

Driving Habits of Studley Campus Commuters:

*Who's driving to Studley Campus, where are they coming from and
why do they drive?*

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Abstract

The need to reduce vehicular traffic to Dalhousie campuses serves a variety of purposes. Environmentally it will cut down on our greenhouse gas emissions and air pollution in Halifax. Economically it will reduce the amount of money Dalhousie currently spends on maintaining parking facilities and free-up valuable land that is currently reserved for parking. It will also make the surrounding community safer by making the surrounding streets and roads more pedestrian friendly. However, in order to reduce vehicle traffic to Dalhousie we must examine the habits and characteristics of those who currently make the daily commute. That is the purpose of this research study. By gaining a better understanding of who is driving to campus we will be able to make appropriate recommendations to encourage transportation alternatives. We conducted 96 face to face surveys and two interviews with parking administration staff. We discovered that faculty and staff are driving more than students proportionately. We also found that those who live within a 10km radius of campus have the greatest potential to find alternatives to driving single occupancy vehicles. We also found that the current carpooling program at Dalhousie is too restrictive and not advertised enough. Our findings have led us to recommend that Dalhousie increase the price of parking, expand the U-Pass program to include faculty and staff, and to improve its carpooling program.

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Introduction

Transportation activities account for roughly one quarter of total greenhouse gas (GHG) emissions in Canada, and transportation has accounted for a significant portion of emissions growth over the past decade (Statistics Canada, 2006). While the effects of GHG emissions are not yet felt directly by polluters or residents, the effects of smog causing air pollutants are (Johnson *et al.*, 1968), and these effects worsen with increased traffic congestion.

In the Halifax Regional Municipality (HRM), automobile and light truck vehicles are responsible for 98% of transportation related energy use (GPI 2008), and are thus the area under which the most significant reductions can be made. Aside from carrying a large environmental burden, private vehicle use also represents a significant socioeconomic burden as well. Transportation costs are slated as the second highest household expense encountered by HRM residents, accounting for an average of 12.4% of total household spending (or \$7 817 annually / household) (GPI 2008). It is estimated the full cost of private vehicle use in the HRM is \$3991 higher than the actual cost when indirect costs¹ are incorporated (GPI 2008).

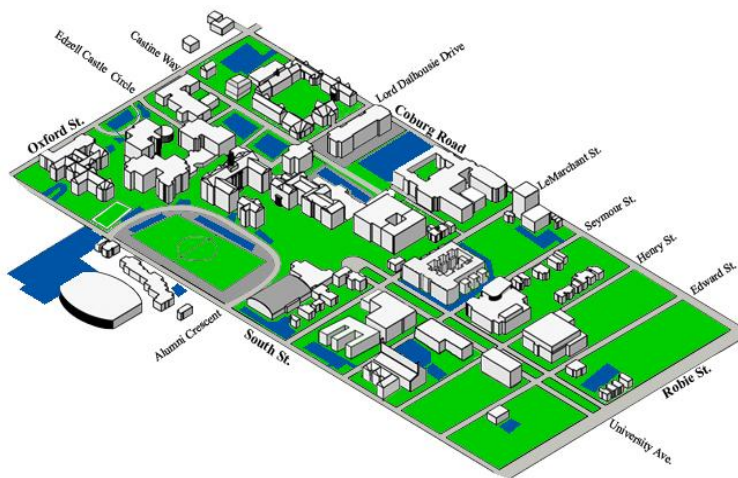
Problem

Dalhousie University currently caters to the urban commuter by providing low cost parking to faculty, staff and students who choose to drive to school. This encourages the

¹ Indirect costs include non market externalities (such as adaptation to climate change, health problems related to air pollution, and travel time) as well as costs paid for transportation through infrastructure etc.

use of private vehicles which have a demonstrated negative environmental impact. Automobiles contribute to worsening of local air quality by releasing harmful pollutants (Johnson *et al.* 1968). Globally, these automobiles contribute to the accumulation of greenhouse gases in the atmosphere contributing to the overall effect of climate change.

Currently, parking lots, parking complexes and parking basements account for a significant amount of space allocation on campus (**Figure 1**). On Studley campus alone there are roughly 1850 general parking spaces available, with reserved parking spaces numbering in the hundreds. The revenue generated from the sale of these passes does not provide the funding necessary for the services required of these lots, namely: maintenance, snow removal, security, and general infrastructure costs. The current system is a drain on the facilities management budget. Essentially, the funding of these parking lots is not being paid for solely by the primary users, but rather by other sources of university revenue. These revenue sources include, but are not limited to: student



tuition fees, auxiliary and ancillary fees, government subsidies, and revenue generated from on campus food and beverage service contracts.

Figure 1 - Parking available on Studley Campus is shown in blue.

The current parking system is also problematic for drivers as more passes are currently sold than there are spaces available. This year, for instance, 2266 passes were sold, while there were only 1850 spaces available for these commuters – an 18.4% gap. In past years, the gap between passes sold, and spaces available has been even larger. During peak times, between 8am and 4pm on weekdays parking is not always available for everyone who comes with a pass forcing them to park elsewhere.

The parking prices and policies in place at Dalhousie do not accurately reflect the market system of supply and demand (**Figure 16**), nor do they accurately reflect our location on a congested peninsula, as is evident through the comparison of parking prices and policies with those of similar institutions that follows.

Parking prices, policies and practises

The price of parking at Dalhousie is relatively cheap when one considers the institution's location on the Halifax peninsula, an area of high congestion, the limited parking spaces available, and the high demand for those spaces. Dalhousie charges differential rates for parking – 145.17 for students and 161.41 for faculty and staff. There is currently no upper limit on the number of passes available for sale, but the finite number of parking spaces is in high demand on all three Dalhousie campuses.

Dalhousie is currently charging less than market price for parking on the Halifax peninsula, as can be inferred from table 1. Dalhousie's prices are well below those of Saint Mary's University, and King's College, both of which are comparable to Dalhousie. Mount Saint Vincent University, a university located off the peninsula charges a price

higher than the general parking price at Dalhousie. The price of parking is too low for given the premium location of Dalhousie lots.

Table 1: A brief outline of parking pricing and policies at several universities in Halifax and a two other Canadian institutions.

Institution	Price (Can \$) /year	Notes
<i>Dal</i>	<i>145.17 – 161.41</i>	<i>Unlimited number of passes sold, price differentiation between students (lower) and faculty and staff (higher).</i>
<i>SMU</i>	<i>205.00 – 230.00</i>	<i>Unlimited number of passes sold, price differentiation between staff and students (lower) and faculty (higher) (SMU, 2008).</i>
<i>MSVU</i>	<i>160.84</i>	<i>Institution located off peninsula in less congested area (MSVU, 2008).</i>
<i>Kings</i>	<i>262.20</i>	<i>Number of passes available equals the number of spaces available. Extremely competitive application process – drivers must justify their reason for driving by indicating distance traveled to school, as well as bus routes available to their home (King’s College, 2008).</i>
<i>U. Ottawa</i>	<i>1021.81</i>	<i>Application required. Sustainable transportation highly promoted on parking rates website (University of Ottawa, 2008).</i>
<i>McGill</i>	<i>1080.00 – 2580.00</i>	<i>Price dependant on lot location and demand for spaces. *Highly congested city (McGill, 2008).</i>

Sustainable Transportation at Dalhousie

In 2006 the U-Pass program was introduced that provides low cost public transit to all full time students at Dalhousie and other universities within the municipality (Dalhousie, 2008). The program has been highly successful since its inception.

Unfortunately, no such program is available for faculty and staff at Dalhousie. The current program is a definite progressive step as it is indicative of the university’s commitment to sustainability as well as its ability to work with the HRM and other universities to develop solutions to problems.

Parking services have developed a rideshare program that allows four commuters living off the peninsula to share a reserved parking space (Dalhousie, 2007). There is no real price incentive to using this system, as the same benefit could be achieved by simply dividing the price of an outdoor reserved parking spot (\$505.69) four ways.

Aside from these two programs, there has been little effort on the part of Dalhousie to create a comprehensive sustainable transportation program for the university as a whole.

Research Objectives and Rationale

The objective of this project was to perform research that will help to reduce the environmental burden caused by motorists in commuting to campus. We did this by investigating the rationale behind the choices that commuters make resulting in their choosing to drive to campus. Based on this rationale we have put together a response in the form of recommendations for administrative personnel at Dalhousie. Our research is intended to help decision makers determine what a successful sustainable transportation program might look like at Dalhousie.

Methods

Research Goals

The information we gathered was to look at who is driving to Dalhousie University and why.

- Are they mostly staff, faculty, or students?
- Are they male or female?
- How often do they drive to school?
- What distance are they travelling?
- Do they carpool and would they take advantage of the Rideshare program?
- What price for campus parking would act as a real deterrent from driving?
- What are the primary reasons they are driving?
- What options are most appealing as an alternative to driving?
- Are transportation options at Dalhousie adequate?

Our research was a non-experimental field study using face to face surveys, observational data and in person interviews.

Interviews

Before conducting the surveys two interviews were conducted with Dalhousie parking administration: Sandy MacDonald, the parking administer, and Leigh Horne, parking attendant and security. These interviews were conducted to gather background information for our research and allowed us to determine the most appropriate sampling techniques and questions. The interviews proved beneficial towards informing the content of the survey, which was geared towards gathering information that would be beneficial to our study, but also to parking services.

Surveys

In targeting the sample population for our research, we Identified as many: questions that could be asked, behaviors that could be observed, and people that could be approached as we could. We also took into account the time constraints of the project (Palys & Atchison, 2008). Due to our limited time frame, we determined the most appropriate sampling technique to use was a haphazard, non-probabilistic technique (Palys & Atchison, 2008). The surveys were conducted with Dalhousie faculty, staff and students who park on campus and currently own a parking pass. This technique was the most appropriate option because it allowed us to collect all of our data to meet our research goals in the time frame we had were allowed, which was four months.

The survey consisted of 12 questions that allowed us to retrieve both quantitative and qualitative data. When the final wording and technique was decided we began to survey any faculty, staff and students parking at the Dalhousie parking lots.

Reliability and Validation Methodology

Each member of the group administered a pilot test on a participant who met the requirements of our sample. Upon completion of the pilot test and feedback from the participants, the survey was modified before administrating it on our sample population. This pilot test contributed to the reliability of our project.

In order to validate our measure, we conducted research and reviewed relevant papers from similar projects before narrowing the scope of interest. These steps have contributed to the validity and appropriateness of our project.

Procedure

Surveying consisted of group members targeting various Studley campus parking lots and administering the survey to faculty, staff and students who were going to or coming from their car. We administered the survey mainly in the morning hours from 7:30 to 9:00 AM from Monday to Friday. Surveying was completed primarily in the morning because it was challenging to get respondents to submit to the survey at other times of the day. For instance, in the morning, people were willing to do the survey because we would administer the survey while walking with them to their destination. In the afternoon, however, the possible participants were eager to go home making them less willing to answer our questions. Additionally, because of the number of pedestrians crossing through the parking lots it was easier to determine which people drove if we were able to see them getting out of their car. In the afternoon we could not determine this until they had actually reached their car. All surveys were started with our approved introduction statement and were conducted in a professional manner.

Limitations and Delimitations

The major limitation in our research was time. There was a limited time frame of less than four months (one semester) to start and complete this project. This meant expediting each process of our research development. Sampling was of utmost concern because we could not sample before defining our scope, and developing appropriate research methods. This left us with just over a month to sample our target population before analysis and presentation of our data was scheduled to begin. For this reason, we used a haphazard technique to quickly collect the data.

Before sampling began we decided to limit the population of interest to the Dalhousie faculty, staff and students who currently use a parking pass to park at Studley campus. This delimitation was used because we could identify the population by the number of parking passes sold, and provide data the administration could use. Our sample size was 2266, which is the number of general parking passes sold to faculty, staff and students (Macdonald and Horne, 2008). From this figure, and based on the number of drivers sampled we determined the confidence level of this study to be 95% with a confidence interval of 9.79 (Creative Research Systems , 2003).

Results

The results were gathered through the interviews conducting with Sandy MacDonald and Leigh Horne and the surveys conducted with Dalhousie faculty, staff and students. The survey questions can be found on Appendix B. The following data was collected from the interview and should be mentioned. Currently the total passes sold to Dalhousie faculty, staff and students are as follows:

Total Passes sold: 2800
General Passes sold: 2266
Reserved Spaces sold: 544

The general parking spaces available to faculty, staff and students:

Sexton: 238
Studley: 1612
TOTAL: 1850

There are a total of 416 (18.4%) more parking passes sold then there are parking spaces.

Parking prices have generally been raised ~3% per year for the last 3 years. Finally, parking services are currently looking at future parking plans for Sexton Campus which means this project can help in the planning of future parking expansion decisions.

The survey was the main data source used in analyzing the trends and drawing conclusions and making recommendations. There were a total of 96 surveys, with students being the majority of respondents (**Figure 2**).

Position of Respondent

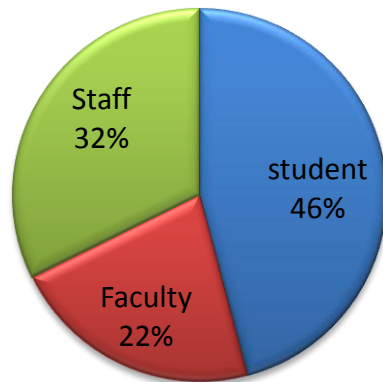


Figure 2: Position at Dalhousie of respondents.

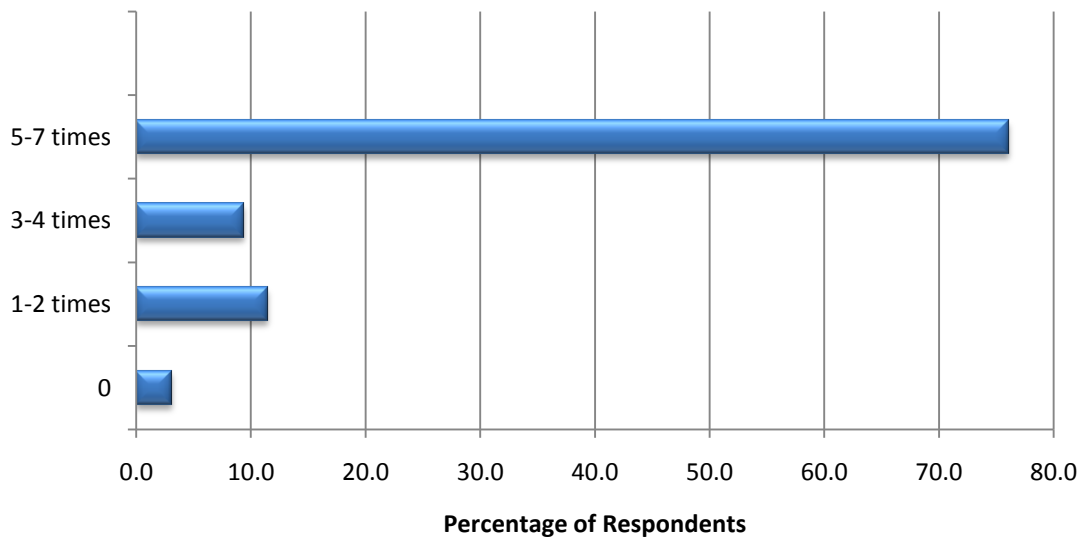


Figure 3: Number of times respondents drive to campus per week

There was an overwhelming percentage of people driving to Dalhousie 5-7 times per week (**Figure 3**). The majority of our data collected from the survey came from people who drive to campus on a regular basis. Our results are therefore pertinent to the segment of Dalhousie population that can make the most difference by driving less'

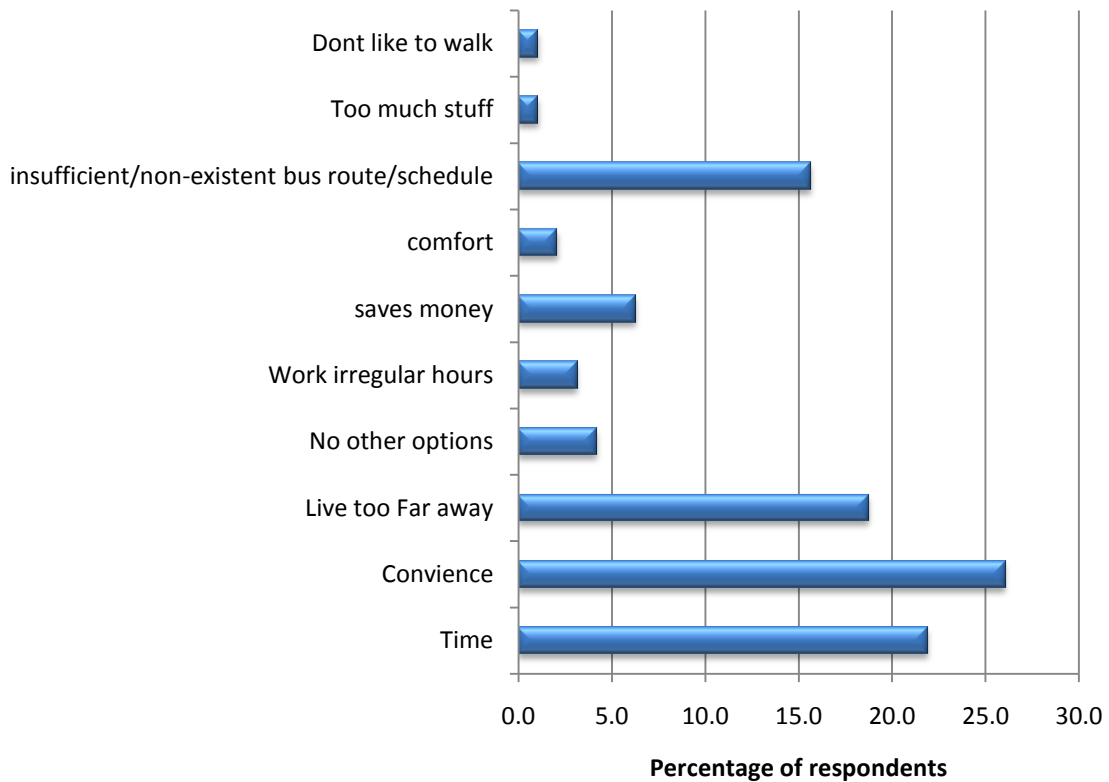


Figure 4: Reasons that best fits why respondents drive to campus

This question was an open ended and allowed a variety of responses to ensure no possible answer was left out. The answers were then gathered and placed into categories that best suit them. It shows that people drive to Dalhousie because it is convenient and quicker. Insufficient/ nonexistent bus route or schedule was a high response as well with just over 15%.

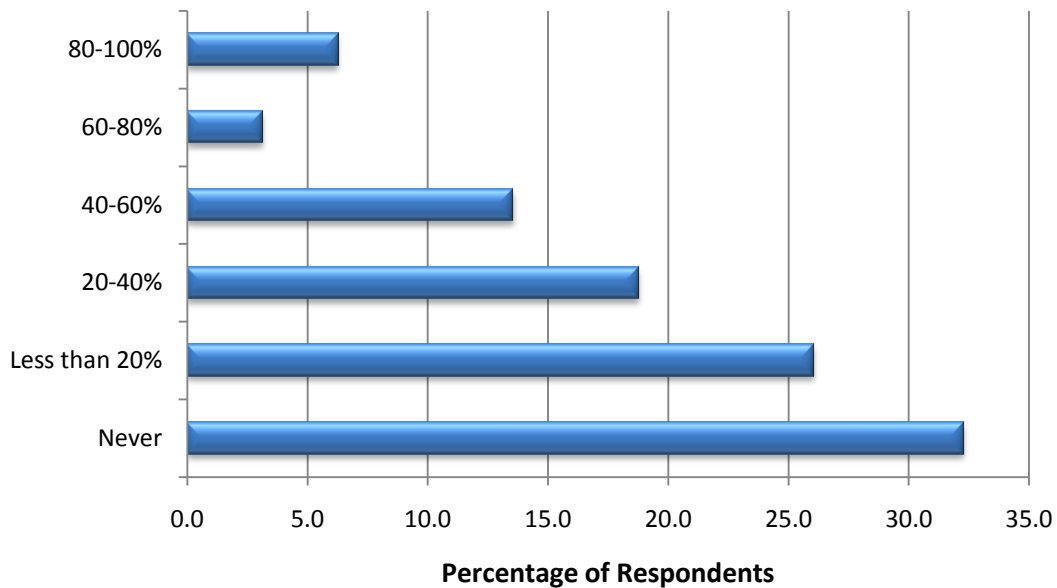


Figure 5: How often are respondents unable to find a parking spot

Figure 5 shows that approximately 57% of the people surveyed said they usually find a place to park, incidentally 68.8% of the people surveyed said they come to campus early to find a parking spot.

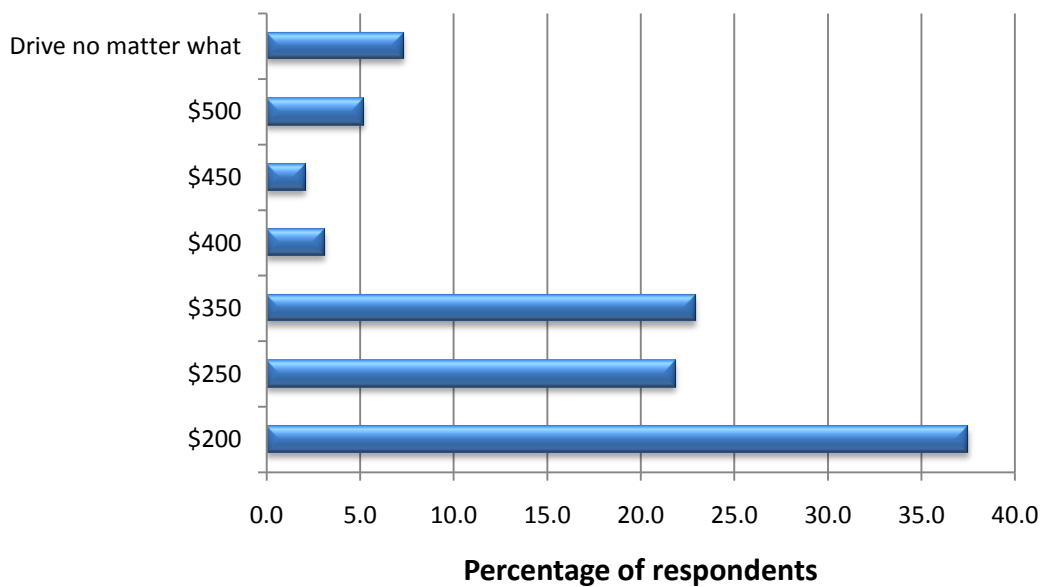


Figure 6: How much are respondents willing to pay for parking

Over 35% of the people surveyed, said they would not want to pay for a parking pass if the price increased up to \$200. Closely thereafter, a price increase of \$350 and \$250 would deter people from paying for parking.

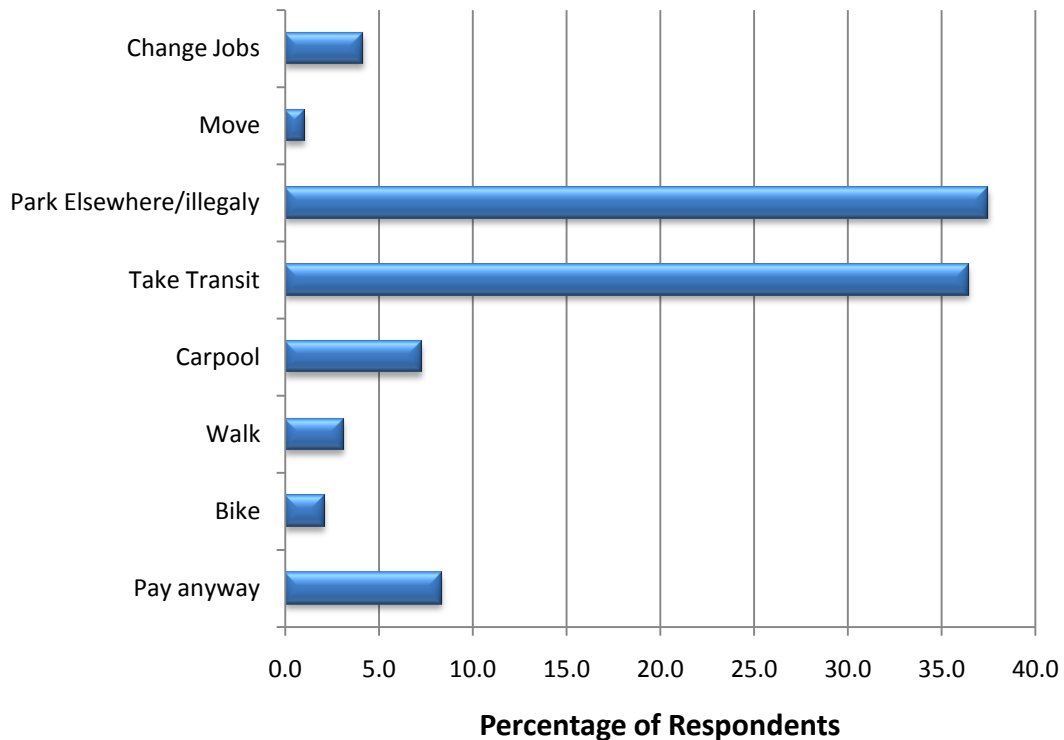


Figure 7: What option would respondents choose if parking was too expensive

The graph in **figure 7** shows what options people would consider if parking was too expensive. Park elsewhere/illegally is the highest response with around 37%; take public transit was second highest with close to 36%. There is a small percentage of people who would still pay for a parking pass if it became extremely expensive but most people would not.

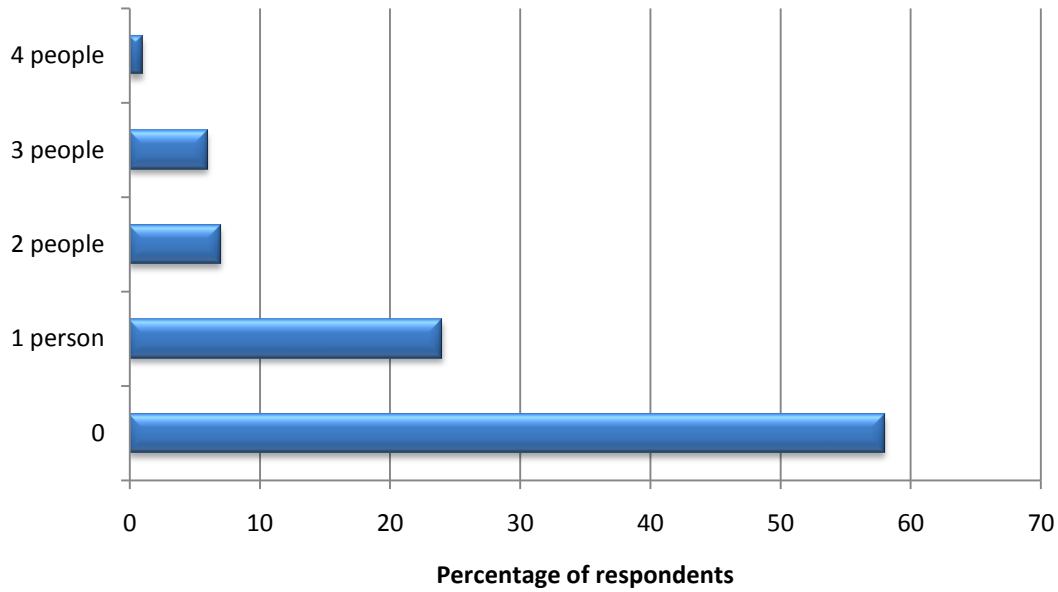


Figure 8: How many people did respondents carpool with

This graph shows that most of the people surveyed did not carpool with anyone the day we surveyed them. Out of the 96 people surveyed, 63.5% said they would not take advantage of the Rideshare program if it was offered to 2-3 people in the carpool, but no reason was given as to why.

Data Analysis

The Role of Data Analysis in our Research:

The data we collected through our surveys plays two roles in our research. It first allows us to gauge the status of the commuting situation on Studley Campus. Secondly, it provides insight into the factors that contribute to the commuter's decision to drive to campus. By examining the factors that contribute to making the decision to drive we are able to better target future efforts to change that behavior. In regards to our survey, we asked a number of questions dealing with specific commuting habits (How many times a week do you drive? How much is too much to pay? Why do you drive? Would you carpool if the rideshare program was improved?) as well as categorical questions (Gender, How far from campus do you live?, What role do you play in the Dalhousie Community?). We were then able to compare the responses from each type of question and observe trends between commuting habits and categorical qualities.

Observing these trends in our data has proven to be very useful, allowing us to make fair and effective recommendations to current parking policies on campus. It has shown us which groups drive the most and would therefore benefit the most from targeting in a social marketing campaign. Finally, it allows us to predict the outcomes of certain courses of action so that the most effective approach can be taken.

Trends:

The following figures illustrate some of the trends that were observed through comparing different data fields.

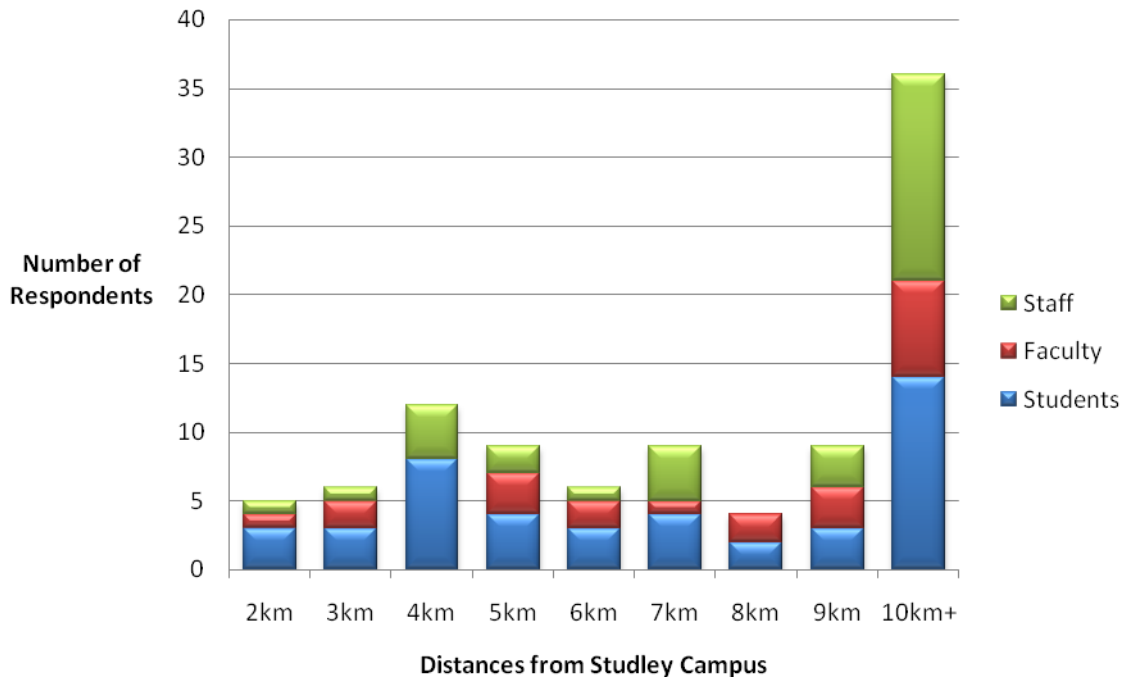


Figure 9: Distance commuter lives away from campus vs. their position

Figure 9 breaks down commuters by the distance they live from campus and by their role at Dalhousie. A disproportionate amount of commuters fall into the 10km+ category since that is the largest area – representing commuters who might live anywhere from 10 or more km away. As for the other zones, there does not appear to be any solid pattern. However, it is important to note that faculty and staff are far outnumbered by students, yet they make up a disproportionate share of those who commute to campus via an automobile. This is an important fact to keep in mind when trying to find an appropriate solution to Dalhousie’s transportation situation. It is also

important to note that while many students only spend four years (or the length of their degree) at Dalhousie, faculty and staff members will generally spend a longer amount of time at, possibly their entire careers, thus, changing faculty and staff commuting habits will have longer-lasting effects.

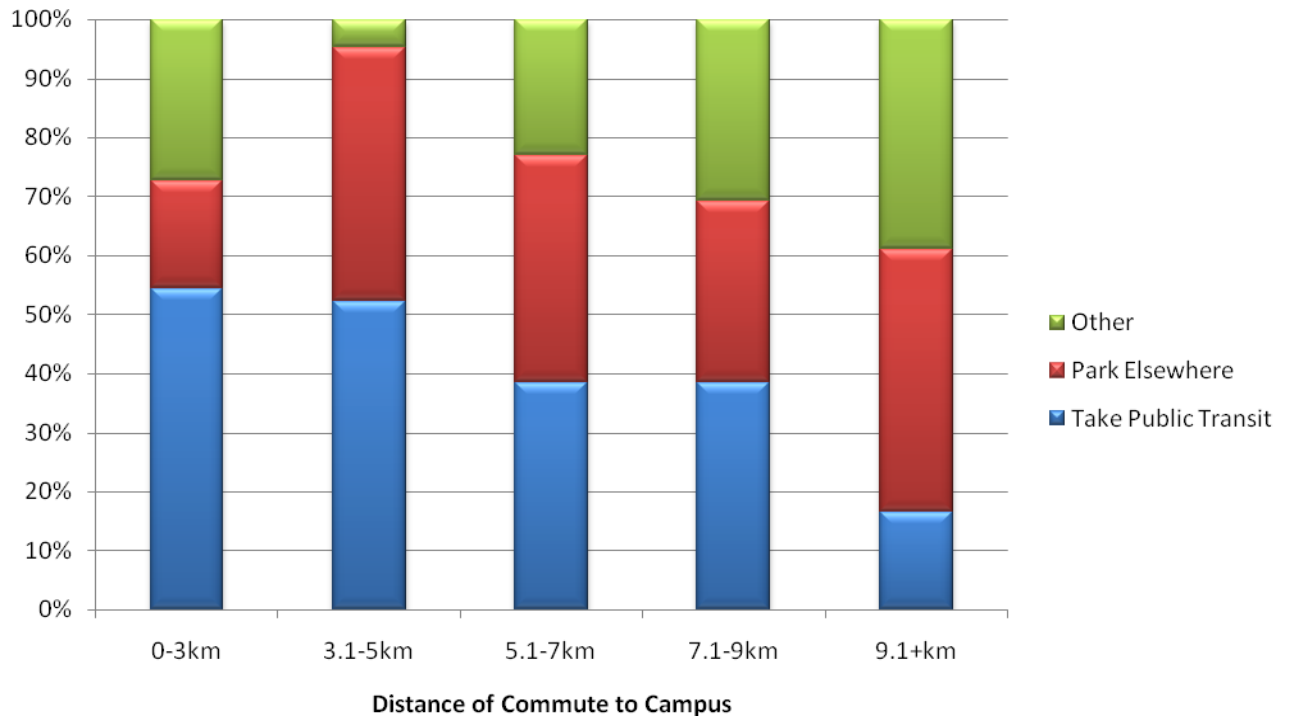


Figure 10: Parking alternatives when cost is prohibitive

Figure 10 shows us what commuters would do if the price of parking was beyond what they were willing to pay. The graph is broken down into the distances that they live from campus. One visible trend is the small proportion of people who would take public transit and live 10+ km from campus, while the zones within 10 km of campus have a fairly high proportion of people who would take public transit. This trend is most likely a result of the public transit system being better and more accommodating for those who

live in areas on or directly around the Halifax peninsula than for those who live further away. This idea is reinforced when you look at the proportion of people who live 10+ km away from campus and would park elsewhere or illegally if they could not afford parking on campus. This suggests that no other option exists for those who live over 10 km away. This is an important to consider if Dalhousie was to amend its parking pass policy because in order to make the campus accessible to everyone we would have to keep in mind that fewer transportation options exist for those who live further away. Therefore, distance lived from campus could become a criteria for a parking pass.

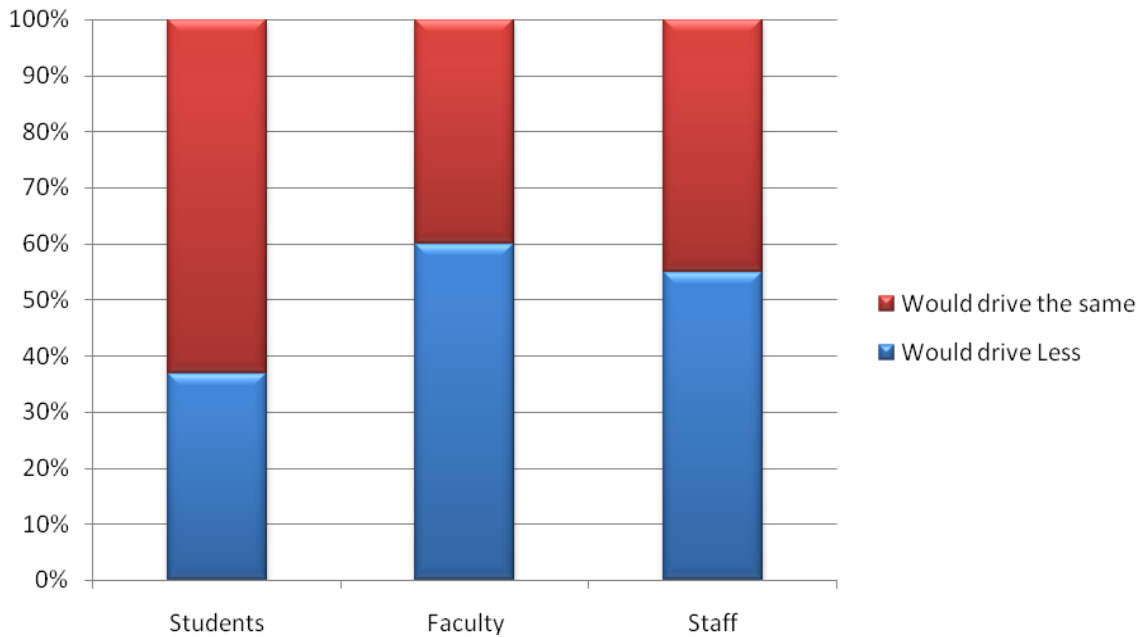


Figure 11 - Effect of more expansive parking on commuting habits

Figure 11 shows the proportion of students, faculty and staff that would drive the same or less if parking prices were increased beyond what they are willing to pay. To determine these behavioral predictions respondents who said they would either carpool, take public transit, walk, or bike to campus if the price of parking was too high were

categorized as those who “Would drive less”. Those who indicated they would pay any price, park elsewhere/illegally, or change jobs/school were categorized as those who “Would drive the same”. This indicates that faculty and staff are more likely to switch to a lower impact form of transportation than students if the price of parking increases. This may be a result of the fact that most students don’t own cars or have easier access to public transit (through the U-PASS) so that those who are already driving are doing because it is the only option, or the best option. From the data it can be predicted that we would most likely see a higher modal shift in transportation habits for faculty and staff rather than students.

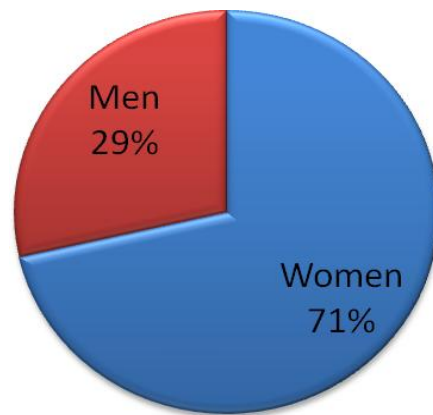


Figure 12 - Breakdown of individuals who cited inefficient public transportation as the most influencing reason they drive

Figure 12 shows the percentage, by gender, who replied that the primary reason they drive to campus is because of poor or inadequate transit services in their area. Women are twice as likely as men to take public transportation. This trend is reinforced by national data shown in **Figure 13**, indicating that women make up more than two-

thirds of all transit trips in Canada. An awareness campaign to encourage bus ridership should, therefore, be directed at men as women are already taking transit.

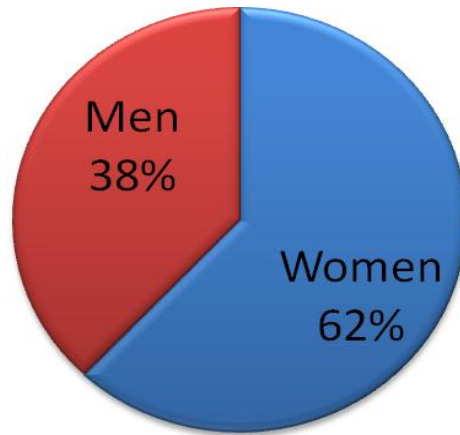


Figure 13 - Breakdown of national public transit ridership by gender (Statistics Canada)

Figure 14 categorizes the current carpooling habits of those who would take advantage of the Rideshare program if it was amended to include groups of 2-3 people. If the program's guidelines were changed then over 50% of those who would take advantage of it are also those who currently don't carpool. It is encouraging that this simple change has the potential for a major modal shift to occur. It could have noticeable benefits, acting as an incentive to encourage those who do not currently carpool to do so.

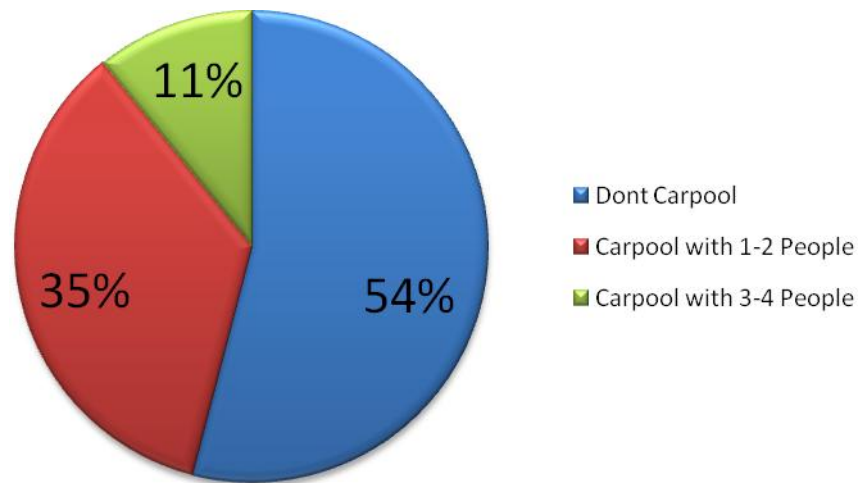


Figure 14 - Current habits of those who would take advantage of the rideshare program if it was offered to groups of 2-3 people

Figure 15 breaks down the highest price people would be willing to pay for parking by role of respondent. The major trend is that the price range of \$200-\$350 is the tipping point when it comes to paying for parking. This is no surprise since lower prices are generally more desirable than higher prices. There might be a bias in the responses towards lower prices; respondents appeared suspicious when this particular question was asked, and many may have stated a lower price because of their desire to see parking prices stay low. The short time frame most respondents replied in may have resulted in a knee jerk low response. For these reasons, we suspect the price drivers are willing to pay to be much higher than the stated averages.

Taking this into consideration, however, there is still a visible trend between student responses and those of faculty and staff. The faculty and staff responses tend to still be a little better distributed over the entire range while student responses are

more polarized towards the lower prices. Likely the disposable income of staff and faculty is higher than that of students and they can therefore afford higher prices and would be more willing to pay. This should be kept in mind when making recommendations since it shows that an individual's role in the Dalhousie community is correlated to how much they could pay or would be willing to pay for parking on campus.

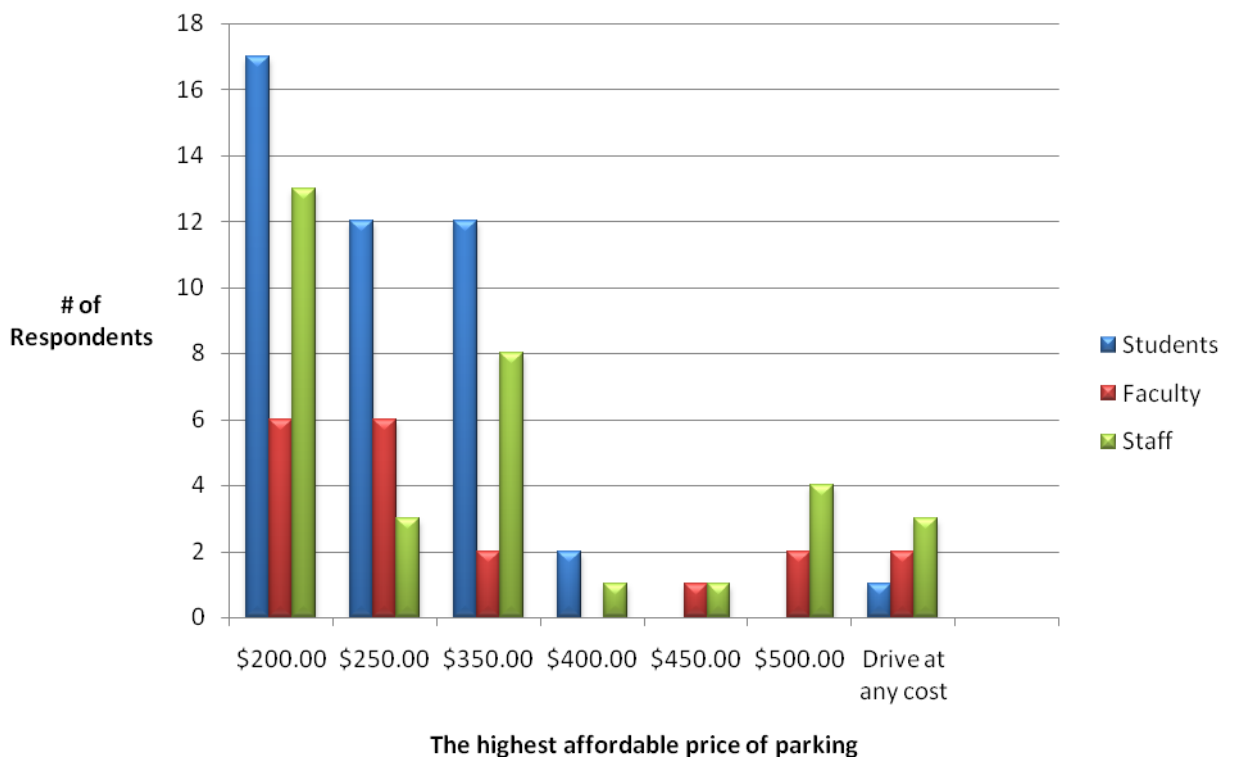


Figure 2 - Break down of threshold price drivers would pay for parking by role

Lastly, the pricing thresholds can be visualized as trends that may exist within the supply and demand market for parking at Dalhousie. By taking the data collected on price thresholds for drivers and extrapolating that onto the entire population of parking pass

purchasers we are able to illustrate the market of supply and demand at Dalhousie.

Figure 15 illustrates the fact that current price promotes a parking system that operates at point of inefficiency, and the corresponding price needed to bring the market to equilibrium. This is, of course an oversimplification, but a worthy observation nonetheless.

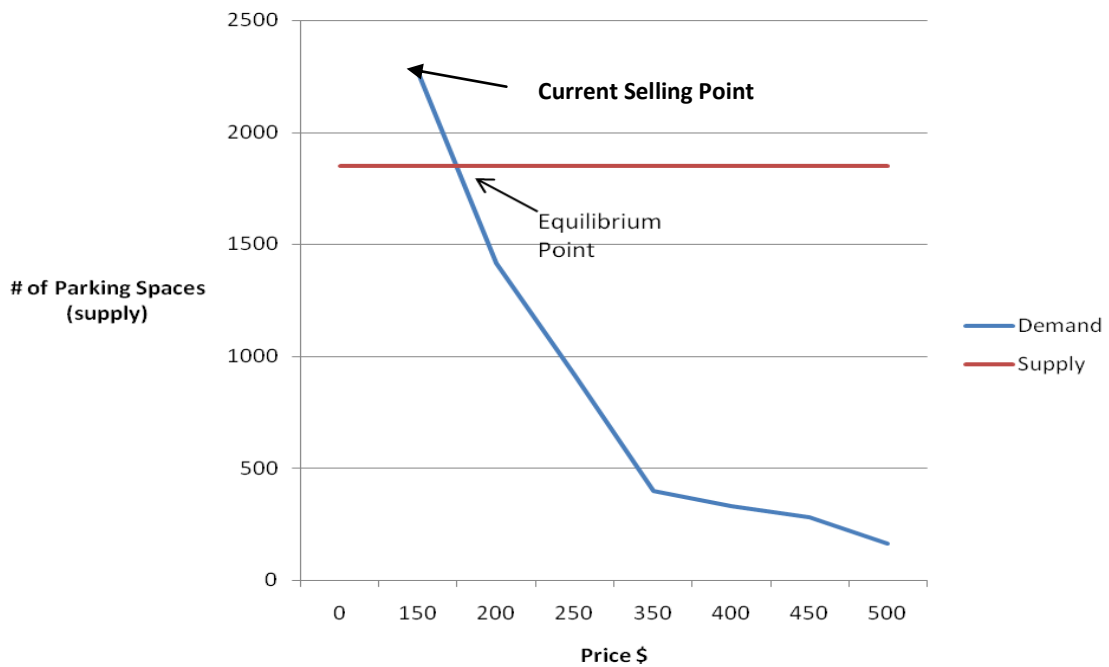


Figure 16: the supply and demand market for general parking spaces at Dalhousie

Conclusions and Recommendations:

Summary of Key Findings

By examining the collected data in detail and by looking at the categorical qualities of commuters and comparing them to their commuting habits, patterns and trends do begin to emerge. From these patterns we can make recommendations to ensure that any changes made to the current transportation situation will be fair, effective, and practical. Based upon the data analysis conducted above the following key findings should be considered in any recommendations to Dalhousie's transportation situation:

1. "Drive Less" campaigns should be focused primarily on faculty and staff since they drive proportionately more than students, and are long term members of the campus community.
2. Considerations should be made to those that live too far from campus and are unable to access other modes of transportation other than the automobile since driving is often their only option.
3. Men need more encouragement than women to take public transit.
4. The rideshare program should be expanded to include groups of 2-3 people because this would create a large modal shift in commuting habits.
5. Students are less capable of tolerating an increase in prices. Thus, there should be a gap between the cost of student prices and faculty/staff prices.

Awareness

Rideshare passes are not promoted to the Dalhousie University population in any meaningful manner resulting in low overall awareness of the program. Information about the passes is located on a PDF with a link placed on the Facilities Management web page. On the first page of the document there is a list of available permits but no mention of the Rideshare program. One has to scroll to the sixth page in order to find only the basic information about the program, and a number to call to get details. The impression one gets is that Dalhousie does not stand by its Rideshare program.

To remedy this situation we suggest that the Rideshare program be prominently displayed on the main page of the Facilities Management website. A link should be dedicated to a separate webpage with complete information about the program, including pricing and parking locations. The Dalhousie homepage should also be used to promote the program, particularly at the beginning of each term when passes are likely to be bought. When viewed on a laptop with a standard 15.4" screen the Dalhousie home page fills only half of the screen. The rest of the space could be used to increase the awareness of the Rideshare program along with other important sustainability initiatives. Orientation packages for all members of Dalhousie should include details about transportation options including the Rideshare program and how to access them.

A complimentary program is needed that would bring together people who may be able to take advantage of the Rideshare program. A webpage networking system would enable people to facilitate car pool arrangements, and again should be advertised with a link on the Dalhousie internet home page. As a progressive institution of learning

Dalhousie has a responsibility to set an example for Halifax to follow. A program to bring together commuters could be extended beyond the University population resulting in a city wide carpooling community. "Rideshare" is a Dalhousie contrived term and not necessarily known by the general public, therefore, the name of the program should either be changed or used in conjunction with the word "carpool" to ensure people using the search engine find the program easily.

Incentives

The Rideshare incentive is too low and needs adjustment. A reserved parking space with a rideshare pass requires four people to participate and costs \$505.69. The portion each rideshare participant pays is \$126.45 resulting in a savings of only \$20-35 from the price of a regular pass. A reserved parking pass also costs \$505.69 for an open air parking spot; the price is not actually reduced, but simply spread out between four people who are all given their own pass for convenience sake. However, considering the amount of effort needed to co-ordinate four people who live in the same region and have similar schedules, the reserved spot, extra passes, and the minor savings may be too low an incentive for people to car pool. With regards to the extra effort needed to facilitate carpooling, the amount of people needed to buy a Rideshare pass should be reduced to 2 or 3 people. The passes could then be priced on a sliding scale with the best rates going to the vehicles with the most passengers.

Pricing

The price for the general parking passes on Dalhousie campuses is below the average for similar institutions both locally and nationally. Fees for parking are not

adequate to cover general maintenance of the lots including snow removal and staffing. Dalhousie is subsidizing an unsustainable practice benefiting a minority of campus community members at the cost of the entire school. We recommend raising the price of parking to match that of other Universities in Halifax. Our data suggest that by raising the average parking price to just \$200 per year enough drivers will begin changing their commuting habits to remove most of the stress from the parking system at Dalhousie. We also recommend that Dalhousie adopt an application process similar to Kings College and increase restrictions on who can buy a pass. The criteria for identifying individuals who are granted passes should be based on the following:

- I. Distance from school
- II. Metro Transit service to area of residence
- III. Whether or not the individual carpools
- IV. Special circumstances (i.e. disability, non-traditional working hours etc.)

Research

Proportionately, staff and faculty are driving more than students. We recommend extending the U-pass system to staff and faculty. Offering the pass will give them a cost effective, built in alternative to driving. We also recommend more research be done to investigate the reasons behind the higher rates of driving by staff and faculty. Finding out the factors that influence decisions to drive can help Dalhousie make effective policy to encourage other modes of transport. With faculty and staff

incorporated into the U-Pass system the university would have increased leverage in lobbying the HRM and metro transit to provide better transit service to universities.

In addition, we recommend doing research in conjunction with the Halifax Regional Municipality and other institutions to study the public transportation system. The purpose would be to ascertain if the transit system is being carried out in the most efficient manner, maximizing frequency of busses while still covering a broad range of destinations. More money will not be allotted to transit if the ridership does not warrant it, and people will not ride the bus if it takes too much of their day to do so.

Dalhousie University would better serve all of its members by reallocating its land from parking spots to higher value uses such as additional buildings and green space. All concerned parties must work together because this is ultimately not an issue that affects only Dalhousie University, but the entire Halifax Regional Municipality.

References

Brown University. (2007). General Policy (Parking). Accessed 2 February 2008 at [http://brown.edu/Administration/Finance_and_Admin/transportation/parkingbrochure.html]

Creative Research Systems . (2003). Sample Size Calculator . Accessed 5 April, 2008 at [<http://www.surveysystem.com/sscalc.htm>]

Dalhousie. (2007). Parking Regulations. Accessed 2 February 2008 at [http://fm.dal.ca/documents/pdf/parking_reg/ParkingRegs_Revised.pdf].

Dalhousie. (2007). About the U-Pass Program. Accessed 5 March 2008 at [<http://upass.dal.ca/about.php>].

Savelson, A., Colman, R., Martin, W. (2008). The GPI Transportation Accounts: Sustainable Transportation in Halifax Regional Municipality. Accessed 6 April 2008 at [<http://www.gpiatlantic.org/pdf/transportation/hrmtransportation.pdf>].

Johnson, K.L., Dworetzky, L.H., Heller, A.N. (1968). Carbon Monoxide and Air Pollution from Automobile Emissions in New York City. *Science* 5: 67 – 68.

King's College (2008). Parking Permits. Accessed 27 March 2008 at [http://www.ukings.ca/kings_3490.html].

McGill University (2008). Parking Services. Accessed 27 March 2008 at [<http://www.mcgill.ca/ancillary/parking/>].

MSVU. (2008). Parking on Campus. Accessed 27 March 2008 at [<http://www.msvu.ca/campus-information/parking.asp>].

Palys, T., & Atchison, C. (2008). Research Decisions: Quantitative and Qualitative Perspectives. Toronto: Thomson Nelson.

SMU. (2008). Facilities Management – Parking Guidelines. Accessed 2 February 2008 at [http://www.smu.ca/administration/facman/park_guide.html].

Sodero, Stephanie B. (2001). Current commuting habits and possible alternatives at Dalhousie University. Halifax: Dalhousie University.

Statistics Canada. (2006). Human activity and the environment: Transportation. Accessed 2 February 2008 at [http://www.statcan.ca/Daily/English/061109/d061109b.htm]

University of Ottawa (2008). Parking and Sustainable Transportation. Accessed 27 March 2008 at [http://www.protection.uottawa.ca/en/parking.html].

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Appendix A – Verbal Script

The following script was used to identify ourselves and briefly explain our research to survey participants:

Hi my name is _____ and I am doing a research project for my Environmental Problem solving Class on the driving habits of people at Dalhousie. Would you mind participating in a brief interview? It will take only two or three minutes of your time. If you like we can walk and talk at the same time.

This survey will be used to determine driving trends of people who park at Studley campus at Dalhousie. This is an anonymous survey, but the results from it will be entered into the public domain. Upon completion of the project (April 8/08) the report will be posted on the Dalhousie Environmental Programs website.

Appendix B – Survey

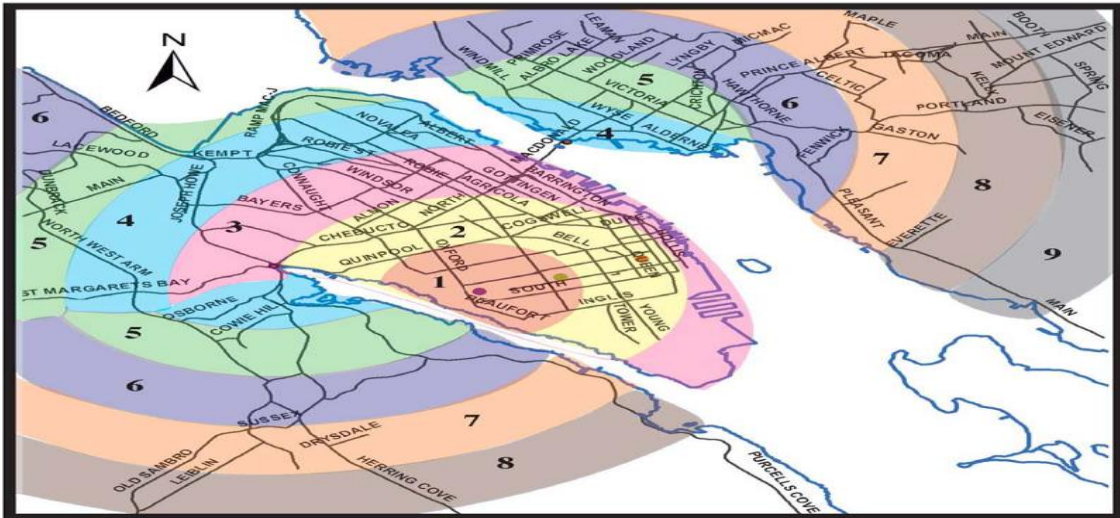
- 1) Please specify age
 - a) 21-25
 - b) 26-30
 - c) 31-40
 - d) 41-50
 - e) 51 +

- 2) Choose the category you best fit into
 - a) Student
 - b) Faculty
 - c) Staff

- 3) Please specify gender
 - a) Male
 - b) Female

- 4) How often do you drive to campus?
 - a) Never
 - b) 1-2 times a week
 - c) 3-4 times a week
 - d) 4-6 times a week
 - e) 7+ time a week

5) Please indicate the zone in which you live by looking at our map (1 – 9, or 10 if outside indicated zones).



- 6) Did you carpool today? If so with how many people
- a) 1
 - b) 2
 - c) 3
 - d) 4
 - e) 5

For those who do not carpool:

- 7) Reserved parking is currently offered at a lower rate for those who carpool with 4 + passengers. If this service were offered for carpools with 2 or 3 passengers, would you take advantage of it?
- a) Yes
 - b) No
- 8) Please tell us the factor that is most important in influencing your decision to drive to campus:

- 9) The current cost of parking at Dalhousie \$161.41/a for faculty and staff and \$145.47/a for students. If parking prices were to be theoretically increased, at what price would you deem them too expensive (i.e. at which point would you stop driving/purchasing parking passes)
- a) \$200/a
 - b) \$250/a
 - c) \$350/a
 - d) \$400/a
 - e) \$450/a
 - f) \$500/a
 - g) I will continue to drive, whatever the price.
- 10) If parking on campus was too expensive what would you do?
- a) Pay it anyway
 - b) Bike
 - c) Walk
 - d) Carpool
 - e) Take public transit
 - f) Park elsewhere/park illegally
 - g) Move
 - h) Change jobs/schools
 - i) Other, please specify
- 11) How often are you unable to find a parking spot on campus?
- a) Never
 - b) Less than 20 % of the time
 - c) Between 20 – 40% of the time
 - d) Between 40 – 60% of the time
 - e) Between 60 – 80 % of the time
 - f) Between 80 – 100% of the time
- 12) Do you ever come to campus early to increase your chances of finding a spot?
- a) Yes
 - b) No
- 13) What type of vehicle do you drive
- a) Car
 - b) Truck
 - c) Van
 - d) Motorcycle
 - e) Scooter
 - f) Other (please specify)