

DALHOUSIE BIKE SHARE PROGRAM:
Exploring the potential for a bike share program
at Dalhousie University

ENVS 3502.03 FINAL REPORT
April 13th 2009

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Abstract

The Greening the Campus Movement at Canadian universities aims to improve sustainability on university campuses while projecting an image of responsible environmental leadership. A bike share program at Dalhousie University would help promote sustainable transportation on campus by making bicycles more accessible to students, staff and faculty. Our research included a survey to assess student support, interviews to determine administrative and community support and an examination of other university bike share programs to determine the best approach for a bike share program at Dalhousie. The survey showed that 63% of Dalhousie students were interested in a bike share program; 43% of students would use a bike share program for free or for a small fee and 20% would only use the program if it were free. The interviews revealed that there is a positive, supportive environment in which to develop and sustain a program at Dalhousie University. Successful aspects of Canadian bike share programs examined provided functional ideas for a potential Dalhousie bike share model. It was concluded that there was strong potential for a bike share program at Dalhousie University, and that such a program should be implemented.

Acknowledgements

We would like to thank Dr. Tarah Wright and John Choptiany for their direction and support throughout this project. We would also like to thank Danny Albert, Marlene Day, Jessica Dawe, Shawn Fraser, Laena Garrison, Anne Gilhen, Wayne Groszko, Hanita Koblents, Sandy MacDonald and UBC's Alma Mater Bike Co-Op for graciously donating their time and valuable knowledge through interviews and e-mail correspondence, and Spencer Fowlie for getting us started. Finally, we would like to thank all the students who filled out a questionnaire for us.

Table of Contents

1.0 Introduction.....	4
1.1 Background Information.....	4
1.2 Research Problem and Rationale.....	6
1.3 Research Objectives.....	9
2.0 Research Methods.....	9
2.1 Document Analysis	9
2.2 Survey Using Self-Administered Questionnaire.....	10
2.3 Interviews.....	14
2.4 Limitations and Delimitations.....	16
3.0 Results.....	18
3.1 Survey.....	18
3.2 Document Analysis for Canadian University Bike Share Programs.....	25
3.2.1 Memorial University of Newfoundland.....	25
3.2.2 University of British Columbia.....	27
3.2.3 University of Ottawa.....	28
3.2.4 University of Waterloo.....	29
4.0 Discussion.....	31
4.1 Survey.....	31
4.2 Interviews.....	36
4.2.1 Dalhousie Administration Interviews.....	36
4.2.2 Community Interviews.....	37
4.3 Proposed Dalhousie Bike Share Program Model.....	39
5.0 Conclusions	
5.1 Concluding Remarks.....	43
5.2 The Next Steps for a Dalhousie Bike Share Program.....	43
5.3 Recommendations for Further Research.....	44
6.0 Works Cited.....	45
7.0 Appendices.....	47
Appendix A.....	47
Appendix B.....	48
Appendix C.....	48
Appendix D.....	48
Appendix E.....	48
Appendix F.....	48
Appendix G.....	49

1.0 Introduction

1.1 Background Information

As environmental threats like anthropogenic climate change become an increasingly pressing global issue, Canadians must begin looking for ways to reduce our impact on the planet and become more sustainable. This shift has already begun locally at Dalhousie University in Halifax, Nova Scotia. In the past few years Dalhousie has been undergoing many changes to bring sustainability to the university's community. This includes the recently established Office of Sustainability, the student-run SustainDal society and the new College of Sustainability that is scheduled to begin classes in the fall of 2009. Sustainability is a very large and complex concept that can be applied to many, if not all areas of society. One of the aspects of sustainability that is getting a lot of attention at Dalhousie, and has been the focus of this research project is sustainable transportation.

What is sustainable transportation? The University of Winnipeg's Centre for Sustainable Transportation gives this definition for a sustainable transport system:

- Allows the basic access needs of individuals and societies to be met safely, in a manner consistent with human and ecosystem health, and with equity within and between generations.
- Is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy.
- Limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the

use of land and the production of noise. (Centre for Sustainable Transportation, 2006)

One of the main goals of a sustainable transportation system is to reduce dependence on automobiles due to their heavy impact on the environment. According to the Government of Canada, greenhouse gas emissions from transportation rose 36% between 1990 and 2004, and by 2004 moving people and goods via roads accounted for 19% of total Canadian emissions (Environment and Resources, 2006). Automobiles also create air and noise pollution at a local level. In light of these facts, Environment Canada's Clean Air Online website states, "One of the greatest contributions you can make to improving air quality is to increase your use of alternative forms of transport". Furthermore, there will come a time in the near future when petroleum production will peak and gas prices will no longer be affordable for most of the population (Energy Bulletin, 2008). This makes finding alternatives to fossil-fueled transportation even more urgent.

Dalhousie is beginning to take big steps towards fostering sustainable transportation on campus. Dalhousie's Office of Sustainability recently received a \$15,000 federal grant to research sustainable transportation programs at other universities and conduct a survey of Dalhousie members' transportation habits; in order to compile a planning project for increasing Dalhousie's use of sustainable transportation (Somers, 2009). One of the alternative technologies highly applicable to a university like Dalhousie, and is getting a lot of attention from the global sustainable transportation movement, is the bicycle.

1.2 Research Problem and Rationale

An effective way of making bicycles more available to people is a bike share program. In European cities like Paris and Barcelona, bike share programs have been extremely successful in increasing or maintaining urban bicycle usage. These programs consist of automated bicycle kiosks dispersed around the city. Citizens and tourists alike can take a bike; use it to get around and then return it to a kiosk when they are finished with it (Forum for Urban Design, 2009). This gives people the option to use a bicycle without the hassle of ownership, which can involve issues of cost, storage and maintenance. Although bike share programs are not yet as popular in Canadian cities, some Canadian universities have already caught on to the European example. Universities from British Columbia to Newfoundland have already implemented their own bike share programs, making bicycles easily available to their university community of students, faculty and staff.

There is currently no bike share program available to students, faculty or staff at Dalhousie University. A Dalhousie-based bike share program would help the university increase sustainable transportation on campus by promoting bicycling as a method of transportation. But why should bicycling be promoted at Dalhousie University? What are the benefits to bicycling?

From a sustainability perspective, bicycles are ideal modes of transport. They do not require petroleum, cost less than vehicles, are less dangerous and more compact than automobiles, and promote a healthy lifestyle (Shore, 2006; Bloomberg & Aggarwala, 2008).

There are numerous health related, economic, environmental and community benefits associated with an increase in citizens choosing to bicycle as a regular means of transportation. Biking to work or school is an effective way for people to incorporate physical activity into their daily

routines. According to the Journal of Physical Activity and Health, countries with the highest levels of cycling and walking generally have the lowest obesity rates (Bassett, Jr. et al., 2008). Economically, someone who chooses to use a bike instead of a motor vehicle will have more disposable income because they are not spending money on fuel. As fuel costs continue to fluctuate unpredictably and the state of the economy remains uncertain, this could benefit many people. Environmentally, bikes are a clean means of transportation. They do not pollute the air or contribute to the greenhouse gas effect. Bikes also require less space than vehicles, and would decrease traffic congestion and the need for large parking lots on campus.

The 2002 Halifax Regional Municipality bike plan contained statistics relating to commuting behavior on the Halifax peninsula, citing that most people choose to drive (37%) or walk (32%) to work, while fewer use public transit (13.5%) and fewer still cycle (3%) (HRM, 2002). This shows that there is a large population of drivers who may find the switch to bicycling feasible and beneficial. Bikes are inherently well suited to compact areas with high concentration of younger people, therefore Halifax and the Dalhousie campus are ideal.

Bicycles are not always available to everyone. Quality bicycles can be expensive, which may deter the purchase of a personal bike. Even a used bike must be refurbished and maintained, which can be costly if professional help is required. According to a *Dal News* article “Where’d everybody come from?” Dalhousie’s enrollment growth comes primarily from new undergraduate students, and there is a continuing trend toward a yearly increase in the proportion of new enrollments from out of province (dalnews.dal.ca, 2008). Students who come from outside the region may not be able to bring their own bikes from home, or do not want to purchase a new bike for the time they are at school. It can be impractical and/or expensive for many students, especially those students who do not live permanently in Halifax, to own a bike

while in university. Some people have never been exposed to bikes, and therefore lack the skills necessary to ride one. Others may simply not want to ride a bike because the people they know do not ride bikes; it is not yet a social norm. Borrowing a bike temporarily from a bike share program is an effective way of directly overcoming some of these problems and indirectly influencing others.

A bike share program would offer university community members a convenient and affordable way to use of a bike. Whether the sharing program was free or for a fee, using a bike-share rather than buying and maintaining a personal bike has the potential to be cost effective and more convenient for the cyclist. Furthermore, bikes conveniently located across the three Dalhousie campuses as part of a sharing program could make travel between campuses much easier for students and faculty. Finally, by exposing students to the advantages of bicycling as a commuting option at this stage in their life, they may be more likely to use bicycles for transportation as they continue into their careers. For all the reasons described above, a bike share program would be a valuable addition to the Dalhousie community. [According to](#) Rochelle Owen, the Director of Sustainability at Dalhousie University, ~~we know that~~ bicycles are “on the radar” within ~~that department~~[her department](#), and ~~that~~ this research project would [assist her work in continued bicycle promotion](#)~~be beneficial to their goals~~.

1.3 Research Objectives

The purpose of this project is to ~~try to answer the research question: “What is the~~ explore Dalhousie University’s potential to implement a bike share program.

~~We have isolated t~~The following ~~research~~ objectives guided the research ~~in order to answer the research question:~~

- 1) Describe existing bike share programs at Canadian universities, identify key components and assess elements applicable to a future Dalhousie Bike Share Program.
- 2) ~~De~~ Explore administrative and community support for a future program.
- 3) ~~Gau~~ge student support for a future program (i.e. gauge potential usership).

2.0 Research Methods

2.1 Document Analysis

Becoming familiar with Canadian university bike share programs was necessary in order to gain expertise with the topic. University bike shares can be very different from city bike shares, because of the differences in environment and users. Documents pertaining to bike share programs at four Canadian Universities were reviewed. *An a posteriori* analysis approach was used in order to examine the key elements and emerging themes of various bike share programs. Documents included web pages, web sites, and written reports, and in some cases documents were complimented by additional e-mail correspondence with the authors. This is an example of exploratory research, because it is intended to provide a basis for further research (Palys and Atchison, 2008: 40).

The four university programs analyzed in this study were from Memorial University of Newfoundland (St. John's, NFLD), University of Ottawa (Ottawa, ON), University of Waterloo (Kitchener, ON), and University of British Columbia (Vancouver, BC). These universities were chosen because of recommendations made by individuals engaged in sustainable transportation and/or sustainable campuses through their studies or work.

Results are organized in the same format for each of the four programs. First a brief description of each program is given with reference to: operating procedures, cost for usership, etc. Second, key elements of each program are presented in a separate SWOT analysis Table. A SWOT analysis is a method for evaluating a project's strengths and weaknesses ("SW...") and the opportunities and threats ("...OT") of the environment wherein the program exists by organizing those elements in a comprehensive table format (Clare et al., 2008: 6). Classifying the key elements in this way makes it easy to identify the elements that could be beneficial or detrimental to a Dalhousie bike share program.

The validity of the results from all four programs is supported by the recommendation of the program made by informed contacts. The validity of the University of Ottawa and University of British Columbia documents is further supported by correspondence with the authors of the web page and website, who confirmed the existence of the programs and provided further information not offered in the document.

2.2 Survey Using Self-Administered Questionnaire

To assess usership support, a survey of Dalhousie students was done using a self-administered questionnaire. Questionnaires are very useful for generating a large amount of data relatively quickly and cheaply (Palys and Atchison, 2008: 155). This worked well within the time and financial constraints of the study. The advantage of the self-administered questionnaire

was that there was a near 100% response rate, and the researcher was present to answer questions and clarify ambiguities (Palys and Atchison, 2008: 156).

The population of interest was Dalhousie students. Faculty and staff were not included in the survey because the large number of students at Dalhousie alone represents a large number of potential users. The assumption was made that students would be more likely to use a bike share program than faculty and staff because ~~students are less we assume that primarily students would use it. This is because students are the least~~ likely to be able to afford their own bicycle or car, and ~~and~~ students living near or on campus could easily benefit by having a faster method of transportation than walking. The sampling element is each individual student who filled out a questionnaire. The Dalhousie student population has homogeneity in the sense that all sampling elements are Dalhousie University students, but it also has heterogeneity in that the sampling elements come from a variety of genders, fields of study, degree programs, transportation preferences, etc. Student support was operationalized into two “Yes or No” questions on the questionnaire that asked if the student would be willing to use a bike share program if it was free and if it cost a fee to use. In order to gain some demographics for student support, the questionnaire also asked students to specify their gender, what Dal campuses they use, and how far from campus they live. Students who said they would not use a free program were asked to specify ‘why not’ from a list of options that was provided (See Appendix A for questionnaire).

A representative sample was desired because the proposed bike share program would be available to all Dalhousie students. To achieve a representative sample, a probabilistic simple random sampling method was used and a high sample size was attained. The simple random model minimizes sampling error, or the deviation of the sample from the characteristics of the population (Palys and Atchison, 2008: 113). On December 8, 2008, Dalhousie University had a

student population size of 15,367 students (personal communication, March 6 2009). To have a 95% confidence level with a results confidence interval of $\pm 3.5\%$ for a population that size, a sample size of 746 is required (“Sample Size Calculator”). The total number of surveys collected is 800. Therefore, the results have at least that degree of significance.

Two more criteria must be met to satisfy the simple random sampling method: 1) every sampling element must have an equal probability of being chosen and 2) only chance must govern the selection of a sampling element (Palys and Atchison, 2008: 113). In order to assure that each sampling element had equal opportunity of being surveyed, particularly with respect to degree program, sampling was done at many different locations across Dalhousie University (see Table 1). Samples were taken from all three campuses: Studley, Sexton and Carleton. More questionnaires were filled out at Studley than at Carleton or Sexton in an attempt to reflect the uneven number of students who use each campus. The exact difference in student size between the three campuses was unknown. Studley, being the central and largest campus, likely services the largest number of students. Sexton and Carleton, which are smaller, satellite campuses, likely service fewer students. At each campus, a large variety of locations were sampled. Some of these locations are very general with respect to the program of study (e.g. Killam Library), while others are more specific (e.g. Dentistry Lounge). To avoid bias, more surveys were done at general locations than at ‘biased’ locations, and a large number of biased locations were sampled from. Table 1 gives a list of all sampling locations.

Table 1: Locations at Dalhousie University sampled for student survey.

Campus	Building on Campus (locations within building) in order of heaviest to lightest surveying	# of surveys collected
Studley	Killam Library (Atrium, Study Floors 1 and 2, Computer Learning Commons, Back Door); Student Union Building (Food Court); Life Sciences Building (Floors 1,3,8; Food Court); Chase Building (Learning Centre), Arts Centre (Music Students' Lounge); McCain Faculty of Arts and Social Sciences Building (Main Lobby); Rowe Management Building (Main Lobby, Atrium); Computer Science Building (Main Lobby, Food Court); Henry Hicks Building (Floors 0,1,2) Risley Residence Building (Main Lobby); Chemistry Building (Help Centre), Weldon Law Building (Dunn Library); Class SOSA 2100Y; Class MUSC 2019; DalPlex (Main Entrance), Quad	468
Sexton	Medjuck Building (Main Entrance Lounge, Library); Sexton Library; MacDonald Building (1 st Floor near main elevator); Sexton Gym; Engineering Lab; Buildings D,J,I,L (Hallways)	180
Carleton	Tupper Building (Student Lounge); Carleton Courtyard; Dentistry Building (Student Lounge, Coffee Shop)	152

Assuring that chance governed the selection of a sampling element was difficult, because the University could not provide a sampling frame. To satisfy that this criterion was met to the best of abilities, however, a haphazard sampling method was also used. Once a location was chosen, researchers would go to the location and ask as many people at that location as possible if they would fill out a questionnaire. Students would be asked to fill out a survey as long as i) they were not talking on a cellphone or ii) they were not engaged in an intense conversation with someone else (samplers would decide the appropriateness of interruption). In this sense, chance dictated who would be in the space and who would be able to fill out a questionnaire.

Although a brief pilot study was conducted, there were ambiguities in some questions that may have influenced results. They are as follows:

- i) Question 6 does not give a detailed description of the bike share program. This is because it is as of yet unsure what that program might be.
- ii) Questions 6,7 and 8 did not flow well. It was not clear whether or not question 8 was in response to question 7 or question 6. It would have been better to say for question 8: “If no *in question 6*,...”
- iii) Question 7 did not specify whether or not the “small fee” was voluntary or involuntary (i.e. levied on student tuition)
- iv) Question 8 was not exhaustive. “Live too far”, “Live to close”, “Rather walk”, “Rather drive”, and “Don’t like biking” were mentioned often in the Comments/Concerns section of the survey, which indicates that these options should have been available to check off.

Another potential influence on the survey results was that the survey was done during winter months. Attitudes towards biking may be more negative during the winter than in summer or fall because of the cold weather and bad road conditions.

Catalytic validity, the notion that research has the ability to move those it studies to a greater understanding of the world in order for them to change it (Palys and Atchison, 2008: 44), has potential to occur at the survey stage of this research project. Students become aware of the bike share concept as the researchers go out into the community and ask them to fill out a questionnaire. These same students are the potential users of the program, and so their awareness of it is very important.

2.3 Interviews

Interviews were conducted with various members in administrative positions at Dalhousie University, and also with members of the community involved in sustainable transportation and bicycles through their work. The purpose of the interviews was to attain a better idea of support for a bike share program within the university and outside the university. Topics discussed included potential program models, issues of concern (e.g. maintenance), sources for materials and sources of funding. Interviewees were contacted first by e-mail, in order to make an introduction and request an interview. Interviews were conducted face-to-face

or by telephone whenever possible, in order to facilitate a discussion between the interviewer and the interviewee. Table 2 contains a list of persons interviewed.

Table 2: Persons who were formally interviewed for the study.

Interviewee	Interview Method	Date	Appendix for Questions
Rochelle Owen, <i>Director of Sustainability Office, Dalhousie University</i>	Face-to-Face	January 28, 2009	B
Hanita Koblents, <i>Transportation Demand Management Coordinator, Halifax Regional Municipality</i>	Telephone	February 24, 2009	B
Marlene Day, <i>Risk Management Coordinator, Dalhousie Financial Services</i>	Telephone	March 10, 2009	E
Shawn Fraser, Sr. <i>Manager of Programs, Dalhousie University</i>	Face-to-Face	March 16, 2009	B
G.A. Sandy MacDonald, <i>Director of Security, Dalhousie University</i>	Telephone	March 18, 2009	B
Anne Gilhen, <i>Head of Supply for Halifax Metro and Halifax Police Department</i>	Telephone, E-mail	March 18, 2009	C
Dr. Wayne Groszko, <i>2008/09 Sessional Instructor, Environmental Science Department, Dalhousie University</i>	Face-to-Face (not contacted by e-mail)	March 26, 2009	B
Laena Garrison, <i>TRAX Coordinator, Ecology Action Centre</i>	Telephone (not contacted by e-mail)	April 1, 2009	D

2.4 Limitations and Delimitations

As with many research projects this study was limited by the availability of time and resources. Time was limited in the sense that ~~The time constraint was set because there were only 10 weeks available to complete the research~~ and analysis ~~the research had to be completed within the winter semester,~~ and ~~also because~~ the researchers were all full-time students with other course loads to attend to.

The first "resource" ~~that was~~ required was ~~the~~ knowledge of experts, which was to be obtained through interviews. Many potential interviewees did respond to attempts to contact them, however a few key figures did not ~~do so~~:

- Courtney Larkin, ~~President of the Dalhousie Student Union (Former President as of May 1st, 2009).~~
- Thomas Traves, ~~President of Dalhousie University~~
- Jeff Lamb, ~~Assistant President of Facilities Management at Dalhousie~~
- Ben Finklemen, ~~University of Waterloo grad student who was part of the bike share proposal that won the TD Go Green Challenge.~~
- MUNbikeshare@gmail.com, ~~Member of Project Green at Memorial University.~~
*Someone named Sarah did respond asking if anyone had answered the questions but then never followed up.

The second desired resource, ~~which proved to be unattainable,~~ which was ultimately unattainable, was a list of how many students use each ~~of the three~~ campuses at Dalhousie. This ~~list was desired so that a would have enabled~~ probabilistic stratified random sampling ~~method could be used for the student survey. The entire Dalhousie student population would have been divided into three strata, one for each campus, and a more accurate comparison of the three campuses in terms of student support would have been procured.~~ ~~because three strata exist (three campuses).~~

~~—This type of sampling would have allowed a more accurate comparison of the three campuses in terms of student support on each.~~ ~~A~~ Instead simple random sampling ~~method~~ was

used ~~instead, which meant~~with -Dalhousie ~~as a whole was~~ being sampled as a whole.

Respondents were asked which campus they used on the questionnaire, and sampling at each campus was done unevenly to reflect the differences in size of each campus. ~~Then questions regarding which campus each respondent used were asked to gather the per campus information~~

—Another inaccessible resource was information regarding costs of insurance or liability for such a program at Dalhousie. Marlene Daye, ~~is~~ Dalhousie's Risk Management Coordinator, was contacted for information but she explained that until an actual program was in place it was ~~next to~~ impossible for her to quote a price for insurance of liability costs of the program. The only number she could ~~provide~~give was that if there were 50 bikes worth \$200 each the University's Miscellaneous Insurance Policy would probably cover them and it would cost \$100 per year and may or may not be absorbed by the university. However, this was not nearly reliable enough to justify including it in a cost analysis for a proposed program.

—These limitations restricted the group's ability to establish whether certain key levels of support were available (DSU/President's Office), reduced the feasibility of doing potential validity of a cost analysis for a proposed program and limited which sampling methods could be used.

Delimitations establish the limits or boundaries of the study and are imposed by the researchers. Originally it was the aim of this research to simply design a model and outline possible locations for it. However, after speaking with Rochelle Owen, Dalhousie's Sustainability Director, and project supervisor Dr. Tarah Wright, ~~this was revised~~this was reduced so that the final product would be more useful to future implementation. The second approach was a feasibility study in terms of a cost analysis, student survey and document analysis. After spending several weeks researching costs it became increasingly obvious that

because an exact model (e.g. specific number of bikes, location, staffing, etc) could not be determined without first obtaining funding and permission to proceed, it was not valuable to spend the limited time available on a cost analysis. At this point ~~what information had already been gathered was assessed and~~ the research question was re-scoped for a third time. The final study ~~was examining~~ examines the potential for a bike share program at Dalhousie. This was done in terms of: what elements from other Canadian university bike shares could work here, whether students were interested in it and if there was sufficient support. It was beyond the experience level and expertise of the researchers at this time to provide a thorough cost analysis.

~~Another delimitation is that the bike share program is intended to be available to students, faculty and staff of Dalhousie but given the time limitation only students were surveyed.~~

3.0 Results

3.1 Survey Results

In total, 800 student questionnaires were completed for this study. This is a representative sample size with a confidence level of 95%. Results have a +/- 3.5% confidence interval.

Overall, of the 800 students 63% would use the program if it were free (Figure 1), 43% would use the program if a small fee (15\$ per term) was charged (Figure 1). 20% of the students would use it for free, but not if a fee was charged (Figure 1).

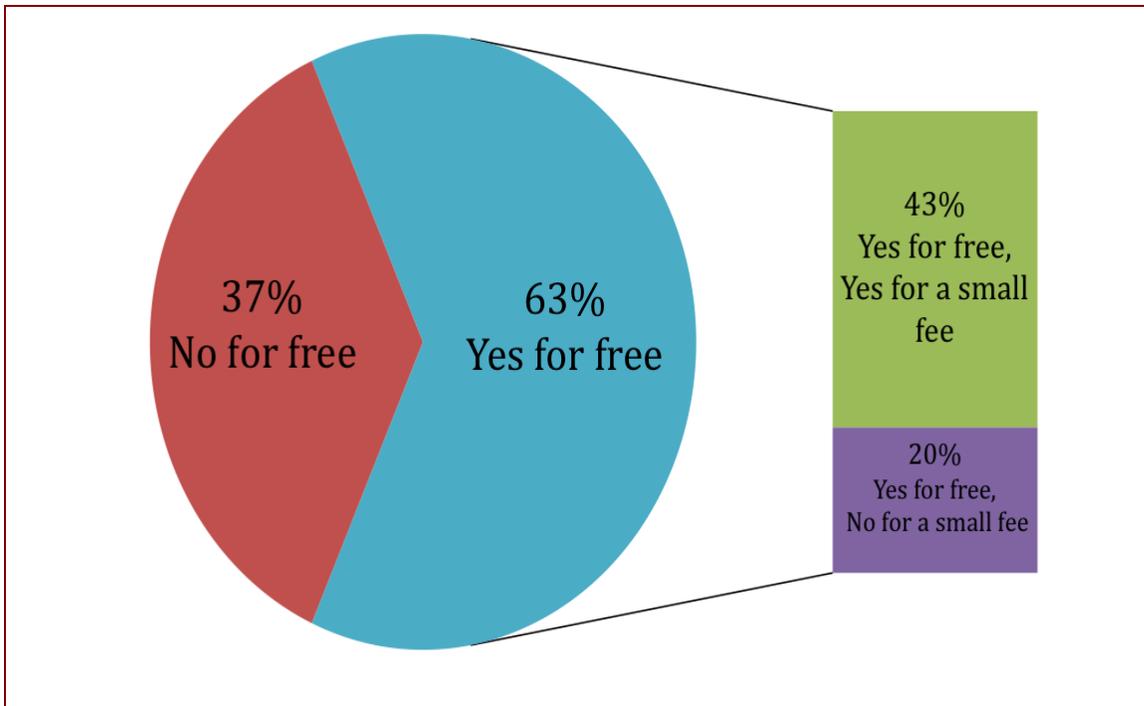


Figure 1: Percentage ($\pm 3.5\%$) of students willing to use bikes provided by Dalhousie for free or for a small fee.

Out of the total 800 surveys completed, 17 respondents indicated being the gender intersex, transgender or rather-not-say. The results of those 17 surveys are included in the figure above, however the small sample size prevented accurate inferences from being made regarding all intersex, transgender or rather-not-say individuals at Dalhousie.

59.98% ($\pm 3.5\%$ C.I) of male Dalhousie students would use a free program; this number drops to 48.04% ($\pm 3.5\%$ C.I) if a small fee was charged (Figure 2).

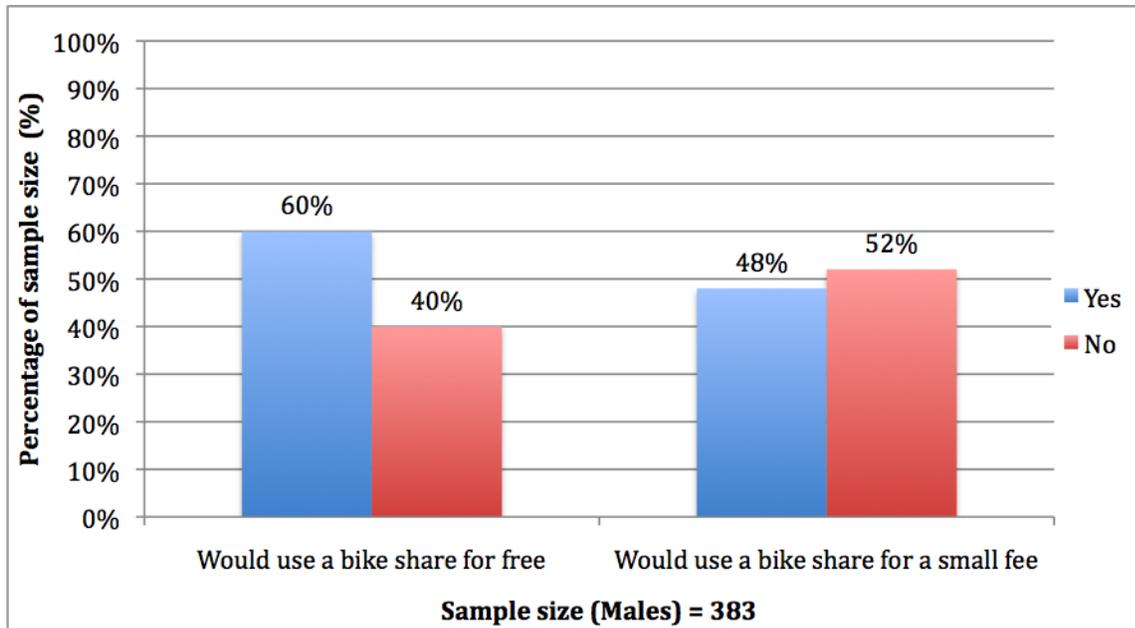


Figure 2: Percentage of male students who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

63.25% (+/- 3.5% C.I) of female Dalhousie students would use a free program; this number drops to 40.25% (+/- 3.5% C.I) if a small fee was charged (Figure 3).

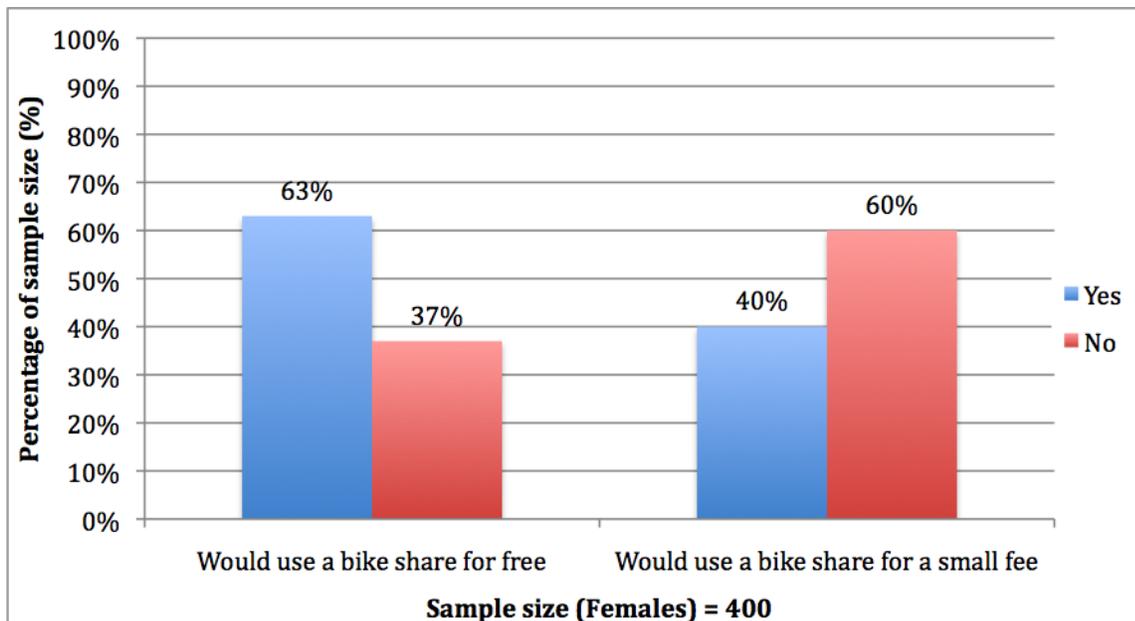


Figure 3: Percentage of female students who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

69.95% (+/- 3.5% C.I) of students who use multiple campuses at Dalhousie would use the free program, while only 46.80% (+/- 3.5% C.I) of the multiple campus students would be willing to pay a small fee to use the program (Figure 4).

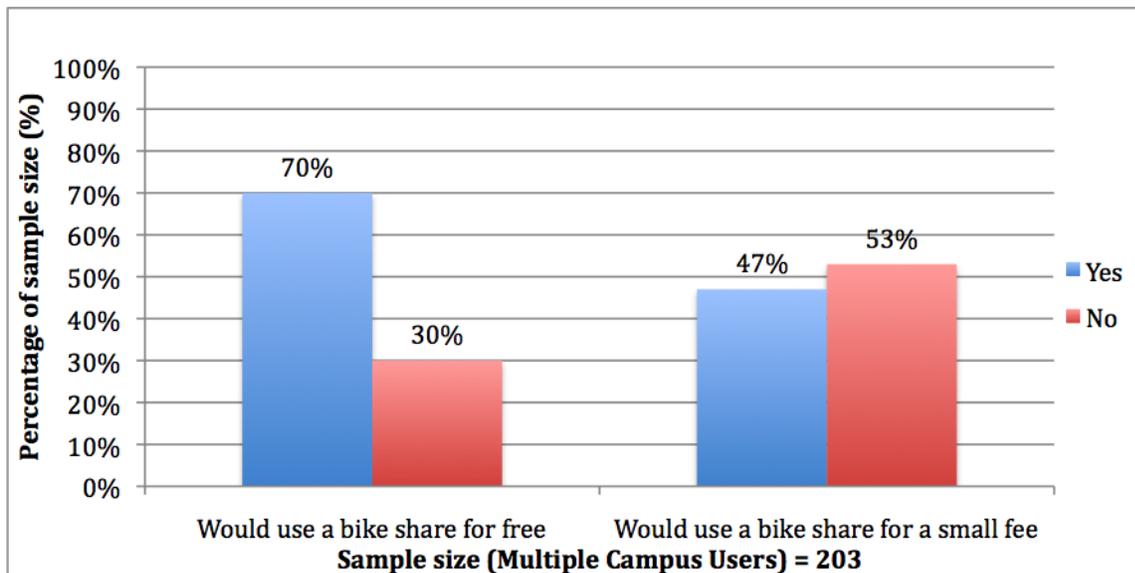


Figure 4: Percentage of multi-campus using students who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

64.32% (+/- 3.5% C.I) of students who consider the Studley Campus as their main campus would use a free bike share program, while only 41.88% (+/- 3.5% C.I) would pay a fee to use a bike share program (Figure 5).

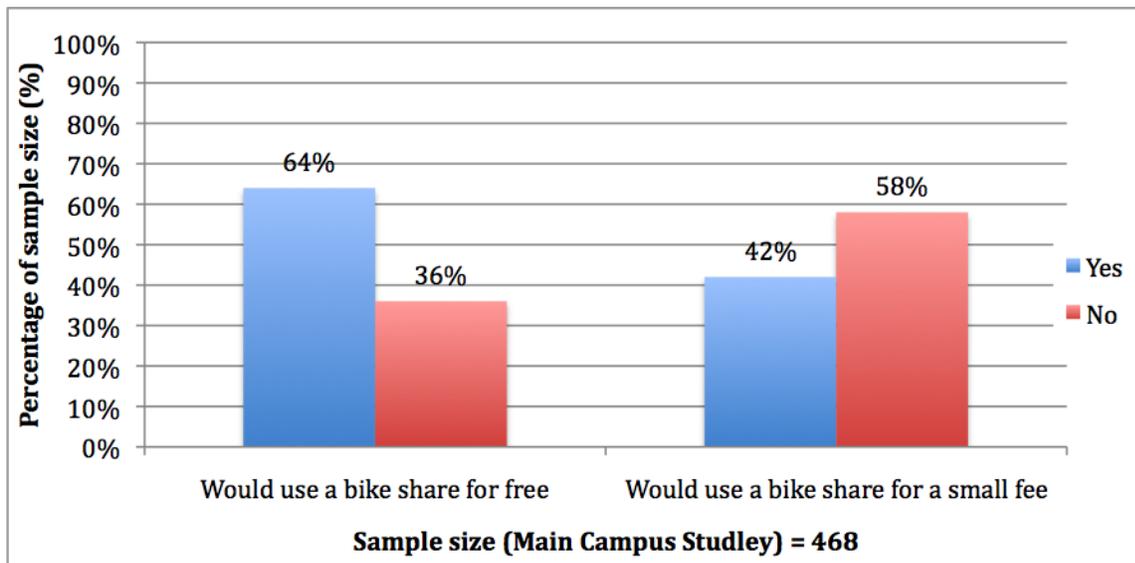


Figure 5: Percentage of students whose main campus is Studley Campus who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

54.60% (+/- 3.5% C.I) of students who consider the Carleton Campus as their main campus would use a free bike share program, while only 41.44% (+/- 3.5% C.I) would pay a fee to use a bike share program (Figure 6).

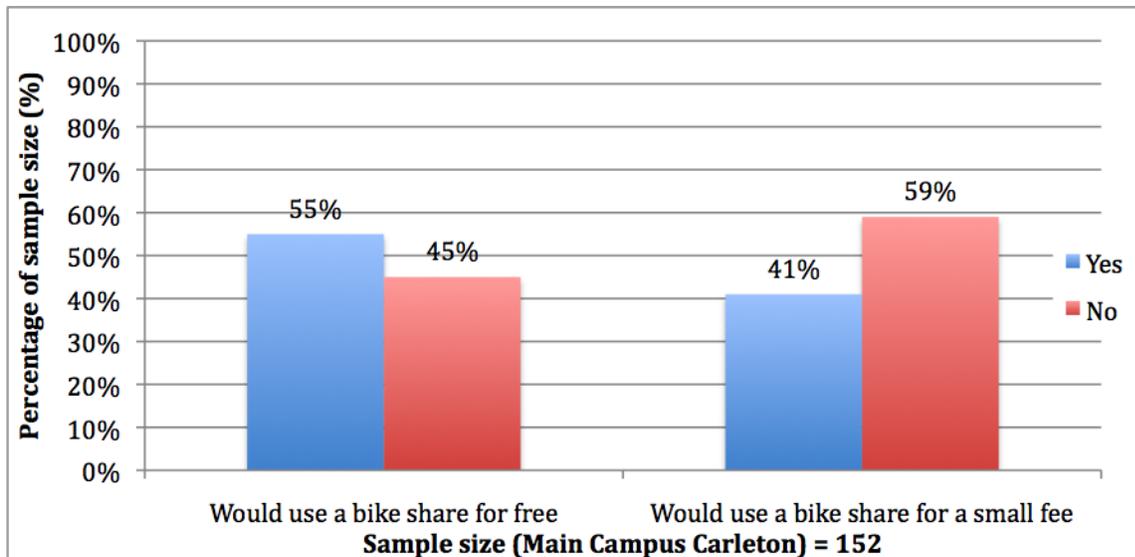


Figure 6: Percentage of students whose main campus is Carleton Campus who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

64.44% (+/- 3.5% C.I) of students who consider the Sexton Campus as their main campus would use a fee bike share program, while only 45.00% (+/- 3.5% C.I) would pay a fee to use a bike share program (Figure 7).

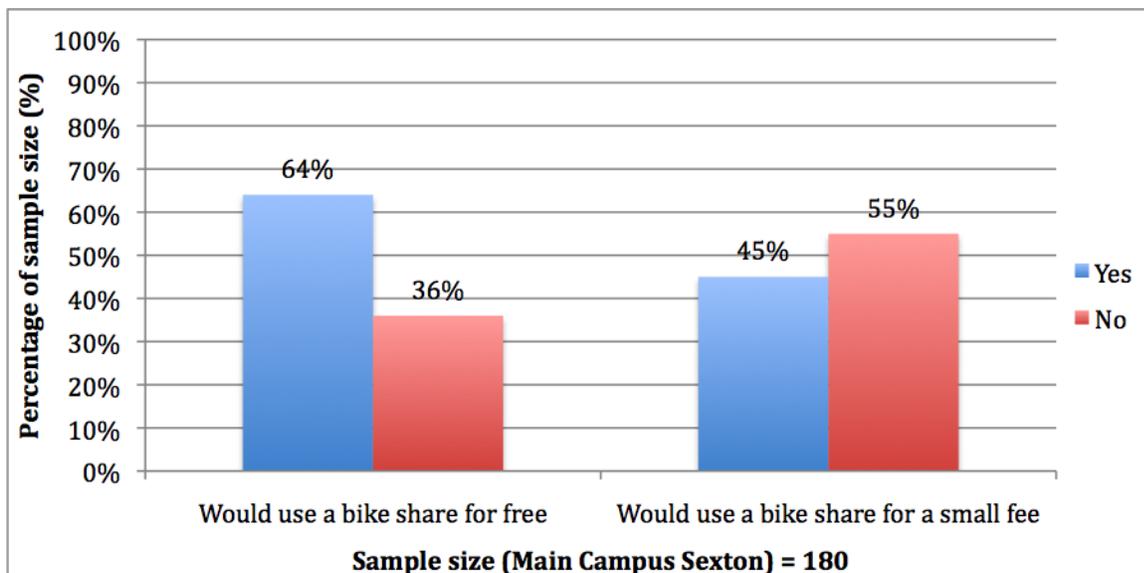


Figure 7: Percentage of students whose main campus is Sexton Campus who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

69.92% (+/- 3.5% C.I) of students who live in a Dalhousie student residence would use a free bike share program (Figure 8). 47.36% of residence students would pay a small fee to use a bike share program (Figure 8).

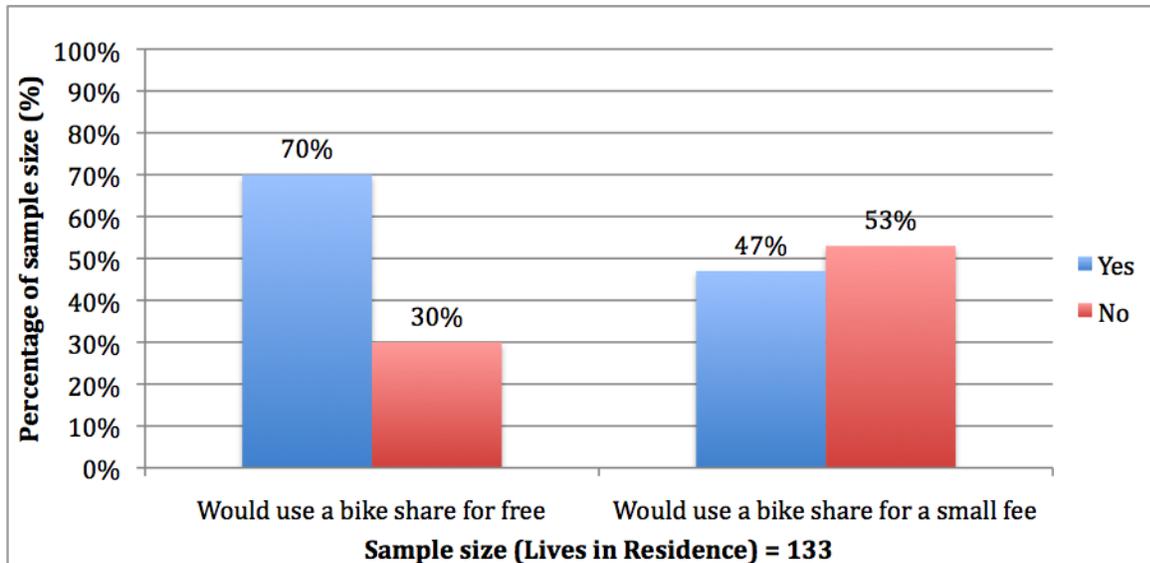


Figure 8: Percentage of students that live in a Dalhousie residence who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

62.22% (+/- 3.5% C.I) of students who live off of Dalhousie’s campus would use a free bike share program, while only 42.28% (+/- 3.5% C.I) would pay a small fee to use a bike share program (Figure 9).

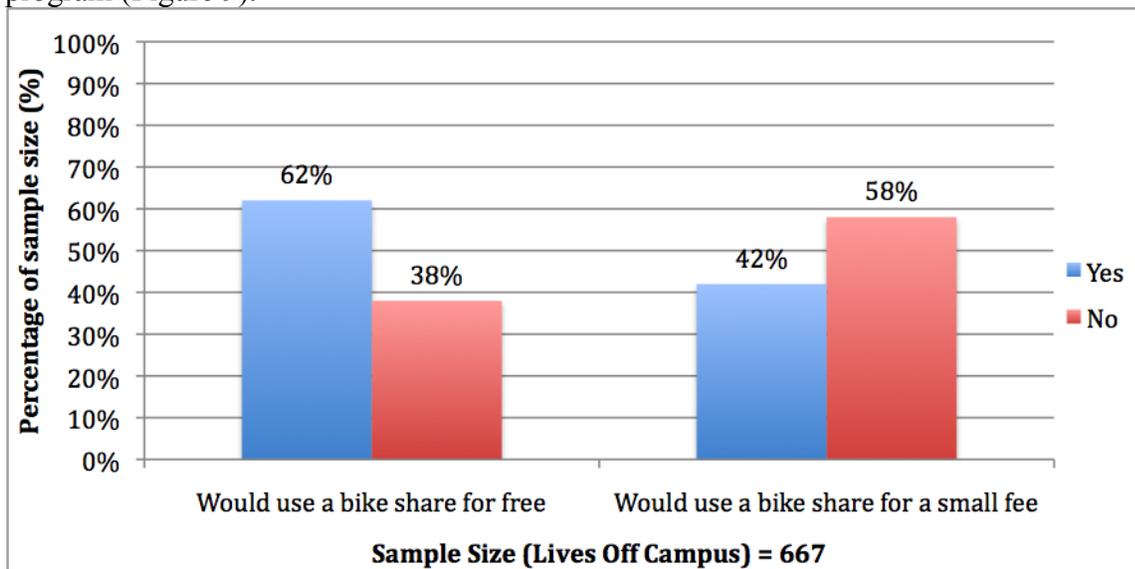


Figure 9: Percentage of students that live off campus who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

68.97% (+/- 3.5% C.I) of students who live 3.0 kilometres or less from their main campus would use a free bike share program, while 59.74% (+/- 3.5% C.I) would pay a small fee to use a bike share program (Figure 10).

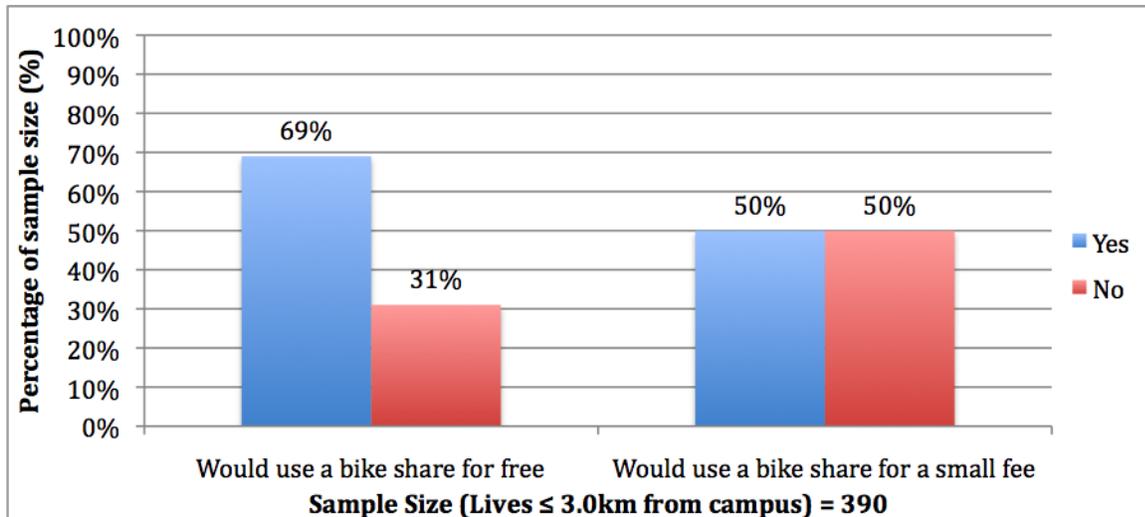


Figure 10: Percentage of students that live ≤ 3.0km from campus who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

48.01% (+/- 3.5% C.I) of students who live 3.1 kilometres or more from their main campus would use a free bike share program, while only 34.66% (+/- 3.5% C.I) would pay a small fee to use a bike share program (Figure 11).

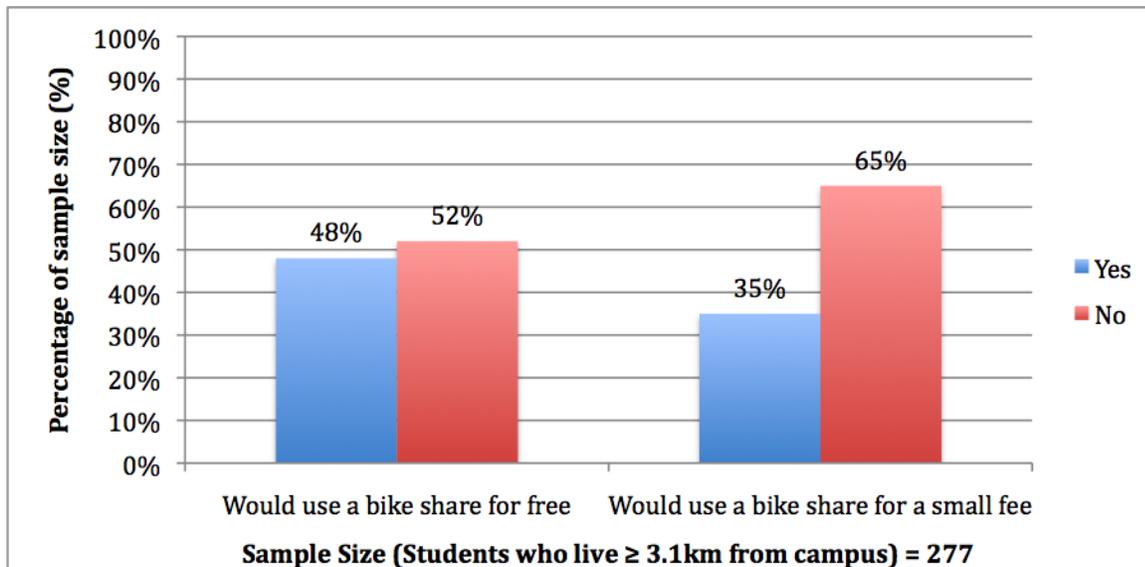


Figure 11: Percentage of students that live ≥ 3.1km from campus who would use a free bike share program and who would use a bike share program that cost a small fee (15\$ per term) at Dalhousie University, (+/- 3.5% C.I).

Table 3: Number of students surveyed and number of students who would use a free bike share program at Dalhousie University.

Group	Number Surveyed	Number who would use free bike share	Percentage that would use free bike share

		program	program
Males	383	229	59.98%
Females	400	253	63.25%
Multiple Campus Users	203	142	69.95%
Main Campus Studley	468	301	64.32%
Main Campus Carleton	152	83	54.60%
Main Campus Sexton	180	116	64.44%
Lives In Residence	133	93	69.92%
Lives off Campus	667	415	62.22%
Lives 3.0 km or less away from campus	390	269	68.97%
Lives 3.1 km or more away from campus	277	133	48.01%

Table 4: Number of students surveyed and number of students who would use a bike share program at Dalhousie University, for a small fee (\$15 per term).

Group	Number Surveyed	Number who would use bike share program for a small fee (\$15 per term)	Percentage that would use bike share program for a small fee (\$15 per term)
Males	383	184	48.04%
Females	400	161	40.25%
Multiple Campus Users	203	95	46.80%
Main Campus Studley	468	196	41.88%
Main Campus Carleton	152	63	41.44%
Main Campus Sexton	180	81	45.00%
Lives In Residence	133	63	47.36%
Lives off Campus	667	282	42.28%
Lives 3.0 km or less away from campus	390	194	49.74%
Lives 3.1 km or more away from campus	277	96	34.66%

The top reasons why students would not use a free bike share program at Dalhousie are concerns with Halifax's climate/weather, the student already owns a bike, and safety concerns (Table 5). Bike theft, inefficient facilities on campus, and helmet hair were not popular reasons (Table 5).

Table 5: Reasons why students would not use a free bike share program at Dalhousie University, (+/- 3.5% C.I).

Reason	Number of Students	Percentage of Total
Already have a bike	61	29.33%
Halifax Climate/Weather	68	32.69%
Safety Concerns	46	22.11%
Concerned about bike theft	4	1.92%
Inefficient facilities on campus (lack of bike racks, showers, etc.)	9	4.33%
Helmet Hair	20	9.61%

3.2 Document Analysis Results for Canadian University Bike Share Programs

3.2.1 Memorial University of Newfoundland – MUN Bike Share

The bike share program at Memorial University is available to students, faculty and staff. Users are required to sign up for a membership and either pay a fee of \$15 per term (\$5 is refunded when the bike is returned) or volunteer three hours with Project Green. Project Green is similar to Dalhousie’s SustainDal and therefore students can volunteer to help with any number of projects. A professional bicycle mechanic who volunteers their time performs maintenance of the bicycles. The Royale Newfoundland Constabulary donated twenty of the bicycles and citizens of St. John’s donated twenty-five more. Members borrow the bikes for a four-month period. This provides members with access to the bicycle everyday at anytime. This eliminates the need for drop off centres and most of the Bike Share is run by appointment or during scheduled office hours. Also, because the users keep the bicycles the whole term this increased their sense of ownership and may ensure better care is taken of the bicycles being borrowed (Dawe et al, 2008).

Table 7: SWOT for MUN Bike Share.

	HELPFUL To achieving objective	HARMFUL To achieving objective
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INTERNAL ORIGIN Attributes of the organization	<ul style="list-style-type: none"> -All of the bikes were second-hand and had been donated. -Grants were acquired for reducing capital and operating costs -Bikes are rented by appointment basis, reducing staffing costs and the number of volunteers required -Those unable to pay membership fee can volunteer to gain membership, which also makes the project more inclusive and accessible 	<ul style="list-style-type: none"> -As a new program, those who are running it have little prior experience, which makes long term planning difficult -Only 55 bikes are available on a first come first serve basis. -Bikes are rented for the entire term, meaning that only 55 students can benefit from the service per term -Bike maintenance is a constant cost for the program
EXTERNAL ORIGIN Attributes of the Environment	<ul style="list-style-type: none"> -Memorial community has been supportive of the project -St. John's has a large student population, and bikes are an affordable travel option for them -Program is partnered with the Atlantic chapter of the Sierra Youth Coalition -Downtown St. John's is within biking distance of the campus 	<ul style="list-style-type: none"> -Bike theft is a problem, and necessary precautions (e.g. locks) are always required -St. John's has cold weather with lots of precipitation for most of the year, which makes biking an unattractive travel option -Lack of bike lanes in city roads -St. John's has a lot of steep hills, which may be difficult for novice bikers to handle

3.2.2 University of British Columbia – Purple and Yellow Bikes Program

The University of British Columbia has a bike share program available to all students, faculty and staff. Membership is required in order to use the bike share program and users must volunteer three hours with the Co-Op. Membership is \$20 for students, \$30 for faculty and staff. This program is unique in that the bikes are not returned to any specific location. Members receive a key that will unlock any of the 50-100 public bikes spread randomly around campus. The procedure for using the bike share is to a) locate a bike, b) unlock it using the membership key, c) ride it to the destination and d) lock it up for the next user. This casual design provides the program with benefits and constraints. While program users are able to take the bikes anywhere on campus, there is no guarantee where bikes can be found. Also, members are not

accountable for the bicycles they use. Maintenance and theft are therefore been major constraints to this model. The program members meet once weekly and perform general maintenance and repairs to the bicycles. Through this weekly meeting there is opportunity for new members to learn how to properly maintain bicycles (AMS Bike Co-Op, 2008).

Table 8: SWOT for UBC’s Purple and Yellow Bike Share Program.

	HELPFUL To achieving objective	HARMFUL To achieving objective
INTERNAL ORIGIN Attributes of the organization	<ul style="list-style-type: none"> -Bikes donated by university departments (bikes abandoned on bike racks) and the local community -Extensive sponsorship (UBC Alma Mater Society, UBC Trek Program, UBC College of Agricultural Sciences BC Environment Youth Team, North Shore Bike Shop, Mountain Equipment Co-Op, VanCity Credit Union...) -Bikes (~55 Feb. 2009) distributed all over campus, and are available to any member (~200 members currently) who finds a bike and has a key to unlock it -Bike share users must donate min. 3 hours of volunteer help -Weekly “Work Parties” for volunteers to repair damaged bikes build new bikes from spare parts. - AMS Bike Co-Op offers many educational/recreational programs (bike safety courses, mechanic instruction, outreach programs...) 	<ul style="list-style-type: none"> - Because of bike theft, most program bikes eventually must be replaced. The maintenance centre is necessary to replace bikes at the rate they disappear. The maintenance centre is very efficient, however; the centre assembled/repaired 40 bikes between September and February, with 10-15 more almost finished by mid-March. -Program bikes are not allowed outside campus boundaries. They are intended strictly as on-campus transportation.
EXTERNAL ORIGIN Attributes of the Environment	<ul style="list-style-type: none"> -Vancouver is a bike friendly city (bike routes and lanes, many rental options, bike racks on mass transit vehicles like buses and trains...) -UBC has a vibrant biking community, and demand for the program is high -Vancouver’s relatively mild climate makes biking an attractive mode of transportation for most of the year 	<ul style="list-style-type: none"> -Bike theft is a significant issue; main causes are users not locking up bikes, other causes are users taking bikes for personal use and not returning them, and bikes being stolen and sold for profit.

3.2.3 University of Ottawa

All students, staff and faculty can use the bike share program at University of Ottawa. Membership for the program is essentially free, although a \$10 refundable membership deposit and completed registration form are required. The program has a total of 8 bikes, which are stationed at two locations on campus. Reservations are not required, although one of the two stations will accept reservations. Students can “borrow” the bike for 6 hours maximum; if they fail to return bike to the station on time twice, membership is lost. Locks are provided but helmets are not, so users must show that they have their own helmet before being allowed to borrow a bike (if users are under 18), in compliance to Ontario law. Members are responsible for lost, stolen or damaged bikes and can be charged up to \$150 for repair or replacement costs (University of Ottawa, 2009).

Table 9: SWOT for Univerity of Ottawa’s Bike Share Program.

	HELPFUL To achieving objective	HARMFUL To achieving objective
INTERNAL ORIGIN Attributes of the organization	<ul style="list-style-type: none"> -Free -Refundable membership fee -Available to all students -Accessible: open 7 days a week etc -Locks are provided -Daily inspections, weekly maintenance and repairs as needed are performed by abike mechanic 	<ul style="list-style-type: none"> - Program only has 8 bikes -Helmets are not provided -Bikes must be returned after 6 hours, and such time constraints limit flexible usage -Users are liable for the bikes which may discourage use
EXTERNAL ORIGIN Attributes of the Environment	<ul style="list-style-type: none"> - Helmet laws do not apply to persons over the age of 18 - Ottawa Biking Culture/Community is very strong (<i>Ottawa Bicycle Club</i>, est. 1882; <i>Re-Cycles Bike Co-Op</i>, <i>Ottawa Cycling Plan</i> for sustainable development) - Professional bike mechanic does all repairs/maintenance - Funding is supplied by the university 	<ul style="list-style-type: none"> -Climate/Weather makes cycling unattractive at times -Bad weather conditions also makes maintenance a constant necessity -No student bike-maintenance centre

3.2.4 University of Waterloo – Yellow Bike Program and VELO Bike Share Program

This bike share program is available to students, faculty and staff. Users must fill out a waiver and pay \$20 per term. Bikes can be used on and off campus, however they must be returned within 24 hours of being loaned. If bikes are returned late three times, bike share privileges are lost, and users are fully accountable for the bike they use. The bike share program occurs in conjunction with the University of Waterloo Bike Centre (University of Waterloo, 2007).

Another interesting aspect of bicycling at University of Waterloo began in 2008, when three Waterloo graduate students won the Toronto Dominion (TD) Go Green Challenge. Their winning project was a design for a new bike share program at the University of Waterloo, called the *VELO* Bike Share Program. The design, which is currently still at the conceptual stage, would employ smartcard technology. Smartcard technology has specialized bikes locked at terminals with program members unlocking bicycles by sliding a membership card through an automated card reader. Although this program has high start-up costs, it has the potential to save operating costs by reducing staffing, and thus increase operating viability. While this system is popular in Europe automated programs like this are new in Canada. Therefore, the SWOT analysis for Waterloo is of the *VELO* Program, not the Yellow Bike Program (Clare et al., 2008).

Table 9: SWOT for University of Waterloo's Proposed *VELO* Bike Share Program.

	HELPFUL To achieving objective	HARMFUL To achieving objective
INTERNAL ORIGIN Attributes of the organization	<ul style="list-style-type: none"> -Program targeted towards university students, although would be available to the greater community -VELOCard technology reduces operating costs -Collaboration with university projects like the University of Waterloo Sustainability Project and University of Waterloo Bike Centre are likely 	<ul style="list-style-type: none"> -Significant user costs are required: Membership fee is \$20/4-month term or 40\$/year for students, 30\$/term or \$60/year for general + \$2.50/hour for 1-3 hours of bike use, or \$5.00/hour after 3 hours. Under 1 hour is free. -Time limitations may restrict flexibility for bike users.
EXTERNAL ORIGIN Attributes of the Environment	<p>The following are points taken directly out of the Go Green document:</p> <ul style="list-style-type: none"> “• Local and provincial planning policies for intensification will help to increase the demand for bicycle-sharing services • Ontario Government exempts retail sales tax on bicycles, helmets, and other cycling safety equipment • Implementation of the University of Waterloo and Wilfred Laurier University Universal Bus Pass means more opportunities for integrated transit-bicycle travel • Waterloo is a young community with three vibrant postsecondary institutions. Young students often do not own private automobiles and are reliant on alternative transportation • Waterloo’s main institutions and central business core are located within close proximity of one-another. These geographical realities make cycling a viable alternative to driving • VELO is eligible for Federal and Provincial subsidies” <p>(6, Clare et. al)</p>	<ul style="list-style-type: none"> -Winter climate makes biking less attractive -Bike theft will likely be a problem. -Current bike lane infrastructure in Waterloo is still limited, making bicycling in the city seem dangerous and unattractive.

4.0 Discussion

The assessment of the potential for a Bike Share Program at Dalhousie required a multi-layered approach, which included a survey of the student population, interviews with key Dalhousie administration staff as well as [bike organizations](#) [community contacts from relevant organizations](#) [-within the Halifax Regional Municipality \(e.g. Bike Again! Program, Ideal Bikes\)](#) [such as Bike Again and Ideal Bikes](#), and a document analysis of other [Canadian University Bike Share Programs in Canada](#). [As these are all distinct approaches](#) [These three sections](#) [they](#) will be discussed individually [because they involve different kinds of information](#). [This type of](#) [The](#) preliminary research [done here](#) is valuable because it provides a baseline of information [to be put toward a bike share program, and it addresses](#) ~~and~~ further questions, which may be investigated in the future.

4.1 Survey

The questionnaire provides evidence of student support for such a program, information pertaining to who exactly such a program might be more heavily used by and what concerns those who would not use it have. Overall, students displayed a high level of interest in a bike share program at Dalhousie.

The questionnaire was kept quite short, and took an average of one minute to complete. Prior to developing the questions an executive decision was made that it was more important to collect a lot of simple responses initially, rather than an exhaustive study of each respondent's attitudes and background. It seemed more significant to first establish if they would use it or not. This approach proved fruitful as the short survey length enabled a sample of 800 surveys to be completed.

Prior to the survey the exact level of interest among students was unclear, yet it was expected that most students would support such an initiative. This prediction was made for a

number of reasons. Firstly, Metro Transit can be quite unsatisfactory as buses are often late and trip planning can be difficult. Secondly, it was assumed that most students do not own a motor vehicle and so they must either use the bus, bike, walk or find another way to get to school. Thirdly, the high proportion of out of province students at Dalhousie means it might be difficult for many to transport a bicycle to Halifax for school. Lastly, the degradation of the environment has received a lot of attention in Canadian society in recent years, and so students would be more willing to support an initiative perceived to be for supportive of environmental sustainability.

As shown in Figure 1 the prediction was correct. Of the 800 students surveyed 63% (508) would use bikes provided by Dalhousie; there was 43% (349) who would use a program requiring a small fee (on the questionnaire an example of small fee was given as \$15/term) and 20% (159) would only use the program if it were free. These are extremely promising results and if actual usership came close to mirroring them, the Bike Share Program would be a huge success.

According to the Bikes Belong Coalition, in 2002, 61% of American cyclists were male, while the remaining 39% were female (Bikes Belong Coalition, 2009). Therefore Question 1 on the survey asked for the respondent's gender to establish if this had any impact on their willingness to use a bike share program. This had very little impact on the respondents desire to participate in the program. It was found that among males 59.98% were willing to use it for free and 48.04% would pay for it, while 63.25% of females would use it for free and 40.25% would pay for it. More females would use it for free, but fewer would be willing to pay for it. There is no clear explanation for this but further investigation is possible.

It was expected that there might be higher interest for such a program among Sexton Campus students since it is typical for them to travel regularly between Sexton and Studley for

class and the bus schedule does not always accommodate this. Therefore Questions 2 and 3 asked which campuses did they use to establish if they used multiple campuses and which did they consider their main campus. Table 1 shows that from those whose main campus was Sexton 64.44% would use a free bike share program, Studley had 64.32% who would use a free program and Carleton had 54.60% who would use a free program. It is possible that because Carleton has a higher percentage of older students more of them may drive and also because it is very close to Studley campus the perceived need for bikes might be decreased. Another possible factor is its central location between the other two campuses, enabling faster travel time to either. Table 2 shows that when a fee was required 45% of Sexton students, 41.88% of Studley students and 41.44% of Carleton students would still use the program. Although those identifying Sexton as their main campus had the highest percentage of who would use a free and “pay-for-it” bike share, there was not a significant enough difference to justify locating the bike share centre there since it is assumed that a much higher percentage of the student body is located on the Studley campus.

Of those who identified themselves as multiple campus users, 69.95% were willing to use a free bike share program, while 46.80% would use it if a fee were required. This very high rate of interest shows that there is clearly a problem with transportation between campuses.

Another expected trend was that students living in residences might be more inclined to want a bike share program since the majority of people in residences are not from Halifax or the surrounding area. This expectation was confirmed since of those living in residences, 69.92% said they would use a free Bike Share while 62.22% of those off campus also would. Likewise, 47.36% of residence students would still use the program for a small fee compared to the 42.28% off campus students who would.

Our final prediction was that there would be a correlation between the distance someone lived from their main campus and their interest in a bike share program; those who lived further away would be less likely to use a bike share. Data to establish this was collected in Question 5 when respondents were asked “If no [do you live in residence], how far from your main campus do you live?” Although there was a range of answers, Table 3 shows that support for a free program among those living less than 3km from campus was 68.97%, while only 48.01% of those who live more than 3km away were interested in using a free program.

Unfortunately, the list of reasons provided to students to indicate why they would not use a bike share program appears not to have been exhaustive since a number of people surveyed explained other reasons why they would not use a Bike Share in the comments/concerns section provided at the bottom of the survey. Generally the comments were extremely positive and are listed in the Appendix G. Here, however, is a summary of common comments organized by theme:

Table 6: Summary of Responses from ‘Comments and Concerns’.

Themed responses	Number of people who wrote this
Positive/Supportive comments	77
Live too far away	38
Live too close to campus	22
Rather walk than bike	17
Don’t like biking/Don’t know how	15
Cost too much (\$15)	12
Theft concerns	12
Have a car/Rather drive	11
Safety concerns – e.g. bike lanes	5
Rather use public transit	3
More bike racks necessary	2
Liability concerns	2
Negative comments	1

The supportive comments were usually brief such as “Good idea” or “Please make this happen!” and sometimes mentioned other places such as Copenhagen or Paris where such programs have met with extremely high success. Of those who said they lived too far many

wrote that they were from Dartmouth, Bedford or commuted 25+ km to school. Most people who said that they lived too close were within 1 km from their main campus and enjoyed the walk. Respondents who thought it was too expensive either said they were: too poor or seemed to have interpreted “small fee” on the survey as a levy that all students would pay, rather than as a membership fee. Many of the safety concerns raised involved the need for more bike lanes. It was very promising that there was only one blatantly negative comment.

The top response for not wanting to use a bike share was “Halifax Climate/Weather” with 32.69% citing it as their most important reason for not wanting a bike. Little can be done to change the winter weather conditions for those who prioritized this as their top concern. However, bike racks could be sheltered to alleviate such issues. It is also important that the survey was primarily conducted in March and the winter weather we were experiencing may have influenced people’s choice of concern. Next was “I already have a bike” with 29.33%. It is very understandable that someone who owns a bike would not want to rent one. However, some people were so enthusiastic about the project that they commented, “I already have a bike but would still use this!”. Next “Safety concerns” ranked third with 22.11%, a recurring comment was that drivers in Halifax do not respect cyclists and that there are not enough bike lanes. Surprisingly 9.61% of people who would not use a bike cited “Helmet hair” as their main concern. Some respondents may have interpreted this to also mean getting dirty on a bike, not being able to wear more formal clothes, etc, since there was no category for these types of concerns or simply are very concerned with their hair. This issue could be addressed through improvements of facilities such as changing rooms on campus.

Overall there was high support from all categories identified. Among females, multiple campus users, Studley and Sexton campus users, people living in and out of residence and those

living within ≤ 3 km from their main campus, over 60% said they would use a free program. In all categories except ' ≥ 3.1 km' (34.66%), over 40% of people surveyed would still use a bike if they had to pay. Support for a free program was almost unanimous, support for a program that cost a small fee was just under 50%, and a wide range of student types are interested in a bike share program; all these statistics indicate that there is strong student usership potential for a bike share program at Dalhousie.

4.2 Interviews

Based on the positive comments received by interviewing relevant members of the Dalhousie and Halifax community, it is reasonable to say that there is support in those areas for a Bike Share Program at Dalhousie University. This support lends to a community building opportunity available not only within Dalhousie but extended to the surrounding community.

4.2.1 Dalhousie Administration Interviews

Dalhousie Security: *G.A Sandy MacDonald*, Director: Sandy emphasized that the security of the bikes would be of the utmost importance. If the bikes are properly maintained and returned by users the program be a positive addition to the community.

Dalplex: *Shawn Fraser*, Sr. Programs Director: Shawn remarked that Dalhousie Athletics is looking to expand program capacity and improve its user access. He believed that a Dal bike share program would be excellent groundwork for introducing "Outdoor Recreational" programming. Since Dalplex usership is expected to increase and available facilities are already maximized, this is an ideal way to provide services to the growing Dalhousie community. Shawn also believed that limiting a bike share to a single form would not serve enough people, so incorporating more than one level of 'borrowing' the bike (e.g. hourly, daily, weekly, term etc.) would be ideal. Similar to the leasing program for laptops offered by PCPC on campus, students

would have the option to purchase the bicycle at the end of their rental period. End user facilities are needed to promote success. In order to make the program work, you must provide the proper showering facilities, lockers, bike lockups and changing rooms. Along with the facilities being available, this would create a communal location with the potential to build a sense of place for bikers on campus. Shawn's enthusiasm and wealth of ideas mark him as an important potential player in the development and implementation of a Dal bike share.

Dalhousie Financial Services: *Marlene Daye*, Risk Management Coordinator: Marlene emphasized that the bikes would need to be well maintained at regular intervals, and the person or persons responsible for bike maintenance would have to be established. Her concern for maintenance supports the necessity of a bike centre on campus that provides maintenance help and expertise. She expressed concern regarding used bikes, and suggested that new bikes would be perceived as safer to use, thus reducing liability risk for the university. Another aspect that she thought should be included in a bike share program was a waiver form or a biking test to be done by the program user to assure that the user could operate a bicycle. She believed that the program would not have to provide helmets for liability purposes, but alternatively would have to establish that the user had their own helmet.

4.2.2 Community Interviews

Dr. Wayne Groszko, Professor and Avid Biker: Dr. Groszko believed that a bike share program at Dalhousie university had tremendous potential. As someone who uses a bike as a primary mode of transportation, he understands the bicycling community in Halifax to be mostly composed of university students, many of them attending Dalhousie. This suggests that there is already a strong bicycling community at Dalhousie. He also believed that a Dalhousie bike centre that provides maintenance, education, and a space for bicyclists to meet and come together

would be very useful in fostering a greater sense of community among Dalhousie cyclists. A strong sense of community would make bicycling more attractive to Dalhousie members.

Ecology Action Centre: *Laena Garrison*, TRAX Program Coordinator: Laena provided suggestions of external sources of funding for research and/or materials. She emphasized that funding could come from environmental or health oriented sources. Her suggestions for sustainability-oriented sources included Transport Canada's "Moving on Sustainable Transportation" Program (research only), Environment Canada and TD Friends of the Environment. For health-oriented sources, she suggested the Capital Health's Community Health Board in Halifax, Atlantic Health Promotion Research Centre, and Carol Davis Jamieson of Nova Scotia Health Promotion and Protection. This extensive list suggests that external funding opportunities for a Dalhousie bike share program are available, and should be taken advantage of.

Simply implementing the bike share program would not be enough to ensure a successful program. Incorporating members from the community would be ideal to promote long-term success, because it strengthens the general interest in the program's success. Two ideas identified along these lines would be either bringing in a community group to help with maintenance or subscribing to a local bicycle shop to maintain the equipment. Offering space at Dal for a 2nd branch of the Ecology Action Centre's *Bike Again!* Program (a free bike maintenance program available to Halifax residents located at the Bloomfield Centre in Halifax) would provide the maintenance of bicycles for free. It would also be beneficial to their goals in addition to providing them with a secure location, considering their residence at Bloomfield is not secured. Not only would this empower the local community group's involvement and growth, it would assist in membership, exposure and long term success of the program. Alternatively, *Ideal Bikes*

on Barrington Street has offered a 25% discount for all bicycle related parts, repairs and accessories. In addition to this, the Halifax Police Department has offered to provide all of the bikes and parts remaining following their annual Bike Auction free of charge. Many other elements can be implemented by enlisting the support of the local community, including user facilities, bike racks, bike lanes on campus, and individual bike trailers. These are only a few of the possible community connections that can be made, but they show that people are interested in a Dal bike share and willing to support it.

4.3 Proposed Dalhousie Bike Share Program Model

Based on the total results of the research the following is a suggestion for a potential Dalhousie bike share program. These concepts were chosen based on successful aspects of other programs and features that would work in the local context. It was determined that the best model for a bike share program should include both short and long term rental options to maximize usership. Students, staff and faculty would have various reasons for requiring a bicycle and this would allow for that. Membership would be required for both rental options. To become a member of the bike share it would be necessary to follow a similar procedure as MUN's program: fill out a membership form, agree to the terms and conditions of the bike share, sign a liability waiver and pay a small fee. The fee would assist in recouping costs and help establish a sense of ownership over the bikes being used. Making part of the fee a returnable deposit is also an option. Based on the results of the survey, citing 20% of students would be willing to use a free program but not a program with a fee, it would be important to keep the membership fee low.

One of Wayne Groszko's primary recommendations was that a bike centre be included in any bike share program that is implemented at Dalhousie. He said that the majority of cyclists in

Halifax are Dalhousie students and this would provide a location for them to gather and therefore strengthen the cycling community. Aside from providing a meeting space a list of other possible amenities and services for a bike centre to offer has been compiled throughout the research process. The more of these that could be included the better. They are as follows:

a) Maintenance related:

- ™ Enough open space to work on bikes.
- ™ Bike repair workshops similar to Bike Again!, or a branch of Bike Again! at Dalhousie.
- ™ Compressed air machine for refilling tires - either inside or by entrance and either free or coin operated.
- ™ Tools and fluids (available for rent/use – Waterloo’s bike centre charges \$1/hour for their tools and \$1 for any fluids used):
 - Tools: Assortment of wrenches, allen/hex keys, headset and cone wrenches, tools required for brake and bottom bracket adjustment, etc...
 - Fluids: Oil for chains, lube for bearings, citrus-based solvent to remove old lube, etc...
- ™ Parts: possibly including chains, valved inner tubes, brake/shift housing and cables, housing, tires, brake pads, and cable ends, etc...
 - Used parts – Available from the Halifax Police Department Auction leftovers for free.
 - New parts –IdealBikes has offered 25% off on all parts.

b) Organizational:

- ™ Since it would be preferable to make the running of this bike centre a student employment opportunity a few part time staff members should be hired rather than full time positions which most students do not have time for.
- ™ It is not practical at this time to suggest that Dalhousie have bike share centres on all three campuses. Therefore, a main one should be located where its use would be highest: Studley campus.
- ™ To make the program easier to use the bike centre should have a telephone number, email that is checked daily by staff and a well maintained website, similar to UBC's Alma Mater Bike Co-Op website.
- ™ The website should include hours of operation, how the membership works, examples of all forms to be filled out, and schedules for bike maintenance workshops. A cycle friendly campus map could also be compiled and placed on the website including locations of showers, change rooms, bike racks and indoor storage facilities, the bike centre, bike lanes, etc... Another aspect could be a ride matching section where people looking for a commuting partner could be brought together. It is also recommended that feedback or a comment wall be incorporated into the website.

c) Amenities:

- ™ Bike accessories available for rent: Baskets, trailers, fenders, bells, lights, etc...
- ™ Promotional items for sale: Stickers, shirts, sweaters, water bottles, etc...
- ™ Above ground access and a ramp to the door if not at ground level.

- ™ Facilities: Change room with shower and washrooms and lockers for rent or day use like the Dalplex.
- ™ Educational materials (library style): Magazines, books and videos on biking as well as information relating to HRM and Dalhousie's bike plans.
- ™ Café/lounge area: Small café outlet with several tables and moveable chairs as well as a couple of couches.

The long-term rental resembles the program found at Memorial University. The students would borrow the bicycles for the whole term. At the end of the term users would return the bicycles, at which time maintenance could be performed. However, they are responsible for maintaining the bike while it is in their possession and returning it in the same condition as when it was loaned to them. This option would appeal to people who wish to use the bicycles as their primary transportation to and from campus and to get around the city in their leisure time. It is recommended that the higher quality bikes be reserved for the long term rentals and that these be marked with the bike share program logo or Dalhousie logo.

The second option would be a short-term rental. This type of system is much more difficult to implement because it either requires: 1) a large and cheap supply of bikes like UBC, 2) an expensive automated system like Waterloo's proposed VELO SmartCard system or 3) that bikes be returned to the Bike Share Centre on Studley to ensure that they are only being used for a short-term. The logic behind 1) is that bikes in a system like UBC, where members have a key and access to any bike they find, there are much higher rates of theft so replacement bikes are needed. For 2) and 3) if bikes aren't simply left out to be used there should be a way to monitor how long they are being used for. This could be achieved with the SmartCard technology or staff members at a bike centre. Short-term rentals would appeal to users who wish to travel between

or around campuses and then leave the bicycle once they arrive or for someone who has an errand to run around Halifax. This system would also give users the opportunity to try out biking in Halifax before committing to the long-term option. To deter theft these bikes should be brightly painted and in a unique fashion like the UBC system.

5.0 Conclusions

5.1 Concluding Remarks

The objective of this project was to determine whether there was potential for a bike share program at Dalhousie University. There are many benefits to implementing a bike share program at Dalhousie University, including promoting bicycles as a sustainable means of transportation and making bicycles more accessible to university members. The student survey showed that there is a high level of interest from potential users of the program, and the interviews with university and community members indicated that there is a positive, supportive environment in which to develop and sustain a program. Document analysis of other university bike share programs across Canada provided not only countless suggestions for how a Dalhousie bike share program would run, but also gave evidence that a program like this is possible. In conclusion, there is very strong potential for a bike share program at Dalhousie University.

5.2 The Next Steps for a Dalhousie Bike Share Program

- This report should be presented to Rochelle Owen, SustainDal student society, and other relevant persons and groups that could become involved in creating and running a bike share program at Dalhousie University. It is important to show potential stakeholders that there is usership support from students for a bike share program.
- Although not mentioned previously in the report, there was until recently a Dalhousie student society that wished to begin a bike co-op like UBC's. This society should be

reinitiated, in order to provide interested students with a medium through which to become involved.

5.3 Recommendations for Further Research:

- Draft a final, detailed model for a Dalhousie Bike Share Program. This should include a cost analysis, in order to evaluate the financial feasibility of the proposed model.
- Conduct a survey of faculty and staff using a self-administered questionnaire in order to determine their willingness to use a bike share program. This would build on the student survey conducted in this project.
- Internal and external sources of funding can be explored more fully. It is recommended to explore opportunities that wish to promote sustainable transportation and also those that wish to promote healthy lifestyles, as bicycles provide benefits in both of these areas.
- Do a comprehensive audit of the facilities currently available for bicyclists on Dalhousie campuses. Facilities to research could include bike racks, change rooms, showers, ironing boards, first aid and lockers.

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7.0 Appendices

Appendix A – Questionnaire

1. What is your Gender?
 - Male
 - Female
 - Transgender
 - Intersex
 - Rather Not Say
2. At Dalhousie University, which campus do you use? (Check all that apply).
 - Studley
 - Sexton
 - Carleton
3. Which campus do you consider your main campus? (The campus where you spend most of your time).
 - Studley
 - Sexton
 - Carleton
4. Do you live in residence?
 - Yes
 - No
5. If no, how far from your main campus do you live?
 - Less than 1 km
 - 1.1 - 3km
 - 3.1 - 5km
 - 5.1 - 7 km
 - 7 km +
6. If Dalhousie provided bikes for free, would you use this service?
 - Yes
 - No
7. If yes, would you still use this service if you had to pay a small fee? (Example: \$15 per term).
 - Yes
 - No
8. If no, why not? (Please check your most important reason).
 - I already have a bike.
 - Halifax Climate/Weather.
 - Safety Concerns.
 - Concerned about bike theft.
 - Inefficient facilities on campus (lack of bike racks, showers, etc.)
 - Helmet Hair

Comments/Concerns: _____

Thank you for participating in our survey!

Appendix B - Question Guidelines for Interviews with Rochelle Owen, Shawn Fraser, Sandy MacDonald, Wayne Groszko and Hanita Koblents

1. Do you understand the concept of a bike share?
2. Can you see any problems/hazards involved with the implementation of a bike share at Dalhousie?
3. Do you and your department support the concept of a bike share?
4. Do you have any further comments or concerns relating to this issue?

Appendix C – Question Guideline for Interview with Anne Gilhen

Is it possible for a Dalhousie Bike Share Program to receive free bikes from the Halifax Police Department?

Appendix D – Question Guideline for Interview with Laena Garrison

Are there government, community, etc. funding opportunities available for a potential Dalhousie Bike Share Program?

Appendix E – Question Guideline for Interview with Marlene Daye

How would liability and risk management issues apply to a potential Dalhousie Bike Share Program?

What insurance policy would such a program fall under?

Would helmets need to be provided?

Appendix F – Survey Instructions

Hello, my name is _____, and I am doing a little research on student attitudes and behaviour with regards to bicycling. Are you a Dalhousie student? (If yes) I was wondering if you would complete this short survey. There are only 8 multiple-choice questions, and it should take you about 1 minutes. It is not mandatory for you to complete this survey. Thank you for your participation!

Appendix G – Responses to the Questionnaire’s “Comments and Concerns” Section

1. “SNOW SUCKS!” – Killam 2 Fri
2. “Bike lanes 4 safety” – Killam 2 Fri
3. “A good service/idea, but I have a bike.” – Killam 2 Fri
4. “Good idea thou!” – Killam 2 Fri
5. “I take the bus.” – Killam Wed 10-11
6. “Long ride.” – Killam Wed 10-11
7. “WOOLTOOO!” – Killam Wed 10-11
8. “liability” – Killam Wed 10-11
9. “Love it!” – Killam Wed 10-11
10. “Brrr!” – Killam Wed 10-11
11. “I don’t like biking that much.” – Killam Wed 10-11
12. “You bet!” – Killam Wed 10-11
13. “Bedford is far from here!” – Killam Wed 10-11
14. “Live too close.” – Medj 12 Mon
15. “No \$.” – Medj 12 Mon
16. “Paying would dissuade me from being bothered.” – Medj 12 Mon
17. “I like this idea, biking is COOL” – Medj 12 Mon
18. “i’m on a boat” – Medj 12 Mon
19. “Halifax is so cold!” – Medj 12 Mon
20. “I don’t know how to bike!” – Al Mac 11 Mon
21. “I think it’s a great idea!” – Al Mac 11 Mon
22. “Great idea!” – Chem Help Centre
23. “GOOD IDEA” – Chem Help Centre
24. “Good idea!” – Chem Help Centre
25. “I live really far away, and own a car.” – Chem Help Lounge
26. “Great idea. Offer bike maintenance clinics!” – Killam
27. “If I had to pay a fee – I would just buy my own.” – Killam
28. “Campus is so small, I don’t really need a bike” – Killam
29. “Great idea. Bike theft would be a concern. Sanitation of helmets also.” - Music Lounge
30. “I have no where to store a bike or else I would use the service.” – Music Lounge
31. “Do it!” – Music Lounge
32. “I would use bikes, but I would bus in the winter” – Music Lounge
33. “I really don’t have a need for it.” – Music Lounge
34. “It would be a great idea for some students, but not for me.” – Music Lounge
35. “I live too far away and the Bedford highway is dangerous.” – Music Lounge
36. “This is a fabulous idea!” – Music Lounge
37. “don’t normally bike” – Carleton
38. “I would use a bike but I only live 10 min away & can walk” – Carleton
39. “I live close.” – Carleton
40. “I live too close to school” – Carleton
41. “Great sexy survey” – Carleton
42. “GREAT IDEAS.” – Carleton
43. “Maintenance, fees for abuse, etc.” – Carleton
44. “Too far” – Carleton
45. “Too far away. Would take too long.” – Carleton
46. “I have to wear business clothes a lot and you can’t ride a bike with such attire. Plus the weather and the amount of stuff I carry to school.” – Carleton
47. “Make bike lanes down University Ave and Morris” – Carlton
48. “I wouldn’t use the bike because I don’t travel during day.” – Carleton

49. "We need covered bike parking!" – Carleton
50. "I walk everyday." – Carleton
51. "I'd rather walk" – Carleton
52. "Sounds like a great idea!" – Carleton
53. "People can get their own bikes." – Carleton
54. "I live pretty close so wouldn't pay but might use occasionally if free." – Carleton
55. "I'm scared of bikes" – Carleton
56. "I live outside the city so I have to drive. I think bikes are great idea" – Carleton
57. "Love biking and more people should do it." – Carleton
58. "I live to far" – Carleton
59. "Close enough not to need a bike." – Carleton
60. "to close I would walk" – Carleton
61. "Good idea." – Carleton
62. "No concerns just live so close it is not required" – Carleton
63. "Close enough to walk" – Carleton
64. "I live to far to have a use for a bike, and do not need one to travel to classes" – Carleton
65. "I don't bike" – Carleton
66. "I think that people who live even closer then me would appreciate a bike share program even more!" – Carleton
67. "I have a car" – Carleton
68. "Good luck!" – Carleton
69. "I'd rather walk" – Carleton
70. "I live too close to school!" – Carleton
71. "I live too close to use a bike" – Carleton
72. "Don't ride bikes" – Carleton
73. "I don't ride bikes!" – Carleton
74. "Very good idea!" – Engineering Hallway
75. "It's a really good idea and I think that sexton campus will respond well to it." – Engineering Hallway
76. "I live about a 30 min drive from campus. But good idea! Good luck!" – Engineering Hallway
77. "Good idea" – Engineering Hallway
78. "I have a bike but think this is a great idea" – Engineering Hallway
79. "Great idea!" – Medjuck
80. "Need showers" – Medjuck
81. "Too close of a walk" – Sexton Library
82. "Great plan" – Sexton
83. "Not if I have to pay for bus pass as well" – Sexton
84. "I'm scared of traffic" – Sexton
85. "Good idea" – Sexton
86. "Great idea, not for me though" – Sexton
87. "Don't enjoy riding bikes" – Sexton
88. "The thing would get wrecked" – Sexton
89. "Prefer walking" – Sexton
90. "Good idea" – Sexton
91. "Cool!" – Sexton
92. "How would you sort our helmets + the provision of appropriate sizes?" – SUB
93. "I live in the middle of no where and have a car" – SUB
94. "I live too far away to bike to school and I just walk around campus" – SUB
95. "Biking from home would be a great distance" – SUB
96. "Rather walk!" – Sexton Library
97. "I would drive if it was too far to walk" – Carleton Courtyard

98. "Great idea!" – Sexton Library
99. "Awesome." – Sexton Library
100. "Great idea!! Good Job." – Henry Hicks
101. "Have a car for long distances" – Kenneth C. Rowe
102. "Awesome idea" – Tupper Building
103. "Good idea!" – Henry Hicks
104. "Too far to bike from home" – Killam Library
105. "Walking takes less energy for me" – Tupper Building
106. "I live so far away that I would only use a bike while downtown" – Henry Hicks
107. "Live in Dartmouth, have a car." – Study Area, Sexton
108. "Sure, why not. Good luck!" – Tupper Building
109. "Winter is much of the yr so it may be not as productive as one might think. How do you know they won't be stolen?" – CS, Studley
110. "Good luck" – Tupper Building
111. "Not worth \$15 to not bring my bike with me everywhere" – Kenneth C. Rowe
112. "If I had no bike, I would use this program." – Henry Hicks
113. "Cool idea!" – Henry Hicks
114. "I can walk" – Tupper Building
115. "Too far" – Sexton Entrance
116. "Stolen bikes may be an issue" – Study Area, Sexton
117. "Too far a distance from home for biking (25 km away)" – Sexton Entrance
118. "Live too far away" – LSC
119. "I live in Bedford, It would be a long commute on a Bike." – Libs, Studley
120. "Cancel the Helmet Law" – Libs, Studley
121. "I live too close to have to bike." – Libs, Studley
122. "love it!!" – Libs, Studley
123. "do it" – Libs, Studley
124. "just do not like riding bike >.<" – Libs, Studley
125. "Please make this happen!" – Libs, Studley
126. "Traffic is terrifying" – Libs
127. "Depending if I buy a new bike. Winter only" – LSC
128. "Stellar" – Kenneth C. Rowe Building
129. "Not sure how often I'd use/smooth running of program. Mandatory for everyone to pay or just users?" – Kenneth C. Rowe Building
130. "Sweet!" – Sexton Library
131. "Too poor" – Engineering Lounge
132. "Have a car – primary answer" – Carleton
133. "I live too far away (Cole Harbour)" – Chem Building
134. "it is a service I would use but it isn't a necessity so I wouldn't want to pay for it" – Killam
135. "Cool idea!" – Killam
136. "won't use bike in winter! Not sure about availability of bike racks on campus" – SUB
137. "Fear of bikes ☹" – SUB
138. "There would be a lot of stolen bikes, because there already are!" – SUB
139. "I enjoy walkin, and am not a skilled person on two wheels!" – Killam
140. "I live too close to campus to make a bike necessary." – SUB
141. "I have a car" – SUB
142. "*not as my main transportation, too far away" – Killam
143. "Cool for environment" – SUB
144. "Good idea" – Killam
145. "Walk to class" – SUB

146. I live 30k +/- fr. Campus. This is too long a distance + I would be forced onto highways” – Killam
147. “I live in Dartmouth!!!!” – Killam
148. “I think it should be more of a security deposit only if you want to use a bike. Opt-in type thing.” – Killam
149. “Too far to bike!” – Killam
150. “Sounds like a good idea, something I would def. use.” – SUB
151. “I can’t ride a bike” – Killam
152. “I live incredibly close already!” – SUB
153. “I don’t live far enough from campus to pay for a bike service” – SUB
154. “Where would the money come from? How would you prevent theft? Would you provide helmets?” – SUB
155. “That’s a good idea, but I think there also should be a biking pathway in streets nearby.” – Killam
156. “Theft would be a principle concern.” – Killam
157. “I prefer walking” – Killam
158. “Good idea!” – Killam
159. “I’ll prefer to walk rather to use bike” – Killam
160. “I live too far to bike to Dal, and all my classes are in one building!” – Killam
161. “I’m concerned about safety as you must drive on streets not sidewalks” – SUB
162. “8: Lack of extra funds for more fees, if free, would definitely use the service” – Killam
163. “Good idea which is effective in several big city (Paris)” – Killam
164. “Close” – SUB
165. “Making people pay might ensure bikes go missing less” – SUB
166. “drive a car live far” – Law Library
167. “ I think its an excellent option. However I already have my transportation covered.” – Killam
168. “Great idea” – Law Library
169. “I would rather walk for the exercise and not have it cost \$.” – Law Library
170. “I think it’s a great idea” – Killam
171. “Great idea” – Law Library
172. “too close” – Sexton Library
173. “Would I be liable if the bike was stolen when in my possession?” – Sexton Library
174. “Where would I leave it in rez?” – Sexton Library
175. “I walk” – Engineering lounge
176. “Good idea” – Dunn
177. “I live too far from campus to use a bike” – Rowe
178. “don’t have any use for it at present time” – Rowe
179. “It would be useful to use a bike to get from sexton to studley” – Computer Science Building
180. “Think it’s a great idea, would pay if I did bike, don’t have any use for it at present time” – Rowe
181. “I think this is a great idea and would be beneficial for many students” – Rowe
182. “More bike racks on campus are needed for this to work” – Sexton stairs
183. “I would use a shared-bike because I am concerned about bike theft (I already have a bike)” – Computer Science
184. “I can’t ride a bike Someone would have to teach me. Lol.” – Rowe
185. “I think it is a good idea but honestly it will not be eligible for use to all students! But all students will be paying” – Sexton Hallway
186. “Dalhousie should use the money in which they would use to purchase these bikes, for something more useful & important.” – Rowe
187. “This is a really good idea!” – Hicks
188. “Need bike lanes. People don’t feel safe.” – Hicks

189. "Great idea both environmentally and practically. Need to figure out how to make sure you get the bikes back!" – Rowe
190. "Inefficient facilities on campus: This is a a problem though - inconvenience" – Hicks
191. "Get faculty on bikes!" – Hicks
192. "How will they not get stolen?" – Hicks
193. "You can buy used bikes on Kiji for 20-30 bucks. It doesn't make renting them very cost efficient" – Hicks
194. "I think this is a great idea + I know that it works (Holland)" – Hicks
195. "Great idea! Good luck!" – Tupper Building
196. "Live too close" – Tupper Building
197. "I believe that \$15 per term is a very costly fee considering that we pay \$15 for the bus pass!" – Hicks
198. "Usually walk & have a car." – Tupper Building
199. "Lots of people would get a lot of use from it" – Sexton Hallway
200. "Good transportation idea!!" – Tupper Building
201. "I have a car" – Tupper Building
202. "I live 25 km+ from campus" – Tupper Building
203. "Sounds like an awesome idea – foreseeable problem: people being douches and disrespecting the service" – Tupper Building
204. "Great idea" – Rowe
205. "I like to walk. But I think it's a great idea!" – Dunn
206. "I live too far off campus to bike
207. "Too far to ride a bike" – Dunn
208. "Really good idea!" – Killam
209. "This will be great" – Dunn
210. "Great idea!!" – Rowe
211. "I live too close" – Rowe
212. "Great idea!" – Dunn
213. "Great idea." – SUB
214. "SERVICE ABUSE (YOU NEED THEFT PROTECTION – CONSIDER BIKES w/ BUILT WHEEL LOCKS)" – Dunn
215. "I actually like the walk" – Rowe
216. "Good idea, though!" – Studley
217. "I would enjoy the convenience of a bike instead of walking" – Dunn
218. "Live very close to campus and have a dress code for program so not bike friendly." – Rowe
219. "Sounds like it would be great!" – Rowe
220. "I'm international student, no money" – Dunn
221. "Great idea" – Rowe
222. "Not a big biker" – Rowe
223. "You don't bike when it rains" – Rowe
224. "and far away, live in Dartmouth" – Sexton Study Area
225. "LIVE TOO FAR AWAY" – Sexton
226. "Levy Fee's of choice of membership?" – Sexton
227. "CAR IS BETTER" – Sexton
228. "I walk to school" – Sexton
229. "I walk" – Sexton
230. "Live too far away" – Sexton
231. "What about theft?" - Sexton