Post-Consumer Food Waste Reduction in the AMS Nest

Post-Consumer Food Waste Reduction in the AMS Nest

Prepared by: Andrea Hon, Dawood Ibrahim, Gagi Sudeer, Sanjum Dhillon, Vincent Gill
Prepared for: AMS Sustainability and AMS Food & Beverages Operations
LFS 450
The University of British Columbia
April 16, 2025

Cover Photo: UBC Brand and Marketing
The Spruce / Nisanova Studio
UBC Brand and Marketing

Disclaimer: UBC SEEDS Sustainability Program provides students with the opportunity to share the findings of their studies, as well as their opinions, conclusions and recommendations with the UBC community. The reader should bear in mind that this is a student research project and is not an official document of UBC. Furthermore, readers should bear in mind that these reports may not reflect the current status of activities at UBC. We urge you to contact the research persons mentioned in a report or the SEEDS Sustainability Program representative about the current status of the subject matter of a report.

SEEDS Sustainability Program

PRACTICIONER SUMMARY

Post Consumer Food Waste Reduction in the Nest: Engaging Students Through Educational Materials and Peer-to-Peer Activities

Research Background

- Food systems are the second-highest source of emissions from UBC campus
- In 2022, UBC produced 615 tonnes of food waste, which contributes to greenhouse gas emissions, from landfills
- Past initiatives at UBC are limited in scope and in changing long-term habits

Research Purpose

- Reduce post-consumer food waste (to reduce GHGs)
- Encourage improved long-term waste sorting habits
- Supporting global and UBC sustainability goals

Research Objectives

Understand sorting behaviors to spot common mistakes and areas of improvement

Improving sorting habits at UBC Nest's Grand Noodle Emporium area

Incentive-based programs and educational resources to inform students about sorting practices, based on results

Research Goals

- Analysis of post-consumer food waste & sorting practices
- Develop tools to develop better food and waste sorting habits
- influence long-term sorting habits, leading to reduction in waste

Methods

In-person surveys: At UBC Nest, asked questions on disposal of waste, 33 participants

Participant Observation: of sorting behaviors at UBC Grand Noodle Emporium Dining Area and proximity, 144 participants

Key Findings

Time

- Time of day does not affect sorting behavior
- Data was collected at the busiest times and only 7.63% of participants faced delays when disposing

Signage

- Clearer and simpler signage is needed
- Majority checked bin labels to sort, yet 30% who looked at signage sorted incorrectly

Simplicity

- Sorting behaviour at Grand Noodle Emporium bins was better compared to outside this dining area.

People had:

- fewer options when disposing
- forced to view signs
- more time to spend

Education

- Education wanted and needed regarding correct sorting behaviors (based on explicit comments from consumers + observed behaviors)
- Education needed regarding environmental impacts of food waste

Reccomendation

Communication-Based

- Update signage with what NOT to throw out in each bin
- Update signage with new containers
- Pamphlets in the Nest educating how to sort waste - customized to what the food outlets sell that needs to be disposed

Procurement

Using brown compostable foodware instead of plastic containers - reduces contamination of waste

Engagement

- Educational materials focused on climate change impacts (Peer-to-peer activities)
- Posters above waste bins to raise awareness of environmental impacts

Executive Summary

This report investigates post-consumer food waste and improper waste sorting at the University of British Columbia's (UBC) AMS Nest, a vibrant dining and social hub on campus. Despite UBC's established sustainability initiatives, food waste and contamination of recyclables remain significant challenges, undermining progress toward the university's Climate Action Plan 2030 and Zero Waste Action Plan. This research explores the behavioral, infrastructural, and informational barriers that hinder effective waste sorting, offering data-driven solutions to foster sustainable consumption and disposal practices.

Guided by the principles of Community-Based Action Research (CBAR), the study involved a collaborative effort with AMS Sustainability and AMS Food & Beverage Operations to ensure community-centered and ethically grounded inquiry. The research employed a mixed-methods approach, including participant observation of 144 Nest consumers, semi-structured interviews and surveys with 35 individuals, and analysis of secondary data such as previous AMS waste audits and peer-reviewed literature. These methods provided a nuanced understanding of the motivations, confusions, and systemic gaps that contribute to improper waste sorting and food waste at the Nest.

Key findings reveal several challenges: widespread confusion around bin signage and labeling, lack of knowledge about recyclable materials and composting guidelines, and a general sense of inconvenience associated with waste sorting. Even well-meaning consumers often dispose of waste incorrectly due to unclear instructions or time constraints. Observations indicated frequent hesitation, mis-sorting, and a lack of engagement with existing signage, particularly at high-traffic locations like the Grand Noodle Emporium.

The research underscores the importance of targeted educational resources, improved visual cues, and interactive campaigns to promote behavioral change. Proposed interventions include revised signage with clearer graphics and language, peer-to-peer engagement activities, and incentive-based programs to encourage proper sorting. These solutions aim not only to reduce food waste and contamination but also to cultivate a culture of mindful consumption and environmental responsibility across campus.

This report contributes to a broader effort to combat the global food waste crisis—one that exacerbates climate change, food insecurity, and resource depletion. By focusing on scalable and community-driven solutions, the research aligns with global goals like the UN's Sustainable Development Goal 12 and positions UBC as a leader in sustainable campus practices. The findings and recommendations offer a model for other institutions seeking to reduce food waste and improve waste diversion, paving the way for a more sustainable future both locally and globally.

Contents

List of Figures

List of Tables

Abbreviations and Key Terms

AMS: Alma Mater Society

CBAR: Community-Based Action Research

GHG: Greenhouse gases

GNE: Grand Noodle Emporium

SEEDS: Social Ecological Economic Development Studies

UBC: The University of British Columbia

Introduction

Research Topic

This research addresses the critical issue of post-consumer food waste and improper waste sorting practices at the University of British Columbia's AMS Nest, a central hub for campus dining. The primary research problems include the significant contribution of food waste to greenhouse gas emissions, resource depletion, and increased labor for manual waste sorting due to contamination of recyclable materials. These challenges undermine UBC's sustainability goals and exacerbate environmental and social issues like climate change and food insecurity. However, these problems present opportunities to foster sustainable behaviors through targeted interventions. By investigating consumer behaviors, barriers to effective waste sorting, and systemic factors via waste audits, observations, and interviews, the research aims to develop educational campaigns, signage and incentive programs. These initiatives offer opportunities to reduce food waste, lower disposal costs, enhance campus sustainability and create scalable solutions for other institutions, aligning with UBC's Climate Action Plan 2030 and global sustainability objectives.

Research Relevance

This research focuses on reducing post-consumer food waste and improving waste sorting behaviours at UBC, addressing the dual challenges of food waste management and its environmental, social and economic impacts. The research problem lies in the significant contribution of household and consumer-level food waste to global issues like food insecurity, greenhouse gas (GHG) emissions and strained landfill capacities, with 17% of food wasted globally (UNEP, 2024) and 11 million tons of avoidable food waste generated annually in Canada (Value Chain Management International & Second Harvest, 2019). Locally, British Columbia struggles with 40% of landfill waste being organic (Government of British Columbia, 2022). The opportunity lies in developing effective behavioural change strategies, policy recommendations, and sustainable waste management practices to reduce food waste aligning with UBC's Zero Waste Action Plan 2030 and UN Sustainable Development Goal 12 for sustainable consumption and production. By leveraging campus engagement and UBC's leadership in sustainability, this research aims to create scalable solutions for waste reduction and promote a circular economy.

This research also holds significant value in addressing broader societal issues by tackling the global food waste crisis, which exacerbates food insecurity, increases GHG emissions, and contributes to climate instability through events like droughts and floods. By identifying strategies to reduce post-consumer food waste, the study will support national and regional efforts to alleviate landfill strain and lower emissions, as seen in Canada's 11 million tons of avoidable waste and British Columbia's organic waste challenges. Furthermore, it advances broader societal goals by aligning with UBC's Zero Waste Action Plan 2030, which targets a 50% reduction in operational waste disposal and promotes a circular economy. Through campus engagement with student groups, UBC departments, and sustainability initiatives like SEEDS and the AMS Student Nest's zero-waste features, the research fosters a culture of mindful consumption and responsible waste management (AMS of UBC, 2023). By enhancing waste diversion strategies and advocating for effective food policies, it strengthens UBC's leadership in sustainability while creating a more inclusive, supportive, and environmentally conscious university community, with potential for broader societal impact through scalable waste reduction models.

Project Context & Background

The reduction and sorting of food loss and waste are said to be integral to reduce its negative impacts on the environment, climate, economy, and food security (Zeineddine et al., 2021). From an environmental and climate perspective, food waste ends up in landfills emitting methane gas, a greenhouse gas that contributes to climate change, and is 25 times more potent than carbon dioxide (Zeineddine et al., 2021). Similarly, the generation of food waste means a loss in all the resources used to produce said foods, which includes approximately 250 km^3 in water resources and 30% of agricultural land area going to waste (Costello et al., 2015; Zeineddine et al., 2021). Food waste prevention and reduction is now considered an international issue, with a Sustainable Development Goal of halving per capita global food waste by 2030 at retail and consumer levels (Reynolds et al., 2019).

One avenue of addressing consumer level waste is post-consumer food waste, which is specifically "food served to consumers that is not eaten" (Costello et al., 2015). Issues specifically linked to post-consumer food waste includes heterogeneity and high contamination amongst the materials that are being disposed of (Lelicińska-Serafin et al., 2023). This is an indication that the sorting of post-consumer food waste is an important part of the matter at hand and needs to be further investigated. Therefore, Lelicińska-Serafin et al. emphasizes the importance of collection systems, such as sorting bins, and ensuring they are effective to prevent impurities between the different types of waste (2023).

When it comes to sorting, researchers have found some of the common difficulties and confusions that consumers come across, which can be a point of further research and focus. There is confusion about the containers themselves, including difficulties understanding the meaning of the different labels on containers as well as not knowing which material types can be recycled or not (Mielinger & Weinrich, 2023). Furthermore, convenience is a point of focus since consumers may not always clean out the food from the packaging before disposal nor will they separate mixed material containers (Mielinger & Weinrich, 2023)

Researchers have provided recommendations for further research and practices including measuring changes in post-consumer food waste over time, raising awareness about the negative impacts of food waste, and promoting and reinforcing sorting behaviours (Zeineddine et al., 2021). Past literature suggests that cultural shifts are integral to food waste reduction as well, which incorporates better education and awareness for consumers about this issue and better practices that consumers can adapt (Parfitt et al., 2010). It is important to note that these practices and actions are not necessarily best implemented individually, nor "mutually exclusive" as Reynolds et al. states (2019). Therefore, our research and recommendations will probe different avenues including consumer behaviours, practices, education, awareness, and principles.

More specifically, at the University of British Columbia (UBC), food waste and improper waste sorting are significant challenges, contributing substantially to greenhouse gas emissions, with food systems being the second-highest source of extended impact/scope 3 emissions after commuting, as noted by UBC Campus and Community Planning (2021). UBC aims to reduce food system emissions by 50% by 2030 under the Climate Action Plan 2030. Previous efforts include peer-to-peer initiatives like the Zero Waste Squad and Sustainability Ambassadors Program, which engage students in sustainability events and workshops to promote waste reduction (AMS of UBC, 2024; UBC, n.d.). However, these programs have limited reach, primarily attracting already sustainability-conscious students, and lack specificity in addressing waste sorting behaviours. The AMS Waste Audit, conducted by AMS Sustainability volunteers,

assesses waste disposal in the AMS Nest to identify sorting practices and areas for improvement, fostering environmental awareness (AMS of UBC, 2024). The most recent Audit in 2025 (see Appendix C) demonstrated the need to intervene in the food waste issue on campus, as food waste was the second highest amount of waste in weight, right after garbage. Composting programs and enhanced signage have been introduced in AMS dining areas, but their impact is hindered by vague signage and students' limited understanding of proper waste disposal. Despite initiatives like the Zero Waste Action Plan, AMS Waste Audit, and composting programs, post-consumer food waste remains inadequately addressed, necessitating more targeted interventions to improve sorting habits and reduce waste at the Nest.

Purpose, Goals and Objectives

The purpose of this research is to reduce post-consumer food waste and promote sustainable waste sorting habits among consumers at the Alma Mater Society (AMS) Nest at the University of British Columbia, aligning with global sustainability goals and UBC's Climate Action Plan 2030 to mitigate greenhouse gas emissions from food waste. The project aims to achieve several broad goals: developing a comprehensive analysis of post-consumer food waste and sorting practices to inform reduction and recovery strategies, ensuring Nest patrons adopt proper sorting habits through effective tools and educational resources, fostering a culture of responsibility and awareness about food waste to enhance environmental sustainability, and influencing long-term sustainable sorting habits to significantly reduce food waste.

To meet these goals, specific objectives include conducting observational studies of sorting practices at locations like the Grand Noodle Emporium to identify improvement areas, creating educational resources based on these findings to inform consumers about food waste's environmental impact and reduction strategies, designing peer-to-peer activities to promote sustainable practices, reducing recyclable contamination through Community-Based Action Research methods (including participant observation, semi-structured interviews, and data analysis) to develop targeted tools like improved signage and incentive programs, and implementing interactive educational campaigns and incentive-based strategies to facilitate long-term change in waste sorting behaviors at the Nest.

Research Methodology and Methods

RESEARCH METHODOLOGY

We applied principles of Community-Based Action Research (CBAR) for this research. CBAR is a type of research that focuses on the local context of the issue, seeking to "understand from a ground-level-up perspective how issues manifest in communities, how they are understood, and how community members experience them" (Guillon & Tilton, 2020, p.22). For our specific project, we worked in collaboration with community-based clients from AMS Sustainability and AMS Food & Beverage Operations. Through ongoing communication and discussions with the clients, we identified community concerns and used the expertise and knowledge of the clients to conduct our research. This ensured the implementation of the core principles of CBAR of centering community in all aspects of research and participant driven research. When observing or interacting with the Nest consumers, we maintained reciprocity when sharing knowledge and experiences and focused on community members' perspectives so that we could center their experiences to create solutions that are effective and benefit them. Furthermore, when creating the deliverables based on the research methods conducted, we wanted to ensure that it promoted a culture of sustainability and awareness. For example, we created educational resources that aim to increase awareness about the social and environmental implications of food waste and improper waste sorting, in the Nest, using appropriate language that avoids putting blame or guilt on the individuals.

CBAR emphasizes the importance of determining solutions based on community experiences, so in this way we can develop community-driven solutions based on their personal concerns rather than imposing ideas as researchers on to the community. Ethical considerations were prioritized by obtaining informed consent from survey and interview participants, maintaining anonymity in data reporting, and ensuring reciprocity by sharing educational resources on waste sorting without inducing guilt. The research team collaborated closely with AMS Sustainability and AMS Food & Beverage Operations to align the study with community concerns. Data collection methods (interviews, waste audits, participant observations) were designed to minimize bias through structured sampling (e.g., random selection of every 5th person near bins) and triangulation (using multiple methods to validate findings). Data was securely stored in Microsoft OneDrive, and analysis followed thematic coding for qualitative data (interviews, observations) to ensure rigor.

RESEARCH METHODS

Secondary Data Collection

The secondary research process involved a comprehensive review of existing waste data to inform the study on waste management at UBC Nest. Sources included past AMS Waste Audits, Food Waste Data by Alireza, and Azzam et al.'s peer-reviewed study, "Understanding Food Waste Drivers." These provided critical insights into common waste-sorting behaviours, shaping the focus of the primary research. The selection criteria prioritized relevance to UBC Nest's waste management context, recent data (within the last five years), and credible peer-reviewed or institutional sources. Research methods encompassed accessing internal AMS reports, academic databases such as UBC Library and Google Scholar. Searches included phrases such as "post-consumer food waste," "consumer waste reduction," and "waste sorting practices." The data types reviewed included quantitative waste audit reports and qualitative behavioural studies, ensuring a robust foundation for the investigation.

Primary Data Collection Research Methods

1. Participant Observation

To investigate waste sorting behaviours at the AMS Nest, a participant observation study was conducted using direct behavioural observation as the primary method. Data were collected via an observational matrix, capturing sorting behaviours, hesitation, and engagement with signage among 144 Nest consumers, including students, staff, and visitors. Participants included anyone who ate and disposed of their food in the Nest as this is most representative of the community that normally frequents the Nest. Participants were randomly selected through naturalistic observation of individuals disposing of waste near the Grand Noodle Emporium (GNE) during peak and non-peak hours, ensuring a diverse sample (n=144). As the study relied on observation, no direct participation or response rate was required. Observations were administered in 1-hour sessions, conducted twice weekly over three weeks from March 13 to March 31, in the AMS Nest lower level atrium, both inside and outside GNE. This approach allowed for real-time data collection in a natural setting, minimizing interference. The rationale for this method was to identify authentic sorting behaviours and physical barriers, such as bin placement or signage clarity, that could influence waste disposal practices, providing insights into potential improvements for waste management systems.

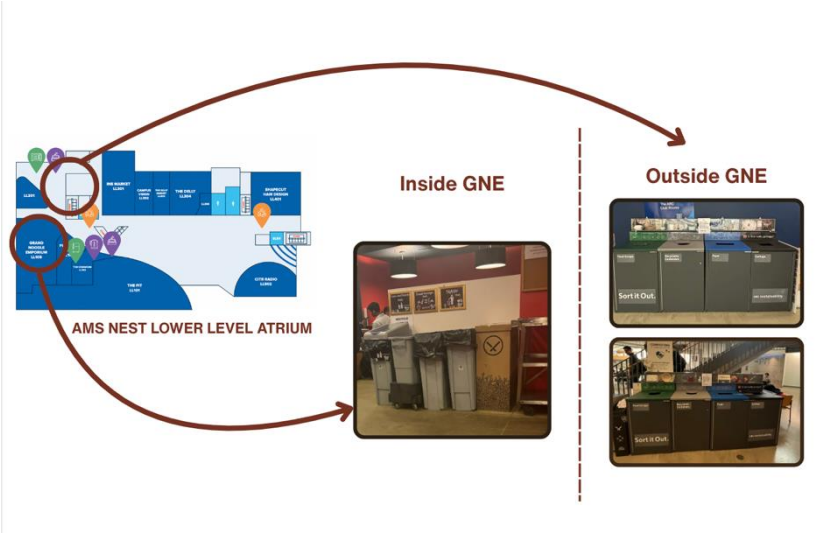

Figure 1: Locations of where the observations were conducted

2. In-Person Surveys

To examine knowledge gaps, attitudes, and challenges related to waste sorting at the AMS Nest, an in-person survey method was employed, utilizing audio-recorded responses and written notes for data collection. The study targeted 33 Nest consumers, encompassing students, staff, and visitors, who were randomly selected to ensure a broad range of perspectives, yielding a sample size of 33 (n=33) and an estimated response rate of approximately 70% based on recruitment efforts. Seven researchers conducted the surveys over one week, from March 6 to March 20, at locations near waste bins in the Nest. Recruitment was supported by posters and a systematic approach of engaging every fifth person near the bins, with a $50 gift card provided as an incentive to encourage participation. This methodology was chosen to gather comprehensive qualitative data on participants' waste sorting knowledge and experiences, facilitating the identification of barriers and informing strategies to improve waste management practices at the Nest.

Results

Literature Review

Table 1: Past research on post-consumer food waste, sorting behaviors, and promising practices

Past research on food waste and sorting behaviour	References
Organic Waste Audit	(Access provided by AMS Sustainability)
Food waste in campus dining operations: Inventory of pre- and post-consumer mass by food category, and estimation of embodied greenhouse gas emissions	(Costello et al., 2015)
An insight into post-consumer food waste characteristics as the key to an organic recycling method selection in a circular economy	(Lelicińska-Serafin et al., 2023)
Understanding food waste sorting behavior in institutional food services: An integrated psychological framework	(Ma & Shen, 2024)
A review on consumer sorting behaviour: Spotlight on food and fast moving consumer goods plastic packaging	(Mielinger & Weinrich, 2023)
Food waste within food supply chains: Quantification and potential for change to 2050	(Parfitt et al., 2010)
Review: Consumption-stage food waste reduction interventions – what works and how to design better interventions	(Reynolds et al., 2019)
Post-consumer food waste generation while dining out: A close-up view	(Zeineddine et al., 2021)

Participant Observations

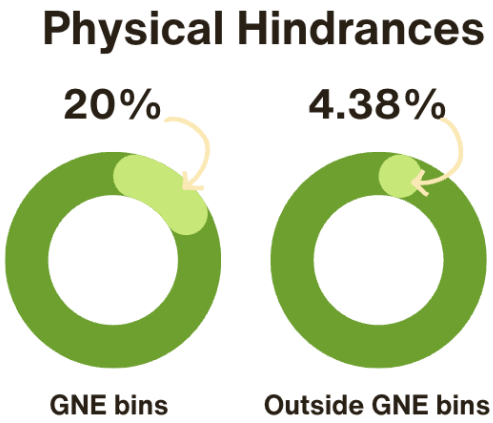

Figure 2: Consumers that faced physical hinderances in percentages. The data for GNE bins and bin outside GNE are represented using doughnut charts

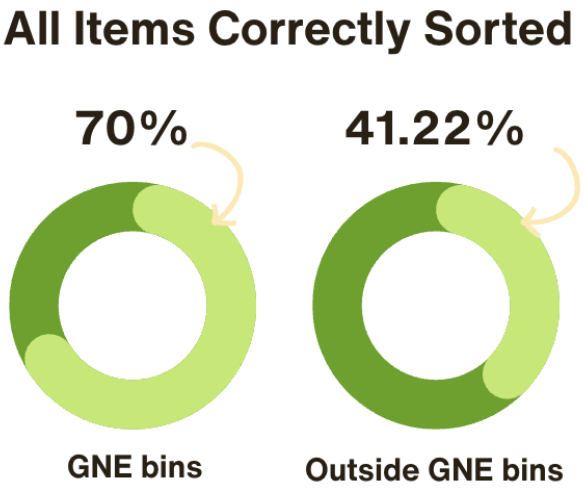

Figure 3: Consumers that sorted all their items correctly at the bins inside and outside GNE.

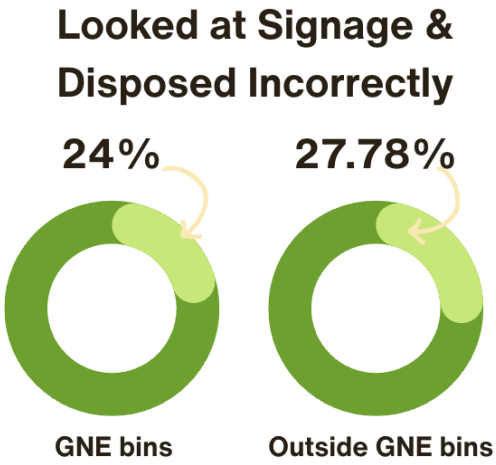

Figure 4: Consumers that looked at the signage yet disposed their wastes incorrectly at the bins inside GNE as well as the bins that are outside GNE

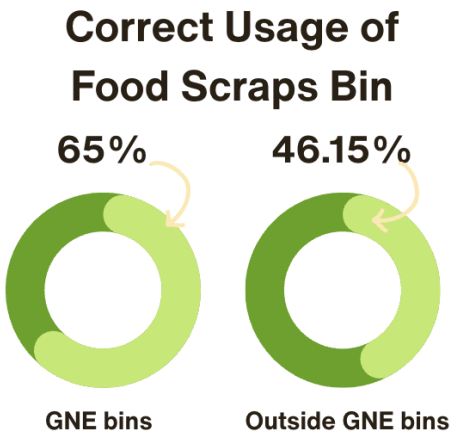

Figure 5: Consumers that used the green/compost bins accurately, both inside and outside of GNE.

Table 2: How consumers' behaviour when approaching sorting stations influences sorting results for non-GNE bins. Code is the Apriori Code used to label the data findings. Description is the explanation of the code/finding. % is the result in percent form.

Code	Description	%
CFD-Inc	% of Confident people who disposed incorrectly	33.75%
HST-Inc	% of Hesitant people who disposed incorrectly	44.44%
CFS-Inc	% of Confused people who disposed incorrectly	37.50%

Table 3: Number of consumers who looked at signage before disposing based on group size for non-GNE dining area bins. The Code is the Apriori Code used to label the data findings. Description is the explanation of the code/finding. % is the result in percent form. The percentages are calculated only within the subset of group disposal events and do not reflect the percentage across all participants.

Code	Description	%
Gro-sign	% of at least 2 persons who looked at signage before disposing, within its subset	65%
Ind-sign	% of individual people who looked at signage before disposing, within its subset	44.33%

In-Person Surveys

*Note: Questions 1 and 2 asked about participants' consent and is therefore omitted from the results section. See Appendix B for the full survey.

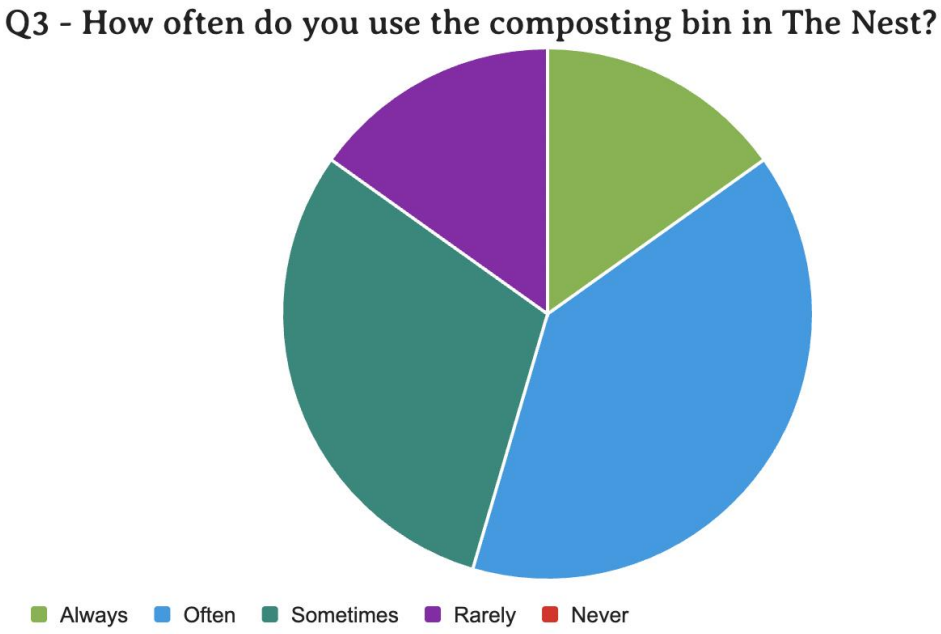

Figure 6: Pie-chart represents the data showing how often the consumers used compost bins

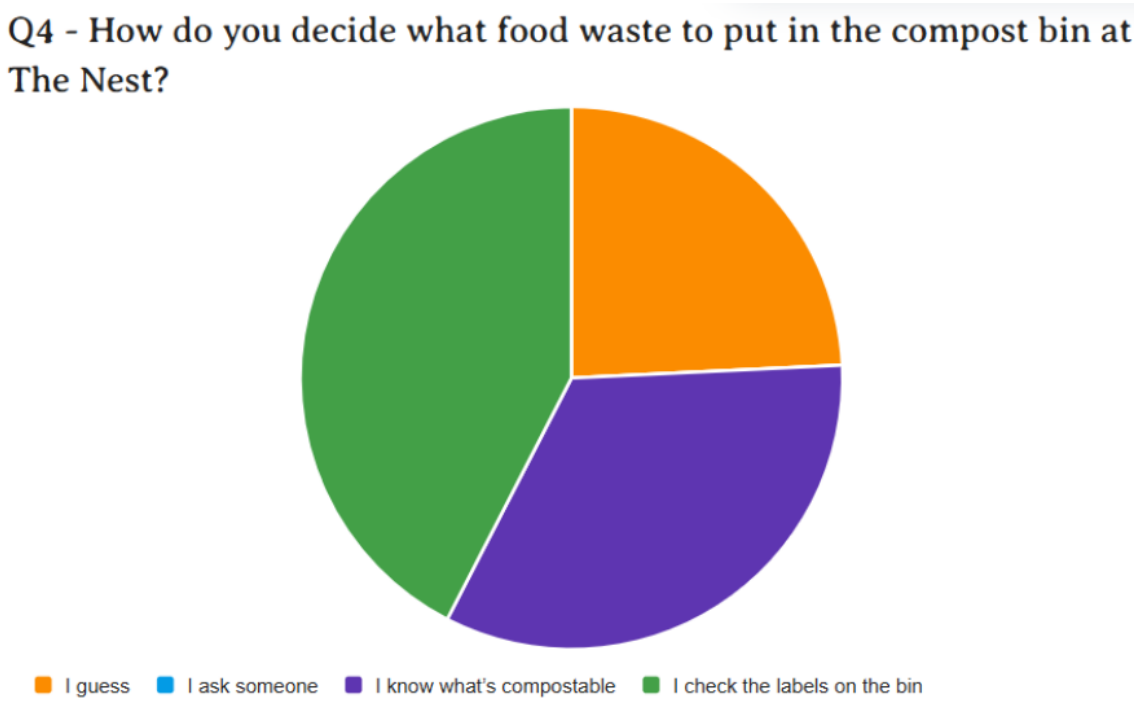

Figure 7: A pie-chart representing how consumers make their decisions on what food waste to put in the compost bin at the Nest

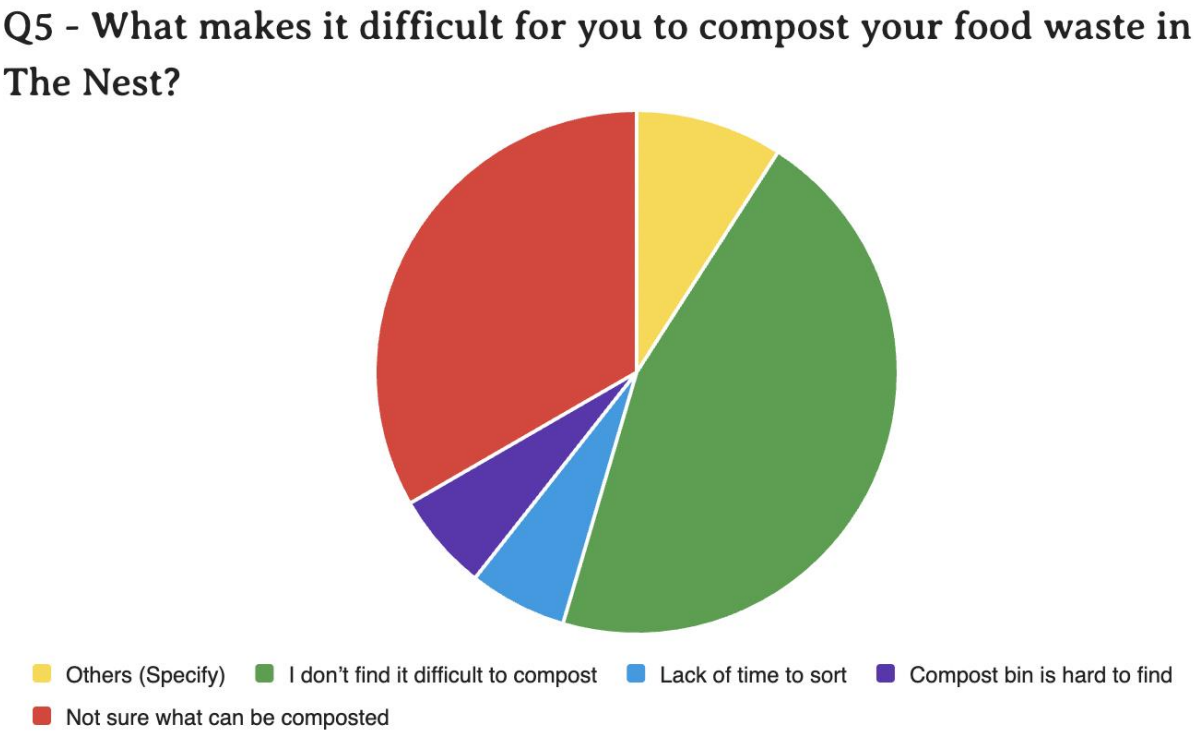

Figure 8: Pie-chart represents the data of consumers opinions on what makes it difficult for one to compost their food waste at the Nest

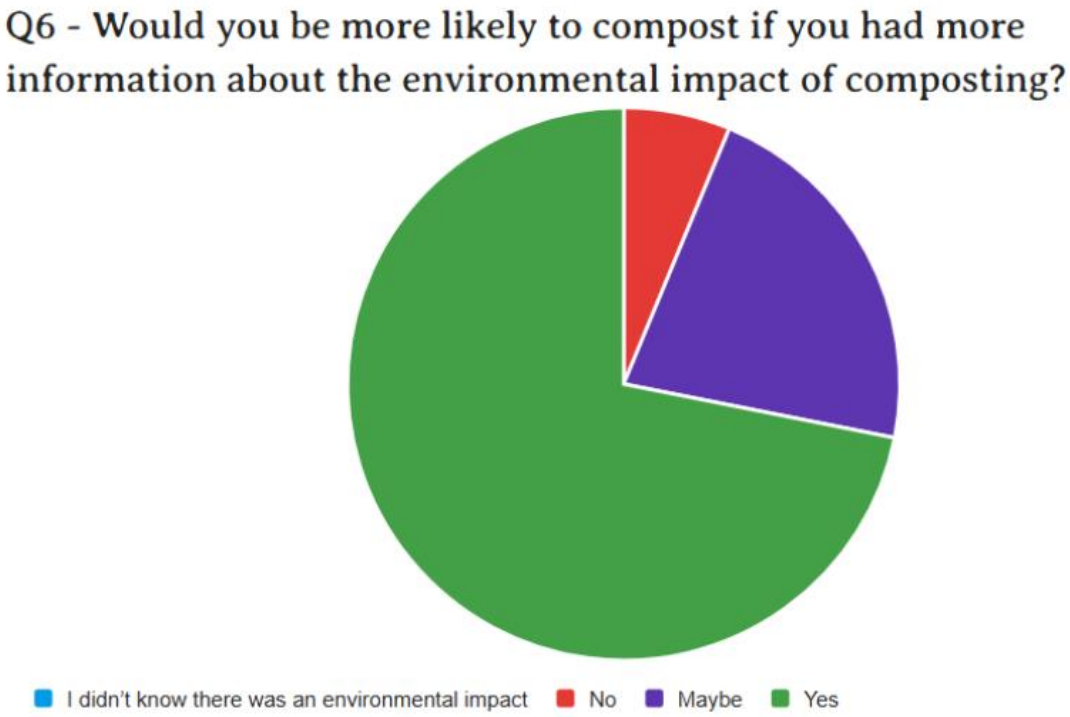

Figure 9: A pie-chart representing how information about the environmental impact of composting would have on their sorting habits

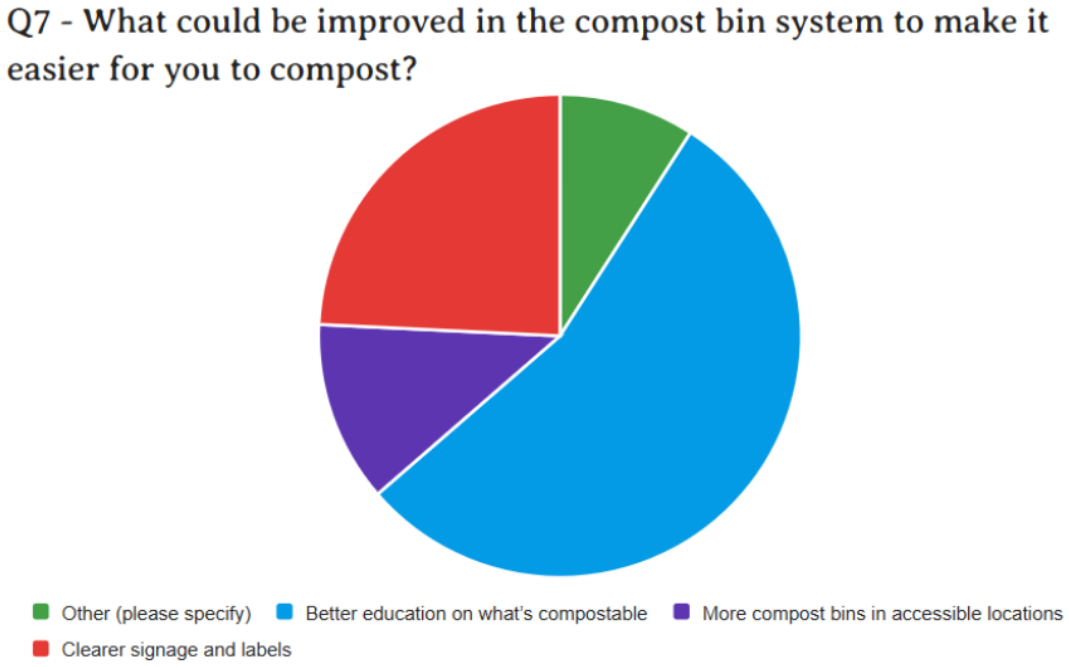

Figure 10: Pie-chart represents what encouraged the consumers to reduce the amount of food waste that they created particularly at the Nest

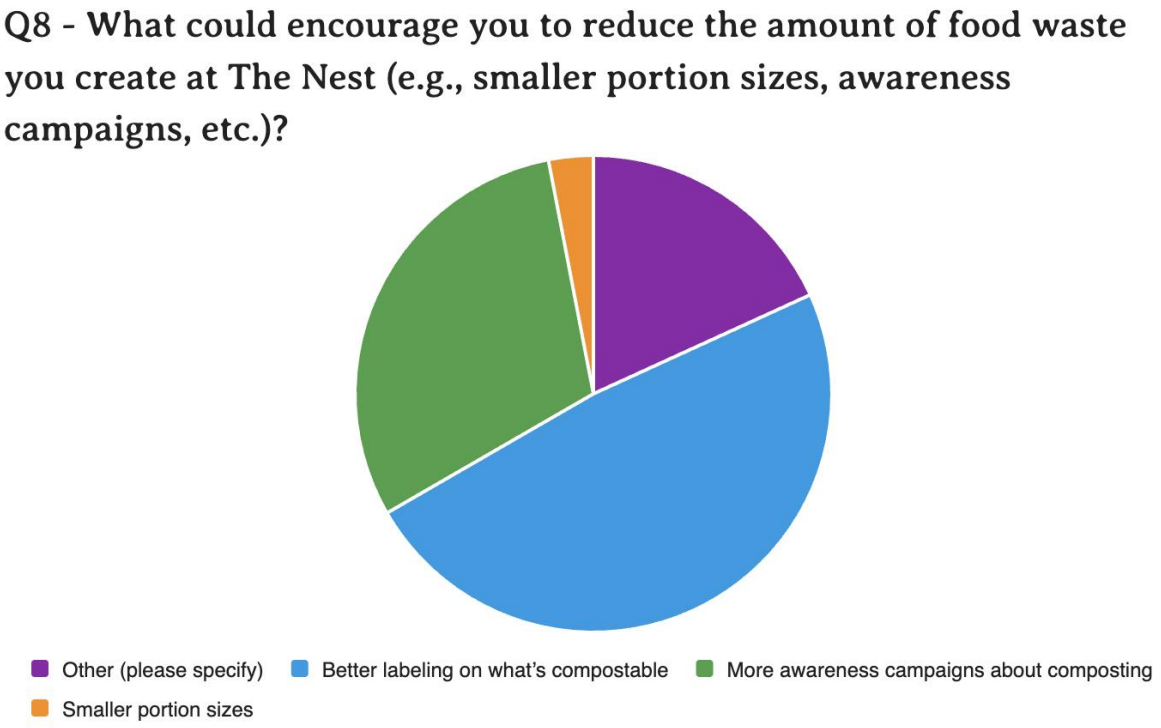

Figure 11: A pie-chart representing opinions of consumers on what could be improved in the current infrastructure that could make it easier for consumers to compost

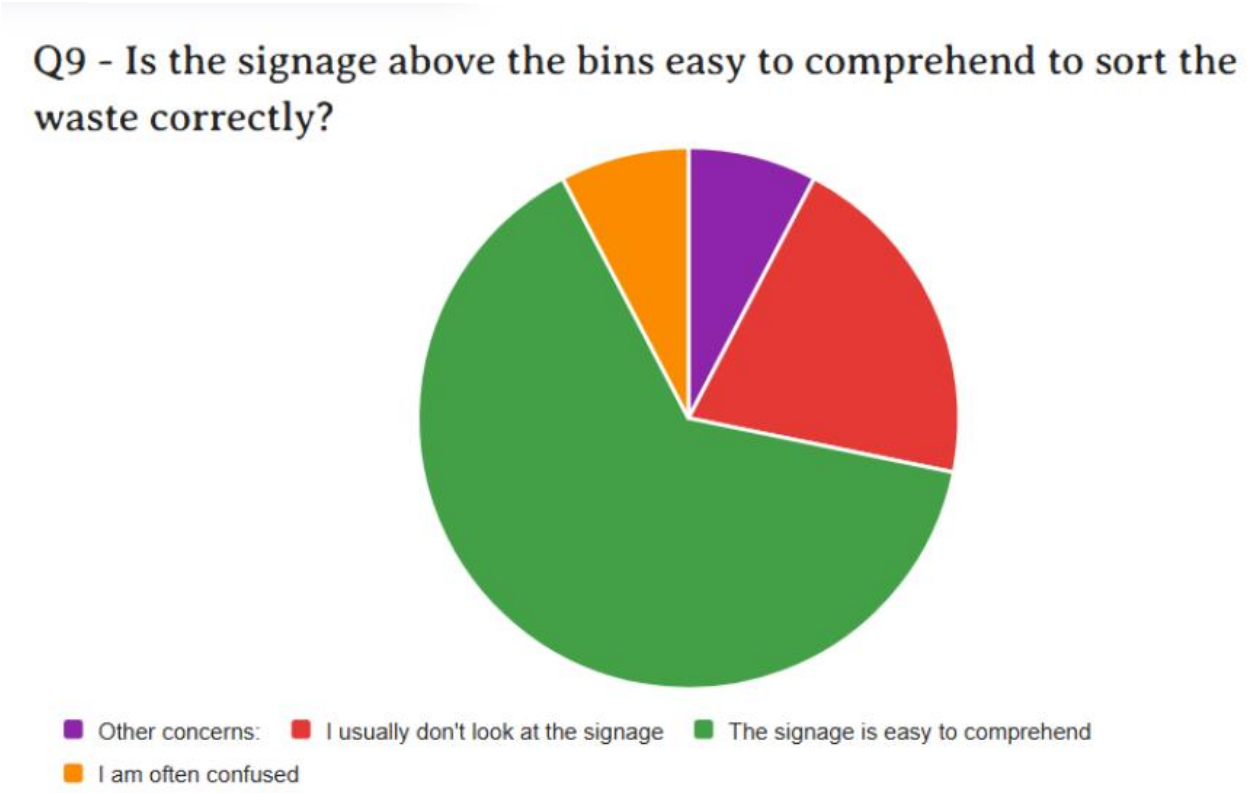

Figure 12: A pie-chart representing the data regarding the ease to comprehend signage above bins to guide in sorting waste correc

Discussion

Time of the day doesn't influence sorting behaviours at UBC Nest, as data was collected during the busiest times, between 11:00 and 14:30, and the vast majority of participants did not face any physical hindrances when disposing of waste. People encountered two physical hindrances: either having a person/people in front of them when disposing, or the UBC employee manually sorting the waste. The first one would take on average 2-4 seconds, while the latter one took 2-3 minutes. In total,11 out of 144 (7.63%) participants faced these physical barriers, and out of this group, only 3 people faced the major challenge of having the UBC worker physically sort the bin, which takes more time than having someone in front of you.

Physical hindrances happened more often inside the Grand Noodle Emporium (GNE) dining area, with 20% of participants being affected, and 4.38% for the two bins outside the dining area. The GNE dining area only has a small sorting area, with a capacity of 60 seats, where people are constantly coming in and out (AMS, 2025). The small sorting area with a high capacity of seats for such a small area explains the variance between the two percentages.

The results also look more promising for the GNE dining area bin relating to sorting behaviors. 18.85% more participants who were involved with the compost bin used it appropriately, and 70% of all participants disposed of all their food waste appropriately, compared to 41.22% for the two non-GNE dining area bins. This dining area has fewer bins, making disposal easier as fewer decisions must be made; there is no recycling bin and no paper bin, therefore, the correct disposal of these items is the landfill bin. In addition, the bins are all black and look the same, students are forced to look at the signage as these bins are confusing without it. Most people dining in have real dishes, causing an easier disposal of compostable items, as most people struggle with the disposal of the compostable foodware appropriately; this problem is not present in the GNE dining area.

Consumer's behaviors ranked from the best sorting group to the least sorting group for non-GNE bins were: Hesitant, Confused, and Confident (Table 1). Hesitant sorters paused, second-guessed their decisions, and looked at signage when disposing waste, explaining why this group was the best sorter. The confident people had the lowest sorting percentage, 33.75%, implying that a clear understanding of UBC's sorting system is not widespread.

Out of the 114 participants who were involved with the two non-GNE bins, 16 of them disposed in pairs, and one was a group of +3 people. 65% of these 17 groups looked at signage before disposing, which is quite a significant amount, considering that for these two bins, the % of all individual participants that looked at signage was 44.33%. To support this, Chencheng Ma and Yayun Shen, with *Understanding food waste sorting behavior in institutional food services: An integrated psychological framework*, have found that perceive social pressure in food waste sorting behaviors plays a key role in inducing the right behaviors in canteens and cafeterias, explaining why at UBC Nest whenever people had company they were more likely to look at signage and try to dispose appropriately (Ma & Shen, 2024).

The results strongly align with the purpose, goals and objectives of the research project as we were able to identify where people struggle the most when sorting waste, allowing us to create the right educational materials based on the problems. These insights contribute to long-term sustainable sorting habits, which directly supports the broader goal of reducing food waste, reducing contamination and contributing to UBC's sustainability goals.

Out of the 33 participants for the in-person survey, 42% rely on the labeling on the bin to decide what food waste they will put in the compost bin at the Nest. This indicates the importance of the labels of the bin, as Mielinger & Weinrich (2023) suggest, and ensuring they are up to date, accurate, and clear for consumers to understand. If the labels are unclear, these 42% may be disposing of their waste incorrectly, resulting in contamination of recyclables or materials being sent to landfills when they could be composted for re-use. This is evident when observations demonstrated 24% in the GNE and 27.78% outside the GNE looked at signage and still disposed incorrectly. In fact, 24% of in-person survey participants explicitly stated that clearer signage and labels could improve the compost bin system and could make it easier for them to compost, with 48% saying better labeling on what is compostable could help them reduce the amount of food waste they create. Therefore, the signage needs to be updated to be clearer for consumers in the Nest who are unable to understand the current signage well enough to correctly sort their waste.

Furthermore, 33% of participants of the in-person survey said they know what is compostable and 24% simply guess. Therefore, a majority (57%) do not rely on sorting bin labels or container labels to decide how they will sort their waste. Rather they use what they already know and intuition to sort their waste. This indicates a need to educate consumers about how to correctly sort their waste if they prefer to use their own knowledge to sort waste. This is especially true because while 33% say they know what is compostable and 45% say they do not find it difficult to compost, behaviour shows otherwise as 58.78% of participants from the observations disposed of their waste incorrectly outside of the GNE. Therefore, even if participants feel confident in their composting and sorting behaviours, it does not translate to actual correct sorting behaviours.

Future work regarding reducing post-consumer food waste in the Nest needs to focus on education, consumer-engagement, and awareness campaigns to address the gaps in knowledge and awareness about food waste on campus. From the in-person survey, 30% say awareness campaigns about composting could encourage them to reduce the amount of food waste they create and a huge majority (72%) saying they would be more likely to compost if they had more information about the environmental impacts of food waste and composting. Similarly, 33% of in-person survey participants say they are not sure what can be composted, with 55% saying better education on what is compostable could improve the compost system and make it easier for them to compost. This aligns with past research, including Zeineddine et al. (2021) and Parfitt et al. (2010), that suggest educational and awareness campaigns would be of importance. There is a clear lack of knowledge as well as a need and want for education regarding correct composting and sorting habits. Our research team has created recommendations for future action and research, as well as some sample deliverables to encourage further action on this matter (see Recommendations and Appendix D).

Limitations:

The main limitation of the data that was collected inside the Grand Noodle Emporium dining area was the sample size; our clients only asked for a sample size of roughly 30 participants, which made certain metrics impossible to measure. For example, out of 30 participants, 29 disposed individually, which may not be a real representation of what happens if we collected more data points. We were not able to make conclusions about group's sorting behaviors. Next, consumer behavior data was not identified, but as a general trend, most people were confident and had to look at the signage. Furthermore, 70% of participants who disposed perfectly at the GNE bins had fewer decisions to make; a direct comparison between the two types of bins is not possible. Throwing paper in the landfill bin would be considered

improper sorting for non-GNE bins, while inside GNE, that action would be considered as sorting properly.

Another limitation could be participants being aware of being observed. Some days, data was collected for at least one hour; someone sitting behind the data collector might have figured out what we were doing, and this would contaminate data results. To collect data about sorting decisions, sitting close to and next to the bin was necessary to see where the mistakes were being made.

For the in-person survey, a limitation would be participants altering their answer due to the perception of being judged for their reply. Since this was an in-person survey, we could guarantee that all answers were answered, however there might have been a pressure to answer in a morally "correct" way which could limit how much the results reflect reality.

Recommendations

RECOMMENDATIONS FOR ACTION

Based on observed patterns in sorting behavior and survey feedback, the following action-based recommendations are proposed. These are grouped by their urgency and potential for immediate to long-term impact.

Immediate Actions

Update Signage with Clear "Do Not Throw" Lists

Responsibility: *AMS Sustainability Office, UBC Waste Management*

To reduce contamination and improve sorting accuracy, signage across all waste stations should be revised to clearly indicate what items should *not* be placed in each bin. This type of negative framing, emphasizing what not to do, can be more effective in catching users' attention (Grappi et al., 2024) and preventing frequent mistakes, such as tossing plastic containers or wrappers into the compost. These updated signs should incorporate bold visuals and icons that directly correspond to the current foodware used by AMS vendors. Providing real-world examples of commonly used packaging, like ramen bowls, bubble tea cups or sushi trays, can help consumers more quickly and accurately identify the correct bin. Including multilingual labels and simple symbols can also improve accessibility for international students and visitors. By aligning signage with actual waste materials and making the instructions more intuitive, users are more likely to sort waste properly, thus minimizing contamination and increasing the rate of correct disposal.

Figure 13: Including 'what not to throw' into bins as well in the signage

Standardize Bin Colors and Placement

Responsibility: *AMS Operations*

Inside the Grand Noodle Emporium, all waste bins are uniformly black, which forces users to read the signage carefully instead of relying on color as a sorting shortcut. Interestingly, this practice contradicts much of the existing research that supports color coding as a tool for encouraging accurate disposal. However, our field observations suggest that removing color cues can actually increase user engagement with the signage and lead to more intentional sorting decisions. Therefore, we recommend piloting the use of standardized, neutral-colored bins, such as all-black or all-grey, in one non-GNE location, and assessing whether it produces similar or better outcomes. Additionally, bins should always be arranged in the same left-to-right order (e.g., compost → recycling → landfill) across all areas in the Nest to promote consistency. If this pilot proves successful, the same approach could be implemented more widely to improve overall waste sorting behaviors.

Install Waste Sorting Posters Above Bins

Responsibility: *AMS Communications & UBC Facilities*

Placing educational posters above waste stations can serve as timely, eye-level reminders for consumers, especially in busy or fast-paced environments where users might be distracted or in a hurry. These posters should not only reiterate sorting instructions but also provide contextual information on the environmental consequences of improper disposal. They could include brief

facts about how landfill waste contributes to greenhouse gas emissions, or how contaminated recycling can render entire bins unusable. Including visual guides and meal-specific examples like what to do with poke bowl containers or bubble tea cups can further clarify how to dispose of complex items. The posters can also feature motivational messaging about the impact of everyday actions, encouraging users to see their sorting behavior as part of a larger climate-conscious effort. By providing both practical instructions and environmental education, these posters can help reduce confusion and foster more responsible disposal habits.

Figure 14: From our deliverables, an example of a poster to convey the environmental impact

Distribute Vendor-Specific Disposal Pamphlets

Responsibility: *AMS Sustainability + Food Vendors*

One way to support accurate waste sorting is to offer pamphlets or small printed guides tailored to the packaging used by each food vendor. These pamphlets would break down the disposal process for specific menu items, indicating where each part of the packaging should go; for example, "Sushi tray: tray in recycling, soy sauce packet in landfill, chopsticks in compost." Providing this level of detail reduces guesswork and empowers consumers to make informed decisions. These pamphlets can be displayed at food counters, attached to receipts or available digitally through a QR code to reduce paper waste. QR codes also allow for easy updates when

packaging changes. This personalized approach helps bridge the knowledge gap between consumers and the often-complex rules of local waste management, especially in a university setting with a diverse and international student population. By offering clear, vendor-specific guidance, this intervention supports better waste sorting outcomes with minimal disruption to the dining experience.

Figure 15: From our deliverables, a mock-up pamphlet that is vendor specific, in this case GNE, that provides item specific instructions to dispose waste

Encourage Group Disposal Discussions via Peer Engagement

Responsibility: *Student Sustainability Groups, Peer Programs*

Our observations revealed that people in groups, such as friends or classmates, were more likely to pause and discuss signage before disposing of their waste, often leading to more accurate sorting. This insight suggests that peer influence can be a powerful tool in promoting better disposal behaviors. To leverage this, we propose organizing casual, student-led engagement efforts during peak hours, such as lunch time. Volunteers from student sustainability clubs or peer ambassador programs could offer quick demonstrations, answer questions, or simply model correct sorting behavior. Light, interactive activities such as “waste sorting bingo” or mini challenges can make learning fun and memorable. The goal is not to lecture, but to create positive and informative social moments that normalize proper sorting. These small interactions can have a ripple effect, sparking conversations and encouraging people to think twice before tossing something in the wrong bin.

Mid-Term Actions

Collaborate with Vendors on Compostable Packaging

Responsibility: *AMS Procurement & Food Vendors*

Food vendors play a crucial role in shaping consumer sorting behavior, since the materials they use directly impact the ease or difficulty of disposal. Our observations indicated that when food is served in compostable brown containers, consumers are far more likely to dispose of both the container and leftover food in the compost bin, often correctly and without hesitation. On the other hand, when food is served in plastic containers, users tend to either throw everything into the landfill or dispose of contaminated plastic into the recycling, both of which degrade the quality of waste streams. To address this, we recommend that AMS Procurement work collaboratively with food vendors to standardize packaging across outlets. Compostable containers should be clearly labelled and easy to identify. Incentives such as promotional signage or reduced procurement costs could encourage vendors to make the switch. This strategy not only improves sorting outcomes but also reinforces AMS's broader sustainability goals by creating a more intuitive and environmentally friendly system for everyone on campus.

Redesign Non-GNE Bin Stations for Simplicity

Responsibility: *AMS Facilities & Campus Planning*

Compared to the GNE, which has a streamlined three-bin setup, some non-GNE areas feature overly complex waste stations with additional bins for paper, soft plastics, or refundables. While well-intentioned, these setups can overwhelm users and increase sorting errors. In contrast, the simplicity of the GNE model: just compost, recycling, and landfill, was observed to improve sorting accuracy, especially for compost. To replicate this success, we suggest redesigning selected non-GNE waste stations to reduce the number of options. Removing underused bins, simplifying signage, and maintaining a consistent layout across the Nest can help reduce decision fatigue and guide more accurate disposal behaviors. This change would also align with behavioral science principles that emphasize the importance of limiting choices to improve user outcomes (Park & Jang, 2013). By making waste sorting more intuitive and less mentally taxing, we can support long-term improvements in campus waste management.

Long-Term Actions

Institutionalize Waste Sorting Education in Orientation

Responsibility: *UBC Sustainability Office, Student Services*

To build a culture of sustainability from the ground up, it's essential to integrate waste sorting

education into student orientation programs. Many first-year students arrive at UBC with little to no prior experience with local waste management systems, especially international students or those new to British Columbia. By introducing this knowledge early through short, engaging videos, live demonstrations or interactive workshops where students can develop a foundational understanding of proper disposal habits that will carry through their entire academic journey. These educational sessions could be part of broader sustainability training during Jump Start, Imagine Day or residence welcome events, ensuring that the message reaches as many students as possible. Additionally, including waste sorting information in student handbooks, residence move-in guides, or through residence advisors can help reinforce these lessons. By making waste literacy a standard part of the onboarding experience, the university not only normalizes sustainable behavior but also fosters long-term environmental responsibility across the student body.

Develop a Digital Waste Sorting Assistant (QR Codes or App)

Responsibility: *UBC IT + AMS Sustainability*

To meet students where they are, on their phones, a digital waste sorting assistant could transform how users interact with bin stations across campus. This tool could be accessed via QR codes placed prominently above each bin setup or developed as part of the UBC Life app. Once scanned, the assistant would offer simple, real-time instructions for how to dispose of specific food items, such as "Ramen bowl: compost; Plastic lid: garbage; Wooden chopsticks: compost." To keep things current, the tool could feature sorting guides tailored to popular meals from AMS vendors, dynamically updating as packaging materials or food options change. Over time, the platform could also collect anonymized data on frequently searched items to identify which products cause the most confusion, valuable insight for future signage or vendor changes. The tool could even feature a gamified element (e.g., "Sort correctly 10 times to win a campus discount") to further encourage engagement. In the long run, this interactive assistant would not only simplify sorting but also build long-lasting waste literacy through everyday use.

RECOMMENDATIONS FOR FUTURE RESEARCH

To further improve waste sorting behavior and inform future design and communication strategies, additional research is needed in the following areas:

Investigate Group Dynamics in Sorting Behavior

While preliminary observations suggested that individuals in groups were more likely to engage with signage and sort waste correctly, the sample size was too small to confirm this trend with statistical significance. Future research should specifically focus on group behavior, perhaps using targeted observation or structured interviews, to examine how social pressure, peer influence or collaborative decision-making impacts waste disposal habits. By understanding how and why people in groups behave differently from individuals, stakeholders can design interventions that

intentionally leverage social interactions such as promoting peer-led sorting or encouraging group disposal behavior during high-traffic dining hours.

Study the Impact of Manual Employee Sorting

In a few cases, UBC employees were observed manually sorting bins, especially during peak contamination periods. While this may help in the short term by reducing contamination levels, it also caused delays and may lead consumers to rely on staff intervention rather than developing proper sorting habits themselves. A focused study could explore whether this practice affects long-term consumer behavior, either by discouraging users due to perceived inconvenience or fostering a dependency that undermines educational initiatives. Understanding these dynamics is crucial to finding the right balance between operational support and promoting autonomous responsible behavior.

Evaluate Signage Comprehension Across Language and Cultural Groups

Given UBC's culturally and linguistically diverse community, future research should explore how students from different backgrounds interpret and engage with existing signage. Not all signage is equally understood or visually intuitive, particularly for international students who may be unfamiliar with certain terms or visual symbols. This study could use multilingual surveys, interviews, or eye-tracking experiments to assess comprehension levels. The insights gained would allow for the design of more inclusive, effective signage systems that consider cultural nuances and language barriers, ensuring all students can sort waste confidently and correctly.

Monitor Long-Term Impact of Packaging Changes

Should AMS or UBC vendors shift toward standardized compostable packaging, it's essential to evaluate whether this change meaningfully improves sorting behavior over time. A longitudinal study could track contamination rates and sorting accuracy before and after the introduction of uniform packaging. It would also be valuable to assess whether such changes result in habit formation, reduced confusion, or increased reliance on visual recognition (e.g., "brown bowl = compost"). These insights could strengthen the case for procurement-led sustainability initiatives and inform vendor engagement strategies.

Explore Waste Behavior Trends Across Times of Day & Week

This study was conducted during peak hours (11:00 AM to 2:30 PM), which may not capture the full spectrum of waste disposal behavior throughout the day or week. It's possible that sorting accuracy differs during quieter hours or on weekends, when fewer distractions, social interactions, or operational staff are present. Expanding observations to these underrepresented time slots could uncover behavioral patterns that are currently overlooked. Such findings might

identify additional gaps or opportunities for signage reinforcement, digital education, or bin design improvements tailored to low-traffic times.

Conclusion

This study investigated waste sorting behaviors at the UBC Nest to enhance sustainability practices, guided by Community-Based Action Research (CBAR) principles in collaboration with AMS Sustainability and AMS Food & Beverage Operations. The objectives were to identify barriers to effective waste sorting and propose community-driven solutions.

Using participant observations, surveys, and waste audits, the research found that physical barriers affected only 7.63% of participants, but behavioral factors significantly impacted sorting accuracy. Hesitant sorters outperformed confident ones, and group settings improved signage engagement (65% vs. 44.33% for individuals). The Grand Noodle Emporium's simplified bin system led to higher accuracy (70% correct disposal) compared to non-GNE areas (41.22%). Surveys revealed 57% of participants relied on intuition, with 58.78% sorting incorrectly outside GNE.

These findings align with literature on social influences in waste sorting (Ma & Shen, 2024) and support UBC's sustainability goals by proposing clear signage, standardized bins, and educational campaigns. Limitations include a small GNE sample size (n=30) and potential observer bias. Future research should explore group dynamics and inclusive signage.

In summary, the study highlights the need for intuitive waste station design and education to reduce contamination and foster sustainable habits, offering actionable recommendations to advance UBC's waste management practices.

References

AMS of UBC. (2024, February 14). AMS Waste Audit. *AMS of UBC*. https://www.ams.ubc.ca/event/ams-waste-audit/

AMS of UBC. (2023, December 16). Sustainability Plans and policy. https://www.ams.ubc.ca/what-we-stand-for/sustainability/sustainability-plans-and-policy/

Costello, C., Birisci, E., & McGarvey, R. G. (2016). Food waste in campus dining operations: Inventory of pre- and post-consumer mass by food category, and estimation of embodied greenhouse gas emissions. *Renewable Agriculture and Food Systems, 31*(3), 191–201. doi:10.1017/S1742170515000071

Government of British Columbia. (2022). Food and Organic Waste. Retrieved from https://www2.gov.bc.ca/gov/content/environment/waste-management/food-and-organic-waste

Grappi, S., Bergianti, F., Gabrielli, V., & Baghi, I. (2024). The effect of message framing on young adult consumers' sustainable fashion consumption: The role of anticipated emotions and perceived ethicality. *Journal of Business Research*, *170*, 114341. https://doi.org/10.1016/j.jbusres.2023.114341

Gullion, J. S., & Tilton, A. (2020). "Chapter 1 Community Health". In *Researching With*. Leiden, The Netherlands: Brill. https://doi.org/10.1163/9789004424852_002

Lelicińska-Serafin, K., Manczarski, P., & Rolewicz-Kalińska, A. (2023). An insight into post-consumer food waste characteristics as the key to an organic recycling method selection in a circular economy. *Energies, 16*(4), 1735. https://doi.org/10.3390/en16041735

Ma, C., & Shen, Y. (2024a). Understanding food waste sorting behavior in institutional food services: An integrated psychological framework. *Journal of Environmental Management*, *360*, 121215. https://doi.org/10.1016/j.jenvman.2024.121215

Mielinger, E., & Weinrich, R. (2023). A review on consumer sorting behaviour: Spotlight on food and fast moving consumer goods plastic packaging. *Environmental Development, 47*, 100890. https://doi.org/10.1016/j.envdev.2023.100890

Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: Quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences, 365*(1554), 3065–3081. https://doi.org/10.1098/rstb.2010.0126

Park, J.-Y., & Jang, S. (Shawn). (2013). Confused by too many choices? choice overload in tourism. *Tourism Management*, *35*, 1–12. https://doi.org/10.1016/j.tourman.2012.05.004

Reynolds, C., Goucher, L., Quested, T., Bromley, S., Gillick, S., Wells, V. K., Evans, D., Koh, L., Carlsson Kanyama, A., Katzeff, C., Svenfelt, Å., & Jackson, P. (2019). Review: Consumption-stage food waste reduction interventions – what works and how to design better interventions. *Food Policy, 83*, 7–27. https://doi.org/10.1016/j.foodpol.2019.01.009

The University of British Columbia. (2023, June 8). Zero waste action plan. *UBC Planning*. https://planning.ubc.ca/sites/default/files/2023-08/230608_ZWAP.pdf

UBC Campus and Community Planning. (2021, December). *UBC Vancouver Campus - Climate Action Plan 2030*. https://planning.ubc.ca/sites/default/files/2021-12/UBCV_CAP2030_FINAL.pdf

United Nations Environment Programme. (2024). Food Waste Index Report 2024. *UNEP*. Retrieved from https://www.unep.org/resources/publication/food-waste-index-report-2024

University of British Columbia. (n.d.). *Zero Waste Squad*. UBC Sustainability. Retrieved February 14, 2025, from https://sustain.ubc.ca/community/zero-waste-squad

Value Chain Management International & Second Harvest. (2019). The avoidable crisis of food waste: Technical report. https://vcm-international.com/wp-content/uploads/2019/01/The-Avoidable-Crisis-of-Food-Waste-NR-January-17-2019.pdf

Zeineddine, M., Kharroubi, S., Chalak, A., Hassan, H., & Abiad, M. G. (2021). Post-consumer food waste generation while dining out: A close-up View. *PLOS ONE*, *16*(6). https://doi.org/10.1371/journal.pone.0251947

Appendices

Appendix A:

UBC Food Waste Survey link
Survey Title: LFS 450 - Post-Consumer Food Waste Reduction
Survey URL: https://ubc.ca1.qualtrics.com/jfe/form/SV_eQB3xgxEhuKu3ci

Appendix B:

Survey Questions:

1. **Do you consent to answering this survey for research purposes?**
    a. Yes
    b. No
2. **Do you consent to the audio being recorded while you complete taking this survey?**
    a. Yes
    b. No
3. **How often do you use the composting bin in The Nest?**
    a. Never
    b. Rarely
    c. Sometimes
    d. Often
    e. Always
4. **How do you decide what food waste to put in the compost bin at The Nest?**
    a. I check the labels on the bin
    b. I know what's compostable
    c. I ask someone
    d. I guess
5. **What makes it difficult for you to compost your food waste in The Nest?**
    a. Not sure what can be composted
    b. Compost bin is hard to find
    c. Lack of time to sort
    d. I don't find it difficult to compost
    e. Other (please specify)
6. **Would you be more likely to compost if you had more information about the environmental impact of composting?**
    a. Yes
    b. Maybe
    c. No
    d. I didn't know there was an environmental impact
7. **What could be improved in the compost bin system to make it easier for you to compost?**
    a. Clearer signage and labels
    b. More compost bins in accessible locations
    c. Better education on what's compostable

d. Other (please specify)

8. **What could encourage you to reduce the amount of food waste you create at The Nest (e.g., smaller portion sizes, awareness campaigns, etc.)?**
    a. Smaller portion sizes
    b. More awareness campaigns about composting
    c. Better labeling on what's compostable
    d. Other (please specify)
9. **Is the signage above the bins easy to comprehend to sort the waste correctly?**
    a. I am often confused
    b. The signage is easy to comprehend
    c. I usually don't look at the signage
    d. Other concerns:

"Thanks so much! Can I get your name and email just for the purposes of placing your name in the draw for the gift cards?"

10. **[Place for name and email address]**

Appendix C

AMS Sustainability Organic Waste Audit 2025:
https://docs.google.com/spreadsheets/d/1tbGyX5NmN46BTcSo6cLKOoeyDBFt3poiaDHUfruAqNc/edit?usp=sharing

Appendix D

Environmental Harms of Food Waste - Workshop Programming (use as a baseline):

- 30 minutes:
  Trivia – Food waste and its Impact on the Climate
  - This would be an ice breaker to get people thinking about how food waste is a contributor to climate change
- 50 minutes:
  Introduction of Food Waste
  - Discussion of the environmental impacts of food waste and its implications
  - Include discussions of food waste in landfills resulting in greenhouse gas emissions, grounding it in the context of UBC
- 30 minutes:
  Group Discussion and Debrief
  - Have participants break up into groups and ask them to discuss their thoughts on climate change and the connection with food waste
  - Have them think about what they would like to see change with the waste sorting system on UBC campus (let them be as imaginative as possible!)
- *Break*
- 30 minutes:
  Interactive waste sorting game (teams)
  - An interactive game in teams as a change of pace

- This would test peoples waste sorting knowledge, getting participants to guess which waste items go into which sorting bin

- 45 minutes:
  Open dialogue and discussion with students, staff, and other consumers at the Nest, with stakeholders (including AMS Sustainability, AMS Food & Beverage Operations, AMS Food Outlet managers and workers, etc.)
  - This time would be dedicated to incorporating public opinion in decision-making surrounding food waste and waste sorting practices at UBC
  - Stakeholders would have the chance to hear from the public and implement policies and practices that would reduce food waste and incorrect waste sorting on campus

Appendix E

Vendor Specific Pamphlet – Mock-up design

Appendix F

Posters above bins – Mock-up design

Are you sorting the wastes correctly?

Make sure to throw the food waste, napkins and chopsticks into the compost (green) bin.

This will help reduce organic wastes that end up in landfills which lead to increased greenhouse gas emissions which harms our environment.

Also, you can minimize food wastage by packing leftovers for another meal.

Paper waste, if clean, must be disposed into the blue bin.

You are thus recycling such waste and giving it a new life!

Plastic bottles, bowls and containers must be disposed into recyclable containers bin.

You are thus recycling such waste and giving it a new life!

Plastics such as forks as well as wraps must go into the garbage.

Unfortunately, these end up in the landfills. It is good practice to carry one's own utensils.

ams
— EST. 1915 —