

ENV 481

WATER BOTTLE CAMPUS BAN

Commissioned by the Toronto Sustainability Office



Table of Contents:

<i>A. Introduction.....</i>	<i>3</i>
<i>B. Description of Scope.....</i>	<i>3</i>
<i>C. Description of Methodology.....</i>	<i>4</i>
<i>D. Research Findings and Analysis.....</i>	<i>5</i>
<i>E. Limitations.....</i>	<i>12</i>
<i>F. Recommendations.....</i>	<i>14</i>
<i>G. Conclusions.....</i>	<i>19</i>

A. Introduction

Background Information

In 2011 the University of Toronto implemented a ban of the sale of plastic water bottles on campus based on the recommendations and pressures from an activist group on campus called The Public Water Initiative (Tanner, 2011). This ban was implemented on the group's main argument that selling water made it a commodity and generally inaccessible. The group believed that water should be an easily accessible human right (Tanner, 2011). The ban paralleled with eco-friendly sustainable initiatives which were becoming popular on campus at the time. Now -in 2016- the ban is still in place and our client The Sustainability Office has asked for research based on a subsection of the student population. The purpose of our case study is to examine the campus five years post-ban through research conducted on campus at water filling stations.

B. Scope of Research

The entirety of the research conducted was completed at the University of Toronto, specifically the downtown St. George campus. This study focuses then on these three buildings on this specific campus. The buildings selected were; the Bahen Centre, Medical Sciences Building, and Sidney Smith Hall. Our research was conducted at these three buildings on the University of Toronto St. George campus because they were high volume multidisciplinary buildings that we felt would provide a well-rounded view of the student body overall. The buildings selected allowed us to conduct interviews during the week when classes are happening, and were conducted during the semester. The point of contact between our data collectors and those being surveyed was in front of the water stations in the three selected buildings mentioned above. The selected sample size of our research was a pool of 90 participants, all of whom were in the vicinity of the drinking fountains. Two buildings (Medical Sciences Building and Sidney Smith Hall) contain the Elkay rapid water filling stations and the Bahen Centre contains only the tap style fountain.

C. Methodology

Project Objectives

Our client wanted information that would help them understand the relationship students have with the bottle filling stations and to establish a campus cultural norm surrounding bottle use on campus. The client also wanted to know the opinions of students who were using the stations in order to understand opinions surrounding stations. It was because of this that questionnaire questions were created to be easily answered, that way interviews could be done during the short use of the filling station and continued if the person surveyed was so inclined. Additionally the client wanted to know if students were aware a ban existed, so this question was also part of the questionnaire. The objective of this work is to understand the campus cultural norms on campus through interviews and observations. Additionally we seek to quantify the awareness of the ban and to understand behaviours on campus of water consumption.

Methods

Methodology for data collection were created from the objectives and deliverables desired by the client. Our project's specific aims were to determine (i) the awareness of the ban, (ii) student behaviours related to water consumption, and (iii) accessibility of water fountains/ refill stations on campus. To accomplish this, Data was collected via 90 interviews conducted in front of bottle-filling stations.

Our initial research plan included conducting 10 long form interviews which would then help formulate a short form survey, however, we were able to condense our survey with the help of the client, the Professor, and the TA. The number of interviews being conducted was also cut down to 90 from 150 to give us time to accommodate observations. The current methods were, therefore, finalized keeping in mind the time constraints and the final deliverables expected by the client.

Final Survey Design Questions

When the final draft of questions was created, our group allowed our client to choose the order in which the questions would be asked based on the importance of the information. Our final survey started with asking if students were aware of the water bottle ban on campus. Asking this question first eased into our subject matter for our participants.

For periods of around one hour-usually during the survey conducting- observations of the surrounding area to each fountain in each respective building were made. These observations focused on counting the visible number of reusable drinking bottles vs single-use bottles in the room. These observations were specifically asked for by our client as a way of observing the campus cultural norm surrounding reusable bottles. If it appeared that many on campus carried a bottle, then it could be surmised that their use is popular and a standard amongst the student body. This coincides with the question from the survey about the number of times per week participants relied on their water bottles.

Methods for data analysis

The data collected was a mixture of quantitative and qualitative. The quantitative data was collected by asking simple questions with predefined options. The answers were, therefore, divided into 2-4 categories, depending on the question. This data was then analyzed by finding percentages for each category.

The qualitative data collected from open ended questions was analyzed using coding. Common subjects and themes were determined by looking for repeating words or phrases in the respondents' answers. The frequency of these words or phrases was then counted to determine which answers were the most popular.

The results were compiled by dividing the questions from the survey into three categories: (i) awareness of the ban, (ii) student behaviours relating to water consumption, and (iii) the accessibility of water refill stations on campus. The answers were analyzed within each category and connections were made between categories as well to get a more comprehensive understating of student behaviours. The limitations of the study were then determined to keep in mind the potential flaws in the data. The results and the limitations were eventually used to make

recommendations for the Sustainability Office, our client, and the future studies that might be conducted on the same topic.

D. Research Findings

Results

The awareness of the ban was determined by asking the participants if they knew about the water bottle ban on campus. Our findings indicate that (see Table 1.) 21 out of the 90 people surveyed had a positive response, whereas, the other 69 participants were unaware of the ban.

The student behaviours were examined by firstly asking the participants how often they used reusable bottles. The options provided were: everyday, a few times, when I can, rarely, and never. In terms of absolute numbers, 58 people claimed everyday usage, 19 reported they use water bottles a few times, 1 participant said they use it when they can, 6 said rarely and another 6 reported that they never use reusable bottles. Hence the major percentage of students (see *Figure 1.*) reported everyday usage of reusable bottles, whereas, a small percentage (see *Figure 1.*) said rarely/never as they filled single use plastic bottles which they planned on disposing at the end of the day. Secondly, we asked if the participants had ever bought an alternative drink because they could not buy water on campus. Of the 90 people surveyed, 33 had bought an alternative drink and the other 57 had not. Our findings (see Table 1.), therefore, indicate that almost one-thirds of the participants had bought alternative drinks. The last question we asked our participants in this category was if they had noticed the ‘count of water bottles’ saved feature. A high number of participants, 63 out of 90, had a positive response.

The accessibility of water refill stations/fountains was determined by asking the respondents how they had found the station. The options provided were: came specifically, stumbled upon or asked others for directions. The results (see *Figure 2.*) indicate that 44 out of 90 came specifically to the station whereas 37 out of 90 stumbled upon, or were just passing by the station. An additional 9 people had asked other students for directions to the refill station. Another

question addressed the busyness of the stations as we asked people if they ever had to wait to use the station/fountain. The responses (see Table 1.) show that only 23 people said that they had to wait to use the station, whereas, 67 out of 90 respondents did not. Finally, we asked students if they would like to see additional stations somewhere specific on campus. Majority of the people (see Table 1.), 77 out of 90 people, said that would like to see more stations. The remaining 13 people said that they didn't think these were necessary. Furthermore, we also asked students for specific locations where they would like to see these stations. The most common answers were University College, old engineering buildings like Stanford Fleming and Walberg building, all libraries (particularly Robarts), Lash Miller and outside.

Table 1. *Participant response to survey questions*

	Yes	No
Awareness of the ban	23%	77%
Bought an alternative drink	37%	63%
Noticed 'count of water bottles saved'	70%	30%
Wait to use the stations	26%	74%
More water stations on campus	86%	14%

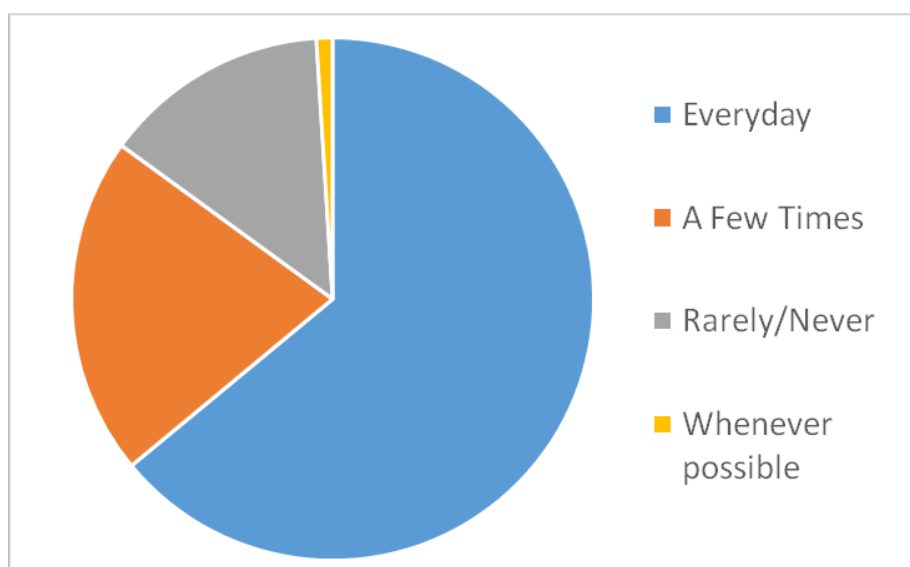


Figure 1. Reusable water bottle usage on campus

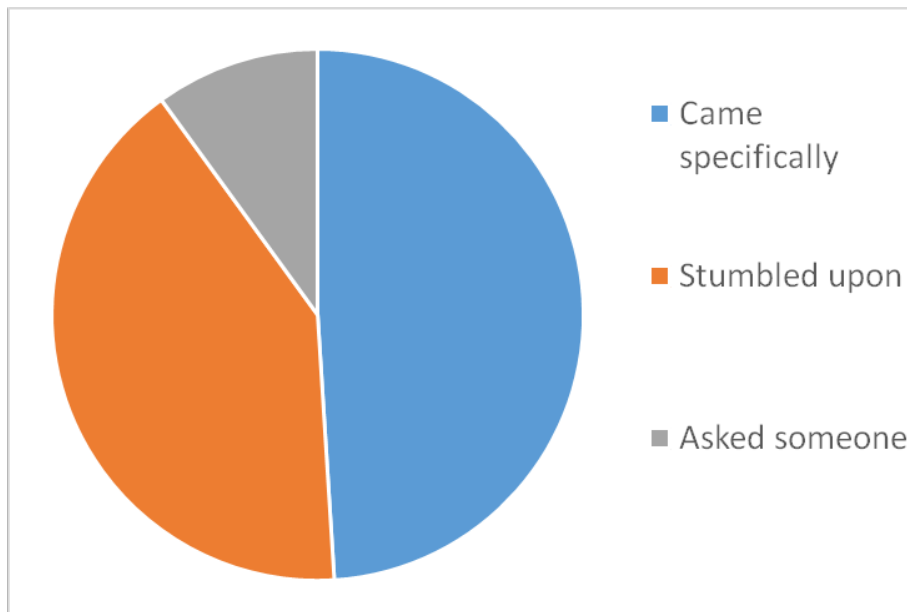


Figure 2. Method of locating the water fountain/station

Analysis

Our findings pertaining to student behaviour indicate that most students at the refill stations or fountains have a bottle that they use daily. This finding shows an interesting paradox with the awareness of the ban, as despite the low awareness of the ban, up to 64% of the respondents have a bottle that they use daily. This brought up the issue that maybe the awareness of the ban is not related to carrying reusable bottles, as people might be doing so out of need or habit. To analyze the issue, we checked how often people were using reusable bottles when they were aware of the ban. Our data shows that 16 of the 21 people, hence 76% of the respondents, who reported awareness of the ban were carrying reusable bottles everyday. This finding, therefore, indicates that knowledge of the ban is positively related to using bottles everyday and most respondents

not using bottles everyday were actually unaware of the ban. Hence the promotion of the ban itself or the reasons surrounding the ban might be useful to encourage the remaining 36% of the people to use reusable bottles everyday.

The survey data shows that over one-third of the participants had bought an alternative drink because they could not buy water on campus. Furthermore, 11 out of the 33 people or 33% of the respondents who had bought alternative drinks were aware of the ban. This data indicates that a large number of students buy alternative drinks regardless of their awareness of the ban and hence promotion of the ban might not make an impact on the number of students buying alternative drinks.

The responses to noticing the ‘water bottles saved counter’ was substantially positive and two students remarked that the bottle counter is a good idea even though they gave no reason for why they thought so. As our client ultimately wants to increase the usage of refill stations, this could be an incentive for students to use the stations. Another 3 students, however, remarked that they did not believe that the counter displayed realistic numbers as the numbers seemed too high. In this case a small description about the workings of the counter might also help in promoting a positive student behaviour in terms of using refill stations.

The data pertaining to the accessibility of water stations shows that not many students had to wait, yet almost all students wanted more refill stations on campus. This suggests that our studies of accessibility are confronted less with the issue of busyness but rather with the distribution of the stations. Furthermore, over half of the respondents had planned their trip to the water station, suggesting that students had to go out of their way to access the station. Some students even made additional comments stating they had never seen a map of the location of water stations.

The website with the location of the stations is also difficult to find and lists locations in a paragraph rather than an easy to read map. These findings indicate that the lack of signs indicating the location of the stations, the lack of a readily available map and the obscure placement of some stations could be significant problems that need to be addressed.

Students were asked where they would like to see stations in the future, and University College seemed to be a popular choice as they reported that there was no station on the main floor. Older engineering buildings like Stanford Fleming and Walberg building were also popular answers indicating that the older buildings need more stations. Some students suggested that all libraries should have more stations but the upper floors of Robarts seemed to be more popular as students complained that only the ground floors had stations. Another suggestion was to have stations outside the buildings for faster access. Instead of having to enter a building to gain access, students could cut travel time between classes and use outdoor refill stations on the go. This poses a problem for our client during the winter seasons, in terms of heating the water pipes, but nevertheless should be considered as an option.

Analysis of additional comments from the survey

The survey was conducted at three buildings: The Bahen Center, the Institute for Medical Sciences, and the Sidney Smith Hall. The Bahen Center only has water fountains and no refill stations, hence, the comments at Bahen Center were different from the other locations. An overwhelming number of participants that filled their bottles wished to see more of the automatic refill stations as opposed to the fountains as the stations are more convenient. At same time, however, having only refill stations could be problematic because some students wish to drink water out of the fountains when they don't have a bottle. In this case the stations containing both, a fountain and a refill station seem to be the ideal solution. An alternate possibility could be the installation of fountains in some parts and refill stations at other locations in a same building.

Low water pressure of the fountains was another complaint. Some people commented that the water at the fountains tastes a little different from the refill stations. One participant also specified that the water tastes more chlorinated at the water fountains or that the filter doesn't work properly at the fountains.

A comment that was made at all three locations was that the stations/fountains should be cleaned more often. A student gave a particular example where algae came out of one of the refill stations while they were using it.

Limitations of the study

The surveys conducted had a small sample size of 90 which is not representative of the 50,000 students of the University of Toronto. Furthermore, the surveys had a smaller target audience as the only people surveyed were the ones who had a reusable water bottle and were using it at the refill station/fountain. This made the sample size non-random and increased the probability of bias. The high percentage of participants (see *Figure 1.*) who reported that they use reusable bottles everyday could be biased. This problem arises since we only surveyed people who had water bottles and the likelihood of these people using reusable bottles is not representative of the entire student population. It is a possibility that most students at the university might not even have a water bottle or might never use the stations. But since these students were not a part of our sample, their behaviours would not be represented by the data we collected. Therefore, the overall percentage of students actually using a reusable bottle everyday might be much lower than the numbers we have reported.

The second issue that arises due to the small target audience is that the number of students visiting water fountains specifically could be much higher in our data as students with water bottles might specifically come to stations for refilling them. On the other hand, the ones without bottles might never seek out a station.

Another reason that could have resulted in false percentages in the data overall, is due to the self reporting of data by the participants. The respondents could have given answers that show a more positive behaviour because they were being surveyed in person.

An unexpected issue that we encountered during our surveys was the presence of only water fountains in Bahen. While this increased the scope of our study and helped us collect data on

different kinds of water stations, it made the data somewhat inconsistent. The inconsistency resulted from different answers for the open ended question asking for additional remarks on the water stations on campus. The answers of the people at the fountains mostly targeted the want for more refill stations, whereas, the answers at the refill stations had more to do with the accessibility of stations or the cleanliness of stations. The percentage of people who had reported seeing the ‘count of water bottles saved’ feature was also lower at Bahen. Only 53% or 16 out of 30 respondents at Bahen said that they had seen the feature elsewhere as the count is not displayed at water fountains. However, in the Sidney Smith building, 87% of the people (26 out of 30) and in the Medical Science building 73% of the respondents (21 out of 30) had noticed the feature. The number is considerably higher in these buildings possibly because the count was actually present at the refill station where the people were being surveyed.

The given issues can be resolved by conducting random surveys of some students in a building rather than only the ones using the stations. Secondly, the respondents could be asked to fill out a survey sheet rather than asking questions in person so that anonymity can be increased. The surveys could also be conducted online to target a large number of students. The random surveys of all students could also include an option where students can specify the kinds of stations that they have used and the ones they would like to see in the future. These surveys would, therefore, help in making the sample more representative of the population.

Limitations of the Observations

The final part of the study included making observations regarding the number of people carrying single use bottles versus reusable bottles out of the total number of people in the room.

This was done on the recommendation of the client to observe the ‘campus cultural norm’ surrounding reusable bottles. The study, however, did not yield any results that could be used for analysis. Firstly, it is not possible to observe the kind of bottle every person in the room is carrying as some people might have bottles stored in their backpack. In future it might help if people were to conduct a survey regarding the kind of bottle they have, if any, at a given time

rather than observations. Secondly, observations at a specific time only provide a snapshot of the data and not the overall trend. It is also difficult to decide on the ideal time interval between each observation as the same people might be in the room during the duration of the observation. We encountered this problem as we decided on half an hour intervals, but often the same people were in the room for long periods of time. Finally, we only counted the number of people with plastic water bottles and excluded other drinks. It could be entirely possible that someone could have bought an alternative drink because they couldn't buy water. On the contrary, if alternate drinks were included, the opposite could be true where someone could have bought the drink regardless of carrying a water bottle. The inaccuracy of the observations, combined with the inability to properly analyze the collected data rendered the observations futile. We were, therefore, unable to observe the 'campus cultural norm' surrounding reusable bottles.

Main recommendations

Behaviour

List of Recommendations Pertaining to Student Behaviours

Based on the analysis and discussion, our water refill station project requires further assessment of student behavioural aspects of usage and subsequent future recommendations. Our client has expressed an interest in the previous, asserting the term "campus cultural norm". The following is an investigation into contributions that could lend knowledge to and ultimately contribute to a campus cultural norm of carrying a reusable water bottle and optimal refill station usage. Based on the previous analysis of the data, the proceeding is our recommendations:

1) Promote easy information access through student clubs and campaigns.

The first issue to address, according to our data, is that only 23% of students are aware of the water bottle ban on campus. In accord with the information deficit model of behaviour change, our project would need to provide more widely accessible knowledge. Specifically, information surrounding the issues of plastic one-use water bottles and its impact on the environment and the

commodification of water; these being the primary reasons for the ban's implementation. We suggest creating a club or campaign to spread the awareness and information to the University of Toronto community. The primary aim for this behavioural dimension of the project is to recommend, based on the analysis of data section, what features could inspire an attitude change and encourage the substitutive or alternative behavior of refillable water bottle use.

2) Utilize a model that was proven to be effective

Our primary instinct to inspire change was to analyze a model that has already been proven effective for other universities or institutions that implemented a water bottle ban as well as water refill stations. UBC started a campaign to ban water bottles on campus in 2013. They used education, as well as behaviour change campaigns. The coordinator of the Tangible Solutions Team for Common Energy said, "I think the difference with this campaign is that we're really emphasizing the alternatives instead of just saying, 'The use of bottled water is bad,'" (Bigam, 2103). Another key factor would be Common Energy teaming up with other clubs at UBC to spread the campaign, in that a cross-discipline approach could encourage unity in action. It is also important to emphasize that involving other clubs would best create a cultural norm that will permeate all corners of campus. The final key factor we identified was the immediate alternative offered in substitute to a one use bottle, this being the water refill stations. By identifying the key methods of a working model from a similar institution, like that of UBC, we hope to transfer these methods to University of Toronto to increase the sustainable behaviour of refilling a water bottle.

In summary, we identified three necessary components of the model:

A) Create a campaign, for school events and online

B) Incorporate and involve a variety of student club collaborations and inter-disciplinary approaches

C) Provide an immediate alternative or substitute from bottled water, this being the refill water stations and suggest refillable bottles to students

3) Maintain a social media presence

An additional method that UBC used to accent water refill station information was a social media campaign, #tapthatUBC. They use the hashtag #tapthatUBC on Facebook and Twitter to answer questions of social media participants regarding disposable versus reusable bottles and the alternative of tap water stations (UBC, 2013). This could appeal to a consumer base, with the use of a slogan as persuasive communication as well as a social media presence. The Facebook and Twitter pages are community-based and demonstrate excellent social marketing. As an example, the Facebook group creates and advertises events that engage students in a “tap that taste test fest”. This event let students participate in a blind test of tap versus bottled water to see if they could tell the difference. Through interactive experiences that engage the students, value and attitude change can be accomplished to ultimately change the infrastructure of a university.

In response to this working model at UBC, we assert that a refill station campaign or club with a social media presence would provide more information to University of Toronto students and consequently aid in the direction of our aim to create behaviours of a sustainable campus cultural norm. This information could include facts often unassessed by the public from Health Canada on bottled water and the differences between tap, spring, and glacier water with a taste test. In Canada, special waters like spring and glacier water must be labeled where they come from (Health Canada, 2013). This would give an opportunity to provide students with information as to where the refill station water comes from in case there is a potential stigma around drinking tap water. We additionally suggest creating a club or campaign to participate in student club fairs and engage students in water issues and perhaps a similar taste test. Providing students with more information on the harm of plastic one-use bottles as well as the reasons for banning them on campus inspires value change. With this newly acquired information, student’s future choices between bottled or tap water, would be met on campus with water refill stations as an immediate substitute. Moreover, the new knowledge in combination with accessibility of refill stations could influence behaviour toward reusable bottles.

4) Work with a health dialogue

Additionally, this leads to the subject of addressing a health dialogue to further increase normalizing the sustainability of carrying a reusable water bottle. If health benefits are offered to the consumer, this is yet another way that new behaviours can be inspired and created. The individual's behaviour will make up the collective social practice. We speculate that a health dialogue is a component that has already, and can further contribute to the individual's rationalization of frequently hydrating by drinking water. To demonstrate this, if one were to look back to classrooms in the 1960's, Professor Robinson, from the School of the Environment at the University of Toronto, informs us that it was extremely rare for students to carry water bottles. The exception was athletes that frequented the gym. Reusable water bottles can currently be observed on student and faculty desks during class or on backpacks. This implies that the collective behaviour of carrying a water bottle has already increased in the past fifty years as a norm for community/institutions like universities. Again referring to the information deficit model, we previously discussed a linear progression through the stages to further encourage the norm. The proof that this could work is that it likely already has; health dialogue is the catalyzing information that motivates consciously integrating hydration in an individual's daily behaviour.

The health dialogue that the University of Toronto portrays, is encouraged by gym access, sports teams, and programs like UfiT, where fitness, healthy eating, and hydration is emphasized as a vital aspect of student life. Additionally, bottled drinking water is sold in association with something refreshing, vitalizing, and healthy. On Nestle waters Canada website, their slogan at the title of the web page says "the healthy hydration company" (Nestle, 2016). Therefore, health is a point of emphasis for many water marketing campaigns. This supports that a health dialogue is coupled with water, as a marketing strategy to increase bottled water purchases. The same application of a health dialogue could therefore increase refill station usage and successively, carrying a refillable bottle. One can root a health dialogue in John F. Helliwell's research on subjective wellbeing. Subjective wellbeing would contribute to an individual's behaviour which makes up the collective social practice. Additionally "Health care makes up the largest and

usually fastest growing component of most government budgets.” (Helliwell, 2011). With health as a societally embedded concern, students may already be subtly aware that drinking more water contributes to better health, sense of well-being and therefore better quality of life. This would be considered a motivation and direct benefit from the behaviour of drinking water.

5) Create a reward or benefit

The issue is: if students are already incorporating hydration into the behaviour of their daily activities, how will they choose to do this? We suggest that to encourage refilling behaviour versus buying bottled water (off campus) or alternatives, that we provide yet another benefit or reward for this particular behaviour. As per future recommendations, it would be of interest to provide a rewards program for the student to receive a stamp on a refill card from the station. Or, (if funds provide) a water refill station cellphone app. , featuring a barcode to scan for points at the stations. When students reach, for example, 100 refills or points on their card, the university could reward them with a dollar at the university book store. Or after 500 refills, they could receive a free T-shirt. The previous also demonstrates the economic side to behaviour change. The students save money by refilling their bottles for free as opposed to buying water, but also profit points making this an overall profitable experience. The phone app could additionally feature a new fact about water for every time the student refills. The fun facts would make students directly aware, by engaging with the app or stamp card, of the impact they are having on the environment by making sustainable choices. These are examples of opportunities for future experiments that we recommend as it should positively increase the usage of refill stations and the campus cultural norm of carrying a reusable bottle.

6) Impact the community

To say nothing of a group benefit would negate the purpose of the campus cultural norm, as something to ultimately assist sustainability, the environment, and community. Though we previously emphasized individual benefits, this is to encourage individual behaviour which contributes to collective behaviour and ultimately socially embeds the norm.

While these tools, especially those that enable users to know the overall social costs of their sources they are consuming, are an essential part of the story, they ignore the all-important social norms. It has been shown that subjective well-being is raised when people are given the opportunity to do things for others. Actions to improve the local and global environments for the benefits of others in current and future generations fall right into that sweet spot. Such actions are most likely to be effective where they are socially connecting, demonstrably efficient, and represent voluntary actions by the givers rather than actions they are paid or forced to do. (Helliwell, 2011)

In terms of refilling a water bottle, how can we make it a better, more social experience that makes the individual feel as if they've benefitted the larger community and are subsequently motivated to repeat the behaviour? Our recommendations come from the source of psychology and behaviour based lab work.

Pertaining to the topic of psychology, important to our project is cued behavior as a response, using Jaiying Zhao's research on water and behaviour change. Her product called "Dropler" creates an instant visual signal for water consumption; the device's light levels go down as water use increases (Vockeroth, 2016). Zhao works for UBC, where the "Dropler" is backed by psychology research at the behavioural sustainability lab. They found the resource's visibility directly reduced consumption. We assert this research as correlative and apply it to the water refill stations in relation to the "water bottle saved counter". This is a digital screen with numbers that are lit up in green and increase when the student fills their bottle. To support this as a viable fact to consider important, 70% of students noticed the "bottles save counter". We ask if the count could be a similar visual cue for behavioural response, and what other ideas could be imagined and applied to cue students at water stations? To compare and contrast, the difference is rather than the aim being to decrease use, like the "Dropler", which shows a visual cue of light levels going down, our aim is to positively increase refill station use with a signal that goes up, like the "water bottles saved" count. Individuals have a hard time seeing how their actions positively impact the environment on a large scale. With a "water bottle save-counter", students are more encouraged that their small decisions are big choices affecting large landfills and even

the world, thus encouraging them to continue the behaviour. This is not only a community and environmental benefit, but could, according to Helliwell, effectively raise subjective well-being and influence the repetition of an experience now positively associated with impacting the greater community. For future studies, we assert an additional sensory cue, for example a positively associated sound upon refill, or a stronger visual cue that could have similar results and therefore increase the behaviour to ultimately contribute to normalizing sustainability on the University of Toronto campus.

Conclusions

The data our team collected has both limitations and merits within the University of Toronto campus. Our data showed that many students were planning their day around stations where they knew their optimal type of hydration could be served at the water filling stations. Students mentioned specific holes in the map of water filling stations including buildings like UC, in the libraries, and other older campus buildings. Another large hole discovered was the fact that no map was easily found on campus to show where the fountains were. We have recommended ways the water station situation can be mended, and based on similar situations at other campuses, there have been proved initiatives which have worked out very well for increasing the use of the station. Overwhelmingly, the survey data found that most were unaware of the ban on campus. While this could mean more awareness should be addressed in coming years, the students who are using their bottles at the station bring their own almost every day as a part of their lifestyle. Hydration, it seems is a key part of students comfort on campus. Whether or not the ban is readdressed, the future map of bottle stations should be expanded to accommodate this cultural growing norm on campus.

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