

# RESEARCH INTO DALHOUSIE WATER CONSUMPTION THROUGH DRINKING FOUNTAIN USAGE

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## PREPARED FOR

Janice MacInnis, Coordinator  
Organizational Health, Dalhousie University

## TO

Rochelle Owen, Director  
Office of Sustainability, Dalhousie University

## AND

Paul Sylvestre, Project Mentor



## SUBMITTED BY

K. Binns // L. Dykhuis // E. Matland // C. Moran // K. Tomany

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## EXECUTIVE SUMMARY

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In our developed society, there exists a social stigma concerning drinking water from municipal sources (Pritchard, 2009). Some people would rather drink bottled water than indulge in a free resource that is easily accessible to them. The rumor of unhygienic water has no grounds of truth, as the municipal governments require their water to be tested much more often than the owners of various bottled water companies (AllAboutWater, 2004).

This project aims to determine whether there is a simple way to increase the amount of water fountain usage rather than resorting to drastic measures, such as a campus wide bottled water ban. Initially, the research group circulated an online survey to the staff at Dalhousie University to gauge their feeling towards campus fountains. The main focus of the research for this study involved monitoring three high traffic fountains around the Dalhousie Campus. After a baseline study of monitoring was done, informative posters were implemented near the observed fountains to encourage individuals to drink more fountain water. After the posters had been up for a mere week, research showed that the signs did indeed cause a small increase in the amount of fountain usage.

The collected data could be used for many recommendations concerning the water fountains of Dalhousie. Some fountains around campus could be restored or thoroughly cleaned to reduce negative feelings towards them. It was also found that the use of promotional posters encouraging the use of water fountains, as well as posters giving directions to the closest water fountain do not lead to an increase in water fountain usage.

# INTRODUCTION

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## Background

There is growing scientific consensus that human civilization is currently exceeding the ecological limits of the planet: people are living a infinite lifestyle in a finite world (United Nations, 2012). The rapid consumption of resources is degrading our planet at many scales. It is generally accepted that humans are, at least partly, to blame for the alterations of the global climate because of our intensive greenhouse gas emissions (Crowley, 2000; IPCC, 2007). Therefore, it is of the utmost importance that humans attempt to move into a more sustainable lifestyle in the upcoming years to ensure the continuance of our fertile and unique planet.

With the desire to change our overly consumptive behaviors, the innovative race is on to develop newer and greener technologies. Eco-friendly products are popping up more and more often in our popular stores. Although it appears marketers seem to be recently focusing on coming out with environmentally friendly products, the focus should also be on making cutbacks in consumption wherever possible. Consumption per capita is much higher than it was 100 years ago and many scientists believe natural resources are being consumed far too quickly due to constantly increasing consumerism (Arrow, 2004). Environmentally friendly materials are a step in the right direction, but there are many changes which can be made to cutback on resource usage in daily life. One major avenue for improvement involves altering how drinking water is consumed. Clean drinking water is essential to human life and influencing people to choose free drinking water over bottled alternatives could save a lot of emissions as well as natural resources.

Despite the fact that Canadian drinking water is naturally of excellent quality, many people choose to consume bottled water. This is likely because of the perceived purity and superior quality of bottled water over public drinking water. Bottled water companies profit off the fear among the North America population of their public drinking water, which causes people to increase wastes by purchasing bottled water rather than using free tap water (Pritchard, 2009). This fear, however, is not based in fact. Canadian water is required to undergo many intensive guidelines to assure its natural high quality is maintained (Health Canada, 2011). The guidelines include monitoring of microbials, chemicals, pH's and various aesthetics (such as taste). In Halifax, the drinking water is tested more thoroughly than bottled water: it is tested a minimum of two times a week at 48 different locations in the urban area (Halifax Water, 2011), whereas bottled water companies are only required to test their water once a week (AllAboutWater, 2004). With such high quality drinking water at our fingertips, bottled water seems like a waste of resources as well as money.

In a study done around Dalhousie campus by students in 2011, the students sampled 10 water coolers around campus and compared their findings to the quality of Halifax drinking water and found they were each of similar quality (MacDonald et al., 2011). Furthermore, according to a fact sheet created in Dartmouth College in Hanover, New Hampshire, the manufacturing of a bottle of water uses twice the amount of water than what actually ends up in the bottle, not to mention the hidden transportation costs and associated emissions (Dartmouth Sustainability Initiative, 2009). The fears that bottled water companies have instilled into our populations have no basis in fact. Public drinking water is of equal, if not better quality than that of commercial bottled water (Pritchard, 2009).

Despite the quality of Canadian drinking water, studies have found a growing decrease in the number of water fountains per university (Polaris, 2009a). This effectively limits people to purchasing beverages or bringing refreshments from their home. A cross-Canada online survey created by the Polaris Institute and the Canadian

Union of Public Employees found that 33% of the individuals who answered the quiz said they have noticed decreased access to drinking fountains across their campuses. Their findings also noted that many fountains were simply broken and neglected or blocked by bulky beverage vending machines (CCPA, 2008). Such inconveniences confound attempts to promote the usage of the tap water at institutions.

In an effort to combat the consumption of bottled water, some educational institutions, such as the University of Winnipeg, have placed bottled water bans on their campuses. They insist that their population drink their tap water (Polaris, 2009b). The students were the motivating forces for the ban. They viewed bottled water as a waste of resources and insisted that their drinking water was of great quality. Other universities such as Memorial, Ottawa, Queens, Guelph and Ryerson have also attempted to increase the use of their drinking water fountains around campus by similar means (MacDonald et al., 2011).

## **Rationale**

There is growing scientific consensus that human civilization is currently exceeding the ecological limits of the planet: people are living a infinite lifestyle in a finite world (United Nations, 2012). The rapid consumption of resources is degrading our planet at many scales. It is generally accepted that humans are, at least partly, to blame for the alterations of the global climate because of our intensive greenhouse gas emissions (Crowley, 2000; IPCC, 2007). Therefore, it is of the utmost importance that humans attempt to move into a more sustainable lifestyle in the upcoming years to ensure the continuance of our fertile and unique planet.

With the desire to change our overly consumptive behaviors, the innovative race is on to develop newer and greener technologies. Eco-friendly products are popping up more and more often in our popular stores. Although it appears marketers seem to be recently focusing on coming out with environmentally friendly products, the focus should also be on making cutbacks in consumption wherever possible. Consumption per capita is much higher than it was 100 years ago and many scientists believe natural resources are being consumed far too quickly due to constantly increasing consumerism (Arrow, 2004). Environmentally friendly materials are a step in the right direction, but there are many changes which can be made to cutback on resource usage in daily life. One major avenue for improvement involves altering how drinking water is consumed. Clean drinking water is essential to human life and influencing people to choose free drinking water over bottled alternatives could save a lot of emissions as well as natural resources.

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## RESEARCH METHODS

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The report investigates the usage of water fountains in three buildings on Dalhousie's Studley Campus. In the course of the research, both quantitative and qualitative methods of inquiry were used. The research consisted of four stages: (1) establishing baseline data for current fountain usage; (2) a poster campaign to promote water fountain use; (3) observation of fountain usage after the campaign; and (4) a qualitative survey of Dalhousie employees on fountain usage.

The first three stages of research were designed to gather quantitative data on current fountain usage. The qualitative surveys in stage four were designed to complement the data gathered through the quantitative observations. The questionnaires asked Dalhousie employees about their beverage purchasing habits, their thoughts on the importance of hydration, and their inclination to use the drinking fountains. Together, these research methods combine to give a more complete picture of the fountain use and employee perceptions at Dalhousie.

For the first stage of the research, it was necessary to establish baseline data of fountain usage. One fountain was chosen in a central location of Henry Hicks, Marion McCain Arts and Social Sciences, and Mona Campbell buildings. Each fountain was monitored for thirty minutes each day during the working week (Monday-Friday, 8-5). Five observation periods were selected, three in the morning and two in the afternoon. The time slots were scheduled around standard Dalhousie class breaks, with observations beginning ten minutes before and ending ten minutes after each break. It was assumed that water fountains would have higher usage during class breaks; so by sampling before, during, and after the breaks, a more accurate sample would be obtained. A schedule of fountain monitoring can be found in the schedule section of the proposal. During observation, each usage of the fountain was tallied. As "usage" can be an ambiguous term, for the purpose of this audit, usage was defined as "a person using the fountain for the purpose of drinking or filling a water bottle." To measure the usage of the fountains, criteria was set that fit in to the categories of built environment, social environment and circulation. The number of individuals using the fountain for the purposes previously stated will be tallied.

The second part of the research involved disseminating informational materials and signs that promote usage of the drinking fountain water. These signs were placed in areas of high visibility to emphasize the location of nearby fountains. Two buildings, the McCain and the Henry Hicks, were chosen to display the promotional materials, while the Mona Campbell building was not. The building without the promotional materials served as a control sample. The other two buildings were the experimental samples. The promotional materials were in place for one week prior to the second round of observations.

The third part of the study involved repeating the fountain monitoring after implementing the promotional materials. The observations followed the same method as the first stage of the study. The same fountains were observed thirty minutes per day for a week, replicating the original observations. The times of observations were consistent with the first observations. The results of the two rounds of observations were compared to determine if significant differences in usage occur with the addition of promotional signage.

The fourth aspect of the study involved a second data collection method. Qualitative surveys were sent to faculty, staff and administration on Dalhousie campus to collect data about their water fountain use. The survey was purposefully delimited to target only Dalhousie employees, as they were the main group identified for research. Dalhousie employees are important to focus on because they are a constant presence, where students come and go in four-year cycles. The surveys were sent by email through specific online databases, such as Notice Digest and the Office of Sustainability's blog. The online survey was chosen for its ease of

distribution to and submission by staff. The survey was kept open for one week from March 19th until March 23rd, 2012. In an attempt to encourage Dalhousie employees to fill out the online survey, there was a prize of a \$20 gift card to Mountain Equipment Co-op (MEC).

There were several limitations in the study. The foremost limitation of the quantitative study is the small sample size of observations. Due to time constraints and researcher schedules, the fountains were only able to be monitored over a short period (two weeks) and in limited time intervals (30 minutes per day). This may have had an impact on the certainty and significance of the results. Furthermore, there was also a delay in conducting the second round of monitoring. This was caused by delays in obtaining approval for the posting of the promotional materials by building management. This caused a separation of the two rounds of observation greater than that originally designed in the proposal. The increasing temporal distance of the two rounds of observation could negatively affect on the validity of the study, due to the increased likelihood of changes in behavior outside the design of the study occurring over this period. Also, a confounding variable was encountered in the process of conducting our study. In the second round of observations there was a heat wave, where temperatures were as much as 35 degrees Celcius greater than in the initial observations. This could have a large effect on the results observed and on the validity of our study.

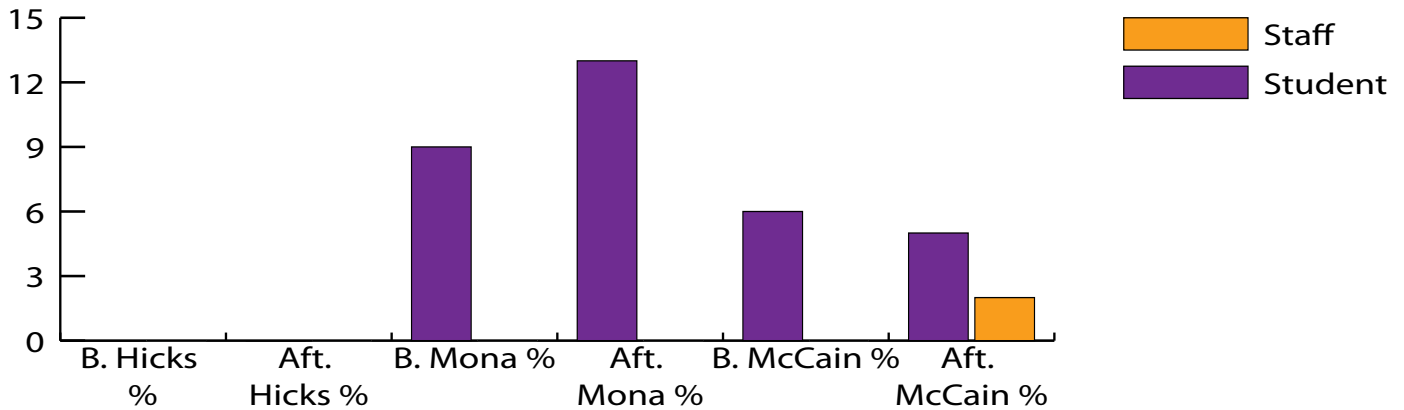
# RESULTS

## Before and After Comparison

From the water fountain observations, it was possible to determine the relative usages of the water fountains in each of the buildings. The McCain building had the most usage both before and after the addition, with an average 10.5% of general traffic using the fountain; this was followed by the Mona Campbell building (%) and then the Henry Hicks (2.5%).

### Before and After Campaign

Monday



Tuesday

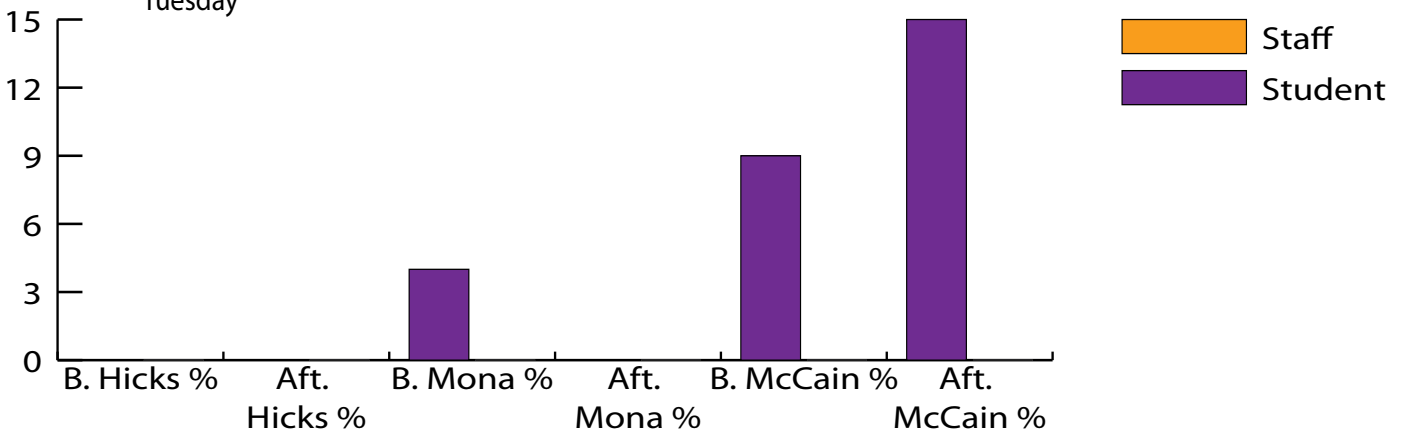


Fig. 1 Three buildings percentages Monday and Tuesday.

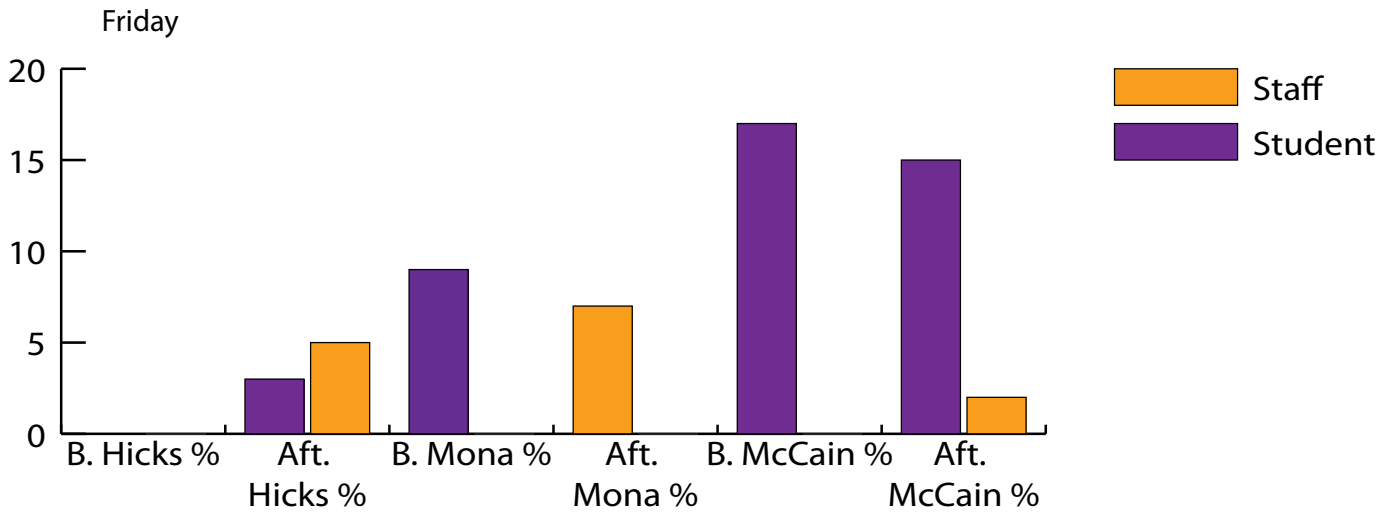
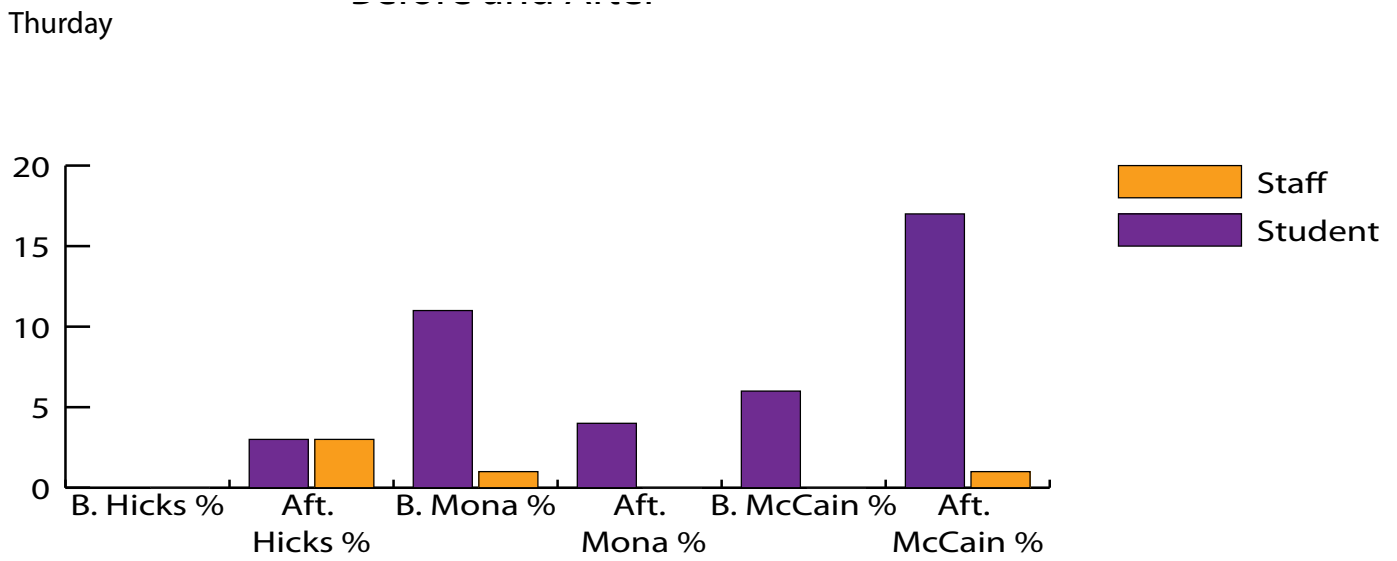
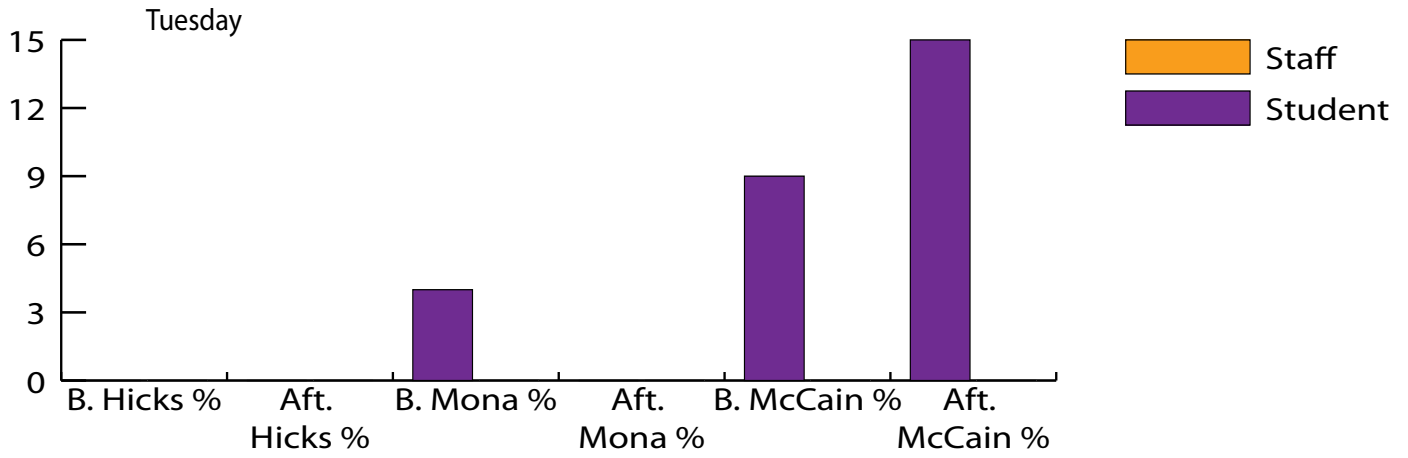


Fig. 2 Three buildings percentages Wednesday to Friday.

## Online Survey

Faculty 85% Staff 87% Student 1% Other 4%

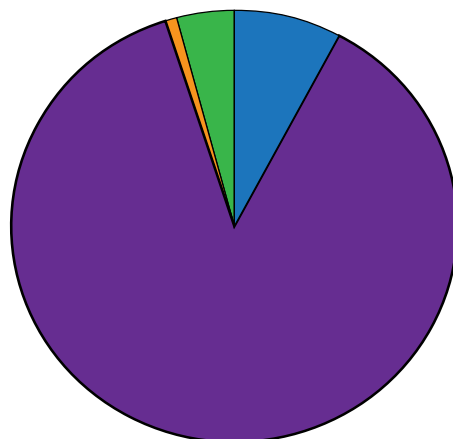


Fig. 3 People who took the survey

## How often do you purchase a beverage on campus?

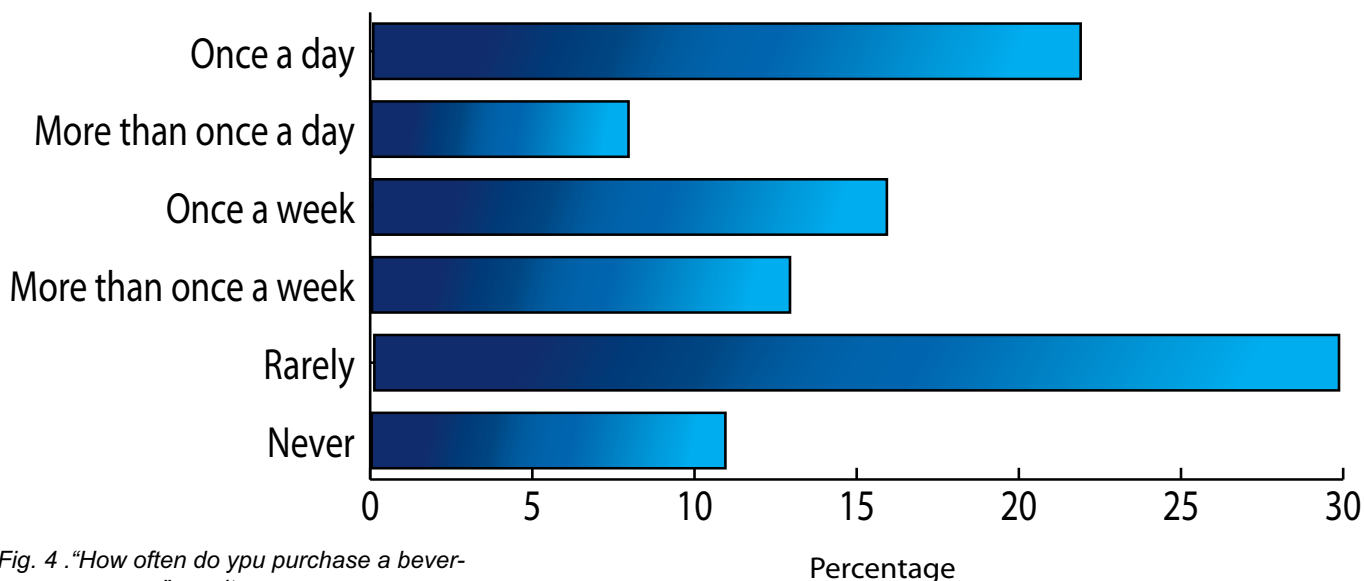


Fig. 4. "How often do you purchase a beverage on campus" results.

## What type of beverage are you most likely to purchase?

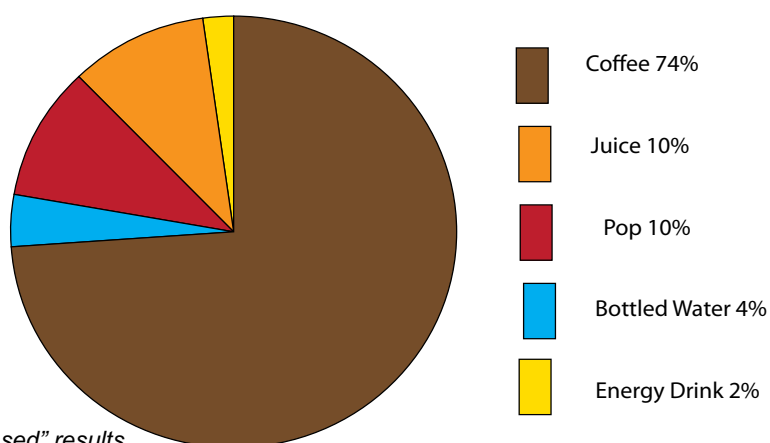


Fig. 5. "Type of beverage purchased" results.

### How often do you use a water fountain on campus?

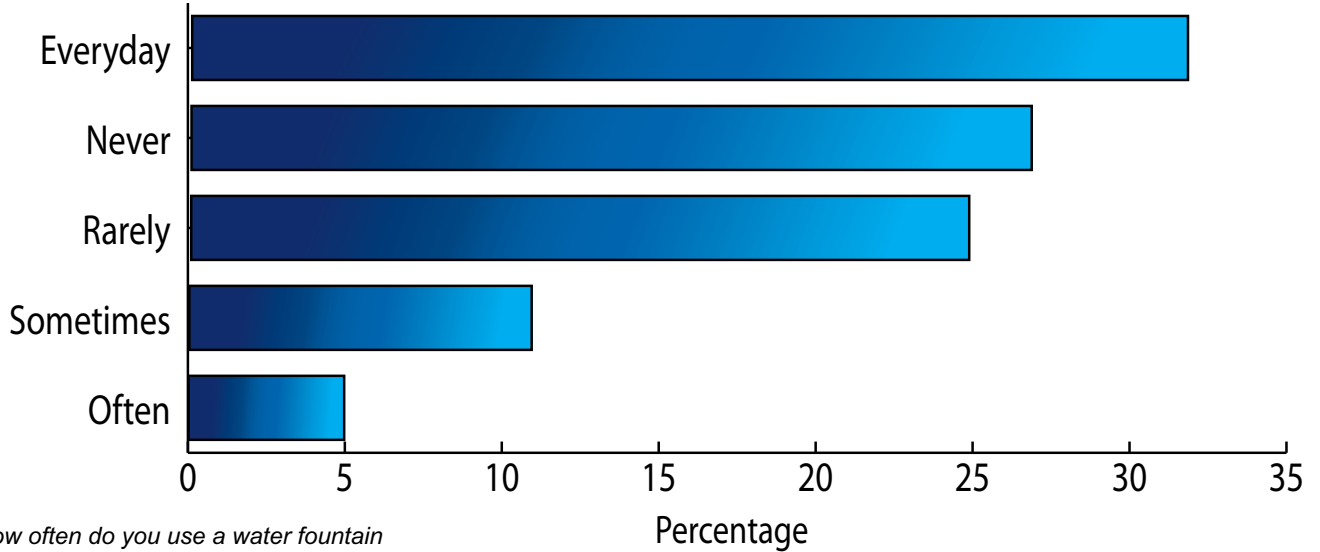


Fig. 6. "How often do you use a water fountain on campus" results.

### Do you bring a reusable water bottle to campus?

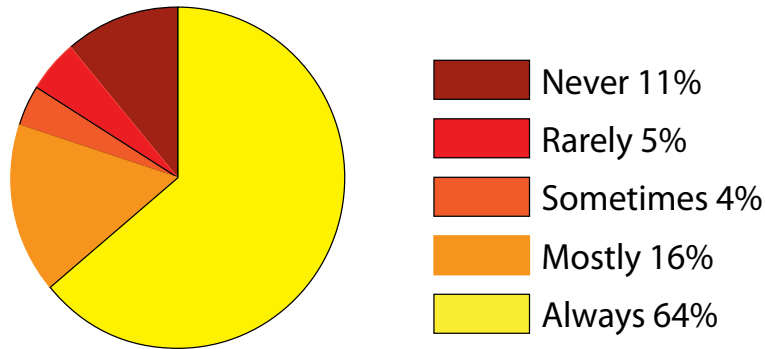


Fig. 7. "Do you bring a reusable water bottle to campus" results.

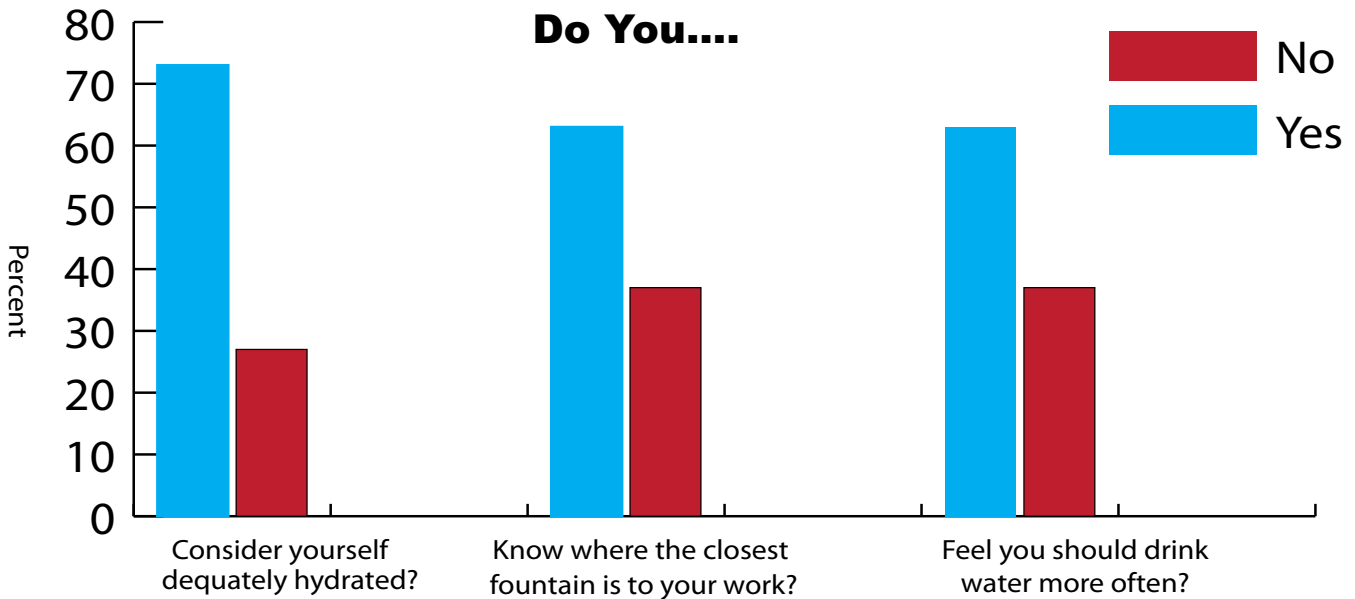


Fig. 8. "Do you.....YES/ NO" results.

## How important is hydration to your health?

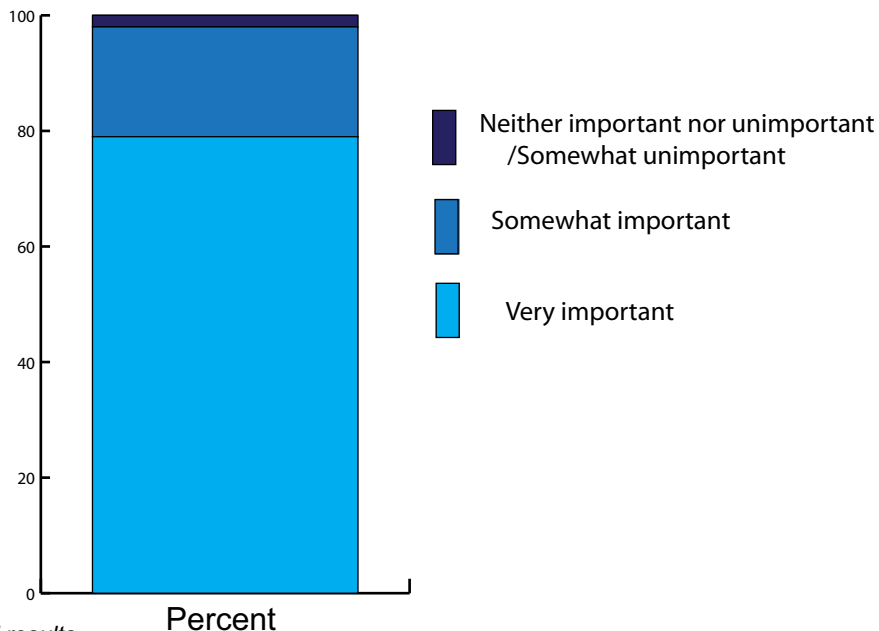


Fig. 6. "How important is hydration" results.

## How likely is the convenience OR improved visibility of the water fountain to affect your usage of the fountain?

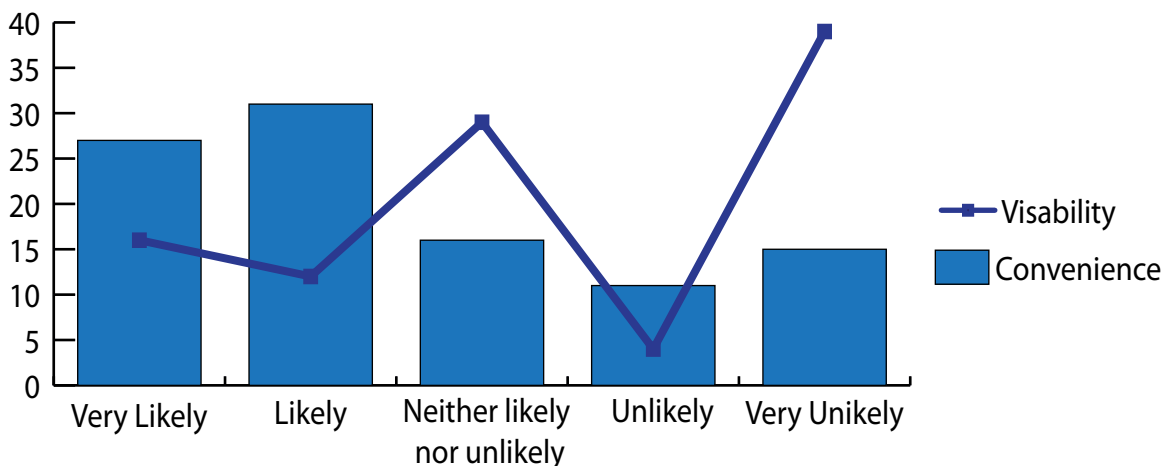


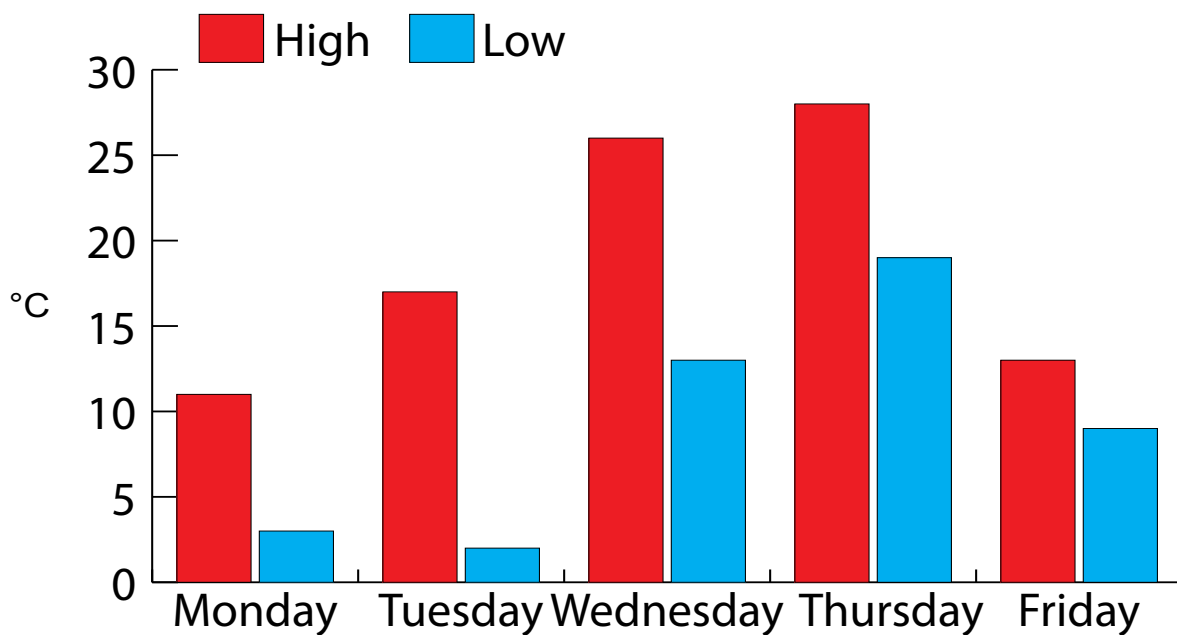
Fig. 9. "Influence of convenience or visibility" results.

## DISCUSSION

From the quantitative water fountain observations, it was found that promotional and directional posters do not significantly increase the use of water fountains on campus. While some samples show an increase in fountain use following the addition of signage (McCain on Tuesday showed an increase from 3.7% to 14.5%), on other days there was a decrease in usage (McCain on Wednesday went from 11.4% to 4.9% ). Taken as a whole, the results of the addition of posters was not statistically significant ( $p=0.05$ ).

Of note, there were increases in water fountain use during the campaign in the Mona Campbell building (Wednesday: 5.1% to 18.4%). This is notable because the Mona Campbell was used as a control sample and there were therefore no posters to influence this fluctuation. One possible explanation were the unusually warm temperatures over the second round of monitoring. Halifax experienced temperatures that were up to 35 degrees Celcius greater than during the first round of monitoring. This serves as a confounding variable to our experimental results and could be an explanation for variations seen in our control.

**Weather For the Week of March 19-23 2012**



*Fig. 10 .“temperatures for the week of March 19-23 2012.*

Given the quantitative results, it is found that the addition of signage did not significantly increase water fountain usage over the course of the investigation. It is understood that this study was limited by the brief monitoring times of only 30 minutes a day and the confounding variable of the differences in temperature. If this study were performed over a longer period of time then there is the possibility of more conclusive results. It is interesting that these results mirror the conclusions of the qualitative survey: nearly 40% of respondents reported that they believed signage was unlikely to affect their water fountain usage, while an addition 29% thought that the signage was neither likely nor unlikely to affect them.

From the qualitative survey results, it was found that 79% of the respondents felt hydration was very important to their health. It was also discovered that 64% of respondents bring a reusable water bottle with



them everyday to work. Furthermore, 91% of the respondents knew where the closest water fountain was to their workplace. These statistics suggest a population that is concerned with their hydration and has a good familiarity with Dalhousie's water infrastructure. It was found, however, that only 37% of respondents reported that they regularly drink from the water fountains.

These statistics are somewhat conflicting. They lead to at least four possible, but non-exclusive, explanations for why reported fountain use is low among a population that regards hydration as important. One possible explanation is that the 64% of respondents who bring their reusable water fountain to work each day only drink from their bottle and don't refill it from the fountains on campus throughout the day. Another possible explanation is that although 91% of the respondents know the location of the fountain closest to their workplace, it is not convenient enough or close enough in proximity to increase their usage; the majority of respondents (58%) felt that the convenience and proximity of a water fountain was very likely or likely to affect their usage of the fountain.

A third possible explanation ties into responses by Dalhousie employees about their beverage purchases on campus. Many of the respondents report purchasing beverages on campus to supplement their hydration, instead of drinking from the water fountain. In the survey, 22% of respondents reported purchasing a beverage on campus everyday and 8% reported purchasing a beverage more than once a day. Of those who purchase beverages on campus, 74% said they purchase coffee. It is believed that the consumption of coffee on campus is not in direct opposition to fountain usage as the two beverages are imperfect substitutes (the main purpose of coffee being caffeine rather than hydration). A significant note is that only 4% of respondents reported purchasing bottled water on campus. These results are mirrored in studies previously done by Carter et al. (2009) and Abercrombie et al. (2011) that found people tend to buy other beverages in preference over water.

A fourth possible explanation is that some employees choose not to use the water fountains on campus due to perceptions regarding the aesthetics, health or safety of the fountains. This perception was examined in greater detail in the survey. When asked what obstacle they felt was most limiting their use of drinking fountains, several answers were reported: 24% of the respondents reported concerns about germs, 22% had an issue with the water taste, 16% felt it was the water temperature, and 19% described other health hazards were obstacles against water fountain use. These findings are consistent with other literature, which has found germs and health issues to be the biggest concerns about public water fountains (Abercrombie et al., 2011; Carter et al., 2009). Given that municipal water is regularly tested and of safe quality, if health concerns are a valid issue it is likely that they would exist at the site of the tap (MacDonald et al., 2011). As these concerns appear to be the main factors limiting the use of water fountains on campus, it is recommended that these obstacles be further examined in future studies focusing particularly on the health safety of the fountain unit.

Overall it has been found in the qualitative survey that out of the group of Dalhousie employees examined in this research only 4% of them reported purchasing bottled water on campus. This percentage is much smaller than originally anticipated, which is a small victory for Dalhousie's sustainability goals. One of the aims of the project was to examine whether the implementation of a water ban on Dalhousie campus was necessary given that increasing fountain usage could possibly provide a simpler solution to sustainability for Dalhousie University. While it was found that bottled water purchases don't threaten Dalhousie's sustainability as much as anticipated, it was also found that water fountain usage was much less than anticipated. Water fountain usage can still be increased, however, regardless of the fact that bottled water does not appear to pose a significant threat to Dalhousie's sustainability efforts.

## CONCLUSION

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The water fountain usage as studied in this research paper sheds some light on the way water fountains are preserved and how they are used. The questionnaires were an effective tool showing how much the employees of Dalhousie view water consumption and the usage of water fountains. The surveys of the water fountains; however, did not seem to be the most effective way to approach this problem with the limited time constraints and the confounding variable of temperature. There are some conclusions that can be drawn from the fountain surveys.

The Studley campus fountain usage was low for all of the survey sites, the lowest being in the Henry Hicks. The simple posters that were placed near the fountains to encourage more water drinking resulted in little increase in the consumption of fountain water, the increase was not significant. It is important to increase fountain usage but indicated by this survey advertising for it is not the way to increase consumption.

Most Dalhousie employees know where the water fountains are and that is not the main driver for drinking fountain water. However, there may be an issue that the fountains are just not placed in an ideal spot. People's main concern lies in health, taste, and water temperature issues. It should be possible to debunk these beliefs by testing whether the population has a reason to be concerned about.

### Recommendations For Action

The study would suggest that Dalhousie need not spend money on advertising. The results indicate that advertising is not a useful method to increase water consumption, which the questionnaire participants also informed us. There are issues with these results so it would be encouraged that some more research was done into this area before writing advertising completely off.

### Further Research

As questionnaires looking at what causes people to not drink from the water fountain have been exhausted all with the same results it would be imperative that the next step is to address people's concerns.

The most important concern is health. Many people believe that fountains are not safe to drink from. It would be important to find out whether is because of health concerns about the municipal water or the water dispenser itself. MacDonald et. al. (2011) looked into the municipal water and found that it was indeed healthy so the focus should be on the water dispenser. A study looking at the bacteria content that is found on the water fountain would be insightful and hopefully could calm some people's woes about the drinking fountain being unsafe.

A concern people have is that fountain water does not taste good. As a previous study suggested a blind drinking test could shed some light on if fountain water does really taste different and unappealing. This can also be combined with looking at how warm the water is when it comes out of the water fountain as this also part of taste preference.

Another thing that should be looked into is where the ideal place for more water fountains would be. Previous studies found that locations of many of the fountains are not ideal (Abercrombie et. al., 2011). If the location of water fountains were better than this should encourage the use the fountains. A study looking at where people

expect to find water fountains or where they feel having one would result in them using a water fountain could help shed light on this.

Since the data on advertising was inconclusive it would be helpful for more research to be done. Preferably increasing the population size and time spent surveying. As a result of spending more time at the water fountains is should cover the temperature variable, however, it would be important to record the weather as this is a variable that affects both foot traffic and water usage.

All of these suggestions should help encourage the Dalhousie population to drink more water from the water fountains. It should shed light on all the reasons why people do not drink from the water fountain and hopefully give Dalhousie the opportunity to educate the population and increase water fountain usage. It should also provide an outline for better places to build more water fountains.

## **Further Research**

The study shows a few points concerning water consumption on campus and the effect that advertising might have on the general public. While there are some concerns about the results based on time limit, population constraints, and a few other variables, the results are a good start for more research. The survey showed an encouraging sign that Dalhousie employees are mostly health conscious and do not buy bottled water, but instead bring with them a reusable bottle with them to work.

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# APPENDICES

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# PRELIMINARY PROPOSAL

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Proposal for Research on Dalhousie Drinking Fountain Water  
in  
ENVS 3502

For

Janice MacInnis, Coordinator  
Organizational Health, Dalhousie University

Submitted By

Krystal Binns  
Lucy Dykhuis  
Emma Matland  
Christopher Moran  
Katherine Tomany

On March 2nd, 2012

To

Rochelle Owen, Director  
Office of Sustainability, Dalhousie University

And

Paul Sylvestre, Project Mentor

- Introduction
- Project Definition
- Background
- Rationale
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- Budget
- References



## **Introduction**

Humans require sanitary drinking water daily to maintain proper bodily functions. The processes by which humans have been extracting water from the environment has been drastically changing over the past centuries. Intensive water extractions can result in serious negative impacts on the environment. Bottled water is an example of an intensive water production method that has increased in popularity over the past few decades because of its convenience and perceived reliability of quality. The increase in purchasable beverages has led to a decrease in the consumption of tap water at public drinking water fountains across the globe. Bottled water is very inefficient as it wastes a large amount of water in production, creates plastic waste in the packaging and also produces a plethora of invisible emissions. In response to these trends and growing pressure to be sustainable, many universities are investigating ways to increase the use of drinking fountains on their campuses. This study will attempt to address several aspects of drinking fountain infrastructure on Dalhousie University campus.

## **Project Definition**

The project will attempt to establish how the Dalhousie University population is currently using the water fountains on campus. Observations will be conducted to establish current levels of fountain usage in buildings on Studley campus. Dalhousie lacks a study on the usage rates of its existing fountains. This data will help to determine whether the infrastructure meets current needs or whether more additional fountains are required on campus.

Furthermore, a study will be conducted on the effectiveness of simple advertising campaigns in promoting increased usage of the existing drinking fountains. The literature lacks reports on the effectiveness of simple campaigns to increase fountain usage; it only addresses the effectiveness of banning water bottle sales on campuses. It is important to know if informative posters could help encourage individuals to using fountains over bottled beverages. If something so simple was effective, there would be no need for dramatic changes such as bans. This study will provide answers that address this void.

Qualitative data will also be sought from Dalhousie University employees about their experiences with the existing drinking water infrastructure. This addresses a request from the client, who wants information on employee experiences with Dalhousie's drinking fountains. This will also give insight to why the university population chooses or does not choose to use the fountains on campus.

## **Background**

There is growing scientific consensus that human civilization is currently exceeding the ecological limits of the planet: people are living a infinite lifestyle in a finite world. The rapid consumption of resources is degrading our planet at many scales. It is generally accepted that humans are, at least partly, to blame for the alterations of the global climate because of our intensive greenhouse gas emissions (Crowley, 2000; IPCC, 2007). Therefore, it is of the utmost importance that humans attempt to move into a more sustainable lifestyle in the upcoming years to ensure the continuance of our fertile and unique planet.

With the desire to change our overly consumptive behaviors, the innovative race is on to develop newer and greener technologies. Eco-friendly products are popping up more and more often in our popular stores. Although it appears marketers seem to be recently focusing on coming out with environmentally friendly products, the focus should also be on making cutbacks in consumption wherever possible. Consumption per capita is much higher than it was 100 years ago and many scientists believe natural resources are being consumed

far too quickly due to constantly increasing consumerism (Arrow, 2004). Environmentally friendly materials are a step in the right direction, but there are many changes which can be made to cutback on resource usage in daily life. One major avenue for improvement involves altering how drinking water is consumed. Clean drinking water is essential to human life and influencing people to choose free drinking water over bottled alternatives could save a lot of emissions as well as natural resources.

Despite the fact that Canadian drinking water is naturally of excellent quality, many people choose to consume bottled water. This is likely because of the perceived purity and superior quality of bottled water over public drinking water. Bottled water companies profit off the fear among the North America population of their public drinking water, which causes people to increase wastes by purchasing bottled water rather than using free tap water (Pritchard, 2009). This fear, however, is not based in fact. Canadian water is required to undergo many intensive guidelines to assure its natural high quality is maintained (Health Canada, 2011). The guidelines include monitoring of microbials, chemicals, pH's and various aesthetics (such as taste). In Halifax, the drinking water is tested more thoroughly than bottled water: it is tested a minimum of two times a week at 48 different locations in the urban area (Halifax Water, 2011), whereas bottled water companies are only required to test their water once a week (AllAboutWater, 2004). With such high quality drinking water at our fingertips, bottled water seems like a waste of resources as well as money.

In a study done around Dalhousie campus by students in 2011, the students sampled 10 water coolers around campus and compared their findings to the quality of Halifax drinking water and found they were each of similar quality (MacDonald et al., 2011). Furthermore, according to a fact sheet created in Dartmouth College in Hanover, New Hampshire, the manufacturing of a bottle of water uses twice the amount of water than what actually ends up in the bottle, not to mention the hidden transportation costs and associated emissions (Dartmouth Sustainability Initiative, 2009). The fears that bottled water companies have instilled into our populations have no basis in fact. Public drinking water is of equal, if not better quality than that of commercial bottled water (Pritchard, 2009).

Despite the quality of Canadian drinking water, studies have found a growing decrease in the number of water fountains per university (Polaris, 2009a). This effectively limits people to purchasing beverages or bringing refreshments from their home. A cross-Canada online survey created by the Polaris Institute and the Canadian Union of Public Employees found that 33% of the individuals who answered the quiz said they have noticed decreased access to drinking fountains across their campuses. Their findings also noted that many fountains were simply broken and neglected or blocked by bulky beverage vending machines (CCPA, 2008). Such inconveniences confound attempts to promote the usage of the tap water at institutions.

In an effort to combat the consumption of bottled water, some educational institutions, such as the University of Winnipeg, have placed bottled water bans on their campuses. They insist that their population drink their tap water (Polaris, 2009b). The students were the motivating forces for the ban. They viewed bottled water as a waste of resources and insisted that their drinking water was of great quality. Other universities such as Memorial, Ottawa, Queens, Guelph and Ryerson have also attempted to increase the use of their drinking water fountains around campus by similar means (MacDonald et al., 2011).

## **Rationale**

There is no common consensus on how to implement sustainability. Universities taking initiative in their attempts to "Go Green" are sometimes criticized for their methods (Pettigrew, 2011). While banning bottled water it is no doubt effective in causing thirsty individuals to utilize the university's free resources, critics argue that removing bottled water should not be an institution's sustainability priority. There have been plenty of studies and articles published about the ways universities have attempted to increase their drinking water usage. However, the literature does not address if these radical measures of banning bottled water are actually necessary to increase fountain usage. There appears to be a substantial gap in tap water research on simple meth-

ods of promoting fountain usage for the university population. There are no cases documented in the literature attempting to change the drinking fountains usage by easier methods than implementing complex bans. It is unknown whether perhaps clear floor maps or eye-catching and encouraging posters would sufficiently boost the water fountain usage around campuses.

Dalhousie University's Sustainability Plan includes desires to reduce wastes outputs, reduce GHG's by 50% by 2020, reduce waste to landfill by 70% by 2020 and consequently attract more students to the university by their sustainable actions. They wish to achieve these means by performing various upgrades around campus, educating the population more and giving more sustainable choices (Dalhousie, 2010). In a survey done by Pritchard (2009), results showed that 70% of students were in favour of banning bottled water at Dalhousie University because they felt bottled water was unnecessary. The article describes that the water fountains on campus are in fine condition and that bottled water is simply a waste. The goal would be to make consumption cutbacks by increasing the water fountain usage and therefore decrease the consumption of bottled beverages. Before such a ban would ever be put into place, Dalhousie would need to ensure that all fountains were up to par and working properly (Pritchard, 2009).

Information will be gathered on current Dalhousie employee usage of the fountains. Staff and faculty members are important to focus on because they are a constant presence at Dalhousie. They could help lead by example if they started making consumption cutbacks. After establishing baseline usage, we wish to observe if informative signage would help increase the usage of the free resource at hand. If promotional posters could help increase water fountain usage and help lower the purchasing of bottled beverages, the university may not have to resort to drastic measures such as bans.

## **Research Methods**

The report investigates the usage of water fountains in three buildings on Dalhousie's Studley Campus. The research will consist of four stages: (1) establishing baseline data for current fountain usage; (2) a poster campaign to promote water fountain use; (3) observation of fountain usage after the campaign; and (4) a qualitative survey of Dalhousie employees on fountain usage.

For the first stage of the research, it is necessary to establish baseline data of fountain usage. One fountain will be chosen in a central location of Henry Hicks, Marion McCain Arts and Social Sciences, and Mona Campbell buildings. Each fountain will be monitored for thirty minutes for a day during the working week (Monday-Friday, 8-5). Five observation periods will be selected, three in the morning and two in the afternoon. The time slots have been scheduled around standard Dalhousie class breaks, with observations beginning ten minutes before and ending ten minutes after each break. It is assumed that water fountains will have higher usage during class breaks; so by sampling at the before, during, and after the breaks, a representative sample will be obtained. A schedule of fountain monitoring can be found in the schedule section of the proposal. During observation, each usage of the fountain will be tallied. As "usage" can be an ambiguous term, for the purpose of this audit, usage will be defined as "a person using the fountain for the purpose of drinking or filling a water bottle." To measure the usage of the fountains, we set out criteria that fit in to the categories of built environment, social environment and circulation. The number of individuals using the fountain for the purposes previously stated will be tallied.

The second part of the research involves disseminating informational materials and signs which will promote usage of the drinking fountain water. These signs will be placed in areas of high visibility and emphasize the location of nearby fountains. The posters will mostly be directed towards Dalhousie employees, so many posters will be placed in Faculty Departments and Administration offices. Two buildings will have the promotional materials, while one building will not. The building without the promotional materials will serve as a control sample. The other two buildings will be the experimental samples. The promotional materials will be in place for one week prior to the second round of observations.

The third part of the study involves repeating the fountain monitoring after implementing the promotional materials. The observations will follow the same method as the first stage of the study. The same fountains will be observed thirty minutes per day for a week, replicating the original observations. The times of observations will be consistent with the first observations. The results of the two observations will be compared to determine if significant differences in usage occur with addition of promotional signage.

The fourth aspect of the study involves a second data collection method. Qualitative surveys will be sent to faculty, staff and administration on Dalhousie campus. The surveys will be sent by email through specific listservs. In attempt to encourage Dalhousie employees fill out the online survey, there will be a prize of a \$20 gift card to Mountain Equipment Co-op (MEC). The purpose of this survey is to collect qualitative data from Dalhousie employees about their water fountain use.

## **Deliverables**

This proposed project contains two deliverables: an educational poster program and the results of our quantitative and qualitative studies.

The quantitative study (fountain use monitoring) and the qualitative study (Dalhousie employee surveys) will both contain information that the client, Janice MacInnis, can use to help make decisions about which methods Dalhousie University should employ to increase usage of water fountains. The information from both studies will be presented through tables, graphs and charts for the client. This data will give insight into current usage of Dalhousie's water fountains. Data from the water fountain monitoring will provide the client with information on fountain usage during peak times on campus. The data from the employee surveys will provide the client with information regarding water drinking habits, social stigmas with water fountains, and employee's tendency to purchase bottled refreshments on campus. The project's deliverable will also report on the effectiveness of simple promotional poster campaigns in increasing water fountain usage. The client is hoping that the project will produce data that shows an increase in water fountain use after a poster campaign has been implemented. The client's overall goal is to have insight as to what methods of encouragement work for changing the current habits of Dalhousie's employees. The qualitative data will be helpful at gaining insight into this subject.

The second deliverable, the educational poster program, will aim to be a changing factor in Dalhousie employees' habits. The client requested that the poster should encourage water fountain usage rather than discourage bottled water purchase. She desires that the poster be incredibly positive and persuasive of the health and sustainability benefits of drinking fountain water. The project aims to create a poster that can be used by the client in future years. It will therefore need to contain a timeless design and timeless information.

## **Communication Plan**

This project will be in communication with four audiences: the client, Janice MacInnis, the Dalhousie employee sector and the wider Dalhousie population and the Office of Sustainability.

The project's final report and poster campaign are both deliverables and apart of the communication plan.

Janice MacInnis will be communicated with through the final project report. This communication will take on the form of a traditional report containing raw data, processed data in charts and graphs and data analysis. It will be the main method of communicating the deliverables with the client.

Janice will also be communicated with through scheduled meetings that all group members will attend. These meetings have already been all planned out for the semester and will be listed below in the schedule section of the proposal. These meetings will be used to communicate progress, obtain input and ensure that the project is following a path that is desired by the client. The group members have already had one group meeting with the client and this process is underway. At the end of the semester, all group members will plan an extensive meeting with Janice to discuss in depth the final project and the findings. At this point, there will also be discussion about where this project could go for future years. An effort will be made to ensure that the findings will be used

either in future projects, research or sustainability initiatives.

The final report will be delivered by April 13th, 2012 to the client, Janice MacInnis.

Dalhousie employees will be communicated with on two different levels. The first way they will be communicated with is through a qualitative survey sent to Dalhousie employees' emails through specific listservs. List serves can be obtained from: <https://listserv.dal.ca/index.cgi?HOME>

Dalhousie employees will also be communicated with through educational posters that will be designed to make water fountain use seem healthy, sustainable and cost effective. Posters will be put up around campus, targeting Dalhousie faculty members, administration and staff members. Posters will therefore be put up in high-use areas on campus, such as Faculty departments, Administrative departments and near washrooms. The educational poster program will be delivered to the client, Janice MacInnis and Dalhousie faculty and Staff during the period of March 12th-16th, 2012.

Although the client desires for the communication to be directed towards Dalhousie employees, it is inevitable that the broader Dalhousie population will also view the poster campaign as well. This project therefore acknowledges that it will be in direct communication with the Dalhousie student population.

The final report and a copy of the poster will also be sent to the Office of Sustainability in hope of bringing research and understanding to the sustainability field at Dalhousie regarding water fountain use. This way the Office of Sustainability can also be aware of what past research has been conducted on campus and what information has been learned from past research.

#### Schedule

This research project started January 17th with the introduction to the group. This including figuring out what the project should be and meeting Paul, who is the mentor for this project. The first meeting was set up with the client on this day. The meeting was held on the 1st of February. The meeting was informative and on February 7th the official research problem was decided upon. Since that time there has been a lot of work getting this proposal done.

Attached in appendix 1 is a detailed Gantt chart explaining the remaining schedule from March 1st to April 13th when the final research paper is due. It is color coded based on who is responsible for each step and when important dates, due dates and client meetings are scheduled: dark green represents everyone in the group is responsible, red represents due dates, black are meetings with the clients, Krystal is responsible for light blue events, Lucy is responsible for light purple ones, Emma is responsible for light green events, Christopher (Kit) is responsible for grey events, and Katherine (Kat) is responsible for orange ones.

The following table are the proposed dates and times for our survey visits.

### Survey Times

DATE	LOCATION	MONDAY 11:15- 11:45	TUESDAY 8:15-8:45	WEDNESDAY 2:15-1:15	THURSDAY 12:45-1:15	FRIDAY 9:15-9:45
Mar. 5-9	Hicks	Kat	Kit	Emma	Lucy	Krystal
"	Campbell	Lucy	Kat	Kit	Emma	Kit
"	McCain	Krystal	Krystal	Lucy	Kit	Kat
Mar. 12-16	CAMPAIGN	CAMPAIGN	CAMPAIGN	CAMPAIGN	CAMPAIGN	CAMPAIGN
Mar 19-23	Hicks	Kat	Emma	Emma	Lucy	Krystal
"	Campbell	Lucy	Kit	Kit	Emma	Kit
"	McCain	Krystal	Krystal	Lucy	Kit	Kat

Table 1: The proposed site survey schedule and time of campaign for research on Dalhousie drinking fountain water.

The budget will be used to produce the educational material (posters) and be an incentive for the faculty and staff of Dalhousie to take the survey that is sent out. On March 2nd financial aid will be applied for through Rob McNeish at the Dalhousie Student Union Sustainability Office. The total money that will be asked for is \$54.50, which is broken down as following.

The posters that will be used are printed on 11 inch by 17 inch paper, at the Dalhousie print. The cost of each poster is \$1.15 per poster. The educational material will be printed on 30 posters that will be distributed across two of the three buildings. This will cost a total of \$34.50 plus \$4.50 in taxes.

The employees of Dalhousie, who are being surveyed, will be given an incentive to take the survey. When they answer the questionnaire and leave their e-mail, they are put into a raffle ticket for a chance to win a \$20 gift card to MEC, allowing them the opportunity to buy themselves a reusable water bottle for further water fountain use. Table 2 gives a clear view of what the budget looks like.

### Cost Breakdown

ITEM	COST	QUANTITY	TOTAL COST
POSTER	\$1.15	x30	34.50
MEC GIFT CARD	\$10	2	\$20
PROJECT TOTAL			\$54.50

Table 2: The proposed budget for research on Dalhousie drinking fountain water.

### Ethics Form

A paper copy was handed in. Corrections were then made and resubmitted electronically on February 28, 2012.

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## Online Survey Questions

What best describes yourself?

Frequency table

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Faculty	6	7.89%	7.89%
Staff	66	86.84%	86.84%
Student	1	1.32%	1.32%
Other	3	3.95%	3.95%
Sum:	76	100%	100%
Not answered:	0	0%	-
<b>Total answered: 76</b>			

How often do you purchase a beverage on campus?

Frequency table

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Once a day	17	22.37%	22.37%
More than once a day	6	7.89%	7.89%
Once a week	12	15.79%	15.79%
More than once a week	10	13.16%	13.16%
Rarely	23	30.26%	30.26%
Never	8	10.53%	10.53%
Sum:	76	100%	100%
Not answered:	0	0%	-
<b>Total answered: 76</b>			

If you purchase a beverage on campus what type of beverage are you likely to purchase?

Frequency table

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Coffee	51	67.11%	73.91%
Bottled water	3	3.95%	4.35%
Juice	7	9.21%	10.14%
Pop	7	9.21%	10.14%
Energy drink	1	1.32%	1.45%
Sum:	69	90.79%	100%
Not answered:	7	9.21%	-
<b>Total answered: 69</b>			



How often do you use a water fountain on campus?

**Frequency table**

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Everyday	24	31.58%	32%
Often	4	5.26%	5.33%
Sometimes	8	10.53%	10.67%
Rarely	19	25%	25.33%
Never	20	26.32%	26.67%
Sum:	75	98.68%	100%
Not answered:	1	1.32%	-
<b>Total answered: 75</b>			

Do you bring a reusable water bottle to campus?

**Frequency table**

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Always	48	63.16%	64%
Mostly	12	15.79%	16%
Sometimes	3	3.95%	4%
Rarely	4	5.26%	5.33%
Never	8	10.53%	10.67%
Sum:	75	98.68%	100%
Not answered:	1	1.32%	-
<b>Total answered: 75</b>			

How important would you rate hydration to your health?

**Frequency table**

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Very important	58	76.32%	78.38%
Somewhat important	14	18.42%	18.92%
Neither important nor unimportant	1	1.32%	1.35%
Somewhat unimportant	1	1.32%	1.35%
Sum:	74	97.37%	100%
Not answered:	2	2.63%	-
<b>Total answered: 74</b>			

Do you consider yourself adequately hydrated?

**Frequency table**

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Yes	54	71.05%	73.97%
No	19	25%	26.03%
Sum:	73	96.05%	100%
Not answered:	3	3.95%	-
<b>Total answered: 73</b>			

Do you feel you should drink water more often?

**Frequency table**

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Yes	47	61.84%	62.67%
No	28	36.84%	37.33%
Sum:	75	98.68%	100%
Not answered:	1	1.32%	-
<b>Total answered: 75</b>			

Do you know where the closest fountain or drinking faucet is to your usual place located?

**Frequency table**

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Yes	68	89.47%	90.67%
No	7	9.21%	9.33%
Sum:	75	98.68%	100%
Not answered:	1	1.32%	-
<b>Total answered: 75</b>			

**Frequency table**

Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Very likely	20	26.32%	27.03%
Likely	23	30.26%	31.08%
Neither likely nor unlikely	12	15.79%	16.22%
Unlikely	8	10.53%	10.81%
Very unlikely	11	14.47%	14.86%
Sum:	74	97.37%	100%
Not answered:	2	2.63%	-

Would signage to improve the visibility of the fountains affect how likely you are to use a fountain?

**Frequency table**

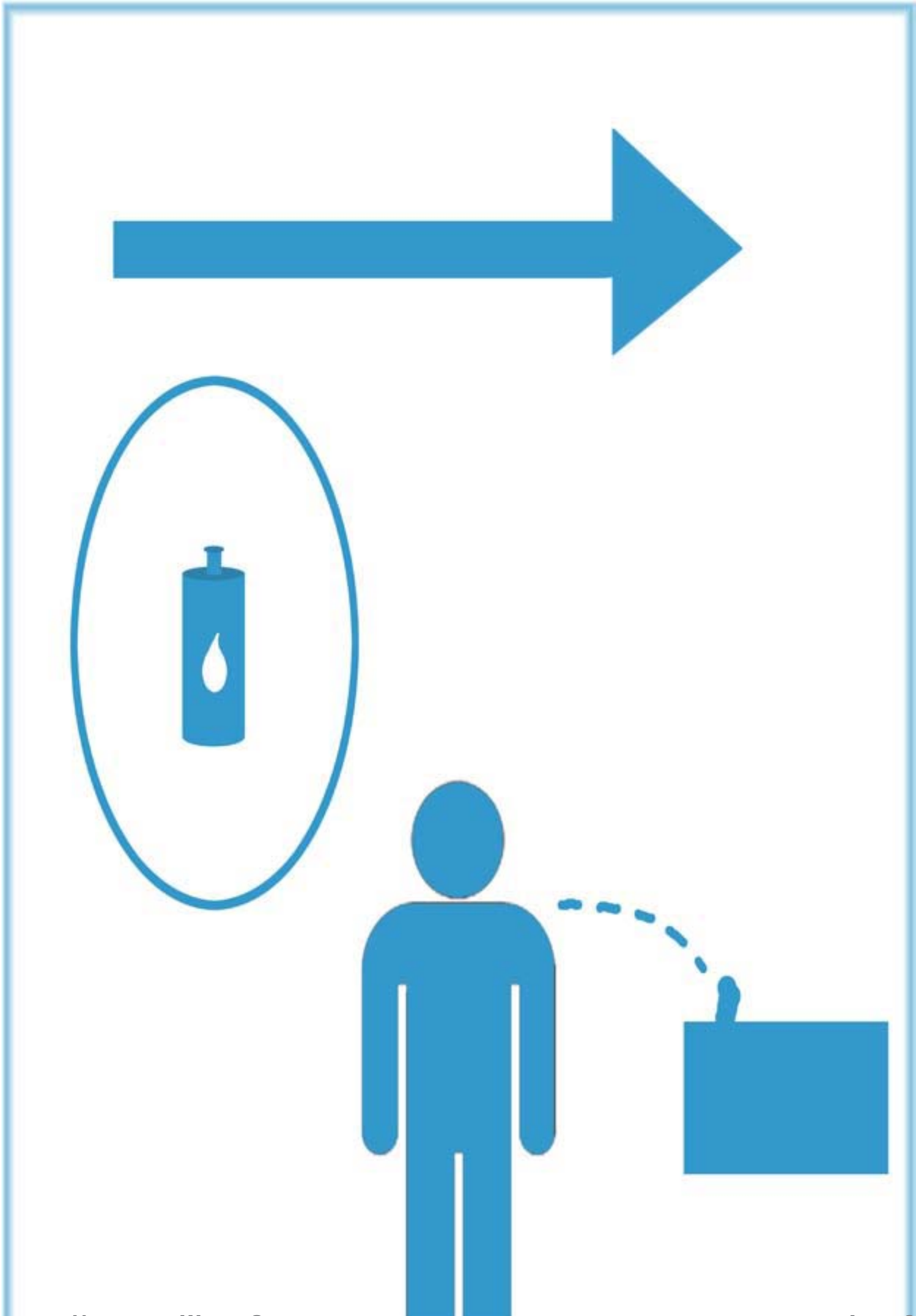
Choices	Absolute frequency	Relative frequency	Adjusted relative frequency
Very likely	12	15.79%	16.22%
Likely	9	11.84%	12.16%
Neither likely nor unlikely	21	27.63%	28.38%
Somehat unlikely	3	3.95%	4.05%
Unlikely	29	38.16%	39.19%
Sum:	74	97.37%	100%
Not answered:	2	2.63%	-
<b>Total answered: 74</b>			

If you do not use water fountains on campus, what barriers are inhibiting your usage?

**Frequency table**

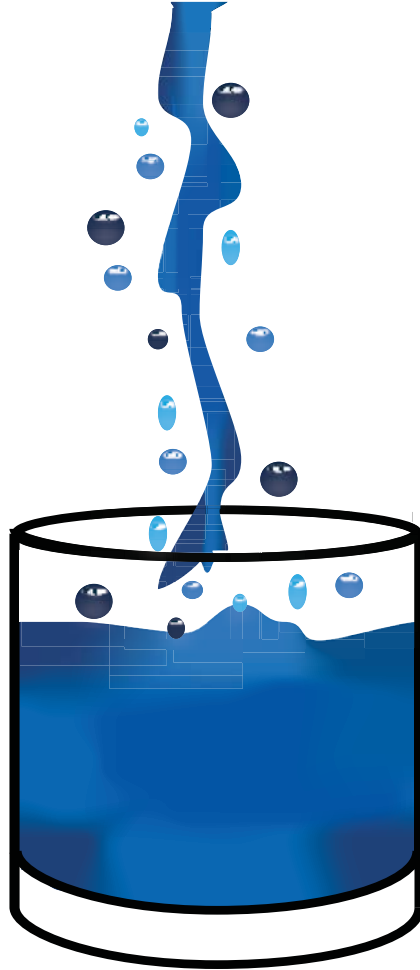
Choices	Absolute frequency	Relative frequency by choice	Relative frequency	Adjusted relative frequency
Germs	20	23.53%	26.32%	46.51%
Water taste	19	22.35%	25%	44.19%
Water temperature	14	16.47%	18.42%	32.56%
Health hazards	16	18.82%	21.05%	37.21%
Other	16	18.82%	21.05%	37.21%
Sum:	85	100%	-	-
Not answered:	33	-	43.42%	-
<b>Total answered: 43</b>				

# Poster One



Poster Two

Get **YOUR**  
**EIGHT**



**Glasses**  
**of**  
**WATER**

Baseline  
Foottraffic  
Date, time

**Before Campaign Tally**

Monday 1115-1145				
Building	1st	2nd	3rd	Total
Henry Hicks	23	16	19	58
Mona	9	30	4	43
McCain	37	125	16	178

People Drinking

Monday 1115-1145					
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	0	0	0	0	0
Mona	3	1	0	0	0
McCain	9	1	0	0	0

Baseline  
Foottraffic  
Date, time

Tuesday 815-845				
Building	1st	2nd	3rd	Total
Henry Hicks	40	39	39	176
Mona	14	20	14	91
McCain	19	31	18	246

People Drinking

Tuesday 815-845					
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	0	0	0	0	0
Mona	2	0	0	0	0
McCain	6	2	0	0	0

Baseline  
Foottraffic  
Date, time

Wednesday 215-245				
Building	1st	2nd	3rd	Total
Henry Hicks	15	16	9	40
Mona	36	41	22	99
McCain	46	123	33	202

People Drinking

Wednesday 215-245					
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	0	0	0	0	0
Mona	3	1	0	0	0
McCain	15	5	1	1	1

**Continued...**

Baseline  
Foottraffic  
Date, time

Thursday 1245-115				
Building	1st	2nd	3rd	Total
Henry Hicks	7	14	11	32
Mona	27	28	17	72
McCain	52	105	48	205

People Drinking  
Date, time

Thursday 1245-115					
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	0		0	1	0
Mona	8		1	1	0
McCain	10		3	0	0

Baseline  
Foottraffic  
Date, time

Friday 915-945				
Building	1st	2nd	3rd	Total
Henry Hicks	14	10	12	36
Mona	17	24	16	57
McCain	14	22	16	52

People Drinking  
Date, time

Friday 915-945					
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	0		0	1	0
Mona	3		2	0	0
McCain	7		2	0	0

**After Campaign Tally**

Baseline Foottraffic Date, time	Monday 1115-1145			
	1st	2nd	3rd	Total
Building				
Henry Hicks	29	25	26	80
Mona	4	30	6	40
McCain	36	123	22	181

People Drinking Date, time	Monday 1115-1145				
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	0	0	0	0	0
Mona	3	2	0	0	0
McCain	8	1	3	0	0

Baseline Foottraffic Date, time	Tuesday 815-845			
	1st	2nd	3rd	Total
Building				
Henry Hicks	32	37	29	98
Mona	12	22	17	51
McCain	18	35	16	69

People Drinking Date, time	Tuesday 815-845				
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	0	0	0	0	0
Mona	0	0	0	0	0
McCain	8	2	0	0	0

Baseline Foottraffic Date, time	Wednesday 215-245			
	1st	2nd	3rd	Total
Building				
Henry Hicks	19	12	18	49
Mona	17	20	12	49
McCain	45	127	51	223

People Drinking Date, time	Wednesday 215-245				
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	4	0	0	0	0
Mona	5	2	2	0	0
McCain	5	5	1	0	0



**Continued...**

Baseline Foottraffic Date, time	Thursday 1245-115			
Building	1st	2nd	3rd	Total
Henry Hicks	13	13	8	34
Mona	13	14	18	45
McCain	55	67	40	162

People Drinking Date, time	Thursday 1245-115				
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	1	0	1	0	
Mona	2	2	0	0	
McCain	16	11	1	1	

Baseline Foottraffic Date, time	Friday 915-945			
Building	1st	2nd	3rd	Total
Henry Hicks	10	8	8	26
Mona	15	25	18	58
McCain	38	16	13	67

People Drinking Date, time	Friday 915-945				
Building	Drink	Fill bottle	Edrink	Efill bottle	
Henry Hicks	1	0	2	0	
Mona	2	2	0	0	
McCain	7	3	1	0	