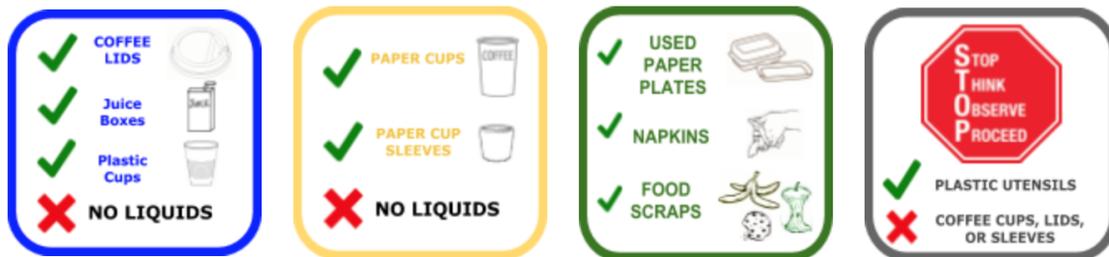


Put Waste in its Place: The Zero Waste Station Challenge

Final Project Report



Written By:

In Collaboration With:



Put Waste in its Place: The Zero Waste Station

Introduction

The “Put Waste in its Place: The Zero Waste Station Challenge” is an ongoing project with the City of Vancouver (COV) and CityStudio with the goal of increasing waste diversion, the amount of waste being diverted away from landfills in Vancouver (Gagnon, P., personal communication, January 23, 2017). Our main goal is to evaluate the effectiveness of decals displayed on the lids of waste bins, in terms of their influence on waste diversion at Hillcrest Community Centre (HCC).

Today, waste disposal is vital to the sustainability of the COV, as the city is striving towards being the Greenest City by 2020. In 2015, Vancouver residents, businesses, and institutions disposed approximately 600 kg of garbage per person (City of Vancouver, 2017). Innumerable useful resources are either buried in landfills or burned in incinerators, taking away their value (City of Vancouver, 2017). The city’s main target is to decrease the amount of solid waste going to the landfill or incinerator by 50% from 2008 levels (City of Vancouver, 2012, p. 35). By 2014, six years after initiation, there was a 23% reduction (City of Vancouver, 2016, p. 2).

For assistance in reaching the 2020 goal, the COV and CityStudio have partnered with students from UBC on the zero waste station challenge. Last year, a team of UBC students designed decals to be placed on the front of zero waste bins, but only a 9% increase in waste diversion resulted (Clark et al., 2016, p. 5). Thus, the project members suggested placing decals on the lids of waste bins instead.

Significance

Our research aims to address the current global issue on waste management. The zero waste project implements the reduce, reuse and recycle (3R’s) environmental trifecta

Put Waste in its Place: The Zero Waste Station

(Government of Canada, 2014). Valuable, recoverable and recyclable materials such as glass, metal, paper and plastics are often improperly disposed (City of Vancouver, 2017). Hence, the city's goal is to divert waste from the landfill to instead be reused and recycled (Gagnon, P., personal communication, January 23, 2017). Correct waste sorting will also cut greenhouse gas emissions, save tax money and raise more awareness in the community.



Figure 1. Why should you care about correct waste sorting?

Several institutions, like UBC and CityStudio, have done research regarding approaches on efficient waste management in Vancouver. Mueller (2008) found that convenience is more effective in attracting people to recycle, rather than penalizing improperly disposed products. Through measuring the effectiveness of decals on waste sorting at Hillcrest Community Centre, we will provide data for the City of Vancouver to construct practical strategies for a more effective waste disposal system. This will garner community support in fulfilling one of the 2020 Greenest City Action Plan goals, and gives people the opportunity to practice accurate waste

Put Waste in its Place: The Zero Waste Station

sorting. Our project will serve as a positive step towards the continuation of future Zero Waste projects.

Project Objectives

The main objective of our project is to measure the impact decals have on waste sorting, when placed on the lids of zero waste bins. In our observations, we will note items commonly thrown in the wrong bin to further assist the city in creating a final version of decals for city-wide implementation. In order to evaluate effectiveness, we will observe the accuracy of waste sorting both with and without decals present.

Inquiry Questions

1. Will having newly designed decals displayed on the lids of bins have an impact on the accuracy of waste sorting?
2. What kind of waste is being correctly sorted the most? The least?

Methods

Data Collection

We collected quantitative data through making naturalistic observations of patrons using waste bins. Specifically, we looked at the type of waste being disposed, if it was thrown in the correct bin, and the time taken for individuals to make their decision of which bin(s) to use. The time taken addresses how effective the signage is. Our visits to HCC for data collection took place on three non-consecutive days for one hour each. Our team separated into two groups for observations, covering the same two zero waste stations during each visit. During our first visit, we made observations with just the existing placards. On our second visit, we placed newly designed decals on the lids of each bin and again made naturalistic observations. For our third observation, we collected data with decals present, but with those of a new design.

Put Waste in its Place: The Zero Waste Station

Data Analysis

Through analyzing the items thrown in the bins during our observation periods, we identified specific items prone to improper sorting. We then applied this knowledge when creating decals to promote accurate sorting. We used an elaborate spreadsheet to record all our data and research observations (table 1, appendix). By first calculating the percentage of accurate waste diversion after each visit (table 2, appendix), then graphing and comparing the data from our three visits, we were able to identify whether the placement of our newly designed decals on lids had an impact on waste sorting.

Ethical Considerations

Every project member completed the TCPS-2 Tutorial Course on Research Ethics before conducting research at HCC. When putting together our final report, we synthesized the data obtained and made generalizations from any noticeable trends, excluding identifying information.

Results

During our first visit, we observed a 55% accurate waste diversion rate without the use of decals. From the variables measured, the majority of the demographic observed were male, in the age range of 30–60 years old or children. However, these variables did not show a significant trend on waste disposal due to the random selection of people observed. During our second meeting with our community partners, it was unanimously agreed that these factors need not be included. Thus, in the second observation we conducted, age and gender were not acknowledged as factors affecting waste disposal due to inconsistency and indifferences with our project objectives. After the first placement of our decals, we observed a significant decline in correct waste diversion rate, at 37%. This resulted in a revision of our decals to accommodate a more

Put Waste in its Place: The Zero Waste Station

effective and visually stimulating design. We then tested their effectiveness at HCC and observed a 72% correct waste diversion rate; a 17% waste diversion increase from our initial observation.

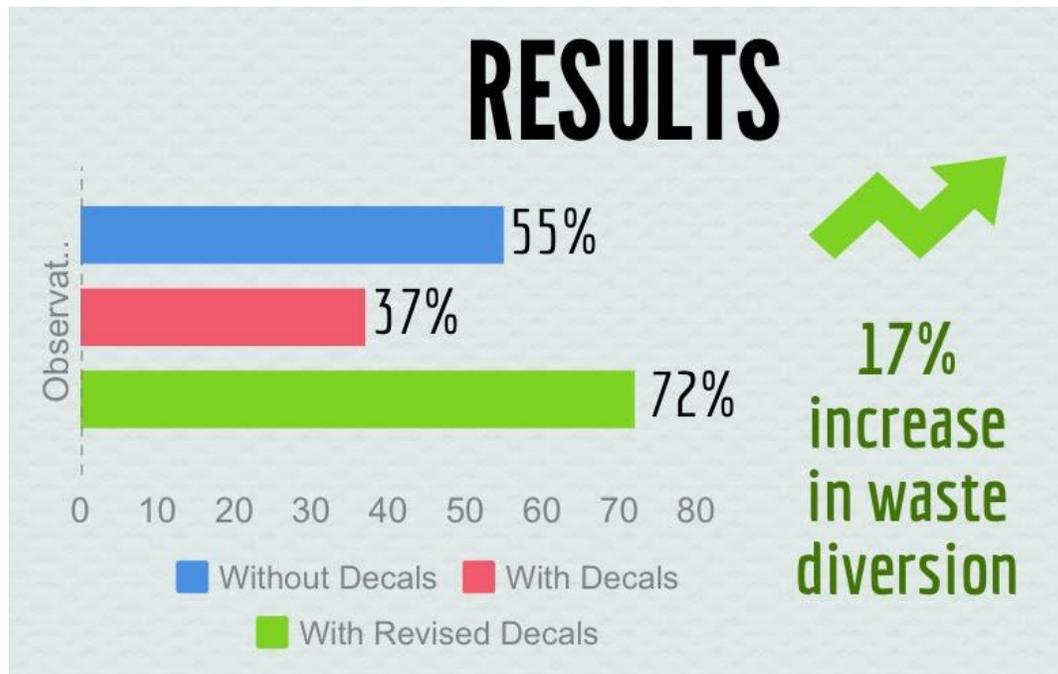


Figure 2. Results obtained from our three observational periods at HCC

Discussion

The results gave us quantitative and qualitative approximations of how patrons are sorting their waste, with and without decals. After our second observation, the decrease in correct waste diversion emphasized our failure in creating an effective decal design. Through analysis of the design faults, we found that placing too many visuals in a small space was not working. That is why for our revised decals, we minimized the use of images and instead focused on including visual representations of the objects commonly sorted incorrectly. With both a decrease and increase after the placement of our decals, our data proves that including decals on the lids impacts the public's ability to sort waste.

Put Waste in its Place: The Zero Waste Station

Asset-based Community Development plays a significant role in studying the integrated food system (Mathie & Cunningham, 2003). Our community-based experiential learning (CBEL) project estimates waste diversion rates through observations at a local community centre. This connects our local food system to the global food system, which correlates with the issues of food justice and food security. The increase in the accuracy rate of waste sorting at HCC shows that a simple activity can have a large impact in our community. Our decals have reduced the amount of waste brought to the landfill and has brought community awareness to the waste sorting process.

Although our data shows an increase in waste diversion, there are limitations that exist. For example, one important reason we succeeded with our revised decals is that we emphasized items that were commonly sorted incorrectly at HCC. Although this was extremely effective at HCC, there is a chance they would not work at zero waste stations in other Vancouver community centres. Moreover, we found that there are currently several variations of waste sorting standards in Vancouver. Due to the lack of a universal standard, it is difficult to develop decal designs that would serve all the community centres and other institutions in Vancouver.

Conclusion

Our CBEL project shows that incorporating simply designed decals along with the existing signage on waste stations can improve waste sorting habits of patrons at HCC. More importantly, this project fills the research gap regarding waste diversion in Vancouver community centres. This project provides additional data for the COV, which will help them plan strategies to increase waste diversion. However, the decals have only been tested at HCC, and have yet to be proven helpful in other community centres and institutions.

Put Waste in its Place: The Zero Waste Station

Moving forward, we suggest including soft plastics bins at HCC, as we found that plastic bags caused much uncertainty amongst patrons. We recommend implementing uniform bin categories citywide to prevent unneeded confusion in community centres. Additionally, we advocate for the City of Vancouver encouraging its residents to divert more food waste to compost. This will benefit the local food system through allowing communities to have a better and lower costing food production system. It would also aid residents in practicing their right to grow, sell and eat sustainable, fresh, nutritious, and culturally-appropriate food that can be easily accessed within their local area.

Put Waste in its Place: The Zero Waste Station

References

City of Vancouver (2012). *Greenest City 2020 Action Plan*.

Retrieved from <http://vancouver.ca/files/cov/Greenest-city-action-plan.pdf>

City of Vancouver (2016). *Greenest City 2020 Action Plan: 2015-2016 Implementation Update*.

Vancouver: City of Vancouver.

City of Vancouver (2017). *Why Zero Waste*. Retrieved from

<http://vancouver.ca/green-vancouver/why-zero-waste.aspx>

Clark, E., Phan, L., Tan, Y. T., Tsang, K. H. T., Sungkarto, J. & Zhang, C. X. (2016). Final

Community Project Report. Retrieved on April 8, 2017 from: [http://lfs-](http://lfs-350a.sites.olt.ubc.ca/files/2016/09/Group18-Final-Report.pdf)

[350a.sites.olt.ubc.ca/files/2016/09/Group18-Final-Report.pdf](http://lfs-350a.sites.olt.ubc.ca/files/2016/09/Group18-Final-Report.pdf)

Government of Canada (2014). Reduce, Reuse, Recycle. Retrieved from:

<https://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=D3A22BDD-1>

Mathie, A. & Cunningham, G. (2003). From clients to citizens: Asset-based community

development as a strategy for community-driven development. *Development in Practice*,

13(5), 474-486. doi:10.1080/0961452032000125857

Mueller, W. (2013). The effectiveness of recycling policy options: Waste diversion or just

diversions? *Waste management (Elmsford)*, 33(3), 508-518.

Riley Park Hillcrest Community Association (2014). Overview & History.

Retrieved from <http://www.rphca.memlink.org/page/overview%20%20history.aspx>

Put Waste in its Place: The Zero Waste Station

Appendix

Table 1. Example of data collection table used (from observation 1 - February 12, 2017).

Green (Compost)	pizza	read the signs; sorted	✓
Yellow (Mixed Paper)	napkins	read the signs; sorted	
Blue (Mixed Containers)	pizza cardboard	read the signs; sorted	
Grey	napkin	quick no care	
Blue	apple juice	care	✓
Blue	can	quick	✓
Green	bread	quick with care	✓
Grey	paper towel	quick with care	
Green	apple	throw	✓
Grey	paper towel	throw	
Grey	celophane	throw	✓
Blue	can	read the signs; quick	✓
Yellow	napkins	read the signs; quick	
Green	pizza	carefully read the signs	✓
Blue	Can	carefully read the signs	✓
Yellow	Napkin	carefully read the signs	
Yellow	Parchment paper	carefully read the signs	
Grey	Napkin	throw	
Grey	Plastic cup	throw no care	
Blue	Plastic cup	throw with care	✓
Green	apple	care	✓
Grey	napkin	throw with care	
Green	food crumbs	throw with care	✓
Yellow	napkin	throw with care	
Blue	plastic container	thinking	✓
Grey	plastic fork	confused	✓
Yellow	paper towel	throw	
Grey	paper ball	throw	
Grey	Parchment paper	looked at signs, but just threw	
Grey	paper towel	confused	
Grey	pizza cardboard, napkin, food	so much thought... with hand on mouth, confusion; looked inside and throw	

Put Waste in its Place: The Zero Waste Station

Grey	paper bag (inside: coffee cup with lid)	quick	
Blue	can	read signs	✓
Grey	parchment paper with pickle	throw	
Grey	parchment paper	looked inside the can; copied brother	
Grey	cardboard	confused	
Grey	napkin	kid can't even see	
Grey	ice cream cone	just throw	
Green	gum	split, confusion	✓
Blue	can	quick	✓
Blue	plastic cups and fork	read but quick	✓
Blue	plastic lid	threw it and then checked with mom	✓
Blue	plastic cup	threw it and then checked with mom	✓
Grey --> Yellow	pizza cardboard	mom fixed it	✓
Green	napkin	read the signs; threw with care	✓
Grey	plastic fork	read the signs; threw with care	✓

Grey = landfill
 Green = compost
 Yellow = mixed paper
 Blue = mixed container

Green = right
 Red = wrong

Table 2. Calculations of accuracy of waste sorting.

Formula	$\frac{\# \text{ of observed } \textit{correctly} \text{ disposed waste}}{\text{total \# of observations}} \times 100 = \% \text{ of total accurate waste disposal}$
---------	--

Critical Reflections

Student 1

Looking back at the the whole experience of LFS 350 this term, it is overall a very meaningful and impressive journey. However, this course has made me feel a lot of emotional and motivational changes. We were once confused and disappointed when our first set of decals decreased the diversion rate at Hillcrest Community Center, however, our passionate and vibrant group, along with effective communication with our community partners, we were able to improve our decals, and successfully increased the waste diversion rate at Hillcrest Community Center. These kind of experiences are almost countless during this course, making it more memorable and meaningful. Through our CBEL project, as well as the lectures and tutorial sessions, we had a first taste of applying our academic knowledge to the real world and work with different groups of people in the society. This is an experience that I will cherish and apply in my later study and career.

Student 2

The CBEL project was one of the most challenging yet wonderful learning experiences I've had so far at UBC. Mostly because it allowed us as students to apply what we have learned and collaborate with professionals in similar fields on active research. It also allowed us to work more independently as students and conduct our own research and lead our own project which I very much enjoyed. I found it most interesting being able to experiment in a public setting, and being able to analyze raw data from everyday life. This project taught me that research is so important in trying to build a sustainable food system because there are so many variables that can be considered and defined in a food system. It has also taught me the importance of waste

Put Waste in its Place: The Zero Waste Station

diversion and how big of an impact it can have in our local community, as well as, on a global scale.

One of the main sources of communication within our group were the online Google docs which I found to be very useful in collaborating on group projects similar to this. Although our research was not as substantial as we would have preferred to be, I feel like we succeeded as a group in contributing to the use of decals on waste stations. I do hope with our project findings, that future groups will be able to take our information and build off of it for their projects as well.

Student 3

Going into this project, I thought I had a decent amount of knowledge about diverting waste through recycling and composting. Therefore, I am pleasantly surprised with how much knowledge I have gained through taking part in this CBEL project. I have not only learned more about the waste diversion system in place in Vancouver but I have also learned about actively applying new knowledge gained to active research. Waste diversion facts aside, there was also a significant amount of learning that took place through working with one group throughout the entire term, and also working alongside our community partners for the entirety of our journey. Having the chance to work with professionals in an area that we all share a passion for was truly a wonderful experience. And to top it all off, I think our project was a success! Small changes made by many people have the ability to make a humongous impact.

Overall, our group functioned well together. We stayed in contact through Facebook Messenger and worked together on all our assignments on google documents to meet deadlines. I definitely think the flexible learning sessions were important in keeping us on track with our project, as we usually had our community partner meetings during these sessions.

Student 4

Throughout the CBEL project, I gained a lot of experiences and knowledge in terms of collaborating, building ideas and creating initiatives in the community. It was such a great opportunity to work with our innovative community partners, as well as with a group of people who works with such energy and commitment. Initially, the project itself seemed simple and not too difficult. However, as my group was in the process of project planning and decision making, it becomes very challenging. I also found it interesting that waste diversion is an important component in relation to food security and food justice. With the help of course materials such as the readings, podcasts and TED talks, I felt more prepared in approaching the tasks that we have to do each week. I also think that the flexible learning sessions were truly one of the main components of the course because it gave us the chance to actively go out in the community centre and conduct our observations.

Altogether, I had an amazing experience collaborating with people who believes that even a simple improvement can make a huge impact in the community. I am also grateful to my group members who devoted a lot of their time on this project. Their dedication and contribution of unique ideas helped us to succeed. As this project ended, I felt a sense of fulfillment knowing that my group and I made a difference in the community.

Student 5

LFS 350 is concentrating on personal development and team spirit via discovering new ideas and creating own project in a broader topic. By connecting food justice and food security with the CBEL project was a unique experiment to understand conceptual tasks via experimental practise. Collaboration with experts provided varied angles to comprehend the food justice and food security. By applying our knowledge about food system at the decals design contributed to

Put Waste in its Place: The Zero Waste Station

the development of waste management system at the local community. The decals design session was my first experiment to create an item that actually used for reality and has given us an opportunity to present our ideas to the public. We utilized the flexible learning time period to explore innovative ideas for our project and arrange our time more flexibly to process the project study. I enjoy working with our group and my group members help me a lot. The way to using Facebook messenger and google documents as our communication channel was helpful and efficient for our schedule. We can upload our thoughts and ideas via those media anytime which is suitable for us, since we all have different course loads and work schedules. LFS 350 gave me a deeper understanding of the food justice and food security via project study.

Student 6

This semester of LFS 350 has greatly influenced my views on food security, food justice, and food waste. The CBEL project I was involved gave me great hands-on experience with how our community is affected by the concepts we learned in class. In working with the City of Vancouver and CityStudio, I have learned a lot about the the waste diversion system implemented in Vancouver. I have realized that as students, we are able to greatly impact how the future for food waste is managed. I hope that this can continue for future years and further develop because there is a lot of insight and valuable lessons to be learned through working with professionals and creating a positive impact on our community. Overall, I think our project was a great success; in an educational perspective but also through personal growth. I was so lucky to be working with such driven and hard-working individuals. Through consistent contact on Facebook Messenger, they helped me achieve my goals for this class as well as encouraged and supported me throughout the project. The flexible learning experiences were a great opportunity to get to know our members as well as effectively complete tasks in an efficient amount of time.

Put Waste in its Place: The Zero Waste Station

The allocated flexible learning times allowed us to keep track of the material in class as well as with our project. It allowed me to work at my own pace whilst still being productive with my group.