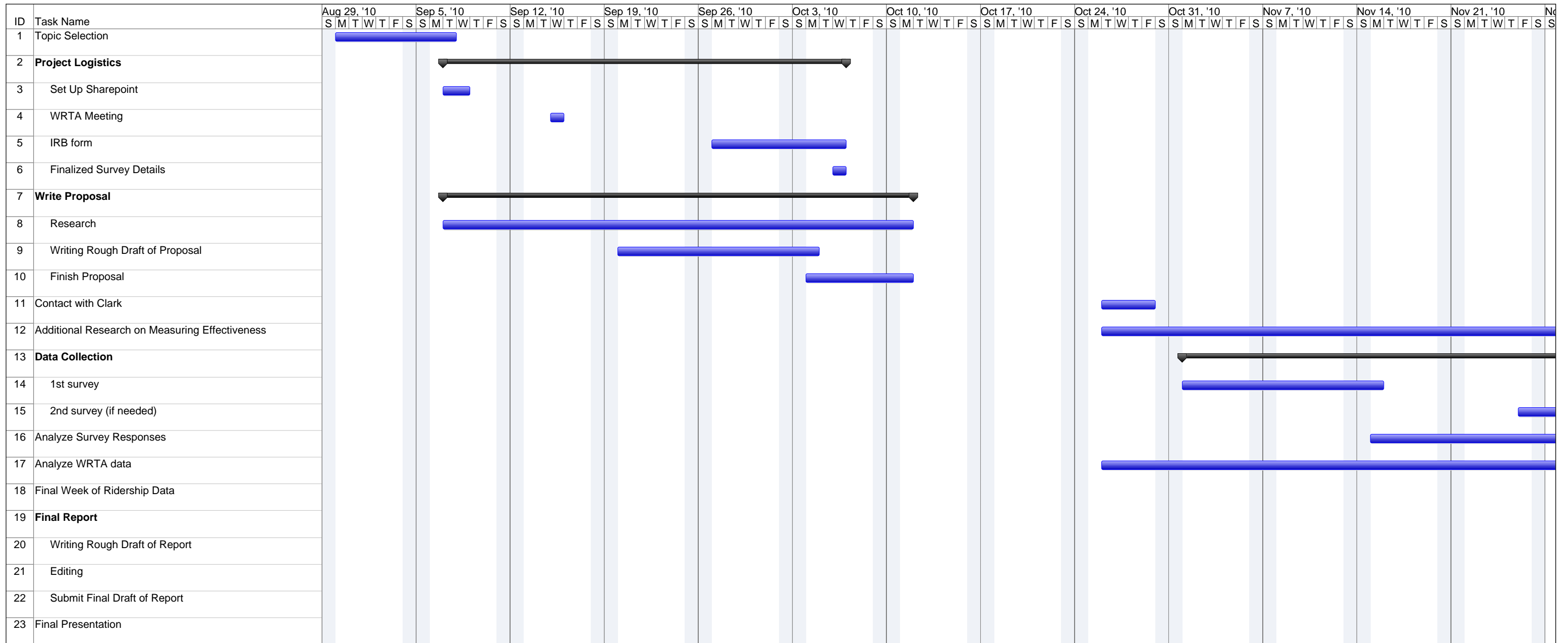
## **3.3 – Presentation**

In addition to the survey and the ridership data, the project team developed an oral and visual presentation that summarized the whole project. This was presented to the WRTA advisory board on February 17, 2011. The presentation was a Microsoft PowerPoint presentation, which consisted of slides detailing the project goals and objectives, descriptions of

the survey data and ridership data, and condensed versions of the project results. The presentation concluded with a slide detailing recommendations for the WRTA. The presentation can be found in Appendix C: Presentation

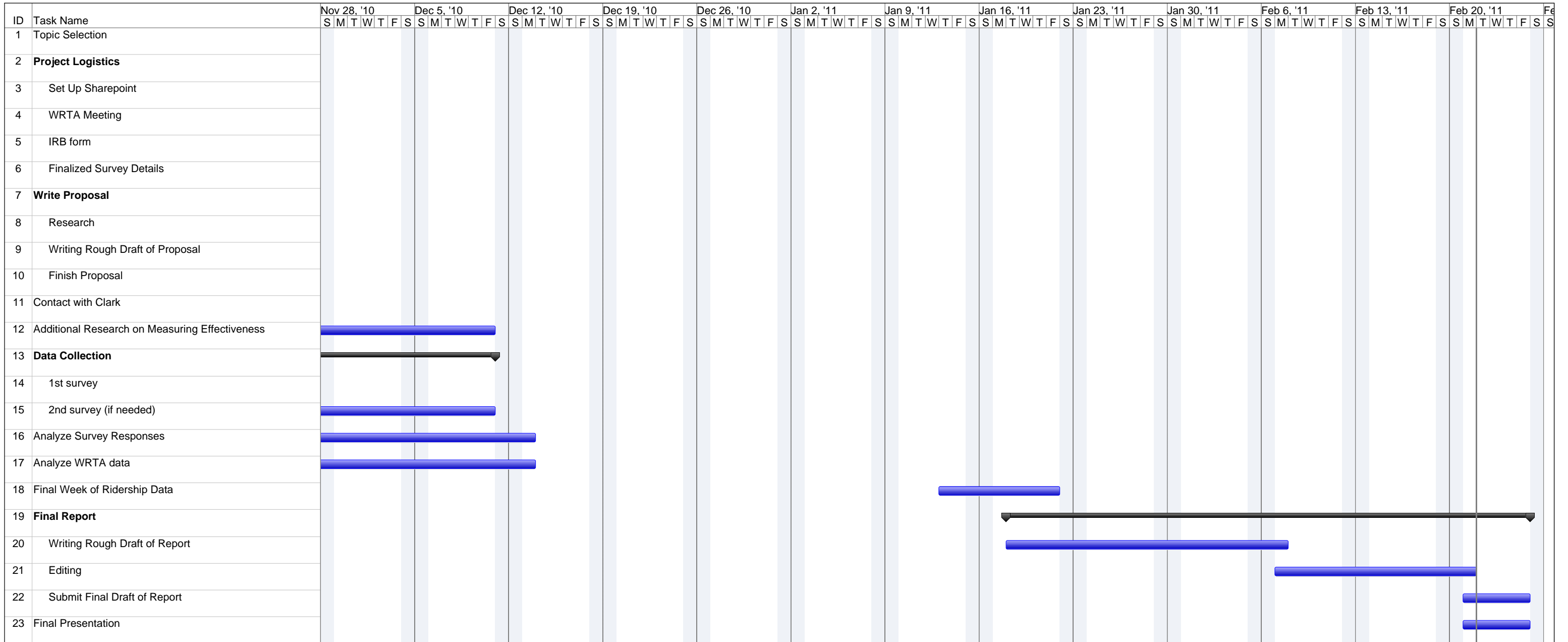
### **3.4 – Timeline**

The following timeline displays when each task was completed for the project. In A-Term, which ran from August to mid-October, the project team came with the topic and project selection, did background research, and met with the WRTA for the first time. All of this culminated in the writing and completion of the IQP Proposal. In B-Term, which ran from late-October to December, the team created the survey and sent it to the target populations, and began to analyze weekly ridership data from the WRTA. The team also analyzed the survey results as they came in, and began writing the final report. In C-Term, which ran from mid-January to early-March, the team developed its recommendations, finished writing the report, and developed an oral/visual presentation that was presented to the WRTA advisory board concerning the whole project.



Project: Official Project Timeline.mpp  
Date: Tue 2/22/11

Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Progress	
Split		External Tasks		Inactive Summary		Manual Summary		Deadline	
Milestone		External Milestone		Manual Task		Start-only			
Summary		Inactive Task		Duration-only		Finish-only			



Project: Official Project Timeline.mpp Date: Tue 2/22/11	Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Progress	
	Split		External Tasks		Inactive Summary		Manual Summary		Deadline	
	Milestone		External Milestone		Manual Task		Start-only			
	Summary		Inactive Task		Duration-only		Finish-only			



## **Chapter 4 – Results**

This project utilized two forms of data in order to determine the effectiveness of the bus pass program. The first was the online survey of all the freshmen from WPI and Clark, and the RAs and CAs from WPI. This survey asked about general knowledge of the WRTA as well as reasons for riding the bus or not. The other form of data was the weekly ridership information from the WRTA. This data documents the number of times the freshmen bus passes were used.

### **4.1 – Response Rates**

The WPI freshmen survey response rate was 69/910 or 7.6%. The WPI RA/CA survey response rate was 17/84 or 20.2%. The Clark freshmen survey response rate was 95/578 or 16.4%. Although the percentages seem low, the freshmen surveys had a large number of responses, which makes the information gathered significant. According to the Sample Size Calculator (Creative Research Systems), these response rates corresponded to a 95% confidence that the data from WPI will be within 11.35% of the actual population answers and a 95% confidence that the data from Clark will be within 9.2 % of the actual population answers. These confidence intervals are low enough that the data and corresponding analysis can be regarded as accurate, although not perfect.

### **4.2 – Survey Results and Analysis**

Surveys were sent out to three separate groups: freshmen at WPI, freshmen at Clark, and the RAs and CAs at WPI. Responses were received from each group, and those complete responses are in Appendix B. Survey Responses. A brief overview of the results and what those results mean follows.

### 4.2.1 – WPI Freshmen

69 out of the 910 freshmen from WPI (7.6%) took the survey. It was found that while most WPI students knew about the bus system, only 23% of the WPI survey respondents had used the bus before the incentive program. Almost all of those used the bus for shopping.

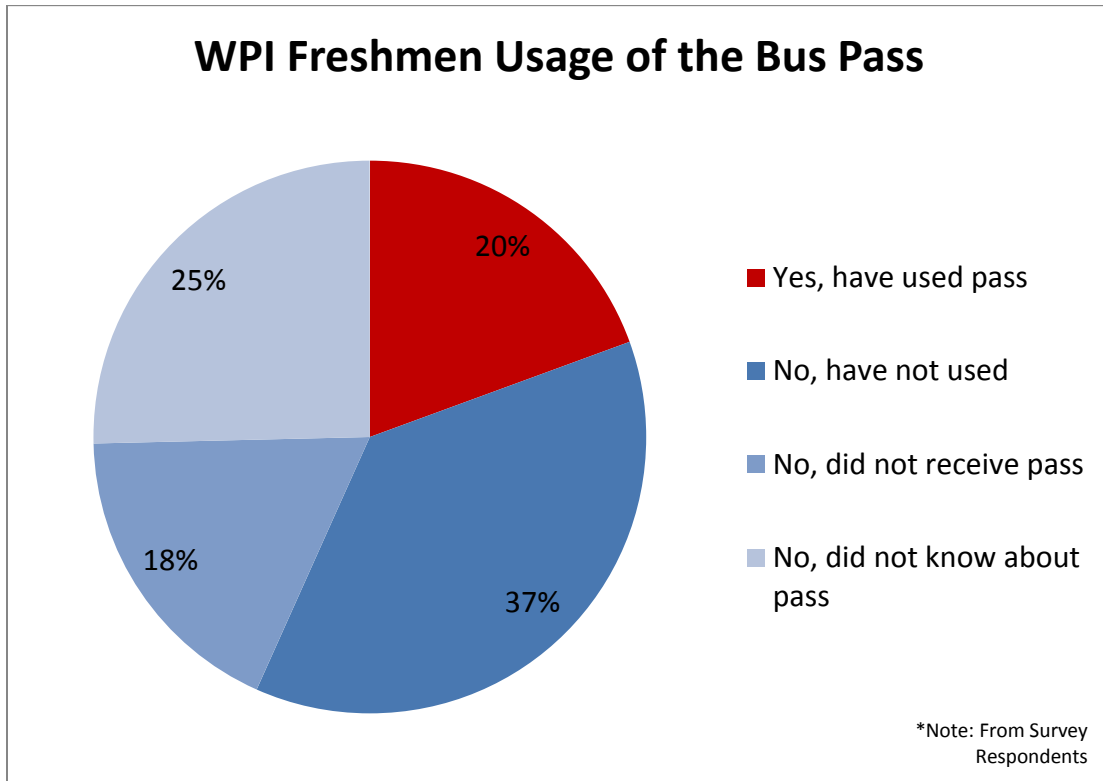
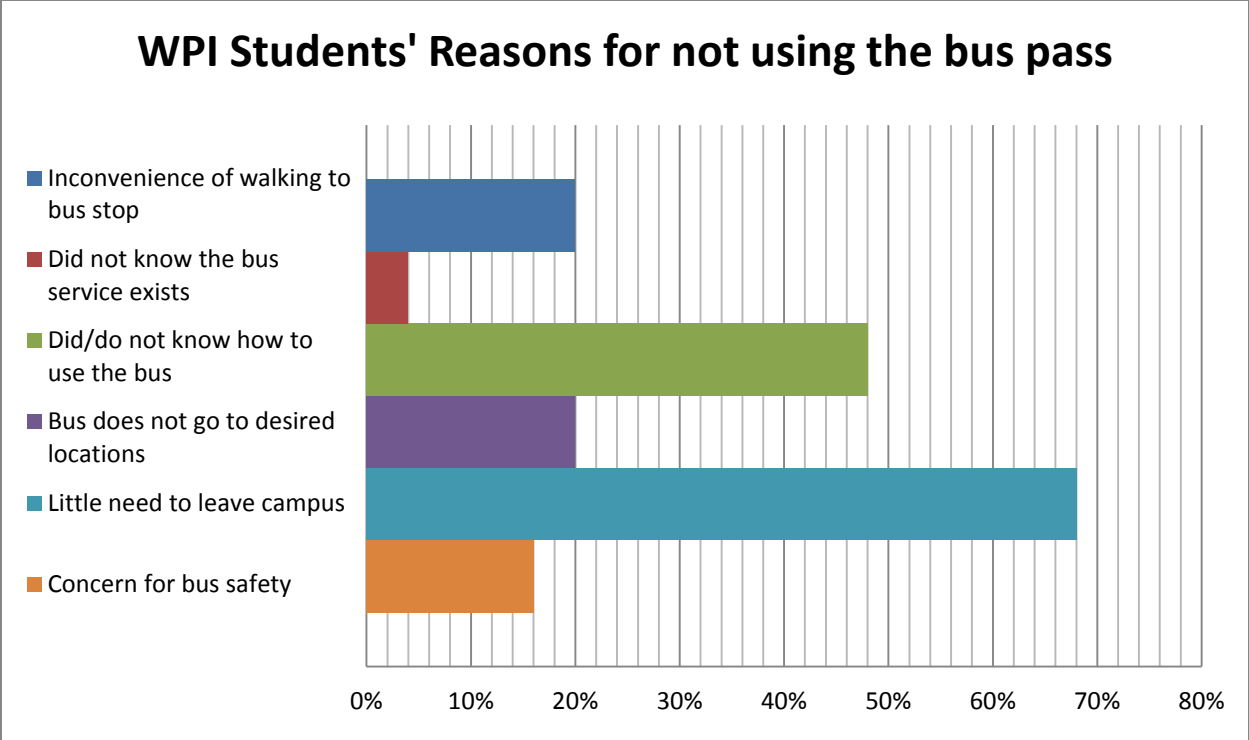


Figure 3. WPI Freshmen Usage of the Bus Pass



**Figure 4. WPI Students' Reasons for not using the bus pass**

As can be seen in Figure 3, most students did not use the pass, and many did not know about it. Of the students surveyed, 57% received a pass, and 20% of them have used it. The main reasons for not using the passes included little need to leave campus and not knowing how to use the passes and/or the bus. These reasons are shown in Figure 4. Of the students surveyed, only 7 planned on renewing their passes. The major reason that students gave was that a semester pass would not be used enough to be worth the price. However, if the bus were to come on campus, 72% of those who used the bus passes might change their minds and renew.

**4.2.2 – WPI RAs and CAs**

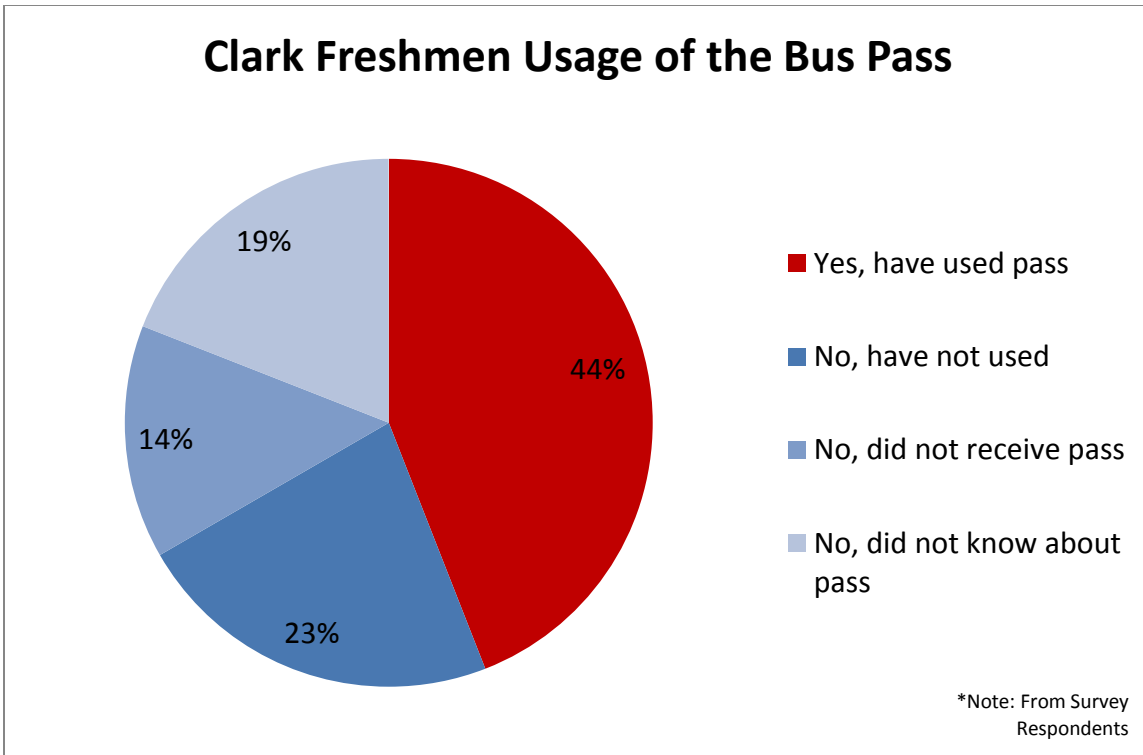
17 out of the 84 total WPI RAs and CAs (20%) took the survey and it was found that 76% of those had not used the bus before the incentive program. The main reasons for not using the bus included not knowing how to use the bus, having little reason to leave campus, and

because the bus did not go to desired locations. Of the RAs and CAs surveyed, even though they all received a pass and travel training, none responded that they used the passes. Although, like the freshmen, 81% of the RAs and CAs surveyed responded that they would use the bus if it came on campus. None of the WPI RAs and CAs surveyed plan to renew their bus passes.

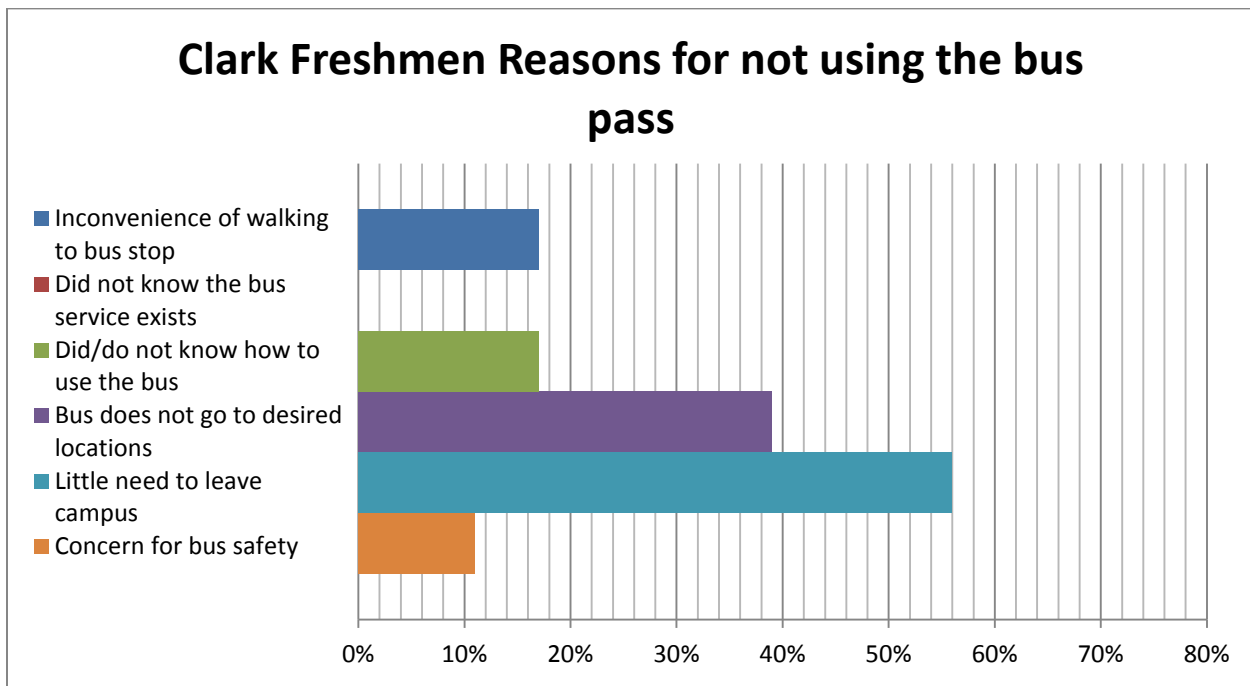
#### **4.2.3 – Clark Freshmen**

95 out of the 578 total freshmen from Clark (16.4%) took the survey. A little over half the students surveyed had used the bus before the incentive program, the two main reasons being shopping and getting to Union Station. The reasons for not using the bus were varied, and included little need to leave campus, not knowing how to use the bus, and having friends who have cars.

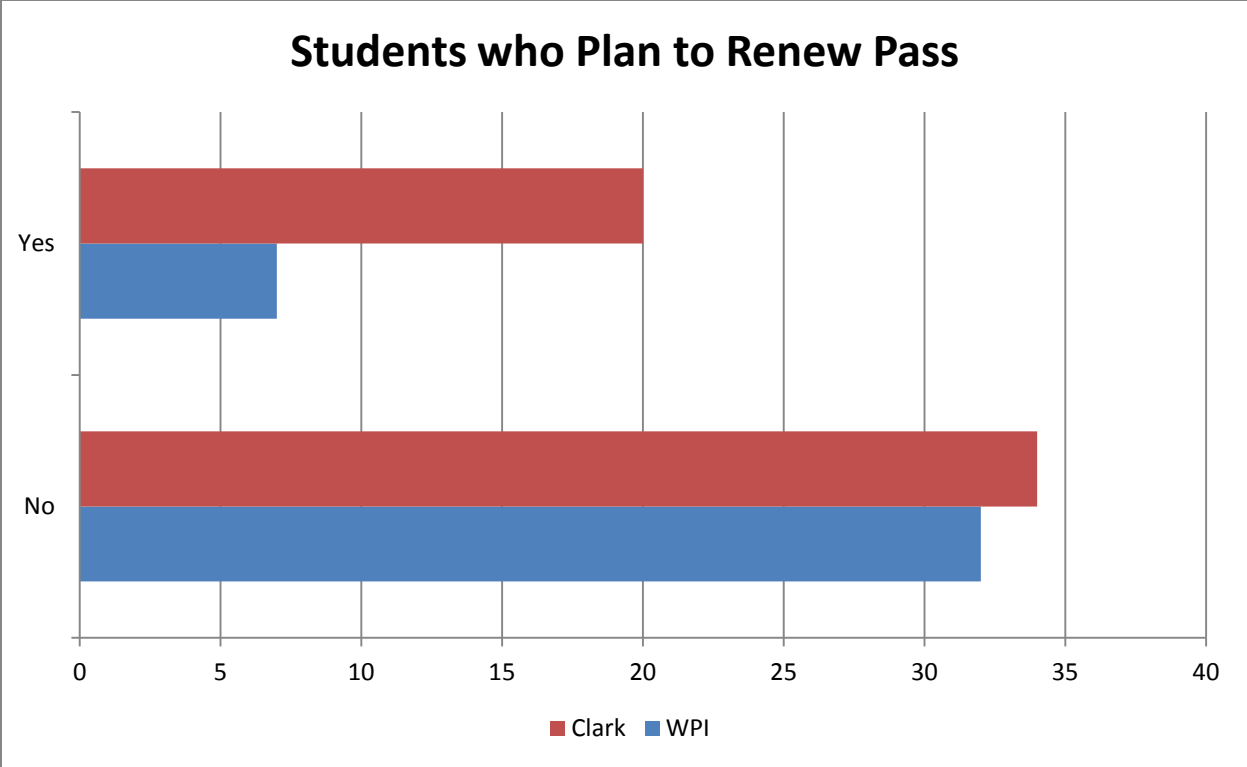
Of those surveyed, 67% received the free semester bus pass and almost 2/3 of those students used the passes. The reasons for using the bus pass included shopping and getting to Union Station, while the reasons for not using the pass were the same as for WPI, and are shown in Figure 6. Finally, 20 Clark freshmen planned to renew their passes when they expired, which is over double the number of WPI freshmen planning to renew. Figure 7 shows the comparison between Clark and WPI for pass renewal.



**Figure 5. Clark Freshmen Usage of the Bus Pass**



**Figure 6. Clark Freshmen Reasons for not using the bus pass**



**Figure 7. Students who Plan to Renew Pass**

## 4.3 – Ridership Data

RTA School year 2010 - 2011									
<i>12/22/2010</i>									
Ticket Distribution by College									
Event	Ticket Numbers		# of Tickets	number of <i>trips</i>					
	beginning	ending		Monthly trips used for College Passes					
				Aug	Sept	Oct	Nov	Dec	Total
<b>WPI</b>									
8/16/2010 <i>_RA Travel Training</i>	2	42	41	0	0	3	4	0	7
8/18/2010 <i>CA Resource Fair</i>	43	85	43	0	0	0	0	0	0
8/25/2010 <i>Freshman Resource Fair</i>	86	1037	952	48	261	327	259	145	1040
									0
<b>Sub Total Tickets</b>			<b>1036</b>	<b>48</b>	<b>261</b>	<b>330</b>	<b>263</b>	<b>145</b>	<b>1047</b>
<b>MCPHS</b>									
9/2/2010 <i>Freshman Resource Fair</i>	1048	1272	225	0	201	303	319	212	1035
<b>Sub Total Tickets</b>			<b>225</b>	<b>0</b>	<b>201</b>	<b>303</b>	<b>319</b>	<b>212</b>	<b>1035</b>
<b>Clark University</b>									
8/18/2010 <i>_RA Training</i>	1273	1326	54	16	119	111	70	27	343
8/23/2010 <i>Freshman Resource Fair</i>	1327	2000	674	50	341	382	464	305	1542
<b>Sub Total Tickets</b>			<b>728</b>	<b>66</b>	<b>460</b>	<b>493</b>	<b>534</b>	<b>332</b>	<b>1885</b>
<b>Total Tickets Distributed</b>			<b>1989</b>	<b>114</b>	<b>922</b>	<b>1126</b>	<b>1116</b>	<b>689</b>	<b>3967</b>
<b>RA Travel Training Trip USAGE</b>				<b>16</b>	<b>119</b>	<b>114</b>	<b>74</b>	<b>27</b>	<b>350</b>
<i>Total number of actual Students using the pass: since the beginning of the program'</i>									300
									<b>Percent of total tickets=&gt; 15.1%</b>
									<b>Auto tracking below number of students</b>
									<b>Total</b>
									<b>WPI</b>
									<b>MCPHS</b>
									<b>CLARK</b>
<b>Totals</b>									<b>101    32    167    300</b>
									<i>22-Dec</i>
<i>Note: A slight variance can occur if Buses out of service are probed after close of current month.</i>									

Figure 8. Final Ridership Data

As of December 17, 2010, 99 of 952 (10.4%) bus passes handed out to WPI freshmen have been used. In addition, 139 of 674 (20.6%) bus passes handed out to Clark freshmen have

been used. Finally, 2 of 84 (2.4%) WPI RAs and CAs have used the pass. Of the three surveyed groups only, a total of 240 of the 1710 passes distributed have been used, leading to a 14.0% usage rate. The usage rate is greatest among Clark freshmen, and smallest among WPI RAs and CAs. For WPI freshmen, the ridership increased from August to October, then declined from November to December. For Clark freshmen, ridership increased from August to November, then decreased in December. For WPI RAs and CAs, the passes were only used in October-December. The low numbers in December can be attributed to the fact that students went home for break halfway through the month.



## 4.4 – Overall Analysis

Overall, the majority of students from all three surveyed groups did not use the bus pass; therefore, it is assumed that they have not used the buses. There are several reasons why this is the case. WPI and Clark freshmen have so many activities to do on campus or nearby that there is little reason to venture off campus. When they do, it is mostly to visit other campuses or to go shopping. Many of the handwritten reasons given by the students in the survey also included having access to a car, and therefore not needing to use the bus. As for the WPI RAs and CAs, they are too busy with the responsibilities of being RAs and CAs to have time to leave campus.

More Clark freshmen than WPI freshmen used the pass, and one possible factor is that Clark University has multiple bus routes through campus, while the closest stop to WPI is a block-and-a-half away. In the survey, when WPI freshmen were asked if having a bus stop of campus would convince to use the bus, 72% said yes.

### Would a bus stop on campus change your mind about renewing the pass?

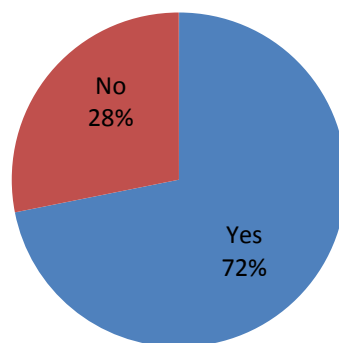


Figure 9. Would a bus stop on campus change your mind about renewing the pass?

This makes sense since the nearest bus stop to WPI is over a block-and-a-half away, and few students would be willing to walk that distance just to use a bus, as the time it takes would be the same as the time taken to get a desired destination. Convenience is a big priority for students. So clearly, there was a correlation between the survey results and the ridership data.

From the ridership data, a few students used the bus pass a lot (more than 10 times during the semester), which skewed the results a bit. For example, one WPI freshmen used the bus pass 361 times. The total number of times a WPI bus pass was used was 1077. That means 33.5% of the time a WPI bus pass was used, this student was the one using it. Every other pass was used less than 60 times, with 80% of the passes used less than 10 times. This information is visualized in the following histogram.

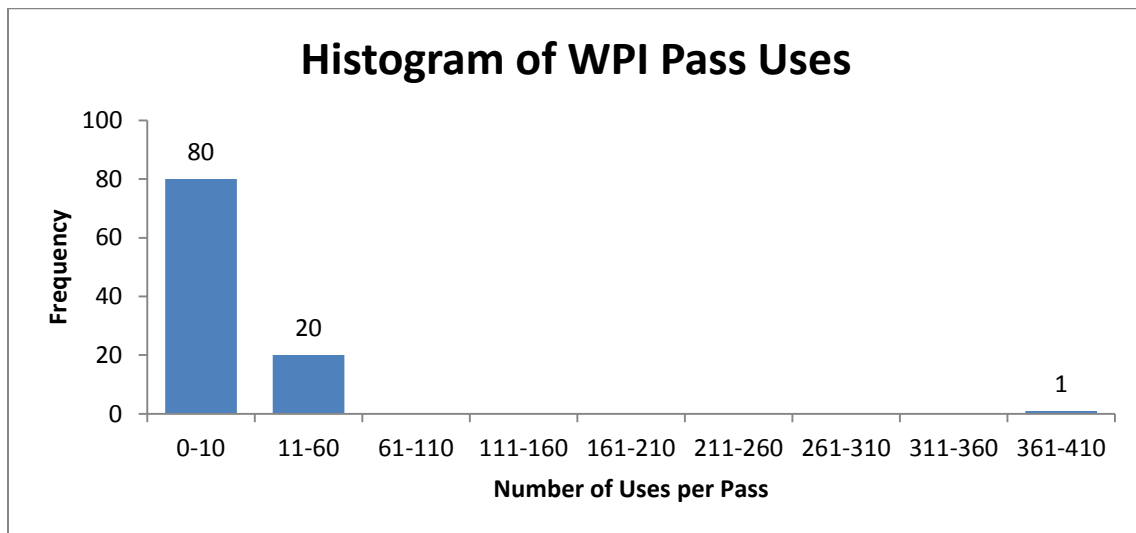
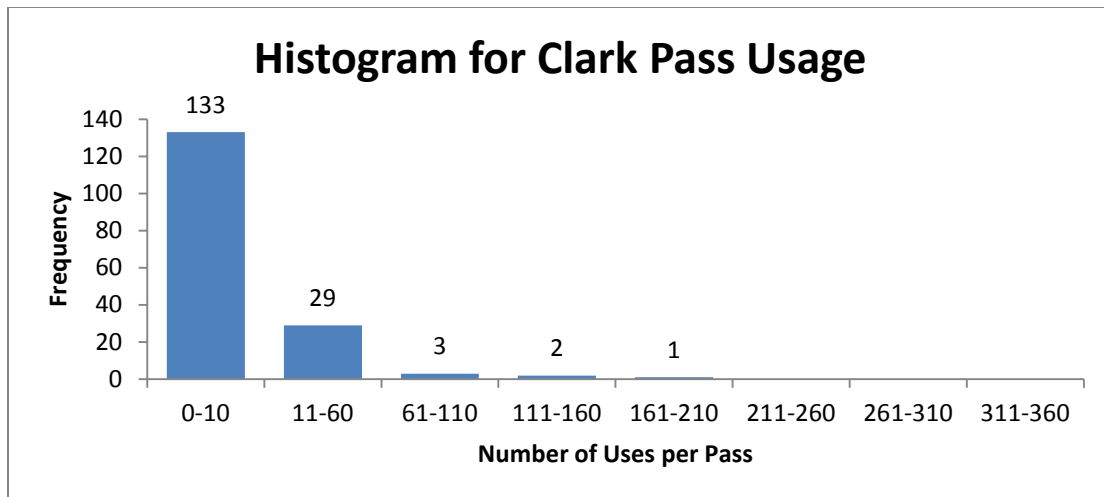


Figure 10. Histogram of WPI Pass Uses

At Clark, only 3 passes were used over 100 times. This constituted 25.6% (492/1925) of Clark's total pass usage. Again, 80% of the passes were used less than 10 times. This information is visualized in the histogram below.



**Figure 11. Histogram for Clark Pass Usage**

The conclusion that can be drawn is that though the total pass usage numbers look high, the reality is the most of the students used the pass a few times. This could be due to students just wanting to try the bus out, which does not increase consistent ridership but does increase awareness.

From the survey results, though there was clear evidence that most of the WPI freshmen were not going to renew their passes, a few of them were going to renew, which is better than none. However, none of the RAs and CAs planned to renew the passes at all. For the Clark freshmen, the passes were more effective, as about 1/5 of them used the pass, and about 1/3 of the students who responded to the survey planned to renew them. The survey results showed that the main reason why the students were not going to renew their pass was because they did not think it was the worth the price, which is supplemented by the low usage rate of the pass among of most of the students. Since the semester pass costs \$100, and the single pass costs \$1.50, a student would need to take at least 67 trips in a semester for the pass to be worth it. A semester is about 4 months long, and each month is about 4 weeks, so a student would need use the pass about 4 times a week. .

In conclusion, the passes were effective in boosting awareness of the WRTA, while not as effective in boosting consistent ridership. Awareness was increased through the surveys, as well as student usage of the bus passes. Even if the students did not take the survey, at least they became aware of the WRTA by reading the email containing the link to the survey. As for the ridership, it was not increased as much among the students. The common result that was present in all three groups was: The students did not use the passes because of not having a reason to leave campus. The main reason for not renewing the passes was also similar in all three groups: the students did not use the pass enough for it to be worth the price. The program did not achieve the desired outcome in one goal, which was to increase ridership by offering an incentive. But in the other goal, which was to increase awareness, the program did succeed

## Chapter 5 – Recommendations/Concluding Remarks

In short, the WRTA needs to provide more reasons for the students to use the buses. The main recommendation that comes from the results of the project is to put a bus stop on or near WPI campus. As of now, no bus stop exists nearby, which forces students to walk off-campus in order to use the bus. Obviously, no one wants to do this just for the bus, and with no bus stop on campus, the bus itself becomes “out of sight, out of mind” for most students. By putting the bus stop on campus, it will be more convenient for students to use the bus and also increase awareness of the WRTA and its pass program among them.

Also, letting students know how to use the bus should be a priority for the WRTA, as most students did not know how to use them. Advertising this program through email before the year begins could increase awareness, so that by the time students arrive on campus in August, they would know about the passes. In addition, advertising the program when parents of prospective students come around in the spring could help, as this would let them know that there are methods of transportation in Worcester other than cars. Thus, the parents might be convinced to send their kids to WPI without their cars and encourage them to use the bus instead.

Another priority is to make the WRTA schedules and destinations more readily available to students, as many students did not know where the bus went or when the bus was scheduled to leave. One possible idea is to create a phone application that has all the destinations/departure times on it. Another idea could be to put the destinations/departure times on campus monitors so that students could look them.

Lastly, the WRTA should consider targeting a different demographic for the bus pass program. Freshmen, and by extension most undergraduate students, usually have little need to

leave campus, as college provides them with almost anything they need (food, housing, academic resources etc.). Graduate students, faculty, and staff, on the other hand, would perhaps be better targets. The majority of them do not live on campus, and need transportation to and from campus daily, so the buses would be a great resource for them. And since campus parking is limited, it would be less of a hassle for them to use the bus, rather than trying in vain to find a parking space. Another group to target would be international students. International students, most likely, do not have cars and need a method of transportation, which the buses could provide. The international students also may know how to use public transportation, which could entice them to use the buses as they may have done it previously.

If the WRTA takes all these steps, ridership among the students should increase. As this is a first year program, adjustments are necessary and patience is required. Overnight success will not happen, and multiple iterations of the program will be necessary. A long-term commitment by the WRTA to the program could have the long-term reward of increased consistent ridership among college students.

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WRTA Ski Shuttle to Wachusett Mountain 2010

<http://therta.com/wachusett-ski-shuttle.html>

## Appendix A. Survey Questions

Below are a few screenshots of the online surveys that were sent out.

Did you know that there is a bus service in Worcester, MA?

Yes  
 No

The Worcester Regional Transit Authority (WRTA) provides the bus service in Worcester. Have you used the WRTA buses since becoming a college student in Worcester?

Yes  
 No

Survey Powered By [Qualtrics](#)

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How often do you use them?

Less than Once a Month  
 Once a Month  
 2-3 Times a Month  
 Once a Week  
 2-3 Times a Week  
 Daily

Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?

Yes  
 No

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**Why not? (Check all that apply)**

- Inconvenience of walking to bus stop
- Did not know the bus service exists
- Did/do not know how to use the bus
- Bus does not go to desired locations
- Little need to leave campus
- Concern for bus safety
- Other - Specify

**Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?**

- Yes
- No

Survey Powered By [Qualtrics](#)

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# Appendix B. Survey Responses

## Final WPI Survey Responses

### 1. Did you know that there is a bus service in Worcester, MA?

#	Answer	Response	%
1	Yes	68	99%
2	No	1	1%
	Total	69	100%

### 2. The Worcester Regional Transit Authority (WRTA) provides the bus service in Worcester. Have you used the WRTA buses since becoming a college student in Worcester?

#	Answer	Response	%
1	Yes	16	23%
2	No	53	77%
	Total	69	100%

### 3. What do you use the bus for? (Check all that apply)

#	Answer	Response	%
1	Getting to class	1	6%
2	Getting to Union Station/other public transportation	8	50%
3	Going shopping	15	94%
4	Other - Specify	3	19%

running errands  
 exploring  
 going to other colleges

### 4. Why not? (Check all that apply)

#	Answer	Response	%
1	Inconvenience of walking to bus stop	11	21%
2	Did not know the bus service exists	0	0%
3	Did/do not know how to use the bus	29	56%
4	Bus does not go to desired locations	9	17%
5	Little need to leave campus	31	60%
6	Concern for bus safety	6	12%
7	Other - Specify	8	15%

Didn't know where the bus stops were  
 Bicycle- no need for bus  
 I have a car on campus.  
 Don't know where/ when it runs.  
 cost  
 don't live in Worcester  
 where are pick-ups?  
 Don't know location of stops

### 5. Are you aware that the WRTA issued free semester bus passes for all freshmen at the activities table on August 27, 2010?

#	Answer	Response	%
1	Yes	51	75%
2	No	17	25%
	Total	68	100%

### 6. Did you receive a pass?

#	Answer	Response	%
1	Yes	39	76%
2	No	12	24%
	Total	51	100%

**7. Since receiving the passes, have you used them?**

#	Answer	Response	%
1	Yes	13	34%
2	No	25	66%
	Total	38	100%

**8. How often do you use them?**

#	Answer	Response	%
1	Less than Once a Month	3	23%
2	Once a Month	3	23%
3	2-3 Times a Month	3	23%
4	Once a Week	2	15%
5	2-3 Times a Week	1	8%
6	Daily	1	8%
	Total	13	100%

**9. Why not? (Check all that apply)**

#	Answer	Response	%
1	Inconvenience of walking to bus stop	5	20%
2	Did not know the bus service exists	1	4%
3	Did/do not know how to use the bus	12	48%
4	Bus does not go to desired locations	5	20%
5	Little need to leave campus	17	68%
6	Concern for bus safety	4	16%
7	Other - Specify	4	16%

Did not know where the bus stop was located

I have a car.

don't know bus times

The bus on Highland Street was late for 20 minutes twice so we use taxi instead. When the bus came we could not get on because it had already pass the bus stop and we already called the taxi.

**10. Would you use the bus if it came on campus?**

#	Answer	Response	%
1	Yes	21	84%
2	No	4	16%
	Total	25	100%

**11. Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?**

#	Answer	Response	%
1	Yes	7	18%
2	No	32	82%
	Total	39	100%

**12. Why not?**

No need to use a bus.

Expensive if not used often

the busses run too infrequently to for a pass to be worth it. i like to take the bus back home, but the 11 stops after 8pm. i still have other club meetings and homework assignments to do by this time.

I am getting a car

I don't use it.

I don't know what the question is asking.

No need

little need to leave campus

No need to leave/ can get a ride

Not using it that often

I don't need it.

i dont use it much

Not sure if I really need it.

No need to leave campus

BECAUSE I DONT WANT TO SPEND MONEY

I don't want to pay money. I live close by and have access to a car if I ever needed to really go somewhere. I've only used it once; I don't venture off campus enough to warrant renewing it

It was nice to be able to use it, but I am not willing to pay for one. I used it because it was free.

I didn't use it enough times to be worth buying

no need for it, don't use it

Because I don't use it often.

Beuase I haven't used the bus yet, no need to.

expensive and may not ride bus as much since route 3 bus that passes WPI doesn't operate on Sunday (when we usually would go out)

The bus rarely come on time on Highland street.

**13. If there was a bus stop on campus, would it change your mind about renewing the pass?**

#	Answer	Response	%
1	Yes	23	72%
2	No	9	28%
	Total	32	100%

**14. Are you aware of the WRTA website (www.therta.com)?**

#	Answer	Response	%
1	Yes, visited before	16	24%
2	Yes, but never visited	12	18%
3	No	40	59%
	Total	68	100%

**15. What do you use it for? (Check all that apply)**

#	Answer	Response	%
1	Location of destinations	11	69%
2	Bus schedules	15	94%
3	Information on fares	0	0%
4	Other	0	0%

**16. Were you aware that Wachusett Mountain offers a seasonal ski pass for students? (The ski pass is called the Wachusett Season UPass)**

#	Answer	Response	%
1	Yes	39	58%
2	No	28	42%
	Total	67	100%

**17. Are you planning to buy the UPass this year?**

#	Answer	Response	%
1	Yes	1	3%
2	No	38	97%
	Total	39	100%

**18. Are you aware that purchasing any multi-ride bus pass (e.g. 10-ride, monthly, or semester) gets you a discount on the UPass?**

#	Answer	Response	%
1	Yes	8	12%
2	No	60	88%
	Total	68	100%

**19. Might that change your mind about renewing your semester pass or buying the UPass?**

#	Answer	Response	%
1	Might renew semester pass	1	14%
2	Might buy UPass	3	43%
3	Might buy both	0	0%
4	Does not change	3	43%
	Total	7	100%

## Final Clark Survey Responses

### 1. Did you know that there is a bus service in Worcester, MA?

#	Answer	Response	%
1	Yes	82	95%
2	No	4	5%
	Total	86	100%

### 2. The Worcester Regional Transit Authority (WRTA) provides the bus service in Worcester. Have you used the WRTA buses since becoming a college student in Worcester?

#	Answer	Response	%
1	Yes	49	57%
2	No	37	43%
	Total	86	100%

### 3. What do you use the bus for? (Check all that apply)

#	Answer	Response	%
1	Getting to class	1	2%
2	Getting to Union Station/other public transportation	31	63%
3	Going shopping	32	65%
4	Other - Specify	20	41%
	visiting town hall		
	going out to eat		
	Going to St. Vincent's		
	Go to restaurants, malls, target, walmart		
	Work/Internship		
	get to a meeting		
	going to doctor		
	Going back home		
	Library		
	doctor		
	Worcester Public Library and YWCA		
	work		
	getting to work		
	Going to the post office		
	going to work and visiting friends/family		
	returning from Union Station		
	going to fencing, errands.		
	Getting to WPI		
	getting into downtown		
	travelling to UMASS Memorial for an internship		

### 4. Why not? (Check all that apply)

#	Answer	Response	%
1	Inconvenience of walking to bus stop	7	20%
2	Did not know the bus service exists	2	6%
3	Did/do not know how to use the bus	13	37%
4	Bus does not go to desired locations	8	23%
5	Little need to leave campus	21	60%
6	Concern for bus safety	6	17%
7	Other - Specify	11	31%
	Inconvenient Times		
	Busy		
	IT DOESN'T RUN ON WEEKENDS!!!		
	have a car		
	dont know where the stops are		
	Have Car		
	Line 33 to Union Station from Clark does not run on weekends		
	have a car		
	friend has a car		
	I have a car		
	Friend with car		



**5. Are you aware that the WRTA issued free semester bus passes for all freshmen at the activities table on August 27, 2010?**

#	Answer	Response	%
1	Yes	68	81%
2	No	16	19%
	Total	84	100%

**6. Did you receive a pass?**

#	Answer	Response	%
1	Yes	56	82%
2	No	12	18%
	Total	68	100%

**7. Since receiving the passes, have you used them?**

#	Answer	Response	%
1	Yes	37	66%
2	No	19	34%
	Total	56	100%

**8. How often do you use them?**

#	Answer	Response	%
1	Less than Once a Month	11	30%
2	Once a Month	5	14%
3	2-3 Times a Month	10	27%
4	Once a Week	3	8%
5	2-3 Times a Week	7	19%
6	Daily	1	3%
	Total	37	100%

**9. Why not? (Check all that apply)**

#	Answer	Response	%
1	Inconvenience of walking to bus stop	3	17%
2	Did not know the bus service exists	0	0%
3	Did/do not know how to use the bus	3	17%
4	Bus does not go to desired locations	7	39%
5	Little need to leave campus	10	56%
6	Concern for bus safety	2	11%
7	Other - Specify	8	44%

- Inconvenient Times
- Busy
- No time
- dont know where stops are
- Does not operate desired route on weekends
- Lost my bus pass
- friend has a car
- lost the pass

**10. Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?**

#	Answer	Response	%
1	Yes	20	37%
2	No	34	63%
	Total	54	100%

**11. Why not?**

too expensive  
 don't use it often  
 Because I have not used the bus at all so far this year and would not want to pay for a service I would not use  
 however much I would like to have a buspass, it will almost definately be more cost effective for me to pay for individual busses  
 I don't use the bus  
 I have only used the bus once. I may as well just pay the fare.  
 Using the WRTA was too confusing and bus came late  
 Not sure how bus works and where they go.  
 I don't have enough money  
 it is cheaper just to pay every time I go on the bus  
 I don't use the bus enough for it to be worth buying

I am a poor college student and I don't know how much it costs, but if it is a lot, I won't be able to afford it.  
 I don't use the bus enough to pay for a year-long ticket.  
 I don't use it often enough, as the transportation system isn't very convenient.  
 I don't use it often enough  
 Because I don't see myself using the bus that often next semester  
 I never use it, it is not convenient  
 I have been surviving without said bus pass and next year I will have a car on campus.  
 i'll have a car on campus  
 Rarely uset the bus  
 I do not know what the rate is, and since I rarely ride the bus it would probably be cheaper if I didn't buy a pass.  
 I use it sometimes, but not that much. I may change my mind and renew it, but at the moment it's not worth it.  
 I am transferring schools  
 why can't it be free for college students?  
 I might not have the money.  
 Because it's too expensive and inconvenient.  
 I can find other rides wven though the WRTA buses are convenient  
 dont use the bus that much  
 i don't have any need to use the bus  
 although I support public transportation I have not found it necessary to use. I have walked or used Clark Escort to get where I need to go.  
 I can't afford to renew my bus pass, so I will just have to find other means of transportation.

**12. Are you aware of the WRTA website (www.therta.com)?**

#	Answer	Response	%
1	Yes, visited before	43	51%
2	Yes, but never visited	19	23%
3	No	22	26%
	Total	84	100%

**13. What do you use it for? (Check all that apply)**

#	Answer	Response	%
1	Location of destinations	34	81%
2	Bus schedules	40	95%
3	Information on fares	15	36%
4	Other	1	2%

bike information and strike alert

**14. Were you aware that Wachusett Mountain offers a seasonal ski pass for students? (The ski pass is called the Wachusett Season UPass)**

#	Answer	Response	%
1	Yes	19	23%
2	No	64	77%
	Total	83	100%

**15. Are you planning to buy the UPass this year?**

#	Answer	Response	%
1	Yes	4	21%
2	No	15	79%
	Total	19	100%

**16. Are you aware that purchasing any multi-ride bus pass (e.g. 10-ride, monthly, or semester) gets you a discount on the UPass?**

#	Answer	Response	%
1	Yes	8	10%
2	No	75	90%
	Total	83	100%

**17. Might that change your mind about renewing your semester pass or buying the UPass?**

#	Answer	Response	%
1	Might renew semester pass	1	6%
2	Might buy UPass	0	0%
3	Might buy both	0	0%
4	Does not change	17	94%
	Total	18	100%

## Final RA and CA Survey Responses

### 1. The Worcester Regional Transit Authority (WRTA) provides the bus service in Worcester. Have you used the WRTA buses since becoming a college student in Worcester?

#	Answer	Response	%
1	Yes	4	24%
2	No	13	76%
	Total	17	100%

### 2. What do you use the bus for? (Check all that apply)

#	Answer	Response	%
1	Getting to class	0	0%
2	Getting to Union Station/other public transportation	1	33%
3	Going shopping	1	33%
4	Other - Specify	1	33%

going somewhere else

### 3. Why not? (Check all that apply)

#	Answer	Response	%
1	Inconvenience of walking to bus stop	4	31%
2	Did not know the bus service exists	4	31%
3	Did/do not know how to use the bus	12	92%
4	Bus does not go to desired locations	6	46%
5	Little need to leave campus	7	54%
6	Concern for bus safety	3	23%
7	Other - Specify	2	15%

I had a car.  
no need for public transportation

### 4. This year, the WRTA issued free semester bus passes to freshmen, RAs, and CAs. Since receiving the passes, have you used them?

#	Answer	Response	%
1	Yes	0	0%
2	No	17	100%
	Total	17	100%

### 6. Why not? (Check all that apply)

#	Answer	Response	%
1	Inconvenience of walking to bus stop	7	44%
2	Did not know the bus service exists	5	31%
3	Did/do not know how to use the bus	9	56%
4	Bus does not go to desired locations	8	50%
5	Little need to leave campus	10	63%
6	Concern for bus safety	3	19%
7	Did not pick up the free pass	3	19%
8	Other - Specify	4	25%

Had car.  
not enough students knew where to get the passes  
already have a car...  
Not sure where they go either

### 7. Would you use the bus if there was a bus stop on campus?

#	Answer	Response	%
1	Yes	13	81%
2	No	3	19%
	Total	16	100%

**11. Are you aware of the WRTA website (www.therta.com)?**

#	Answer	Response	%
1	Yes, visited before	4	25%
2	Yes, but never visited	2	13%
3	No	10	63%
	Total	16	100%

**12. What do you use it for? (Check all that apply)**

#	Answer	Response	%
1	Location of destinations	4	100%
2	Bus schedules	4	100%
3	Information on fares	1	25%
4	Other	0	0%

**13. Were you aware that Wachusett Mountain offers a seasonal ski pass for students? (The ski pass is called the Wachusett Season UPass)**

#	Answer	Response	%
1	Yes	8	50%
2	No	8	50%
	Total	16	100%


**14. Are you planning to buy the UPass this year?**

#	Answer	Response	%
1	Yes	1	13%
2	No	7	88%
	Total	8	100%

**15. Are you aware that purchasing any multi-ride bus pass (e.g. 10-ride, monthly, or semester) gets you a discount on the UPass?**


#	Answer	Response	%
1	Yes	1	6%
2	No	15	94%
	Total	16	100%

## Appendix C: Presentation



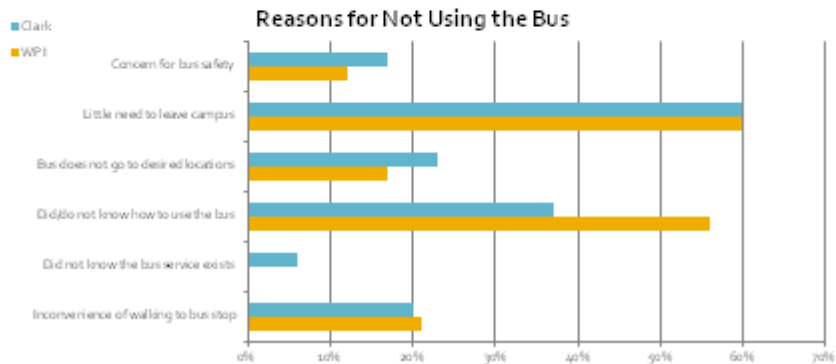
Andrew Eng and Caleb Swieson  
February 17, 2011

# Assessing the Effectiveness of the WRTA Bus Pass Program



## Problem

- Low bus usage by college students in Worcester



## Outline

- Problem
- WRTA's solution
- Our role
- Our methods
  - Ridership Data
  - Survey
- Results
- Recommendations

## WRTA's Solution

- Solution: The freshman bus pass program
  - Freshmen from WPI, Clark, and MCPHS given free semester-long bus passes
- Goals: Increase ridership and awareness of the WRTA

## Our role

- Our Interactive Qualifying Project (IQP) at WPI
  - A junior-year project that forces students to use their knowledge to address a problem in society
  - Year long project during school
- Analyze the effectiveness of the pass program

## Methods – Ridership Data

- Weekly ridership data from the WRTA

Ticket Distribution by College									
Event	Ticket Numbers		# of Tickets	Monthly trips used for College Passes					
	beginning	ending		Aug	Sept	Oct	Nov	Dec	Total
<b>WPI</b>									
8/23/2010 Freshman Resource Fair	86	1087	962	48	261	327	289	8	898
<b>Clark University</b>									
8/23/2010 Freshman Resource Fair	1827	2000	674	60	341	382	464	0	1287



# Methods – Survey

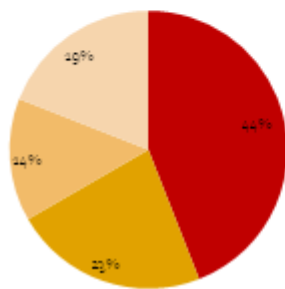
- Online survey sent to all freshmen at WPI and Clark
- Questions asked about:
  - Usage of the bus and the pass
  - Knowledge of the bus system
  - Whether or not students would renew their passes



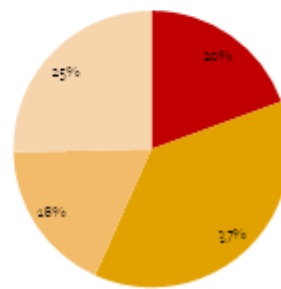
# Results – Usage

- Most freshmen did not use the pass
  - Many did not know or did not receive a pass

Clark Freshmen Usage of the Bus Pass



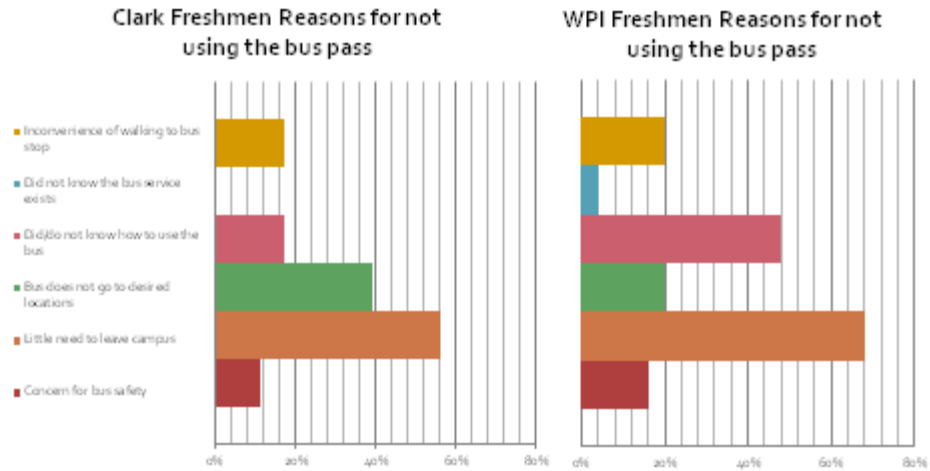
WPI Freshmen Usage of the Bus Pass



- Yes, have used pass
- No, have not used
- No, did not receive pass
- No, did not know about pass

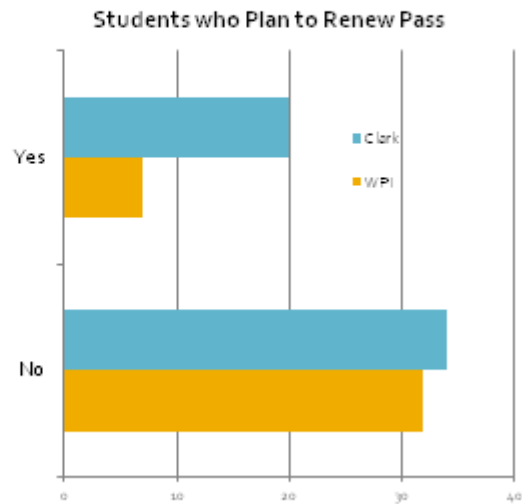
\*Based on Survey Responses

# Results – Reasons



# Results – Pass Renewal

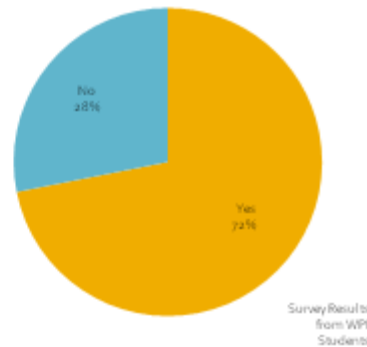
- Few Students plan to renew the pass
  - Most passes used less than 10 times
  - Not used enough to be worth the cost for a semester pass



## Recommendations

- Put a bus stop on campus (WPI)
- Increase awareness of WRTA bus pass program
- Make destinations and schedules more available
- Target a different student demographic
  - International
  - Graduate
  - Faculty

Would a bus stop on campus change your mind about renewing the pass?



## Concluding Remarks

- Program increased awareness of the WRTA bus system
- Bus pass program could increase ridership, but requires some adjustments
- First year of the program
  - May require multiple iterations
- Committing long term to this program could see increases in ridership among college students

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  - Director (WRTA)
- Kristin Murphy
  - Associate Director of Residential Services (WPI)
- Connie Peppes
  - Associate Director of Academic Advising (WPI)
- Denise Darrigrand
  - Dean of Students (Clark)

## Questions?

# Appendix D: IQP Proposal



## **Assessing the Effectiveness of the WRTA Incentive Program**

### **An Interactive Qualifying Project Proposal**

Written by:

\_\_\_\_\_  
Caleb Swieson

\_\_\_\_\_  
Andrew Eng

Advised by:

\_\_\_\_\_  
Suzanne LePage

In partnership with:



December 16, 2010

## **Abstract**

This Project Proposal provides background information and a scope of work for the Interactive Qualifying Project (IQP). The purpose of this project is to examine the effectiveness of the Worcester Regional Transit Authority (WRTA) free bus pass incentive program for freshmen at WPI and Clark. This will be accomplished by analyzing ridership data and conducting surveys. The goal is determine if incentives alone are enough to cause college student to use the bus.

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## Chapter 1 – Introduction

Public transportation is an important part of any city. Public transportation is generally cheaper and more efficient than driving. It is used for daily routines, including work, school, and shopping. For college students, public transportation offers a way to get off-campus without needing a car.

Worcester, MA has a very large college community, of about 28,262 students (as of 2007), full time and part time (Worcester Colleges, Schools and Universities). As such, the public transit system could be a very useful source for getting around the city. The Worcester Regional Transit Authority (WRTA) is the public transportation provider in Worcester and the surrounding communities. Unfortunately, a previous IQP determined that students do not use the bus system very often. Reasons included lack of awareness, price, and not having reasons to go off-campus.

In response to the lack of students using the bus, the WRTA has implemented an incentive program to raise awareness and build ridership. The WRTA has given out free semester-long unlimited bus passes to freshmen on three college campuses; WPI, Clark University, and Mass College of Pharmacy (MCPHS).

This project will assess the effectiveness of the free bus pass incentive program. Issues to be examined include whether the passes were enough incentive for students to use the bus system, or whether there are factors other than price, lack of awareness, or not having a reason to go off-campus that go into a student's decision to not use the bus. The effectiveness will be determined through analyzing ridership data from the WRTA as well as conducting a survey of freshmen at WPI and Clark. The survey will include questions about the program and the bus system as well as questions about future use of the bus.

# Chapter 2 – Background

## 2.1-Bus System Overview

Public transit involves many forms of transportation; the two most common being buses and trains. As such, these two are often compared when analyzing a public transit system. Bus systems are not as fast as rail systems, but are much cheaper to operate and install, and are much more versatile, considering they can use roads already placed, instead of needing to build new rails. (Lew) There are many route setups for bus systems, but the most common is the trunk and feeder (or hub-and-spoke) system. (Factors Influencing Bus System Efficiency / Route Planning) In this system, there is usually one or more “hubs” located in the centers of the system. “Feeder” bus routes radiate out from these hubs like spokes. The separate hubs are usually connected by

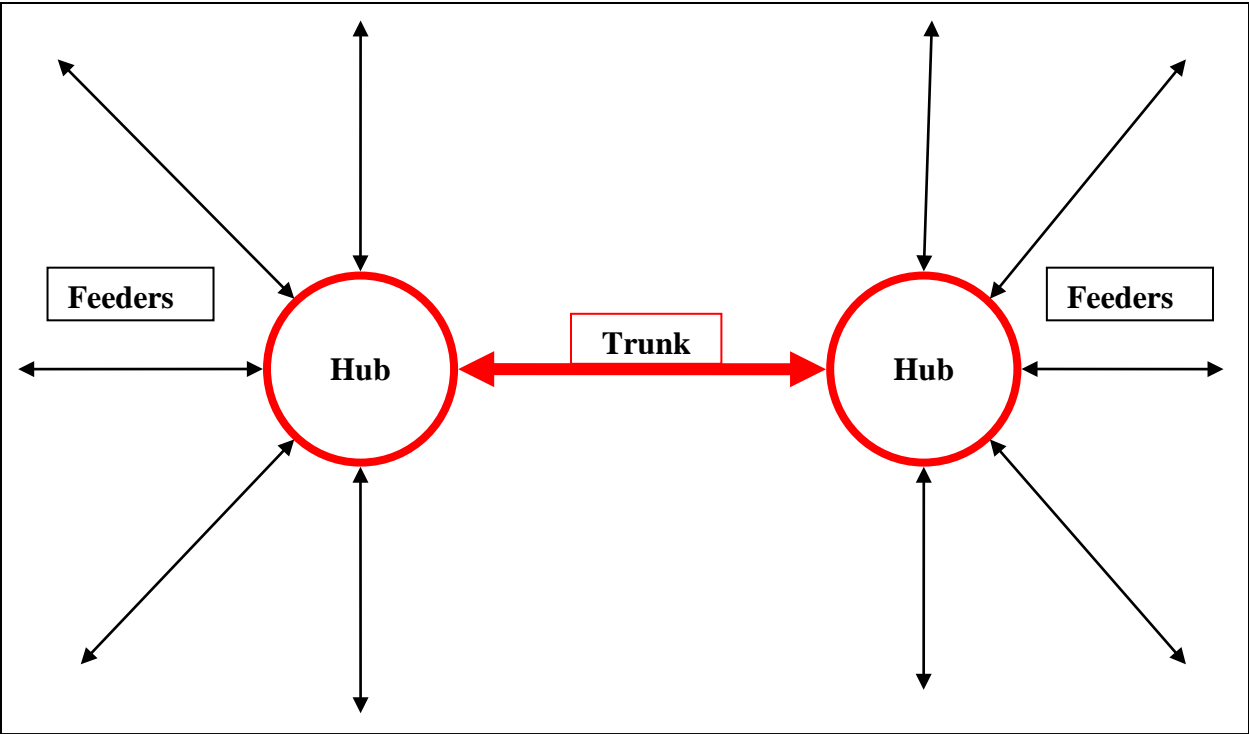


Figure 1. Simplified Bus Route System

“trunks” which is where most of the bus traffic occurs.

There are many components that make up a useful, effective bus system. First and foremost is the willingness of the passengers to use the bus. According to the Transit Cooperative Research Program, there are several fields that can be used to assess the satisfaction (and therefore willingness to use buses) of the passengers. (TCRP) These fields include:

- **Safety** – passengers need to feel safe while waiting for and riding the bus.
- **Reliability** – buses need to be on time most of the time.
- **Convenience** –buses and routes need to go where passengers want to go.
- **Courtesy** – passengers need to feel valued by the bus system.
- **Cleanliness** – buses, stops, stations, and transfer locations need to be clean.
- **Added Value** – riding the bus needs to be easier, cheaper, and/or quicker than other means of transportation.

Some or all of these factors should be taken into account when designing and redesigning any bus system. In addition to passenger satisfaction, the bus system needs to be cost effective and efficient for the bus system to succeed. (United States Federal Transit Administration) An IQP conducted in 2009 assessed the Worcester Regional Transit Authority’s bus system based on these factors and how they related to Worcester college students.

## **2.2- Worcester Regional Transit Authority (WRTA)**

The Worcester Regional Transit Authority (WRTA) is the public transportation for the Worcester area. According to their website:

“The WRTA was created in September 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 the territory.” (WRTA)

The WRTA operates a fleet of 48 buses, including 4 hybrid diesel-electric buses. (WRTA) There are 23 routes that serve the city of Worcester, as well as many of the surrounding towns and communities. In addition to the regular bus service, the WTRA runs a paratransit service that provides curb-to-curb service for passengers with disabilities.

## **2.3-Previous Studies**

An IQP conducted in 2009 by Adrian Mejia and Nathan Horvath “examined the use of public transportation by college students in Worcester” and “proposed modifications to both funding mechanisms and route designs of the WRTA.” (Horvath and Mejia)

The IQP researched the reasons why and how college students use the bus in Worcester. Through the use of past surveys, focus groups with students, and interviews with key staff at WPI, it was found that most students do not use the bus. Some reasons include not needing to leave campus, bus stops being too far from campus, not knowing about the bus, being concerned about the safety of buses, and buses not going where the students wanted to go.

The IQP conducted several focus groups with students about how they use the bus. Most students said they didn’t use the bus, while those that did reported that it was mainly to get to local malls, the DCU center, or other colleges. Inter-college transportation is currently fulfilled by the Consortium Shuttle and is subsidized by the participating Worcester colleges.

Another service currently offered by many of the Worcester colleges is the Woo Bus, which takes students to and from their college campuses (Anna Maria College, Holy Cross, Assumption College, Becker College, and WPI) and various local spots for food, shopping and

entertainment. These include Shrewsbury St., Union Station, Blackstone Valley Mall, and the Target Plaza.

The IQP also looked at the bus systems in two other locations: Curitiba, Brazil and Providence, Rhode Island. Curitiba has a very good BRT system in place, utilizing most aspects of the BRT so the bus system almost rivals a light rail system. Rhode Island's public transportation RIPTA has been subsidized by many of the local colleges, allowing students to get bus passes at reduced or even free rates. The Providence case study is summarized with the other case studies.

The IQP then proposed several changes to the WRTA. The main change was a new conceptual route system that treated the colleges as city suburbs. In this design, there would be a central transfer location for all the college bus stops. Students could then branch out to wherever they wanted to go, including the other colleges.

The other major finding from this IQP was that the majority of college students did not know about the bus system or how to use the bus at all. This finding was very influential to the WRTA.

## **2.4 – Effects of the IQP**

As a result of the IQP in 2009, the WRTA implemented an incentive program for incoming college freshmen. At the activities fairs for Clark University, Worcester Polytechnic Institute (WPI), and Mass College of Pharmacy and Health Services (MCPHS), the WRTA handed out free semester-long bus passes to all freshmen. (Bock) In addition, the WRTA did travel training sessions for the RAs and CAs of Clark and WPI, and gave them all the free bus passes. The travel training is a service the WRTA offers for free to teach passengers how to use

the bus system. (WRTA) The WRTA believes that if the RAs and CAs know how to use the bus, they are more likely to have programs for their residents that use the bus.

These bus passes provide unlimited use until the end of the semester, at which point students can renew them at almost half the retail value. A normal semester-long (4 month) bus passes costs \$192, while students will be able to purchase them for only \$100.

## **2.5-Case Studies**

The free bus pass program of the WRTA is not the only one of its kind. Several similar programs exist across the country. Like the WRTA program, these programs seek to increase awareness and use of public transportation, while offering said transportation at a more affordable price. This is very convenient as some people may not have access to a car, or may lack the money to regularly pay for public transportation. In some cases, the bus passes come at no charge. In other cases, the bus passes are priced at a small fee, or are free for a certain time and then require payment for continued use of the passes. Nevertheless, there is a clear effort to get college students on the buses.

### **2.5.1- Mt San Jacinto College, San Jacinto, CA**

The Riverside Transit Agency (RTA) bus pass program, which is in the pilot stage for this college, offers student free bus passes during the 2010-2011 academic year. (WESSON) The Riverside County and 11 cities in the area are funding the program (which costs \$18,500) with air-quality improvement funds. A Go-Pass sticker is attached to a student's ID, and then the student can go anywhere the bus route will take them. However, the free pass expires at the end of the year, after which a fee is required for continued use (which is unspecified). This fee would have to be approved by both students and college trustees. Also, in addition to the program being

in the pilot stage, the number of students using the buses is very low, which raises questions as to whether the program is effective and should be continued. Approximately 103 out of 21,000 students use the bus, which represents approximately 0.5% of the student population.

### **2.5.2- Regional Transport District-Denver**

This program has been successful for the most part. (College Pass) The program, called the College Pass program, allows students with their college ID to utilize the bus and rail (train) for a fee. This fee is good for one semester, and is non-negotiable. The pass itself is voted on by the student body, because the pass applies to all students. The vote is implied to be a yes/no vote. A major indicator of the program's success is that more than 60,000 students use the bus system through this program.

### **2.5.3- De Anza College, San Francisco, CA**

This incentive program is also in the pilot stage. (Banchik) Of the 50 students who applied for the program, 30 were selected to be the test subjects. It began in August 2010, and students were given free bus tokens. The tokens were the equivalent of a day pass and they allowed the students use of the Valley Transportation Authority (VTA) buses. The program was funded by the 2009-2010 DASB (De Anza Student Body) Special Allocations Fund. One of the main goals of the program is to target students who actually need use of the bus. Some of the criteria for selecting students for the program included financial need for the bus as well as class load and academic success. The program was advertised and information was distributed near the De Anza library.



#### **2.5.4-Cornell University**

The bus pass program at Cornell gives free passes to all registered students. (Cornell University) Students need their ID's to board the Tompkins Consolidated Area Transit (TCAT) buses using the free pass. The passes provide unlimited use of the buses after 6pm on weekdays and at all times on the weekends. New students to Cornell (freshmen and transfer) also get free passes for the year, but without any time restrictions. This privilege is called Omni-Ride, and it is available to returning students as well for the price of \$125 for the fall and \$200 for the year, if purchased in September. The prices decrease each month as the school year goes on.

#### **2.5.5-Maryland Transport Administration (MTA)**

The MTA program is called the MTA All Access College Transit Pass. (MTA) It is a monthly pass that is priced at \$39, which is \$25 less than the full price (\$64). The passes are given to the participating schools by the MTA for distribution, and students pay the \$39 mentioned above for the passes. Through the pass, along with student ID's like most programs in this section, students can use the bus, train, and subway without any restrictions. A big sign of its success is that 31 schools/colleges in the area have enrolled in the program.

#### **2.5.6 – Providence Case Study**

This study was from a previous IQP. (Horvath and Mejia) Providence is an example of a city with colleges that utilize the bus system. Many of the colleges subsidize the cost of bus passes, anywhere from half off to free passes. This service is called UPASS and also provides additional benefits to students, including late-night bus service on Thursdays, Fridays, and Saturdays during the school year.

### 2.5.7-Summary Table

Table 1 is a summary of the previous case studies. It shows the different college incentive programs, as well as the cost to the students and how the program is funded.

Program	Cost (if any)	Funding
San Jacinto	free for 1st year, then fee is required	Air quality improvement funds
RTD	semester fee	none
De Anza	free	DASB special allocations fund
MTA	\$39 per month	none
Cornell	free for normal pass, \$125-\$200 for OmniRide	none
Providence	free or half-price	Colleges

## 2.6 Measuring Effectiveness of Incentive Programs

According to the Transit Cooperative Research Program (TCRP) report 107, there are three types of measuring effectiveness of incentive programs. (TCRP) They are activity or output indicators, outcome indicators, and cost-effectiveness indicators.

Activity indicators “focus on the activities and processes associated with a program.” These focus on strategies used to achieve certain objectives. In the case of the WRTA, this would be giving freshmen free semester-long bus passes in order to achieve greater ridership.

Outcome indicators “focus on the results of program activities and are closely tied to the goals and objectives of a program.” These focus on the results of the activity indicators. In this case, indicators would include the actual ridership data, as well as responses to surveys.

Cost-effectiveness indicators “focus on comparing a program’s outputs or outcomes with the costs of outcome production.” These focus on whether the activities are cost-effective. In this case, indicators would be how many freshmen renew the bus passes.

## 2.7 Survey Development and Deployment

A survey is one way to measure the effectiveness of the incentive program. It is a very useful tool in obtaining information from many people on their own time (as opposed to a focus group or an interview, where all the respondents must be present at the meeting). Having the survey online allows students from multiple colleges to be able to take the survey without needing to go anywhere.

Since the students who were given the free semester bus passes are freshmen at WPI and Clark University and the Resident Advisors and Community Advisors at WPI, this is most effective group to give the survey. The WRTA also gave the freshmen at the Worcester campus of the Mass College of Pharmacy and Health Services (MCPHS). The project team decided that since MCPHS is a small satellite campus of the Boston college, it was not worthwhile surveying them. The **total** number of students enrolled at the Worcester campus of MCPHS is 612. 225 passes were given out, indicating that 225 freshmen or more are enrolled in MCPHS this year. Such a small population should not have an effect on the results and is not worth surveying. At WPI, the number of freshmen in 2009 was 918 (WPI). At Clark University, the number of freshmen in 2009 was 550 (Clark University). Table 2 shows the number of responses required to obtain statistically significant data from these three colleges, using equations from (Creative Research Systems).

The table shows that if the number of respondents from each college is at least the required sample size, it is 95%

**Table 2. Required Sample Size**

	# of Freshmen	Confidence Level	Confidence Interval	Required Sample Size
<b>WPI</b>	918	95%	5%	271
<b>Clark</b>	550	95%	5%	226

confident that the sample data collected in the survey will be within 5% of the population statistics. This means that the number of respondents from each college needs to be around 250-300.

### **2.7.1 Survey Design and Conduct**

A survey needs to be easy to understand and fill out and have relevant questions. There are many qualities of a good survey question. Questions should (StatPac):

- Evoke the truth
- Accommodate all possible answers
- Have mutually exclusive answers
- Produce variability in the answers
- Not imply a desired answer
- Follow well from the last question

In addition to the specific survey question qualities, the survey as a whole should have certain qualities. It should not be too long and it should require as little respondent free response as possible, while still keeping the question qualities.

The purpose of this project is to measure the effectiveness of the WRTA's incentive program, so the questions in the survey should be useful in measuring that. Specifically, the survey should address whether or not students have used the bus before, whether they have used the bus after receiving the free semester passes, and whether they plan to renew the pass when it expires. The survey should also examine why students are not using the bus. Finally, the survey should make respondents aware of the WRTA website and the Wachusett Mountain UPass. The UPass is a season long Wachusett Mountain ski pass for college students. (Wachusett Mountain Ski) The WRTA runs a shuttle to Wachusett Mountain. Using a semester pass, students can ride

for free as well as save \$10 on the UPass itself. (WRTA) The WRTA wants to know if students will use their service.

### **2.7.3 Survey Tool Selection**

Multiple online survey options were researched, including Google forms, Survey Monkey, and Qualtrics. A comparison of these survey tools has been compiled by the Academic Technology Center (ATC) and is shown in Figure 2. (Desilva) One change from the ATC's information is that Qualtrics has 350 maximum responses, instead of 50.

In determining which survey tool to use, several factors were taken into account, including number of survey questions, number of responses required, and who the recipients are. With unlimited questions and 350 responses per survey, as well as impressive question logic and in depth analysis tools, Qualtrics was picked as the survey tool for this project. (Qualtrics Survey Website) The project team decided to have a separate survey for each college so that up to 350 responses from each college can be collected.

	Survey Monkey	Google Docs	Qualtrics	Zoomerang	SharePoint
Number of Questions	10	Unlimited	Unlimited	30	Unlimited
Types of Questions	Multiple Choice Textbox Matrix Rating Essay Demographics Image	Multiple Choice Textbox Paragraph Checkboxes Drop-down Scale Grid	Multiple Choice Textbox/Graphic Matrix Table Slider Constant Sum Rank Pick/Group Drill Down	Multiple Choice Textbox Date/Time Image Demographics Rating Rank Yes/No	Multiple Choice Textbox Rating Scale Number Date/Time Yes/No WPI Person (username)
Survey Flow	No Options	No Options	Skip Logic	No Options	Branching
Maximum response #	100	Unlimited	50	100	Unlimited
Post-survey Data Evaluation	No Export	Automatically Fed to Spreadsheet; Can be Exported to Excel	Export to <a href="#">.csv</a>	No Export	Export to Access or Excel
Look and Feel	15 Templates Survey Monkey Landing Page	20 Themes Can customize Thank You Page	20 Templates, plus two for Mobile Devices	17 Themes Customizable message on <a href="#">Zoomerang</a> Page	Not customizable
Recipients	Anyone	Anyone	Anyone	Anyone	People with @wpi.edu email addresses only
Website	<a href="http://www.surveymonkey.com">www.surveymonkey.com</a>	<a href="http://www.google.com/docs">www.google.com/docs</a>	<a href="http://www.qualtrics.com/">http://www.qualtrics.com/</a>	<a href="http://www.zoomerang.com">www.zoomerang.com</a>	<a href="http://www.wpi.edu/+sharepoint">www.wpi.edu/+sharepoint</a>

Figure 2. Survey Comparison (Desilva)

## Chapter 3-Methodology

### 3.1- Survey

The primary method of investigating the effectiveness of the WRTA free semester bus pass program will be through a survey to the freshmen at WPI and Clark. This survey, distributed online, will contain questions about the pass program as well as questions regarding the students' knowledge and awareness of the WRTA bus system. After getting approval from the IRB, the project team will upload the survey to Qualtrics, and ask the freshmen at WPI to fill it out. The freshmen will be contacted by email using the group name [freshmen@wpi.edu](mailto:freshmen@wpi.edu). The survey will also be sent to freshmen at Clark University, since the WRTA issued bus passes to them as well. This will be accomplished through Clark University's Program Director of Academic and Student Services, Laura Burgess, in order to gain their permission to send out the survey and to determine how to send the survey to the freshmen.

As another measure of the effectiveness of the semester bus pass program, the project team will survey the WPI Resident Advisors and Community advisors, who were given free semester bus passes as well. The first reason for surveying them is that the RA's and CA's from WPI all participated in WRTA's travel training program. This program has expert trainers from the WRTA teach participants how to use the bus. As of 10/12/2010, none of the WPI RA's have used the passes, and the WRTA management is concerned and wants to know why this is the case. Just like in the case of the WPI freshmen, the team will get approval from the IRB before sending out the survey online using Qualtrics.

## 3.2-Survey Questions

### 3.2.1 Survey questions to freshmen at WPI and Clark:

- Did you know that there is a bus service in Worcester, MA?
- The Worcester Regional Transit Authority (WRTA) provides the bus service in Worcester.  
Have you used the WRTA buses since becoming a college student in Worcester?
  - ◆ If yes, what do you use them for? (Getting to class, getting to Union Station/other public transportation, going shopping, other-specify)
  - ◆ If no, why? (Inconvenience of walking to bus stop, did not know bus service exists, did/do not know how to use the bus, bus does not go to desired locations, little need to leave campus, concern for safety, other-specify)
- (WPI students only) Are you aware that the WRTA issued free semester bus passes for all freshmen at the activities table on August 27, 2010?
  - ◆ If yes, did you receive a pass?
- (Clark students only) Are you aware that the WRTA issued free semester bus passes for all freshmen at the freshman resource fair on August 23, 2010?
  - ◆ If yes, did you receive a pass?
- Since receiving the passes, have you used them?
  - ◆ If yes, how often do you use them? (Once per week, twice per week, once per month, other-specify)



- ◆ If no, why? (Inconvenience of walking to bus stop, did not know bus service exists, did/do not know how to use the bus, bus doesn't go to desired locations, little need to leave campus, concern for safety, other-specify)
- Are you aware of the WRTA website ([www.therta.com](http://www.therta.com))?
  - ◆ If yes, what do you use it for? (Location of destinations, bus schedules, fares, other-specify)
- Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?
  - ◆ If no, why? (Write own response)
- Were you aware that Wachusett Mountain offers a seasonal ski pass for students? (The ski pass is called the Wachusett Season UPass)
  - ◆ If yes, are you planning to buy the UPass this year?
- Are you aware that purchasing any multi-ride bus pass (e.g. 10-ride, monthly, or semester) gets you a discount on the UPass?
  - ◆ If no, might that change your mind about renewing your semester pass or buying the UPass?

### 3.2.2 Survey Questions for Resident Advisors and Community Advisors at WPI

- The Worcester Regional Transit Authority (WRTA) provides bus service in Worcester. The WRTA issued free semester bus passes to freshmen, RAs, and CAs. Since receiving the passes, have you used the bus system?
  - ◆ If yes, how often do you use the bus? (Once per week, twice per week, once per month, other-specify)
  - ◆ If no, why not? (Inconvenience of walking to bus stop, did not know bus service exists, did/do not know how to use the bus, bus does not go to desired locations, little need to leave campus, concern for safety, other-specify)
- Have you used the WRTA website ([www.therta.com](http://www.therta.com))?
  - ◆ If yes, what do you use it for? (Location of destinations, bus schedules, fares, other-specify)
- Do you plan to renew the semester bus pass at a reduced rate after it expires at the end of the year?
  - ◆ If no, why? (Write own response)
- Were you aware that Wachusett Mountain offers a seasonal ski pass for students? (The ski pass is called the Wachusett Season UPass)
  - ◆ If yes, are you planning to buy the UPass this year?

- Are you aware that purchasing any multi-ride bus pass (e.g. 10-ride, monthly, or semester) gets you a discount on the UPass?
  - ◆ If no, might that change your mind about renewing your semester pass or buying the UPass?

### **3.3.-WRTA data**

Another method of investigating the effectiveness of the bus pass program will be the actual ridership data from the WRTA. The WRTA keeps a record of how many students with passes use the bus, and when they use it. The passes are numbered so that the WRTA can track when students are using the passes. This data is compiled weekly by the WRTA and will be sent to the project team. This data, along with the survey results, will be used to determine effectiveness.



### 3.4.-Timeline

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