

UBC Social Ecological Economic Development Studies (SEEDS) Student Report

Waste Behaviour in UBC Food Services Residence Dining Halls

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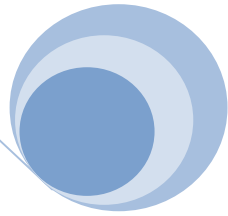
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Group 3, Scenario 3

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Abstract

The purpose of this project was to assess how waste is produced and managed at UBC residential dining halls at Place Vanier and Totem Park residences and to provide feedback and recommendations as to how existing waste behaviour practices can be further improved. We developed and addressed the following research question: “What is the current waste management system in the two residential dining halls and how can we improve waste behaviour to reduce total waste produced from these sites?”. We surveyed the dining halls and kitchens of these residential areas and assessed the levels of waste production, disposal and sorting activities of pre- and post-consumers at these sites. We also conducted literature reviews and consulted with professionals and waste management experts to obtain more information about how waste are managed at different areas.

Pre and post-consumer waste sorting can be optimized through the use of 3-bin system, which is effective in dining halls but contamination must be reduced. Hard plastic are being sold off for charity and soft plastic are being recycled. Space for bin recycling is a limitation for the kitchen area; recycling efforts are made harder due to proximity of recycling stations. Increase usage and Eco-to-go program is a critical factor in waste reduction. Funding of the composting vessel is generated by UBC. Government funding of waste disposal has caused lack of awareness in waste sorting. Current campus waste diversion is at 44%, but a maximal value of 95% can be achieved. This can be achieved through right education, advertisements and incentives.

Introduction

Waste management is an important component of a sustainable food system as it contributes to the enhancement of the environmental, economic and social health of a community. However, with a finite disposal capacity of every municipal landfill, understanding the importance of waste reduction and redirection of recyclable and organic waste to different waste streams is essential to accommodate this issue. In many developed countries, several successful waste reduction initiatives are implemented in order to reduce or divert waste away from landfills. For instance, Germany has implemented an ordinance on packaging in order to minimize solid waste production from manufacturers. This ordinance required manufacturers to take the packaging of their goods for reuse or recycling (Rousso and Shah, 1994). In Sweden, approx 46.7% of household waste goes into incineration facilities, where wastes are converted into energy and are recovered for heat and electricity use (Canadian Urban Institute, 2006). This does not only reduce their solid waste contribution to landfills, but it also decreases their total methane-emission and thus improving their air quality. Also, in British Columbia, the City of Vancouver has implemented various waste reduction and recycling initiatives in Vancouver residential areas. Such initiatives include on-site waste transfer stations, also known as the Residential Drop-Off areas (RDO), that offers recycling programs for various materials such as scrap metals, white goods, corrugated cardboard, mixed paper, newspaper, lead acid batteries, used oil and oil filters, tires, and propane tanks (City of Vancouver, 2011). In 2008, the City of Vancouver also implemented disposal bans in efforts to reduce the amount of material being landfilled that could instead be recycled.

In contrast, in developing countries where economic and technological resources are scarce, many do not practice sustainable waste management. As a result, these countries often

opt for open dumping as their main method for waste disposal. Open dumps are characterized as a land disposal site where indiscriminate deposit of solid waste takes place with either no, or very limited measures to control the operation and to protect the surrounding environment (International Solid Waste Association, 2007). In the Philippines, for instance, the practice of open dumping is predominant throughout the country (The World Bank, 1999). Open dumping practices can have several detrimental environmental impacts on air, water and soil quality. Open dumps have the potential to have a severe impact on the quality of living for communities nearby and therefore there is a great need to upgrade waste management practices to a more sanitary and sustainable method. For this reason, it is important to understand how waste management and waste reduction programs can directly affect the health of communities.

In addition, it is just as important to understand how the community itself can contribute to the amount of waste produced in landfills. For instance, in UBC, approximately 56% of total waste produced is directed into the City of Vancouver landfills (Giratalla, 2011). Although approximately 44% of total waste produced is diverted into the recycling and composting waste streams, the UBC Campus of Sustainability Office believes that this number could be improved further if waste behaviour practices of individuals are improved (Giratalla, 2011). For instance, if both staff and students were follow proper waste sorting methods or are willing to participate in waste recycling/reusing programs, more waste can be diverted away from landfills.

According to Vicki Wakefield, UBC's Hospitality and Housing purchasing manager, failure to follow proper waste sorting methods by staff or students can result to contamination of bags that contain recyclable or compostable products. Instead of recycling or composting the contents of these bags, contaminated bags will consequently be redirected to landfills. It is therefore important to manage waste behaviour practices on an individualistic level in order to manage waste behaviour practices on a community level.

For our LFS 450 UBC Food System Project, our team has been assigned to conduct a review in regards to pre- and post-consumer waste behaviours in UBC's Food Services residence dining halls, with emphasis to Place Vanier and Totem Park student residential areas. The purpose of this project was to assess how waste is produced and managed at these sites and to provide feedback and recommendations as to how existing waste behaviour practices can be further improved. In order to do this, we surveyed the dining halls and kitchens of these residential areas and assessed the levels of waste production, disposal and sorting activities of staff and students at these sites. Throughout our project, we also consulted with several professionals and waste management experts to gain more information as to how wastes are managed in different sites at UBC. This project aimed to (1) understand the different waste streams involved at these sites, (2) identify the strengths and weaknesses of the current waste management system at UBC and (3) to provide recommendations as to how waste production can be reduced and how waste systems can be improved at the dining areas and kitchens of these two residences. Therefore, our team focused on the following research question: "What is the current waste management system in the two residential dining halls and how can we improve waste behaviour to reduce total waste produced from these sites".

Methods

For the inception of our project, we knew we want to interview our stakeholders to gather more information on the currently set up waste management occurring in the two dining halls and identify the strengths and weaknesses of the system to make feasible recommendations on how to improve current practices.

Before interviewing our stakeholders, during late January to early February, our group started with reviewing both the previous year's UBC Food System Project (UBCFSP) as well as the scenario document provided by our instructors to understand the purpose of this project and to identify the specific tasks that we must accomplish. Gathering background information on waste strategies being used in the waste management systems in the global, national and local context were necessary because these information would provide us with the general trend and the development of the current waste management system. Therefore, we conducted a few literature reviews that based on Canada's waste management included *Integrated Solid Waste and Resource Management*, *Vancouver Landfill Report*, *Solid Waste Division Annual Report* etc. Also, we reviewed the *AMS SUB Waste Audit* to build up our knowledge of the current waste collection and sorting systems being used on campus. Our focus on this project was on the waste behaviours in UBC food services residence dining halls. To have a basic understanding about the waste management system that is currently set up in the two residence dining halls, Place Vanier and Totem Park, we also took several preliminary observation trips to the dining hall to observe the waste disposal, sorting system, and the student behaviour. However, literature reviews and personal observations only provided us with limited information.

Interviewing the stakeholders would be the most efficient way to collect the relevant information because they are experienced in this field and they would have suggestions and comments on the current waste management system. Therefore, we quickly began to contact our stakeholders via e-mail immediately and arranged meetings with them. The stakeholders we interviewed were Waleed Giratalla, the Water and Zero Waste Engineer, Steve Golob, the Head Chef of Place Vanier, Rene Atkinson, the Dining Manager of Totem Park Residence, Cate Morrison, the Residence Place Vanier's Life Manager, and Victoria Wakefield, the Purchasing Manager. Please refer to the "Project Timeline" in appendix for the specific dates. Prior to our first scheduled meeting with the stakeholders, we provided them with an electronic version of the questions. The questions we asked were relatively short and broad which allow the stakeholders to elaborate. Therefore, we would be using qualitative analysis in this report. During the meetings, all took place in the two residence dining halls, these stakeholders provided us with invaluable information on the pre-consumer as well as the post-consumer waste disposal and sorting behaviour. Steve Golob even gave our group a tour in his kitchen to observe how they manage the pre-consumer solid waste. However, our group decided not to observe garbage bags and collect quantitative data because the data would not be large enough to represent the population of the resident dining halls. As a result, our quantitative data would only be based on the waste audit of UBC campus rather than the waste behaviour of the two dining halls.

With all the data we obtained, our group analyzed our results and made feasible recommendations for both the stakeholders as well as the future UBCFSP. Our recommendations would address the issues the stakeholders have mentioned and they would be innovative, sustainable and economically-friendly. Our group presented our recommendations in the Food Committee Meeting with our stakeholders on April 4th and received invaluable feedback. With our findings, we developed a brochure for the “Residence Opening Week” to guide students with proper waste sorting and disposal procedure. Then, we would associate with the UBC sustainability office which regulates the sustainability practices of the whole campus. If our solutions are valid to the whole campus, it would then be implemented. Even though our solution space would only consider the two resident dining halls, but, if applicable, it would also ultimately affect the whole UBC campus. Lastly, the project evaluation of our methodology would be further discussed in Project Evaluation Section.

Findings

A. Pre-consumer food waste treatment

In both resident dining halls, pre-consumer food wastes are separated from other solid wastes and are put into compost bins. Currently, they are using pails previously used to store sauces and condiments from suppliers. Food wastes commonly include un-consumed food items and vegetable trims. The food waste will then be managed by UBC waste management and brought to the composting vessel south of UBC campus. Steve Golob has also mentioned that the current kitchen design does not allow compost and recycling bins fitted well under the tables or near the equipment, and at some stations, the compost bin is not at close proximity.

B. Other Pre-consumer waste treatment

There are several key items that can be recycled or sold to be re-used. Soft plastic is separated from other waste into a collection bin and is picked up by UBC waste management for recycling. However, soft plastic can only be recycled when it has not been contaminated, in other words, it must be clean. If contaminated, soft plastic will be separated into another container or thrown into the garbage. In Place Vanier, approximately 50-60% of the soft plastic is recycled. Common items of soft plastic include food packaging and food wrap.

In terms of hard plastic items such as pails and bins, they are either recycled or sold to a local liquidation store. Currently, Place Vanier has been storing their smaller pails (~4 gallon pails), searching for a method to re-use. Larger pails are sold to the local liquidation store and are bought by painters and renovators. Metal containers and cans are also separated and recycled

similar to the soda cans. They are collected in recycling bins and managed by UBC waste management.

Although there is emphasis on purchasing local foods, packaging is still a prominent waste source. All of the cardboard from food packaging will be flattened and recycled, again through UBC waste management systems. Kitchen utensils such as metal bowls, plates, and spoons are washed to be reused in the circulation.

C. Post-consumer food waste treatment

Students are asked to sort post-consumption waste via a three bin system: compost, recycling and garbage. They are encouraged to put any leftover food and food scraps into the compost bin. These compost bins, along with the pre-consumer food waste, will be sorted and transported to the composting vessel via UBC waste management. During the first term, Place Vanier hired a student to monitor and guide other students waste sorting methods. Chaz Barker, Assistant Manager of Place Vanier, stated its effectiveness, although it was quite costly. From our observation at the dining halls, students are doing a great job at separating wastes and discarding them in the different waste streams.

However, not all food wastes can be brought to the composter. Victoria Wakefield has explained the high possibilities of contamination of compost through mis-sorting of waste items. Once the batch of food waste is contaminated, it cannot be composted. Currently, approximately 75% of the organic food waste has been diverted from the landfill in Totem Park and both residents go through three compost bins daily. Similar levels can be seen in Place Vanier as well.

D. Other Post-consumer wastes treatment

Students are asked to sort their waste through the multi-bin system: compost, cans/bottles, paper recycling, and garbage. Metal cans, glass bottles and plastic bottles are to be put into the recycling bin for further sorting by UBC waste management. Any waste in the garbage bin will be brought to the landfill. A recycling bin for paper products, including napkins and any cardboard, is included in the waste sorting area in both Place Vanier and Totem Park resident dining halls. Both resident dining halls have the conveyor belt utensil return system. By using reusable utensils (ex. metal forks), waste can be reduced because these utensils can be washed and returned to the circulation. Common waste items in Totem Park are paper plates and food waste in Totem.

E. Perception of current waste reduction implementation from resident dining hall managers and other stakeholders

In general, the managers of the resident dining halls have positive feedback on the current waste program. Steve Golob has noted the increase of organic food waste diversion from garbage and an increase in student participation in waste sorting. The current organic waste diversion in UBC campus is at 44%, and the waste audit has shown a maximum of 95% of UBC's organic waste can be diverted.

The managers are also very active in creating a zero-waste site; however, they have mentioned the two greatest barriers in creating such a setting are:

1. Cost: facilities, labour, and operation costs
2. Behaviour of consumer
3. Inconsistency in signage

F. Eco-to-go Program

A recent waste reduction program was implemented on the student body and the UBC Food Services. This program, known as Eco-to-go, requires the students to obtain a reusable to-go container. The use for this container is very flexible because once the container is dirty; the students can acquire a card and exchange the dirty container for a clean one at any location run by Food Services UBC (ex. Tim Horton’s). The container is microwavable and damaged or moulded containers are either discarded or recycled. In order to encourage student participation, Way to Go Program was created to act as an award system. Every time somebody uses the Eco-to-container they are given a stamp on their card. Once enough stamps are collected, there is a chance to win a bigger prize in the end of the year. Some examples of rewards are whistler ski lift tickets or \$200 Sears gift card. Use of this container is widely accepted in resident dining halls; however, we have not seen its use outside the dining halls. In addition to the Way to Go Program, the Eco-to-containers bring other incentives to students because they offer a 10% discount whenever food is purchased using the container.

G. Strength and weakness of current waste policies

Weakness	Strength
<ul style="list-style-type: none"> - Hard plastic not recycled as much as soft plastics due to space insufficiency - Water wasted in use for research equipments - Inconsistency in mandates and waste management or behaviour in different buildings across campus 	<ul style="list-style-type: none"> - Eco-to-go and Way to Go program to increase implementation for zero waste on campus - Working towards integrating different building waste management mandates and policies - Involves different student bodies and activities to increase waste reduction awareness (ex. Imagine Day) - UBC waste audit is conducted periodically to help analyze the adequacy of our current policies

H. Project evaluation findings

The concept and objective of our project is mainly focused on raising awareness to students in UBC about waste sorting and waste management. We identified barriers that prevented us from conducting the mini waste audit, survey, and focus group. Most of the concerns are directed to time constraints and our sample group. Through our observations in the two dining halls, students showed excellent knowledge in waste sorting. Thus, improvements in post-consumer waste behaviour in Vanier and Totem are difficult to identify. We combined interview results, observations, and researches to produce an awareness plan for students in UBC overall. Since our visions with the stakeholders are aligned, the expected outcome from our project can be applied efficiently. However, we do not have enough resource and time to accurately assess the efficiency of our project. Efficacy of our project recommendations are evaluated informally through a food committee staff meeting and our project presentation. The feedback from the stakeholders has been positive and much interest on some ideas has been presented to us. There was also effective communication with our stakeholders, and with the mandate to sign a consent form for interviews allowed us to keep our primary research focused on partners who share the same goal. This greatly increased mutual trust and understanding between all parties. For this term, our team hope that next year the LFS 450 team for this project can continue implementation of our recommendations and evaluate how our project have sustained to have an effect on UBC next school year. The project evaluation allowed us to find the area of constrains and improvements that can work around these barriers. For further recommendations and lessons learned from our project evaluation, please refer to the Project Evaluation section.

Discussion

Our research is primarily focused on the waste disposal habits in the two dining halls located at Place Vanier and Totem Park residential sites in University of British Columbia. In this section, our team will reflect on the current limitations that are present in UBC which may inhibit a more sustainable approach in the future. Wastes being recycled or composted are mainly solid wastes such as paper and food products, but there is a great deal to be explored in terms of liquid waste as well. There is little or no monitoring of wastes that do not go into our bin systems routinely. Not only should we look through material conservation, we should also focus on energy conservation. This improvement may require steps such as cold water wash to limit energy inputs into the system while cleaning.

We would like to improve on the weaknesses and enforce on the strength that allow sustainable waste management. An example of weakness in UBC policy is the inconsistency of signage and mandates in different buildings across campus. This is an area that will be hard to integrate because different buildings have different waste disposal behaviour due to the structure and function of the building. The chemistry building may produce more chemical wastes and is much older in terms of age, whereas the Sauder building may produce more paper waste and was recently rebuilt with more sustainable measures. Thus, these buildings have different waste management systems. It is understandable why there are different mandates and management in different buildings. However, UBC sustainability is starting a project to integrate these different buildings policies in terms of waste management. By focusing on the unique trait of the buildings and what has worked very well in the previous years, this integration will allow more consistent signage and management system for an easier and more controlled waste reduction environment.

A. Limitations: The Three Bin System

Due to technological constraints of the compost vessel at UBC, diversion of waste to compost streams is limited to an extent. In order for the compost vessel to work, a certain ratio of organic waste to paper waste is necessary. If there is a greater ratio of paper waste to organic waste, the excess paper waste will be sent to the landfills even if they are properly sorted into their respective bins.

Furthermore, the three bin system was implemented by the university to not only reduce the amount of waste created, but to also reduce the amount of waste sent to the landfills. However, a bulk of the waste that enters UBC contains packaged and processed materials that come from the pre-consumer or producers side. Because UBC has no control over how purchased goods are packaged and with what materials they come in, the UBC campus of sustainability office can only encourage consumers to recycle the items as effectively as possible.

B. Limitations: Pre-consumer Waste Diversion Efficiency

UBC's waste diversion efficiency is confined by limited space and the design of the kitchen area which affects how the workers manage their wastes. Although there are recycling bins found near food processing areas, not all stations have immediate access to recycling bins. Because of this, chefs and other food service handlers may choose to place recyclable items into trash bins out of convenience. This space and design issue also contribute to why hard plastics are not recycled as often as the soft plastics. In order to address this issue, Steve recommended that future kitchen counters should be redesigned to have organic waste bins under them. This will increase efficiency for the food service workers in terms of accessibility and convenience to the recycling bins. The bin system that Steve suggested for Place Vanier Kitchen is for the bins

to be rolled out directly to the loading dock, but still be able to fit with the kitchen design.

C. *Post-Consumer Waste Diversion Efficiency*

Our team visited Place Vanier and Totem Park during their peak lunch hours in order to collect information on waste sorting by students. We noticed that students have formed a habit to accurately sort out their wastes and place their plates and cutlery on the conveyor belt for washing. When we tried to do the same with our food waste, the signage above each of the recycling bins helped us to figure out where to put the waste materials. The post-consumer waste behaviour and management system was very well structured and was performed under control by the students. For those who could not eat their meals there, we witnessed them carrying an Eco-to-go container to their room. Overall, our group concluded that food wastes at the two dormitories' lounging areas are recycled with great efficiency, but this cannot be said for other buildings on campus and some of the other residential dormitory rooms.

D. *Eco-to-go Program: Effectiveness of the Eco-to-containers*

Our group feels that the Eco-to-go container has great potential to significantly reduce trash because of its reusability; however, our group also feels that the Eco-to-containers are not marketed very well. Aside from the awareness campaign during the opening week of UBC to students at the dormitory, there has been limited promotion outside the residential buildings. Food hot spots such as the Student Union Building and chain food outlets throughout UBC (i.e. Tim Horton's) should actively promote recycling benefits and incentives offered to students. Similar to the inconsistent mandate for waste management in the different buildings, eco-to-go program is inconsistently marketed and coordinated across the campus as well. Students living in

residences are given more responsibility to sort wastes correctly, but this responsibility should be enforced on all student bodies in order to achieve overall zero waste goals in UBC.

However, we were informed by our stakeholders that franchises are not allowed to post any notices or advertisements of other endorsement products; therefore, it may be a challenge to notify students that Eco-to-go containers are available in those food establishments. UBC Food Services overlook 17 cafe and snack bar style operations, food court, three full service dining restaurant, two residence dining halls, and three convenience stores. There are wide selections of locations outside of the dining halls where we can enforce the eco-to-go containers, so we should focus on these areas first for implementing this program on UBC campus.

E. *The Zero Waste Challenge at a Municipal Level*

Victoria Wakefield, our stakeholders from purchasing, suggested that it is not cheap to try to attain zero waste. Everything from the food service workers, to the collecting and transporting of waste, to buying and setting up of the composter, are all costly jobs required for sustaining an effective waste reduction program. Victoria mentioned that there should be government funding towards zero waste programs. Money is an enormous driving force when it comes to waste and recycling management as it contributes to the maintenance and operations of recycling/composting facilities. When dealing with tonnes of wastes, the government should intervene and set a positive example for institutions to follow the zero waste challenge.

Stakeholder Recommendations

We have drafted several stakeholder recommendations based on the interviews and literature search. These recommendations are meant as a working improvement on our problem statement. For project recommendations for UBCFSP, please review our project evaluation section. We thought that it would be more effective to focus on increasing awareness and consistency of proper waste sorting as methods of increase organic waste diversion.

A. For resident dining halls and student housing, we would like to suggest:

- By September 2011, change the bin sorting signage in parallel with UBC food services. We understand that this will be implemented in the resident dining halls by the start of the new term, but we would like to have consistent signage throughout campus. This will create less confusion and encourage students to use the bin to sort waste on a regular basis.
- Implement a short but concise pamphlet in the welcome package to remind students of proper waste sorting procedures. We understand that students may not read all the information they were given, therefore we would like to have MUG leaders and Resident Advisors engage the students for a few minutes during the imagine day lunch or during opening week. For more information, review our opening week procedures section.
- Although it is out of our scope of our project, many stakeholders did mention this problem. They would like to see a method that could decrease waste during moving out period in residences. We would like to put forth the ideas of a thrift store, a consignment, and a charity donation. UBC resident services can contact charity or consignment organizations before moving-out period and set up bins or trucks so students can donate.

B. For UBC Food services (at a community level):

- Increase awareness of the Eco-to-go container program. Set up a sticker or a small poster for each UBC food service establishment that carries this program, and broadcast this message through UBC FYI (email newsletter to students), and state in welcome packages for residency students.
- Engage students with the work done by UBC sustainability office with current sustainability practices shared in other universities. With the current sustainability clubs in UBC, speak at a UBC student conference to gain awareness.
- Involve upper management members of UBC (managers, coordinators, deans, etc.) into encouraging and introduce concepts of sustainability and the zero-waste challenge.
- Network with other universities, in USA for example, by attending waste management related conferences. Exchange knowledge of current or past waste management and consumer waste behaviour to help improve UBC mandates and policies.

C. For UBC campus:

- Get the whole campus involved with the zero-waste action plan. Implement the Eco-to-go container program to not only resident students, but all students on campus. Introduce this program to students in the student-led conferences.
- Work with UBC food services to design a waste sorting plan which is consistent throughout the campus: all buildings and facilities. This would include sorting practices in both pre-consumer and post-consumer levels. Define a set plan for all buildings and facilities with UBC waste management to maintain consistency of all waste management practices in all buildings in possible.
- Other faculties on campus can work with UBC waste management to design or implement compost bins and recycling bins that could fit into the kitchens on Place Vanier and Totem Park dining halls. For example, department of psychology can research into behaviours of pre- and post-consumer waste sorting or management to formulate tactics that will motivate consumers to make optimal decisions.

UBC Opening Week Recommendations

To promote proper waste sorting and disposal procedures around campus, a brochure was designed as a guide for students (See Appendix C). The brochure introduces both the three bin system in dining halls and how to sort waste accordingly, and the Eco – To Go program. It also provides facts on items that are currently prohibited at Vancouver landfills, such as recyclable materials and hazardous wastes.

Each September, UBC Food Services can refer to this guide in order to direct students on positive waste sorting habits. When Resident Advisors (RAs) bring student residents on a tour to the dining halls, they can provide residents with this handout and point out where and how the waste disposal bins should be used. In addition, this brochure can be used during MUG Leader training to encourage them to teach first year students waste sorting. On Imagine Day, MUG leaders can create activities, such as games or questionnaires, for their students.

Conclusion

We believe that the most prominent issue to work on currently is to increase awareness. With the successes of the Eco-to-go containers and the Way-to-go program in the resident dining halls, we believe these implementations can be brought out to the whole campus to further reduce waste. It would also be effective to deliver messages of sustainability to all faculties. Once students' awareness has established, we can then further execute waste reduction policies. We strongly think this plan could shorten the time to achieve a zero-waste campus, as well as bring forth these ideas internationally through the work of UBC students.

Project Evaluation

A. Project Concept:

We initially thought we could build our problem statement through the work of previous groups to further refine the stakeholder recommendations. We had two main streams we thought of focusing: implementing new policies, or increasing waste sorting awareness. With the methodologies we have chosen, we have decided to focus on increasing awareness. Our methods are designed to gain information from experts, research municipal waste management adequacy, and through primary research, to implement ways to increase awareness on the important issues introduced to us.

We are still unable to measure whether if the objectives are consistent with the project's expected outcomes. However, judging from the final presentation and feedback from the stakeholders, we are confident that the implementations that UBC sustainability is working on now will be consistent with our project goals and implementations to increase awareness for waste reduction. The UBC sustainability, our stakeholders, and this project have the same vision for UBC, thus we believe their achievements also apply to our project objectives. The feedbacks from stakeholders have been positive because there has been an increase in food waste diversion from garbage to compost and an increase in student participation for post-consumer waste behaviour.

B. Project Design:

In the beginning we have assessed many methods including stakeholder interviews, mini waste audit, student survey, focus groups and personal observation. Due to the nature of the

waste audit, we believed that it would be extremely difficult in designing a mini waste audit without going through many bags of garbage and sorting. Also, after our interview with Waleed Giratalla, we were notified about a new waste audit that was just published. Therefore, it would be more feasible to take the professionally conducted waste audit data for consideration.

Another design we have considered but did not implement was the student surveys and focus groups. We first thought the student surveys would be a great way to collect quantitative data and more structured qualitative data. The survey would include short multiple choice questions that test the student's knowledge of waste sorting. However, after personal observation, we found out that students know the waste sorting rules very well; most of the waste sorting errors are for items that are not explicitly stated on the bin posters. On the other hand, we have thought of using focus groups to increase proper waste sorting behaviour in the students. However, we predicted only those who are more active in practicing sustainability would attend, defeating the purpose of increasing awareness.

Therefore, our final decision is to collect qualitative data through interview our stakeholders and personal observations.

C. *Relevance and Outputs-to-Purpose:*

We realized that the scope of our project is very broad and it was difficult to work on all the areas we would like to improve. Therefore, we decided to focus on one of the more prominent issues that the stakeholders mentioned, which is awareness of sustainable practices. Sustainable practice is closely correlated with maximizing waste reduction in UBC. All of the stakeholders we have contacted, although from different areas of work, have an ultimate goal to increase campus sustainability to reduce total waste diverted to the landfill. We also believe that the

recommendations and the goals we have set for the project will contribute to the purpose it is meant to serve.

A consent form must be signed by the stakeholders before our interviews; this is an effective way to ensure the level of agreement regarding the interview content and purpose. Our relationship is further improved through the instructors and facilitators of this course because all of our stakeholders were aware of the LFS 450 projects, and they are very accommodating to our needs due to our identical visions.

D. Efficiency/Efficacy:

Every recommendation should be evaluated. Due to the short time span of our project, our only method of evaluating our methods and recommendations is through discussing with experts. We were lucky to have the chance to attend a food committee staff meeting before the deadline of our project, and they have provided us with feedback of their own experience. The recommendations that are listed in our project have been revised with the feedback from the meeting, and we agreed that the changes would make the recommendations more feasible and effective. Due to the approach of our project, we collected our data qualitatively; however, quantitative data can be collected if the project was expanded in the future. There is an insufficient resource at the moment for our team to assess the efficiency and efficacy of our project.

E. Sustainability:

So far our team is still in the phase of planning and carefully evaluating the adequacy of the recommendations provided to the stakeholders. Our initiatives have not been put into action but

we are hoping to propose these recommendations so that they will be implemented further by the next LFS 450 team that will be working on this. There is a strong emphasis in continuing the project next year to implement the idea of brochure distribution and MUG leader awareness during Opening Week and Imagine Day. Once this is put into place, the knowledge can be sustained within the student bodies simply by raising awareness and exposure to the idea of sustainable practices.

UBC Sustainability is already working towards the goal of integrating different building's mandates and policies of waste management to increase efficiency. They will also be working with Imagine Day to increase student initiatives in being more sustainable. These implementations, although not initiated under our recommendations, will increase the affect of our initiatives that we hope to achieve. A suggestion to improve the sustainability of our project output is to continue interacting and staying in good terms with our stakeholders so that next year the LFS 450 team can further improve our partnership (as a follow-up study). In addition, having information from this year transferred to next year's LFS450 team will help with their transition in starting their project and sustaining our current initiatives.

F. Lessons and Recommendations:

With the implementation of television in the resident dining halls, the future LFS 450 group can film a short video on waste sorting procedures

- Due to the short time frame, we were unable to evaluate the effects of our stakeholder recommendations; therefore, it would be more realistic for future LFS 450 students to evaluate them. They should be able to see the effects of the implementations after one

term. A good transition from this project to the next development of this project to the future students is useful

- We would like to view the project from previous years to have a better sense of what was done and their methods for our project evaluation
- We learned that having one term to work on the project is not enough time to carry out the implementation plan we put forth as a result. Especially due to the complexity and broad spectrum of areas in this project, we suggest that it is ideal to extend the project period. In order to do this without changing the structure of the course, the next LFS 450 students can focus on the sustainability of this project. Their main goal can be to implement or evaluate whether if the recommendations from us has been successfully carried out. If not, why so? If so, how effective are the outputs and what can be improved or changed
- The project objective was ambiguous in the beginning because the topic consists of a broad area of research: municipal, dining halls, sustainability, waste management, waste sorting in pre- and post-consumer, UBC campus waste management, and Opening Week. Although these all ties in well together and implement each other, it is ideal to have one clear objective indicated to the student so the rest can follow as supplement research.
- It is also important to mention what implementations has failed so students and stakeholders know what works and what does not work. In this case, future students won't repeat recommendations and lessons learned. They will be able to work around the lessons learned to help with project advancement
- An area of improvement is the project evaluation itself. More time, resources, and helpful guidelines to conducting the evaluation will be helpful in providing the team with

feedbacks to improve their project. This will also allow accurate and effective project evaluation

- Information and resources on the involvement of UBC sustainability or UBC waste management during the First Week would be very helpful. We contacted our stakeholders for more information regarding First Week; however they were unable to provide any information. Without knowing what was done previously, it is difficult for our team to make sufficient implementations

Acknowledgements:

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Appendix A Stakeholders Contact List

1. Victoria (Vicky) Wakefield, SCMP (C.P.P.) CSS,
Purchasing Manager
Student Housing & Hospitality Services
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2. Steve Golob
Head Chef, Place Vanier
UBC Food Services
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3. Waleed Giratalla
Water and Zero Waste Engineer
Campus Sustainability Office
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4. Cate Morrison
Residence Life Manager - Place Vanier
UBC Student Housing and Hospitality Services
Tel: 604.822.6832
Fax: 604.822.2636
cate.morrison@ubc.ca

5. Rene Atkinson
Residence Dining Manager - Totem Park Residence
UBC Food Services
rene.atkinson@ubc.ca

Appendix B Project Timeline

<u>Date</u>	<u>Tasks</u>
Jan 26	Review UBC Waste Audit and UBC Food System Project
Feb 2	Background Research and Literature Reviews (global, national and local context)
Feb 9	Development Questions for Stakeholder Interviews
Feb 16	Arrange meetings with Stakeholders via-emails
Feb 23	Gather Personal Observations (Tour to Place Vanier and Totem Park)
Mar 2	Steve Golob's Interview at Place Vanier Residence Dining Hall Waleed Giratalla's Interview at Totem Park Residence Dining Hall
Mar 10	Rene Atkinson's Interview at Totem Park Residence Dining Hall
Mar 16	Victoria Wakefield's Interview at Place Vanier Residence Dining Hall
Mar 23	Analysis Results and Make Recommendations
Mar 30	Analysis Results and Make Recommendations
April 4	Food Committee Meeting with Cate Morrison
April 6	Reporting

Appendix C Opening Week Brochure



The following materials are banned at UBC over barrels:

Recycle Materials

- Corrugated Cardboard
- Paper
- Containers
 - Beverage Containers
 - Glass
 - Metal
 - Recyclable Plastic (e.g., #2, #4, #5)
- Organic Waste

These materials can be recycled and will only take up unnecessary space if they were thrown away as waste.

Hazardous Materials

- Automobile bodies and parts, Tires
- Batteries, Electrical products, Light bulbs
- Bio-medical waste, Pharmaceuticals, Thermostats
- Dead Animals
- Oil containers, Oil filters, Flammable products, Solvents, Flammable liquids
- Pesticide products, Radioactive waste
- Single pieces longer than 2.5 m in length or weighing more than 100 kilograms

These items need a licensed waste collection workers, the public, and the environment.

FACT!

In the 1990s Vancouver Solid Waste Composting Study 2009, waste received at transfer stations were sorted into different categories. In the Industrial, Commercial, and Institutional sector:

- Compostable Organics: 26%
- Paper: 28%
- Plastics: 13%


For more information on the UBC Waste Management System, please visit:

UBC Campus Sustainability Office
Phone: (604) 827-6641
www.ubc.ca/sustainability

UBC Food Services
Phone: (604) 822-3033
www.food.ubc.ca

UBC Waste Management Website
www.waste.ubc.ca

UBC Food System Project Blog
<http://blog.ubcfoodsystem.ca/foodsysprojblog/>



DO YOUR SHARE

A quick guide to waste sorting



RECYCLE

Bottles & Cans



GARBAGE

GENERAL WASTE (NO FLAMMABLE, POISONOUS, OR LIQUID)



COMPOST

All Food Waste
& Water-soaked Paper



Eco-Go
Container Exchange Program

- FREE
- Green
- Reusable

WHO
Anyone who lives, works or eats on campus.

WHERE
The program is available at UBC's Dining Rooms and all participating UBC Food Services locations. You may exchange your used container for a membership card at any participating location where they will be washed and sanitized.

HOW
Membership is \$5 plus tax. Once you buy your first membership card, there is an equity rate on annual renewal. For lost or damaged container and/or card, a replacement fee is required. You can purchase a container at any of the participating locations. You simply exchange your membership card for a container and vice versa; you'll never have both in your possession at the same time. Drop it off dirty when you are finished with it, obtain your card, or get another meal to go.