

Reusable Mugs: Reducing Waste on Dalhousie's Studley Campus

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Abstract

This project focuses on waste produced at Dalhousie University in Halifax by disposable cups. Thousands of cups of hot beverages are purchased on Dalhousie's Studley campus everyday creating a large volume of waste. This project's long term goal is to reduce waste in order to increase Dalhousie's sustainability. In doing so, we looked at only four of the most popular beverage outlets on campus, two Tim Hortons', a Second Cup, and a Starbucks. At these locations we surveyed customers to learn about consumer habits. The on-campus companies managing these outlets (Aramark and Sodexo) were interviewed to further understand their environmental policy and determine their willingness to participate.

The research methods we chose to use include a literature review of previous reusable mug projects, a survey of hot beverage purchasers on campus, and interviews with representatives from both Sodexo and Aramark. For informal research methods we contacted facilities management to discover how much waste is removed from campus each month to establish data baseline from which to work and to inform our advertising campaign. Also, we collected used disposable cups on Studley campus for the purpose of measuring their volume, which in turn allowed us to calculate their volume within the total amount of waste produced.

In conclusion, by focusing efforts on the reduction of disposable cups on campus we can significantly reduce the amount of waste that will ultimately be sent to local landfills. This can be fulfilled through raising the awareness of the Dalhousie community to the benefits of using reusable mugs as well as the environmental costs of neglecting such a shift in consumption patterns.

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1.0 Introduction

Reducing waste is an essential component when trying to achieve environmental sustainability. Any individual, community or institution attempting to reach this goal must therefore address the various aspects surrounding solid waste production, consumption and disposal. Hot beverage consumption at Dalhousie University contributes to the institution's overall waste production through the use of disposable drinking cups. The availability of disposable cups (from the industry side) and their use for beverage consumption (from the consumer side) are both relevant aspects when addressing unnecessary waste production on campus. One possible alternative to disposable cups is the use of reusable mugs by the consumer body at Dalhousie University. This alternative would address the cause of waste directly, altering the actions of consumers and industry to decrease disposable cup use.

This project seeks to address the problem of waste production on campus caused by the use of disposable cups for hot beverage consumption. Using a methodological approach based on both qualitative and quantitative strategies, the project seeks to research the actions of industry and consumer action on campus as it relates to the use of disposable cups. This research will subsequently be used in an education campaign to raise awareness and ultimately affect consumer choice, as well as to further our knowledge to proceed in addressing the areas of industry that need to be altered to decrease cup use. It is our goal to reduce the amount of paper and Styrofoam cups that are used on campus.

1.1 Primary Objectives

- a. Collaboration with the food services companies on campus (Sodhexo and Aramark) to achieve our goal. We seek their increased involvement in reusable mug incentives and advertising
- b. To discover disposable cup and reusable mug use patterns on campus.
- c. To provide accessible reusable mugs for students on the Dalhousie campus.
- d. To use our research results to educate the student body regarding unnecessary waste production on campus; through this education campaign we seek to increase awareness and thereby increase reusable mug use on campus.

1.2 Secondary objectives

- a. To reduce the amount of waste created at Dalhousie University.
- b. To reduce the cost of waste removal for Dalhousie University.
- c. To reduce the amount of disposable cups purchased by Sodexho and Aramark.
- d. To actively contribute to reducing Dalhousie's ecological footprint by increasing sustainable practices on campus.
- e. To provide valuable information for future initiatives.

2.0 Importance and Rationale

Ultimately, the solutions mentioned above seek to decrease disposable cup use on campus, thereby increasing campus sustainability. The research problem is important to

the overall sustainability of the Dalhousie campus in a number of ways. It seeks to engage Dalhousie's students, staff and faculty in a comprehensive campaign to decrease the use of disposable cups on campus. Simultaneously, this project seeks to increase environmental initiatives taken by the business sector by directly incorporating Sodhexo and Aramark into our approach. Increasing the use of reusable mugs on campus contributes to Greening the Campus by decreasing waste production and increasing environmental awareness.

2.1 Waste Reduction

The population of Dalhousie University is growing each year. Consequently, more and more people are purchasing beverages in disposable containers, thereby increasing the waste that goes into overcrowded landfills. Landfills are environmentally damaging for the following reasons:

- a.** They can require clearing wild areas to create more space to dump garbage.
- b.** They can increase air pollution and contribute to global warming because of the continuous requirement of transporting of garbage to the dump and burning the garbage.
- c.** They can pollute ground water sources.
- d.** They perpetuate over-consumption and cultures of convenience by allowing people to freely produce garbage and dispose of it.

Any type of non-biodegradable waste production negatively affects environmental sustainability. If successful, our project could help to reduce the amount of solid waste that Dalhousie sends to the landfill. By increasing the use of reusable mugs on campus we can help to reduce Dalhousie's ecological footprint.

Reducing waste should not rely entirely on technological innovations or policy changes. It is essentially reliant on individual routine action. Increasing the use of reusable mugs on campus will only occur if individuals are willing to make changes in their consumption patterns.

Reusable mugs are a form of advertising. When a consumer hands a coffee shop employee their reusable mug, they are making a statement that might influence the salesperson and some of the people in line to also use the mugs. People who tie reusable mugs to their backpacks have the potential to inspire those who notice the cups to buy one of their own. Reusable mugs have a domino effect in that when a person purchases and uses one they will likely inspire and influence others to use them as well. If this hypothesis is correct, then increasing reusable mugs on campus could lead to increasing reusable mugs throughout the community. If people around Halifax notice that reusable mugs have increased in popularity on campus they might be inspired to purchase and use their own. This in turn reduces the amount of disposable cups on campus while increasing the use of reusable mugs, and will contribute to greater sustainability for both the university and the surrounding community. The potential to increase reusable mug use is an attainable goal. It is likely that reusable mug use has increased over the years and will continue to do so. If we can successfully educate people about the economical and environmental benefits of reusable cups then we can help to contribute to greater sustainability for Dalhousie University.

2.2 Case for Sustainability

Disposable cup use contributes to environmental destruction in various ways. The raw materials used in the manufacturing of cups often come from diminishing forests and colonized oil reserves. In addition, cups represent the essence of an over consumptive society: an obsession with convenience. As Dalhousie's population continues to increase, so will the production of solid waste in the form of disposable cups. This will increase the university's ecological footprint and perpetuate over consumptive attitudes within the university community.

The university environment can act as an effective model for environmentally sustainable practices. We believe that Dalhousie has an ethical responsibility to encourage students to live sustainably. By exploring the causes of disposable cup use on campus and working towards changing such patterns, our group is contributing towards increasing environmental stewardship on campus.

2.3 Our Perspective

Our group, which performed all of the methods and procedures referred to in this report, is a part of the 'greening the campus' movement. This movement seeks to address "college and university actions to reduce environmental impacts from campus decisions and activities." (Creighton, 2001) Our perspective and goals are all derived from environmental concerns. All relevant methodologies, research questions and recommendations must be considered from within an environmental framework.

3.0 Research Objectives

The research in this project seeks to explore the use of reusable mugs on campus as compared to the use of disposable cups from both consumers and industry. Our approaches to gathering information and achieving our research objectives were:

- a. Exploratory research- general questions in survey and interviews as well as literature review used to gain familiarity with cup use on campus.
- a. Explanatory research- questions regarding causal relations on survey to use towards analyzing general causal relationship regarding reusable mug use.

3.1 Research Questions

- What proportion of waste produced on the Studley Campus is created by disposable cup use?
- What are the main motives for using/not using reusable mugs?
- What is the percentage of people on campus who use reusable mugs?
- What are the existing environmental policies at Sodhexo/Aramark on campus?
- How willing are Sodhexo and/or Aramark to participate in advertising/incentives pertaining to reusable mug use?

This report entails an explanation of the methods, the specific procedures, and possible limitations of our research. In addition, it reveals the specific results of our research tools and how these results were analyzed to best suit our research questions. This report highlights any significant findings in light of existing research and hypotheses, and the implications of these findings on future practice and/or theory. Finally, this report will make recommendations for further research, addressing directly how the above-mentioned findings can be used.

4.0 Boundaries of Study

4.1 Definitions of Key Terms

Disposable Cup- any cup that is distributed with hot beverages and not intended for reuse.

Explanatory Research- research that “aims to investigate causal relationships or other patterned conduct that is thought to characterize social processes.” (Palys, 2003, 72)

Exploratory Research- research that “aims to gain familiarity with or to achieve new insights into a phenomenon.” (Palys, 2003, 72)

Purposive Sampling- “people or locations are intentionally sought because they meet some criterion for inclusion in the study.” (Palys, 2003, 142)

Qualitative- research methods that tend to be constructionist, cautious about numbers, and characterized by an inductive perspective and a predominantly phenomenologist approach to research. (Palys, 2003, 8)

Quantitative- emphasis on numerical precision and a hypethetico-deductive approach (Palys, 2003, 5)

Reusable mug- a mug for the consumption of hot beverages which is made of plastic or metal so to be repeatedly reused

Sustainability- “A sustainable society is one that can persist over generations, one that is far-seeing enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support.” (Meadows, 1997)
For the purposes of this project, an increase in sustainability will have been reached if the use of disposable cups is decreased by 5%. To conclude if this is achieved, further research at a later time will be required.

4.2 Scope

This project will focus on the providers of hot beverage services (Aramark and Sodexo) through the primary beverage outlets on Studley Campus at Dalhousie University (See **Appendix A**).

- a. Life Science Building - Tim Horton’s
- b. Killam Library - Second Cup
- c. Student Union Building - Tim Horton’s
- Starbucks

In doing so, the customers at these outlets will represent the consumer body, and Aramark and Sodexo will represent the management and policy makers. We will not be considering the manufacturers, or distributors of disposable cups beyond the Studley campus framework. Nor will we be considering any other Dalhousie’s campuses.

Due to the limited time frame of this project, we will focus solely on the Dalhousie Studley campus. We feel that our resulting scope is adequate for making generalizations concerning hot beverage consumers at Dalhousie University as a whole.

Although the overall scope of our project is narrow, we intend for our results and recommendations to be used in similar future projects. It was our intention to work quickly and efficiently on the necessary research in order to enact an education campaign

pertaining to the research results, and affect positive change on campus. Unfortunately, the research took longer than intended and we were unable to enact such a campaign.

There were scope risks involved in this all of our final goals. The time period available for this project was relatively short, there were no funds available at the present time, and some of our goals rely on the participation of the companies involved in our system. But, as mentioned above, all research results and subsequent recommendations are reliable and valid and should be used by similar endeavors in the future.

4.3 Systems Analysis Diagram

Appendix A shows the relevant campus system which our study focused on. We chose to look at both Aramark and Sodexo's coffee shops on the Studley campus. With resource and time constraints we have limited the scope of our project to the system of components inside the dashed red line. This qualifies the LSC (Life Sciences Centre) Tim Horton's and Food Outlet, the CS (Computer Science) and Killam Library Second Cups under Aramark management, and the SUB (Student Union Building) Tim Horton's and Starbucks Outlet under Sodexo management.

4.4 Actor Groups

Core Actors

- The Consumer- Through demand, the consumer exerts the largest influence on products sold by businesses. They determine what is sold and how it is contained. As well, the consumer controls the quantity of a product sold.
- "Reusable mug" Project Group- Through interviewing and surveying key actors, we have increased our understanding of consumer behavior regarding cup choice. We have also educated the consumer on the impacts of disposable cups on the environment and encouraged them to consider the effects of their consumption.
- Aramark/ Sodexo- These corporations respond to the demands of the consumer and produce the desired product for convenient consumption.

Supporting Actors

- DALGreen- This organization has initiated projects such as the sale of reusable mugs, and in that they are encouraging growth of reusable cup use, therefore affecting the amount of waste produced.
- Reusable Mug Manufacturers- Manufacturers make reusable cups accessible to the consumer in turn increasing the likelihood that they will be used as an alternative.
- Past Reusable Mug Studies- Through their research on the impacts of disposable cups, researchers are ultimately providing the information on which the decision of the consumer will be based.
- Reusable Mug Users- This group has a great potential for influencing other consumers to use reusable mugs through setting an example.

Should-be Actors

- Environment- The Environment is affected through the exploitation of resources to create products, effluents (in the production and transportation processes), and finally in the disposal of the consumed product.

- Dalhousie Facilities/ Waste Management- The University must pay for the removal of campus waste, thus by not encouraging the reduction of waste produced they are spending university funds that could be utilized for other purposes.
- HRM Waste Management- The municipality must also deal with the waste (taking to landfill sites or incineration), and Dalhousie's contribution to this is increasing the rate at which sites reach capacity.

4.5 Perception and Diagnosis of Problem

Reusable Mug Project Group: Our approach was proximate

By recognizing the root cause of excess waste as over-consumption within a capitalistic framework, we are identifying the surplus disposable cups as a symptom of that cause. Our project attempts to promote alternatives to the use of disposable cups by creating solutions, not to the fundamental problem but a symptom of its existence (proximate problem). Properly addressing the fundamental problem would be to curb consumption levels and to provide an alternative measure of success within the economy. This is beyond our scope. We also believe that our project is not addressing the problem symptomatically as that would be dealing with the symptoms of the symptoms of the root problem. An example of this would be working on new ways to store the mass amounts of garbage produced by consumers, or dealing with the pollutants that often contaminate ground water sources.

As for the rest of the actors involved, we can only do our best to try and speculate their view of the problem. Research needs to be done in order to properly deduce their diagnoses. Some of this research will be carried out in the implementation of our project proposal, leaving us with a better understanding of how the consumers at Dalhousie as well as the companies Aramark and Sodexo view the problem of excess waste on campus.

4.6 Limitations and Delimitations

Scope

- We are focusing solely on beverage outlets that predominantly use disposable cups; we were not looking at consumers who purchase from places such as the Gradhouse (where they have in house mugs that they clean for reuse), or beverage drinkers who bring drinks from home.
- By focusing our energy solely on disposable cups (and not all waste), the effect we can have on waste reduction is limited.

Available Data

- Measuring the success of our project in reducing disposable cup use is limited because we are not aware of the total number of disposable cups used on campus.

Influence

- Due to the fact that Sodexo and Aramark have policies that extend past the Dalhousie campus, we are limited in our ability to have influence on these corporations.

Spatial and Temporal

- We are not looking at whole year, but only winter portion (colder months may coincide with an increase of the sale of hot beverages).
- By focusing our education campaign on the Studley campus, our message will only reach a limited amount of the total campus population.
- We realize that not all disposable cups will be discarded on the campus where they are purchased.
- Our survey period partially coincides with roll-up-the-rim purchasing incentive.
- We are unable to address the trends that effect cup use on campus.

5.0 Methodology

Our study is designed to find out about the attitudes, knowledge and actions of both consumers and producers of hot beverages on Studley campus in regard to the use of disposable and reusable mugs. Four main methods were used in order to increase our understanding regarding these areas. A literature review, a consumer survey, key informant interviews, and waste data analysis were performed in order to answer the above mentioned research questions (see 3.1 above). In employing all four methods we hoped to increase the reliability of the information that was gathered; using various methods increases reliability by looking for the same information in multiple ways, ensuring that future research would most likely find the same information. The four methods used were appropriate to our research as they addressed the exact populations that we were studying and the looked at the issue of cup waste in archived literature and physical waste data. These methods combined to increase our understanding of the consumer population, the companies involved, and the actual waste that we were addressing.

The literature review provided background information pertinent to our study. The survey of beverage consumers was designed to address consumer knowledge and action. The interviews were carried out with representatives from the companies in charge of the hot beverage outlets in order to gather information regarding current industry attitude and practice. Waste data collection was used in order to get a better idea about the amount of waste that is created by disposable cups on campus.

5.1 Literature Review

Relevance and Description

Our group looked at similar projects from other universities, as well as studies done by CESR (Corporate Environmental and Social Responsibility) at Dalhousie. Many of the goals of past studies are similar to ours. Therefore, past studies' shortcomings and obstacles can be analyzed and applied to Dalhousie's situation, as well as, past studies' recommendations based on their data, that can be related to the current project.

Procedure:

- Read and analyzed two previous Reusable Mug projects conducted at the University of Waterloo (UW)
- Discussed with students the problems/ opportunities of their reusable mug projects, which were conducted at Dalhousie during the same time period as our own.
- Referred to *Greening the Campus* for project ideas

- Referred to *Research Decisions: Qualitative and Quantitative Research* for information on survey and interview question style, survey format etc.

5.2 Survey

Sampling Method

The survey process used purposive sampling, as only a population of beverage drinkers is required for our understanding of consumer use of reusable mugs. The rest of the Dalhousie University population is irrelevant, and thus will be excluded, as we can assume they do not produce waste from disposable cups.

To make the survey random we conducted the survey at different times of day at various locations around campus. Most often, a random selection of consumers in line were chosen to fill out the survey, but because there were longer lines at different times, the randomness of the survey was based only on a random selection of date, time and location. All the surveys were completed verbally; as the answers were given we recorded them.

Survey Questions (See Appendix B)

Question 1 was asked so that the answers to the rest of the questions could be weighed in relation to frequency of consumption. It was necessary to determine if there was a correlation between high consumption and reusable mug use.

Question 2 serves as a split question for the rest of the questions. Those who answered yes are asked a different set of questions than those who answer no. Therefore, we can determine why reusable mug users do so, and why non-users don't.

Question Yi exists because if someone owns a reusable mug, but uses it very little or not at all, their consumption data belongs in the "no" set of questions. The threshold value to be changed to the "no" section was 3 (out of 10) or below.

Questions Yii-Yiii was relevant to discover what incentives are working to make reusable mug users use their mugs.

Questions Yiv & Niii were designed to determine the potential public support of a reusable mug program and campaign, based on whether waste from disposable cups is deemed "excessive."

Question Ni was relevant to determine if the current economic incentives for reusable mug use is known by consumers.

Question Nii let us know exactly what needs to be changed for reusable mug use to increase.

Question Niv helped us to recognize what would work to convince non-reusable mug users to become users.

Relevance and Description

The survey relevant to the project because the information gathered will give us direction in what actions are most affecting waste production, what attitudes and knowledge are related to these actions. The survey provides valid information regarding consumer practices and can therefore inform an education campaign designed to increase the use of reusable mugs. It also produces information on the use of reusable mugs on campus that will be useful to future projects.

Procedure

- Created preliminary survey questions and structure
- Conducted 5 pilot tests with tentative survey.
- Adjusted survey questions according to pilot test feedback
- Carried out survey in front of the Killam Atrium Second Cup, Student Union Building Tim Horton's and the LSC Tim Horton's; all participants were informed that they were to remain anonymous, etc.
- Created excel spreadsheet for survey results, filled in results.
- Created graphs to illustrate survey results (pie and bar graphs).
- Analyzed Data
- Created academic poster from survey and interview results.

5.3 Interviews

Sampling Method

We used a purposive sampling method in order to interview representatives from the companies that control the hot beverage outlets on campus. Using this method, we selected and interviewed a representative from Sodexo and one from Aramark.

Interview Questions (see **Appendix C**)

The interview was designed with the purpose of furthering our knowledge regarding company attitudes and actions. It addressed existing company policies and possible future initiatives.

Relevance and Description

We interviewed a representative from Sodexo and from Aramark on Studley campus. A series of prepared questions were asked in order to gather information that is pertinent to our research questions (see 3.1 above) The questions helped to determine the degree to which the corporation is willing to participate in incentives for reusable mug use and in an advertising campaign that would inform beverage consumers of the various economic incentives. They also helped us to understand the company's interest in reducing disposable cup production and promoting the sale and use of reusable mugs.

The interview set up the necessary "face-to-face" connection between the suppliers and the researchers who are studying the supply-demand relationship in order to reduce waste. Afterwards, we had a much better understanding of the corporations' motives and knowledge regarding disposable cup use on campus.

Procedures

- Created tentative interview questions and structure
- Conducted pilot test interview
- Adjusted interview questions according to pilot test feedback
- Sent cover letter to companies requesting participation (see **Appendix D**)
- Conducted interviews with both Sodexo and Aramark representatives
- Analyzed the responses to our questions
- Discussed results of interview with group
- Sent recommendations for the new advertising design to Sodexo

5.4 Informal waste-data collection

Relevance and Description:

The waste data analysis was used to find out how many cups (total number) are used on campus each year. This can be found out through the supply end (ordering information), which was possible through the above mentioned interviews (see 5.3 above) Also, by figuring out the weight of one cup and how many cups fit in a garbage bag, compared to the total waste produced, it is possible to figure out the proportion of waste created by disposable cups on the Studley campus.

Procedures

- Contacted Dalhousie Facility Management (Bob Cleveland) and gathered information on the total amount of waste produced on Dalhousie's Studley campus (located in the Canadian Waste Reports).
- Collected disposable cups from around campus and measured the numbers of cups that fit in a 45L garbage bag (average number of cups from 4 different garbage bags). From this information we established the percentage of the total waste produced on the Studley campus that is made up of disposable cups.

5.5 Validity of Chosen Methods

6.0 Analysis

6.1 Analysis of Data

- Our group correlated data to find out what students know and don't know about the benefits (environmental/economic etc.) to using a reusable mug to best inform an education campaign. The survey will also show students' concern about the amount of waste caused by cups.
- From these interviews, we requested purchasing information that will estimate the amount waste caused by cups to later be used in the advertising campaign.
- The results of these inquiries gave the project its "baseline data" so when the results of this and other studies are compiled in the future at Dalhousie, a viable comparison between baseline data and post-campaign-data can be compiled.
- The quality of the work done by past researchers was reviewed and evaluated as to whether or not the results are usable. Taking their recommendation also gave direction to the project.

6.2 Description and Justification of Analysis

Literature Review

All of the past studies analyzed were gathered from the internet and used as a source of inspiration and support for our project. The quality of the work done by past researchers were reviewed and evaluated to see whether or not the results are reliable (repeatable) and valid (having a solid foundation or justification). Taking their recommendations gave direction to our project.

Survey

A sample of ninety-nine university community members was collected and the results were interpreted into generalizations about hot beverage consumption behavior at Dalhousie University.

Our group has correlated the data between reusable mug owners and non-owners and their respective reasons for use and non-use (environment, inconvenience etc.). Additionally we sought to discover factors which would:

- a. encourage the greatest number of non-owners to become owners and,
- b. owners to simply increase their use.

Modal analysis, identification of the most frequent response, was the only statistical protocol used in the analysis of the data. Other responses were considered based on their magnitude of response percentage.

The survey questions (**Appendix A**) were designed and structured to readily divulge generalizations with little else than intuition. For example, one question examined the respondent's the main reason for using their reusable mug; the resulting answers, based on response frequency, uncovered one factor as most prominent. The results then lead our group to pursue emphasis and education regarding that factor. The primary purpose of the data collection and analysis was to guide group efforts into areas that would yield the greatest improvements in reusable mug use and to establish a baseline for future study comparison.

Interview

The data gathered from our interview with Sodexo required minimal analysis. The questions that were asked of the interviewee (**Appendix B**) resulted in data that would either directly reflect corporate operational policy, reflect corporate willingness to participate, or reflect purchasing requirements of their hot beverage vendor.

The purchasing records were the only data that required analysis and manipulation. This analysis is explained under 'Waste Data Analysis'.

Waste Data Analysis

The figures received from the interviews were in number of cups purchased per week, which were then converted to an approximate monthly regime. An average estimate of the number of cups that fit into a known volume was calculated and yielded ratio of cups per liter of solid waste. The mass of one cup was used, multiplied by the approximate number of disposable cups used (assume cups purchased= cups used) to establish the mass of waste created per month by the use of disposable cups. This was then used to calculate the proportion of total solid waste that disposable cups accounted for.

7.0 Results

7.1 Literature Review Results

Past Projects

A report was looked at that had been done by four students at the University of Waterloo in 2001. These students developed a research project that would assess the reasons why beverage consumers did or did not use disposable cups at the Tim Hortons in the Modern Languages building on the University's campus. Their objectives were to find out why reusable mugs were not used. In order to do so they surveyed the consumers and attempted to raise awareness by placing educational signs throughout the building. These signs highlight the consequences of using disposable cups. Afterwards they observed any potential changes in the use of disposable cups after surveys, interviews, and signs were put into place, and to decrease disposable cup use. Their final goal was to increase the use of reusable mugs by implementing a plan that pertained to what the answers recorded in the surveys. Because our project is so similar to theirs, we gained valuable information

from reading their report. For example, they recommended that we place permanent, rather than temporary, advertisements about economic and environmental incentives of using travel mugs at coffee shops around campus. They had hung up paper advertisements, without permission from faculties management, that got torn down every evening and were therefore ineffective. They taught us the importance of working with the faculty and staff in order to accomplish our goals. As a result, we collaborated with staff at Sodexo to implement our plan of placing permanent advertisements at their coffee shops.

Company Websites

Sodexo:

Sodexo's mission to improve quality of life wherever they serve includes statements in support of sustainability. They state that they will improve the environment through "changing our operations, and working with our suppliers and clients." <<http://www.uwaterloo.ca/infowast/watgreen>> Sodexo's commitment to sustainability mandates a working relationship to their clients, in this case the hot beverage consumers at Dalhousie University. This relationship includes the students in ENV5 3502.

Recently, Sodexo opened up a new coffee shop in the SUB which "proudly brews Starbucks coffee." Although the shop is not explicitly called "Starbucks," it is obligated to practice Starbucks' values. Starbucks has an environmental mission statement which states, "Starbucks is committed to a role of environmental leadership in all facets of our business" <<http://www.starbucks.com/aboutus/envaffairs.asp>>. Recently, the corporation conducted a waste audit that indicated paper cups as one of the five dominant wasted materials produced by the company. In an attempt to reduce this waste, they sell and encourage customers to use travel mugs. Unfortunately, they have not been persuasive enough and travel mug use remains quite low (1.7% in 2003). Nevertheless, Starbucks appears to be a willing partner in the quest for sustainable practices and Sodexo's connection to them only increases the potential of our projected goals.

Neither Aramark, Second Cup nor Tim Horton's have published a statement in support of sustainability.

Aramark:

No pertinent information was found.

7.2 Survey Results

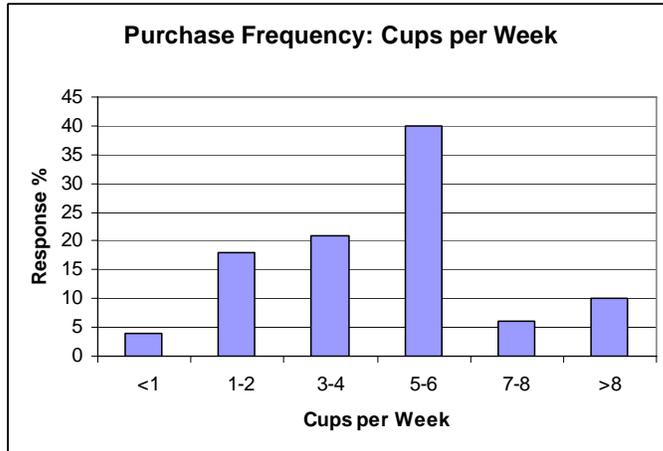


Figure 1: Purchasing frequency in terms of cups per week of the respondents in the survey.

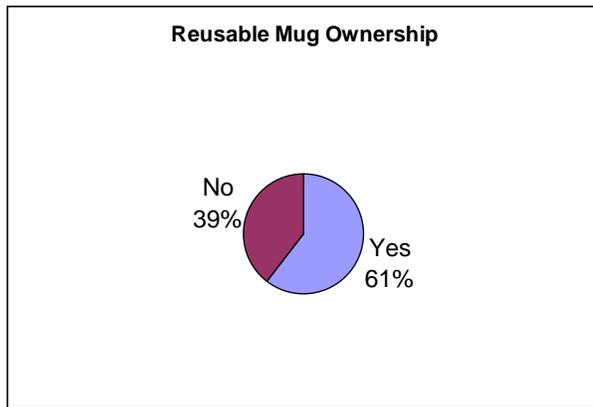


Figure 2: Reusable mug ownership of respondents in the survey

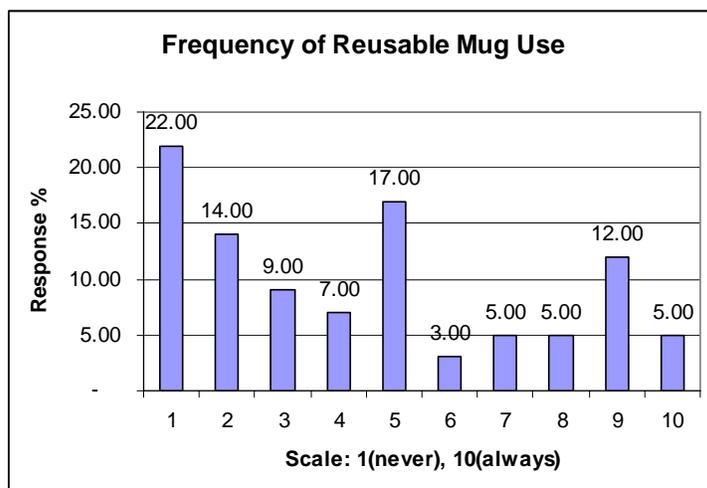


Figure 3: The frequency of reusable mug use among owners of reusable mugs in terms of a 1-10 scale

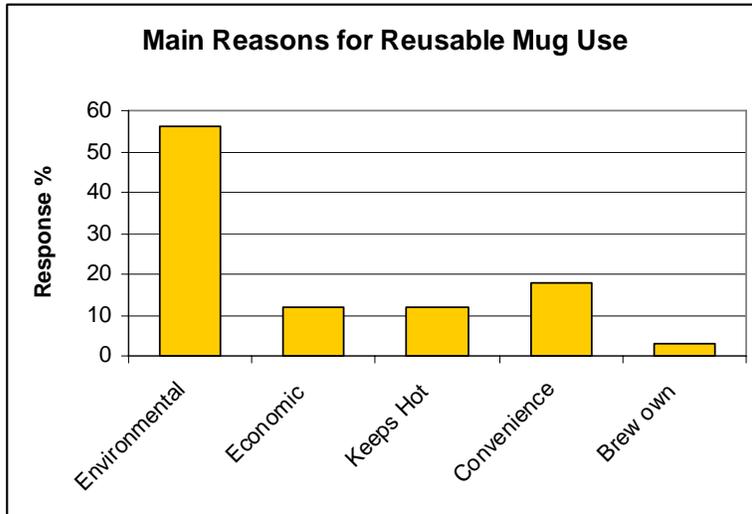


Figure 4: The main reasons for reusable mug use of those respondents who answered positively in terms of consistent mug use.

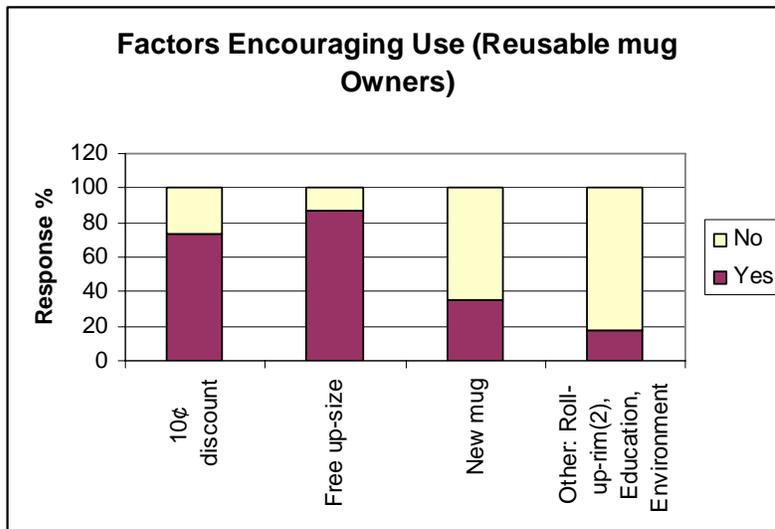


Figure 5: The factors that would encourage mug use among the reusable mug owners

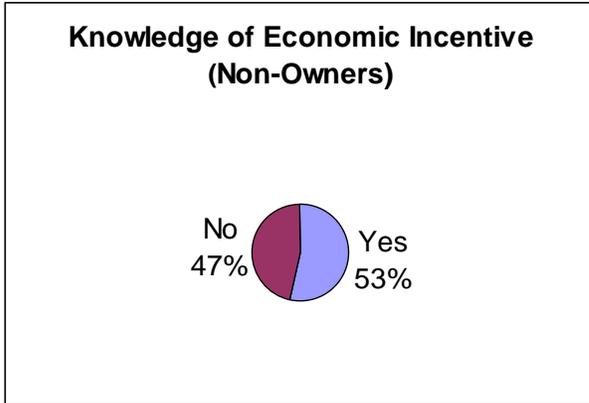


Figure 6: Level of awareness as to the available economic incentive of reusable mug use on campus among non-owners

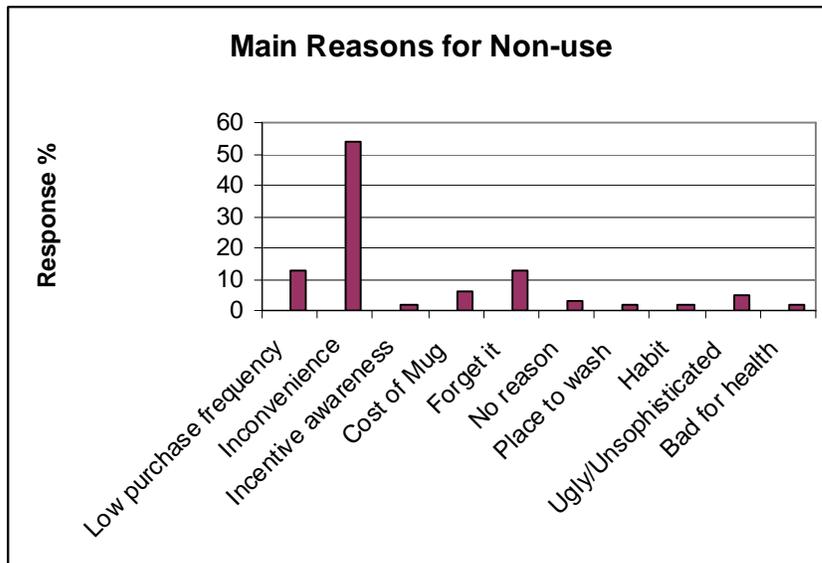


Figure 7: The reoccurring responses as to non-use of reusable mugs among non-owners

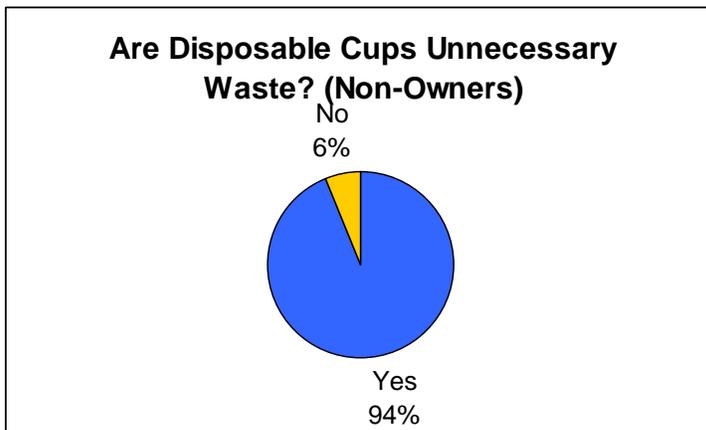


Figure 8: The percentage of respondents who believe that disposable cups create unnecessary waste on campus versus those who believe they do not

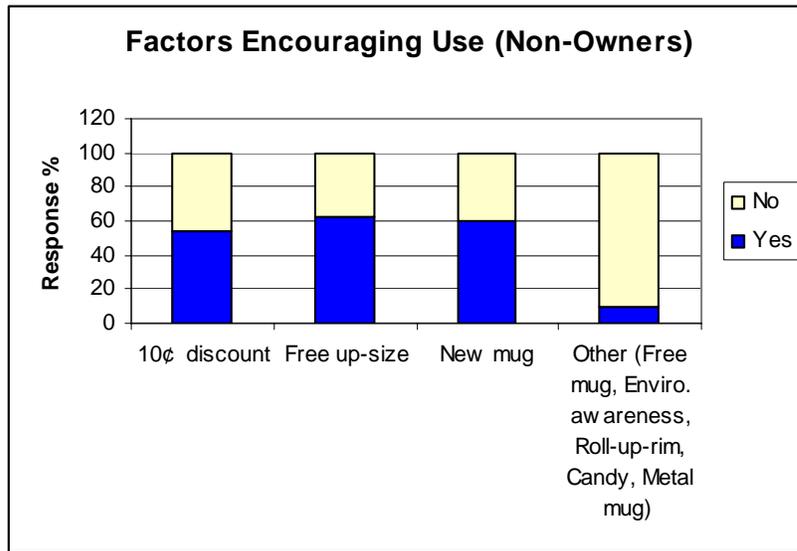


Figure 9: The factors that would encourage reusable mug use among non-owners

Results from Figures

Over half of the respondents (60%) are owners of a reusable mug

Most reusable mug owners (45%) never-rarely use it, even though 95% of people believe disposable cups produce unnecessary waste

For those who use their reusable mug the main reason is environmental (56%)

Main factors that would encourage or increase use:

- 10cent discount (74% yes)

- Free up size (87% yes)

For those who do not own a reusable mug the main reason is inconvenience (54%)

Main factors that would encourage reusable mug use:

- 10cent discount (54%)

- Free up size (62%)

- New mug (60.5%)

Slightly over 50% of non-owners were aware of incentives. This accounts for approximately 33% of people surveyed

7.3 Interview Results

Disposable Cup Use

SUB Tim Horton's: 24,000cups/month, producing 49,440 litres of solid waste

SUB Starbucks: 280cups/month, producing 577 litres of solid waste

LSC and Tupper Tim Horton's: 36,000cups/month, producing 74,160 litres of solid waste

Killam and Comp. Sci. Second Cup: 30,000cups/month, producing 61,800 litres of solid waste.

Sodexo

Sodexo recognizes their duty to protect the environment and have policies in place reflecting their commitment. This attitude was also evident in their enthusiasm and willingness to participate and implement our recommendations for advertising.

Permanent advertisements have been placed in coffee shops outlining the incentives offered to reusable mug users.

We also found that Sodexo has existing incentives in place which include: Tim Horton's: \$0.10 off or an upsized drink; Starbucks: \$0.25 off for a small mug or \$0.45 off with a large mug.

Sodexo was very forthcoming with disposable cup purchasing figures and with a general break down of costs associated with hot beverage sales:

- Cost of cup and lid
- Cost of cream and sugar
- Cost of beverage
- Profits

Aramark

Aramark has no recorded environmental policy. Although interview scheduling proved difficult, Aramark was helpful in acquiring disposable cup purchasing data and appear willing to aid us in promotion of incentives to Dalhousie community members.

Existing Incentives: Second Cup: \$0.10 off or upsized drink.

Additionally we discovered that Aramark, and most likely Sodexo, is on a 5 + 5 contract with the university. This means that they perform fulfill their contract for 5 years then are reviewed and continue for another 5 years if their performance has been satisfactory. Aramark and Sodexo do not have full control over franchise operations. Many procedures are dictated according to franchise established guidelines. Charging consumers who bring their own mug is one such instance.

7.4 Waste Data Results

Waste Management Statistics: 10 tonnes/month of waste is produced on the Studley campus

Garbage bag analysis: 2.06 cups/litre

1 cup and its top \approx 14.15 grams

14.15 g/cup (2.06 cups/liter) = 29.15 g/liter of cup waste

Therefore, in every liter of cup waste there will be 29.15 grams of waste.

Then, using the information of cup sales from the interview results (see section 7.3 above), and assuming that Studley campus uses half of the Studley/Carleton figures, we can figure out the approximate mass of waste produced by cups per month.

$[(\text{SUB Tim Horton's: } 24,000\text{cups/month}) + (\text{SUB Starbucks: } 280\text{cups/month}) + (\text{LSC and Tupper Tim Horton's: } 36,000\text{cups/month} / 2) + (\text{Killam and Comp. Sci. Second Cup: } 30,000\text{cups/month} / 2)] = 57280 \text{ cups/month used by industry on the Studley Campus}$

Proportion of waste on Studley campus produced by cups:

$\{(57280\text{cups/month}) (14.15\text{g/cup})\} / \{(907 \text{ 180g/ton})(10\text{ton/month})\} = 0.08934 \approx 9\%$ of waste produced on Studley Campus is in the form of disposable cups

This equates to approximately 27 806 liters of cup waste per month. (Which could fill 12 Volkswagen Beetles!)

8.0 Discussion and Conclusion

The problem addressed in this report is that of the waste produced through the use of disposable cups for hot beverage consumption on the Studley Campus at Dalhousie University. The purpose of the research that was performed was to gain an understanding of existing research, gain an understanding regarding consumer attitudes and practice, gain an understanding regarding company attitude and practice, and gain an understanding regarding actual physical waste at Dalhousie.

8.1 Significant Findings

Survey

Through the results of the survey, as shown above, we were able to draw on some key findings that should be highlighted. These are as follows:

- *Motives:* Though 63% of respondents said that they own a reusable mug, a 45% of them rarely or never use it. The main reason given for non-use was inconvenience. Interestingly, just under 20% of reusable mug owners listed “convenience” as their reason for *using* a reusable. Convenience clearly plays a large factor in decision making, most significantly as a negative impact on reusable mug use.
 - It is interesting to note, however, that what some find to be increasingly convenient, others see as inconvenient. This clearly shows that the issue of convenience is not fixed, but a matter of flexible opinion, able to be changed through education and advertising. Future groups thus can focus on increasing convenience of reusable mugs by creating free of use wash and/or locker stations for mugs, or more simply and effectively changing public opinion on convenience.
 - For those who do use their mugs regularly, the majority (56%) do so for environmental reasons
- *Monetary:* For those who already use reusable mugs, economic incentives are the primary reason they stated to increase their current use of their mugs. To the non-user/ rare-user of mugs, the economic incentives would encourage approximately half of them to use their mug more often.
 - Only 53% are aware of the economic incentives of reusable mugs.
 - Monetary reasons, however, are not as significant as issues of convenience. An increase in *awareness* with respect to economic incentives would reduce disposable cups, as more than 10% of those who use reusable mugs do so for the money savings.

Therefore, we can assume that permanent and clear advertising of incentives and an increase in monetary incentives would increase reusable mug use; environmental awareness would also spur an increase in reusable mug use. These may work to override issues of convenience, but ultimately the issue of convenience needs to be addressed as it was such a large determining factor.

Interview

Upon meeting with a Sodexo representative, we discovered the economic incentives that the company offers to reusable cup users.

Our main objective was to place permanent advertisements in their coffee shops on campus. To our surprise, we learned that the representative had already placed an ad in the new Starbucks in the Student Union Building. We went to look at the sign and decided that some changes needed to be made to increase its effectiveness. We emailed

the representative our suggestions and she responded with gratitude. We were impressed with Sodexho's willingness to co-operate with us and look forward to working with them in the future.

8.2 Consideration of Findings in Light of Existing Research

The results of the survey illustrate that, despite the differing external factors that can affect a universities' population, much of our results match those of the studies conducted at the University of Waterloo. One significant parallel conclusion is the identification of a number of incentives that would increase the reusable mug use. The main incentive found in both research instances was the advertisement of the discount received with the use of a reusable mug. As well, both studies revealed that the major reason for not using a reusable mug was a lack of convenience. This includes carrying a mug, and cleaning after use.

In this way, our project fit into the existing research, confirming that which has been found by preceding research, and added other insights.

8.3 Implications for Future Theory/Practice

- By creating a knowledge baseline for subsequent ENVS 3502 projects, our research will have influence on future project theory. Key survey findings can be used to inform any future education campaigns as they indicate which areas relating to consumer consumption patterns require change. Through our projects recommendations, our research will have implications on the practice of students next year, and in years to come.
- New signs posted at the Tim Hortons and Second cup will continue to inform consumers of the economic incentive to bring a reusable mug, and hopefully work to influence their practice.
- Surveys and interviews have created awareness concerning the issue of disposable cup use for those involved, therefore influencing personal and corporate practice. As well, by creating positive relationships with those corporations that hold control over policy, future projects will have the ability to build upon these relations and further influence corporate practice. Key interview findings can be utilized to inform any future action taken to promote industry involvement.
- The projects resulting academic poster will educate the university body as to the problem of excess waste on campus, the impact of disposable cup use and the results of our research.
- Due to the limited scope, time, and experience in the research conducted, I don't believe it will have much effect beyond the scope of Dalhousie and possibly the surrounding community.

8.4 Recommendations for Future Research:

- Take action to implement and advertise incentives that were shown to affect reusable mug use.
- Design and implement a week long education campaign (based on the results of this projects research) to inform Dalhousie's consumer body. This could include posters, information table, etc.
- Do a "life cycle analysis" of cups for education purposes. This will encourage people to recognize the impact of disposable cups.

- Research ways to make reusable mugs more convenient for consumers.
- Design stickers for reusable mugs, with environmental or personalized messages that allow individuals to personalize their cups. Contact NSPIRG and Students for a Green Politics and Activism (SGAP) for funding and stickers.
- Future lug-a-mug project groups should contact all Dalhousie and Kings University environmental groups that involve environmental projects in an effort to combine resources and knowledge to produce the most effective education campaign.
- Create a proposal for the Frosh week planning committee that states the need for informing the new generation of Dalhousie students of the importance of sustainable consumption, and reducing Dalhousie's footprint. They could include the upcoming sustainability handbook (contact Adam Popper) as well as Sodexo mugs in their frosh goodies.
- Obtain disposable cup sales records for (~5 years) the purpose of analyzing to see if there are any patterns in purchasing (ex. Increase/ decrease in sales)

For Increased Sustainability

- Create a proposal which states the need to incorporate environmental criteria into prerequisites for the food service contract when it is up for renewal.

Cooperate with Sodexo/Aramark by

- Encouraging them to donate Sodexo "enviro-mugs" for education campaign.
- See that permanent incentive signs are placed at all coffee shops on campus.
- Work with the company to create an alternative contest to "Roll-up-the-Rim" that is applicable only to reusable cup users. This would motivate consumers to bring their reusable mugs during the popular "Roll-up-the-Rim" contest. For instance, every time a consumer brings a reusable mug during the contest, they can enter their name into a jar for a draw. Prizes could be donated from the Grawood, the Gradhouse, Pizza Pizza, or environmental friendly businesses such as Mountain Equipment Coop, etc.
- Encourage Sodexo to educate Tim Horton's staff about the reasons why students bring reusable mugs. They need to know that pouring drinks into disposable cups and then transferring them into reusable cups defeats the purpose of bringing a reusable mug.

8.5 Concluding Remarks

This project sought to answer a number of questions regarding consumer and industry actions and attitudes regarding waste produced by the use of disposable cups for hot beverage consumption on the Studley Campus. Validity was high in so far as we answered all of the research questions that we set out.

The project is meaningful to those involved in so far as it supplies pertinent information regarding waste on the Dalhousie campus. The data provided in this report is valuable for use in education campaigns and further research that will address the issue of waste on campus. Actions that were informed by the research have already begun, and further action and research is pending. Ultimately, this project reached its goal in affecting the greening the campus movement at Dalhousie.

Appendix A – See web site for link.

Appendix B: Survey

1. On average, how many times do you purchase a hot beverage each week on campus?

- a) Less than once per week
- b) 1-2
- c) 3-4
- d) 5-6
- e) 7-8
- f) More than eight

2. Do you own a lug-a-mug? (Optional Definition: "A Lug-a-Mug is a reusable/non-disposable mug that is carried around, and available for repeated use.")

If Yes:

y.i. On a scale of 1 to 10, 1 being never and 10 being always, how often do you use your mug? 1-3/4-10

y.ii What are your main reasons for carrying a lug-a-mug?

- a) environmental
- b) save money
- c) trendy
- d) all of the above
- e) other:_____

y.iii To each of the following, answer 'yes' or 'no' as to whether the incentive would further encourage you to use your mug:

- a) a 10 cent discount
- b) an upsized coffee at no extra charge
- c) a new mug
- d) none of the above
- e) other:_____

y.iv Do you believe that disposable cups produce unnecessary waste on campus?

If No:

n.i Did you know that economic incentives are offered to consumers who use Lug-a-Mugs?"

- a) yes
- b) no

n.ii What are your main reasons for not carrying a lug-a-mug?

- a) Don't buy hot beverages often enough to use one
- b) Inconvenience
- c) Not aware of the economic incentives
- d) Lack of interest in environmental issues
- e) Other:_____

n.iii Do you believe that disposable cups produce unnecessary waste on campus?

n.iv To each of the following, answer 'yes' or 'no' as to whether the incentive would encourage you to become a lug-a-mug user:

- a) a 10 cent discount
- b) an upsized coffee at no extra charge
- c) any of the above
- d) none of the above
- e) other:_____

Appendix C: Interview Questions

1. Does your organization have any environmental or procurement policies? If so, what do they include?
2. Would it be possible to get a figure regarding the total number of cups purchased per year/month?
3. Does the use of disposable cups affect your profits in any way? (Sodexo)
4. What are your existing policies/procedures regarding the sale of hot beverages to reusable mugs carriers (incentive)?
5. Do you sell reusable mugs?
6. If yes, would you consider making these more accessible by decreasing price or selling them through a student-run campaign?
7. Would you consider increasing these incentives to improve your environmental image and possibly save on disposable cup expenses?
8. Past projects considering disposable cup use have recommended the use of permanent signs at vendor locations that inform customers of the incentives involved with using reusable mugs. Does this sound like a realistic goal to you? How often do you change your signs?
9. Would you like your participation to be advertised in any future efforts to increase the use of reusable mugs?
10. What kind of contract do you hold with Dalhousie University? (Aramark)

Appendix D: Cover Letter to Interview Respondents

Dear Participant;

We are a group of students from an undergraduate Dalhousie course called Environmental Problem Solving (ENVS 3502.03), and we are writing to you concerning your possible involvement in our Greening the Campus project. The Greening the Campus movement has been around for decades on hundreds of campuses; it seeks to research those practices on campus that are proving to be detrimental to the environment, both on campus and in greater community, and work to make them more sustainable. Our specific project is looking at the use of disposable cups on the Dalhousie campus, how their use could be affecting the environment, and what possible measures could be taken in order to address any possible negative consequences of their use. In addressing these possible solutions we are seeking to work both with students, staff and faculty at Dalhousie (the consumer body), and the companies that are directly involved with beverage sales on campus.

In order to conduct our initial research, it is vital for us to speak with a representative from [Sodexo/Aramark] in order to increase our knowledge pertaining to cup use, sales, and possible efforts leading to waste reduction on the Dalhousie campus. More specifically, we would like to speak to you about your existing environmental policies and procedures, and how your cooperation in our “lug-a-mug” campaign could ultimately fuel more sustainable practices.

Your participation in an interview with a representative from our group would be greatly appreciated. Further participation will be discussed in the interview itself, as will the issue of our use of the information we obtain from you. For example, if your company responds favourably to our project, advertisement within our “lug-a-mug” campaign may not only increase waste awareness, but also bring attention to the companies that are involved in the initiative to reduce it.

We thank you for your time and cooperation. A representative from our group will be contacting you in the near future. If you have any questions or concerns you may contact:

Dr. Tarah Wright

Office: LSC 821

Phone: 4943683

Email: tarah.wright@dal.ca

Sincerely,

Adam Popper, Sabrina Malach, Johanna Kalkreuth,
Julia Kemp, Tyler Field and Jessica Alsop

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APPENDIX A: Physical system

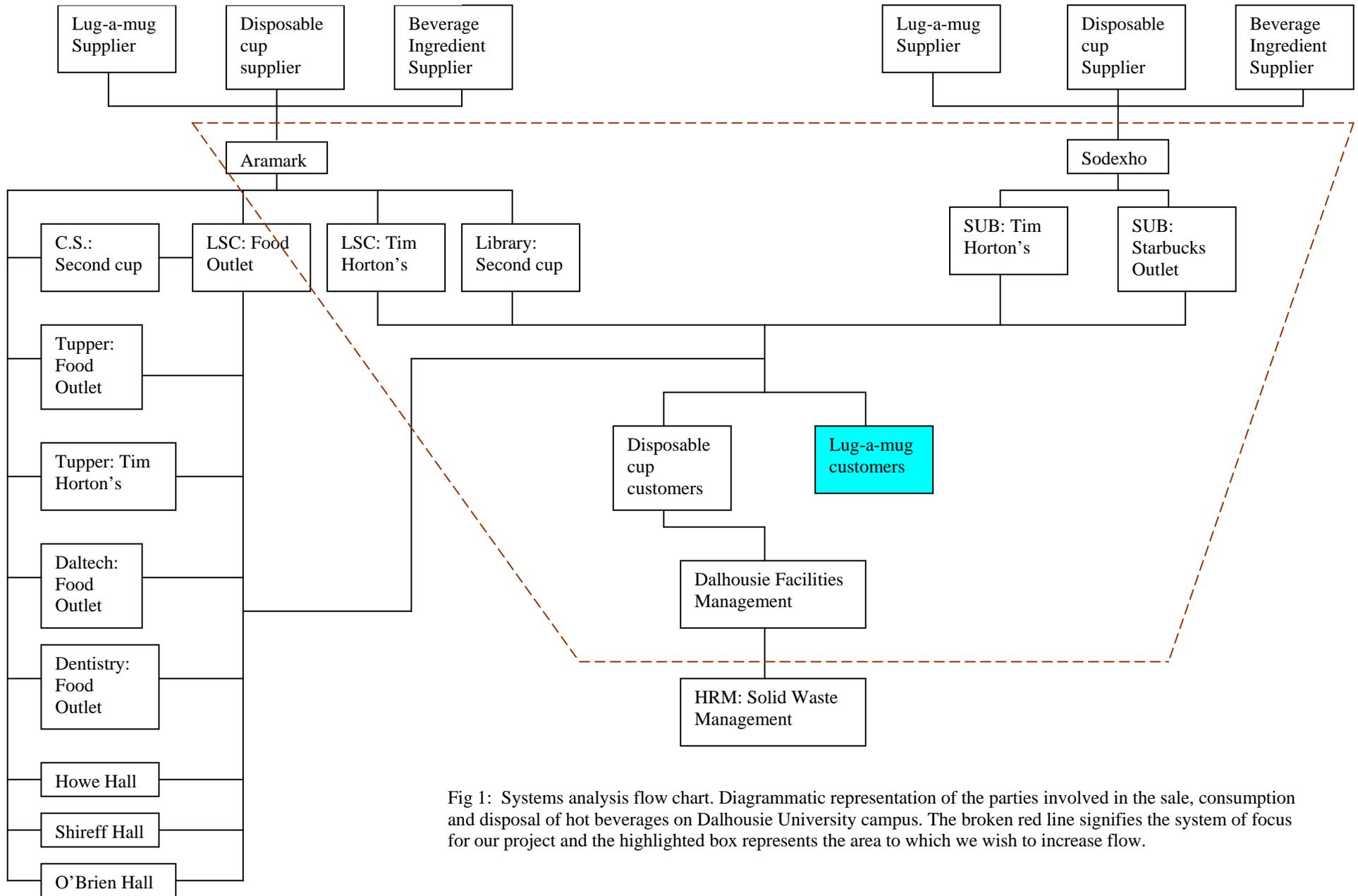


Fig 1: Systems analysis flow chart. Diagrammatic representation of the parties involved in the sale, consumption and disposal of hot beverages on Dalhousie University campus. The broken red line signifies the system of focus for our project and the highlighted box represents the area to which we wish to increase flow.

