

Understanding Food Waste Drivers Of Students attending Open Kitchen, Gather and Feast All Access Dining Halls

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Practitioner summary



UNDERSTANDING FOOD WASTE DRIVERS OF STUDENTS ATTENDING OPEN KITCHEN, GATHER AND FEAST ALL ACCESS DINING HALLS



Background and Goal

- Food waste is a critical contributor of global greenhouse gas (GHG) emissions. At UBC, dining halls such as Open Kitchen, Gather, and Feast generate considerable food waste, presenting challenges for sustainability and operations. The research aims to identify the factors leading to post-consumer food waste and offers solutions to help UBC achieve its Climate Action Plan 2030 goal of reducing food system-related greenhouse gas emissions by 50%.

Methodology

A mixed-methods approach was applied

- Online Surveys: 81 responses collected to assess student behaviors and perceptions.
- In-Person Interviews: 47 responses were Conducted across all three dining halls, providing qualitative insights categorized into common themes.
- Literature Review: Examined best practices and existing research on food waste reduction strategies in post-secondary dining settings



Key Findings

- Awareness Gap:**
 - A significant number of students were unaware of food waste's environmental impact, highlighting the need for targeted educational efforts.
- Portion Sizes:**
 - Many respondents advocated for smaller or adjustable portions to reduce over-serving and waste.
- Food Quality :**
 - Although the majority of students were satisfied with the food quality in the all-access dining halls, a significant number of students expressed dissatisfaction with aspects such as taste, temperature, and texture.



Recommendations

- Education Awareness**
 - Launch awareness campaigns using digital displays, posters, and social media to inform students about the environmental impact of food waste.
- Portion Sizes:**
 - Implement smaller default portions with optional refills.
 - Introduce self-serve stations for customizable side dishes.
- Menu and Quality Improvements:**
 - Conduct regular menu reviews with student feedback.
 - Implementing more diverse menu
 - Improve food preparation to address concerns around taste, texture, and temperature.



Executive Summary

Food waste is a critical global challenge with severe environmental consequences, contributing substantially to greenhouse gas (GHG) emissions and resource inefficiencies. At the University of British Columbia (UBC), food waste is a significant issue, with a notable portion originating from all-access dining halls (UBC Sustainability, 2022b; UBC Zero Waste Action Plan, 2023). This presents both a challenge and an opportunity for impactful intervention. Recognizing this challenge, this study investigates food waste drivers and proposes actionable strategies to reduce waste, aligning with UBC's Climate Action Plan 2030 (UBC Vancouver, 2021).

This research employs a mixed-methods approach, combining online surveys and in-person interviews with students across all three all-access dining halls. Surveys captured student behaviors and perceptions regarding food waste, while interviews provided deeper insights into the factors driving waste in three key dining halls: Open Kitchen, Gather, and Feast.

Key Findings:

- **Awareness Gap:** A significant portion of surveyed students were unaware of the environmental impacts of food waste, underscoring the need for greater awareness and education on this issue.
- **Portion Sizes:** Many respondents identified inappropriate portion sizes as a primary driver of waste, suggesting the need for more customizable options.
- **Food Quality:** Although the majority of students rated food quality positively, a significant portion of students showed dissatisfaction with factors such as taste, temperature, and variety, which was common, indicating room for improvement to better meet student preferences.

Recommendations:

1. Launch targeted awareness campaigns, including real-time waste tracking, sustainability workshops, social media campaigns and educational posters, to inform students about the environmental effects of food waste.
2. Implement customizable portion sizes and self-service stations for side dishes, empowering students to select quantities suited to their needs.
3. Regularly review and diversify menu offerings, incorporating monthly student feedback to ensure high-quality, culturally inclusive meals.

Addressing these drivers provides UBC with the opportunity to lead by example in sustainable campus food systems. By reducing food waste and fostering climate-conscious behaviors, UBC can significantly contribute to its climate action goals while serving as a model for other academic institutions worldwide.

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1. Introduction

1.1 Research Topic

Food waste is a persistent critical global challenge with irreversible impacts, including greenhouse gases (GHG) emissions that disrupt climates worldwide (UNEP, 2018). The University of British Columbia Food Services (UBCFS) aims to better inform its policies and practices to support its target of a 50% reduction in food system GHG emissions by 2030 by identifying the factors that drive food waste. According to the United Nations Environment Programme (UNEP, 2023), approximately one-third of all food produced for human consumption is wasted, generating 8–10% of global GHG emissions.

At UBC, all-access dining halls contribute notably to GHG emissions through food waste. This study contributes to that goal by examining the primary drivers of post-consumer food waste among dining hall visitors. Building on existing research, the project also aims to raise student awareness through an educational resource designed to promote mindful consumption and reduce food waste across UBC's three all-access dining facilities.

1.2 Research Relevance

1.2.1 Societal Issues

Greenhouse gases (GHGs) play a key role in climate change, and their growing impact on the environment is undeniable (IPCC, 2023). Waste management is a critical area for reducing greenhouse gas emissions, particularly methane. When organic waste decomposes in landfills, it releases substantial amounts of methane—a potent greenhouse gas with a global warming potential 28 times greater than carbon dioxide (USEPA, 2023).

In 2020, methane emissions from organic waste in landfills accounted for 19% of global methane emissions, underscoring the crucial role of effective waste management in climate change mitigation (USDA, 2022). Solid waste is responsible for about 5% of global greenhouse

gas emissions, primarily due to methane release from decomposing organic waste, while food waste alone contributes around 10% due to resource use in production and landfill emissions (EPA, 2019).

Research shows that our dietary choices have a substantial impact on greenhouse gas (GHG) emissions (Poore & Nemecek, 2018). Poore & Nemecek (2018) indicate that diets high in animal-based foods, particularly red meat and dairy, contribute significantly to GHG emissions due to the energy-intensive nature of livestock production and the high methane output from ruminants like cattle. In opposition, opting for plant-based diets can reduce emissions by up to 29% compared to meat-heavy diets (Soret et al., 2014). For example, the production of beef generates 100 times more CO₂-equivalent emissions than vegetables, underscoring the potential of dietary changes in lowering GHGs (Poore & Nemecek, 2018; Ritchie, 2024).

Further, according to Rippin et al. (2021) who focused on exploring the associations between greenhouse gases and specific food intake, Meat is responsible for 32% of diet-related greenhouse gas emissions, followed by drinks at 15%, dairy at 14%, and cakes and sweets at 8%. Non-vegetarian diets generate 59% more GHG emissions than vegetarian diets (Rippin et al., 2021).

Furthermore, according to Project Drawdown, tackling food waste is one of the top solutions for climate action, underscoring the need for initiatives at both the consumer and institutional levels (Brennan et al., 2020). Efforts to prevent and reduce food waste—through improved planning, food redistribution, and consumer education—could significantly reduce these emissions globally (Brennan et al., 2020). Thus, transitioning to sustainable waste management and dietary patterns is encouraged and could collectively decrease GHG emissions by up to 20%, making them crucial strategies in combating climate change (Rippin et al., 2021).

1.2.2 UBC Sustainability Issues, Policies, and Practices

UBC is widely known for its commitment to sustainability, and has made significant efforts to create a sustainable campus food system. However, there are still challenges that need

to be addressed. In 2022, UBC produced 615 tonnes of food waste, which contributes to greenhouse gas emissions, particularly methane from landfills (UBC Sustainability, 2022).

The results of this research project have the potential to support various UBC plans and policies aimed at addressing challenges. This research project aligns with the UBC Vancouver Climate Action Plan 2030, which aims to reduce greenhouse gas emissions by 50% (UBC Vancouver, 2021). By identifying strategies to minimize food waste in UBC dining halls, a key source of methane emissions, this research can significantly contribute to achieving the university's climate goals. Moreover, it advances the UBC Climate Emergency Action by promoting awareness about the environmental impact of food consumption and encouraging climate-friendly diets (UBC Climate Emergency Response, 2023).

Additionally, the project contributes to the UBC Zero Waste Action Plan 2030 by providing insights into food waste reduction strategies for residence dining halls (UBC Sustainability, 2021). Through the involvement of students in sharing about their dining practices, this research supports UBC's Inclusion Action Plan, which promotes equity, diversity, and inclusion in decision-making processes (Szeri et al., 2022).

1.2.3 Community Benefits

Food insecurity at the University of British Columbia (UBC) is a growing concern, with 37% of undergraduate students reporting food insecurity, according to the UBC Food Insecurity Update 2020. Groups such as international students, students with mental health diagnoses, those living with disabilities, and students reliant on loans, are particularly at risk. UBC is committed to reducing food insecurity by 2025 as part of its **Wellbeing Strategic Framework**

The aim of this research is to explore the factors that contribute to food waste in dining halls, which is a significant issue at UBC. Based on the recent data approximately 615 tonnes of food waste were generated in 2019 at UBC Vancouver campus (UBC Sustainability, 2022). Thus by identifying the main causes of food waste, this research can provide valuable information for developing strategies to reduce it, thereby supporting UBC's Zero Waste Action Plan 2030, which aims to substantially decrease food waste on campus (UBC SEEDS, 2024). Additionally, this project will empower students to have a direct impact on university policies, ensuring that

their input can help increase the variety of menu options and improve the overall dining experience.

1.3 Project Context

This research aims to contribute to UBC's ambitious goal of reducing greenhouse gas emissions from food systems by 50% as part of the UBC Vancouver Climate Action Plan 2030. While previous studies have focused on a single dining hall, this broader study examines food waste and its drivers across all three of UBC's all-access dining halls. These dining halls allow students unlimited access to food, a system that may contribute significantly to food waste levels. By analyzing students' food preferences and consumption behaviors, this study explores whether the all-access dining model (AAD), implemented in 2022, plays a central role in food waste generation across campus.

This research not only collects data on food waste but also includes an educational component. An informational booklet has been created to raise student awareness about food waste issues and to promote more sustainable behaviors in dining halls. The booklet aims to educate students about the environmental impacts of food waste, provide practical steps to reduce waste, Offers simple recipes that can be made using leftovers, and emphasize the importance of sustainable dining practices in supporting UBC's Zero Waste Action Plan. The ultimate goal of this project's findings and educational initiatives is to inform strategies for reducing food waste and enhancing the sustainability of UBC's dining services, thereby contributing to the university's broader climate and sustainability goals.

1.4 Research Purpose, Goals and Objectives

Purpose: The purpose of this research project is to investigate the primary drivers of post-consumer food waste among UBC dining hall visitors and provide actionable insights to reduce food waste and its associated greenhouse gas (GHG) emissions. By engaging students through surveys and interviews, the project aims to identify key factors influencing waste behaviors. The research will inform UBC Food Services in creating a more sustainable, culturally relevant dining experience that aligns with the Climate Action Plan 2030. The outcome

of this research has the potential to reduce campus food waste, promote food security, and advance a circular economy.

Goals:

1. Assess student perceptions and behavior regarding post-consumer food waste and the contributing factors in the 3 dining halls.
2. Provide recommendations to develop Food waste reduction strategies in dining halls among students.
3. Identify actionable techniques and material to develop to support the food waste reduction in the 3 dining halls aligned with student perception and behavior insights.
4. Develop educational material to inform about the food waste impact and reduction (e.g Food waste Booklet)

Objectives

1. Examine the effectiveness of current educational materials on food waste within dining halls, determining whether increased awareness among students could impact waste behaviors and promote more sustainable choices.
2. Identify specific food categories that contribute most to plate waste, offering targeted recommendations on portion sizes and menu planning to better align with student preferences and consumption patterns.
3. Creating a draft Anti-Waste Booklet tailored to ubc students needs.

2. Research Methodology & Methods

2.1. Research Methodology:

The Community-Based Action Research (CBAR) framework and principles served as the foundation for our project's research process, ensuring that our research design was reviewed and accepted by the key stakeholders, such as UBCFS. The research methodology known as community-based action research (CBAR) enables communities to actively and actively participate in tackling issues that directly affect them (Gullion & Tilton, 2020). From planning to conducting the study and putting the findings into practice, the community is involved at every

step of the process. CBAR works to promote equality by fostering a collaborative learning environment for scholars and community members. Information and practical solutions for the community's benefit are the ultimate goal, as they can promote social transformation and social justice.

Through the involvement of relevant community members such as staff, students and faculty, a CBAR approach was applied at every stage of the study. Surveys and in-person structured interviews were used to get a range of viewpoints and feedback from the students in all three accessible dining halls. In collaboration with the UBCFS management team, discussions were held, and advice was sought on reducing food waste generated by the dining halls. A comprehensive literature review has been conducted to explore potential recommendations for the future.

Furthermore, by emphasizing the sustainability and scalability of efficient waste reduction strategies and advocating for their broader adoption both on campus and outside of university grounds, our project advances UBC's sustainability and climate action goals.

2.2. Research Methods:

This research employs a mixed methods approach as it uses both primary as well as secondary data collection.

Primary Data: An online survey was disseminated through Qualtrics to students and access dining halls consumers. Furthermore, In-depth structured interviews were conducted at booths in all three all-access dining halls to assess consumers' thoughts and opinions regarding food waste.

Secondary Data: A literature review was one of the secondary procedures used to make sure that our initial data collection was done in an informed way and support our recommendations for the future.

2.2.1 Secondary Data Collection

Literature Review

For the purpose of ensuring that our primary research study was done in an educated way, a preliminary literature evaluation was carried out. Three primary goals were addressed by the literature review: reviewing recent studies on food waste in post-secondary dining halls, identifying promising practices to guide our suggestions for further research and action, and investigating methods for designing surveys that take into account a range of lived experiences. Search queries included entering keywords such as “University Dining Hall Food Waste reduction”, “Affordable Strategies To Reduce Food Waste In Dining Halls”, “Inclusive Survey Design”, and “Inclusive Focus Group Design”, into search engines such as the UBC Library and Google Scholar. Additionally, past survey results and background information sent out to students by UBCFS were provided, aiding in gaining access to student experiences and satisfaction rates with residence dining halls, allowing for an analysis of trends over the years. This informed the creation of the online survey framework used by the study.

2.2.2. Primary Data Collection

The two primary methodological techniques used in our research are 1) an online survey and 2) in-person interviews. Both methodologies were administered after distributing a consent form with all project goals and project staff information and receiving consent from each participant (online and/or in-person). The responses can be seen on page 34 under Appendix.

Web-based Survey

The purpose of the online survey was to get short-answer answers to questions about food waste at all three all-access dining halls and to gather basic demographic data about our target group. Printed copies of the survey's QR codes were dispersed throughout Orchard Commons in an effort to maximize response rates. Additionally, posters were put up throughout the dining hall to advertise the poll and encourage conversation on food waste. With an initial goal of 100 respondents, the online poll received 81 replies.

In-persons structured interviews:

The purpose of the in-person booth interviews was to supplement the online survey's findings. A predetermined set of questions was used in the interviews at these dining halls in an effort to elicit more detailed responses about the food preferences, reasons for food waste, and general

experiences of the students. For Open Kitchen and Feast, the booth was located directly outside the dining hall, while for Gather, the booth was located between the kitchen and dining tables. This method ensures that the population most affected by our study's goals will be represented in our data. The initial goal was to reach 60 respondents, with 20 from each AAD; however, the total number of interviews conducted was only 47, comprising 15 from Grather, 15 from Open Kitchen, and 17 from Feast.

3. Results

3.1.1 Literature Review

Table 1: Promising Practices and Current Research: Guiding Recommendations on Post-Secondary Dining Hall Food Waste

| Current research on post-secondary dining hall food waste | References |
|--|-----------------------------|
| Food Choice and Waste in University Dining Commons—A Menu of Change University Research Collaborative Study. | (Wiryaphanich et al., 2021) |
| Reducing portion size reduces food intake and plate waste | (Freedman, 2010) |
| Toward food waste reduction at universities. | (Whitehair et al., 2013) |
| Wasted food: A qualitative study of U.S. young adults' perceptions, beliefs and behaviours | (Nikolaus, 2018) |
| Understanding Food Waste Produced by University Students: A Social Practice Approach | (Ozanne et al., 2022) |

3.1.2 Online Survey Results

Online survey population

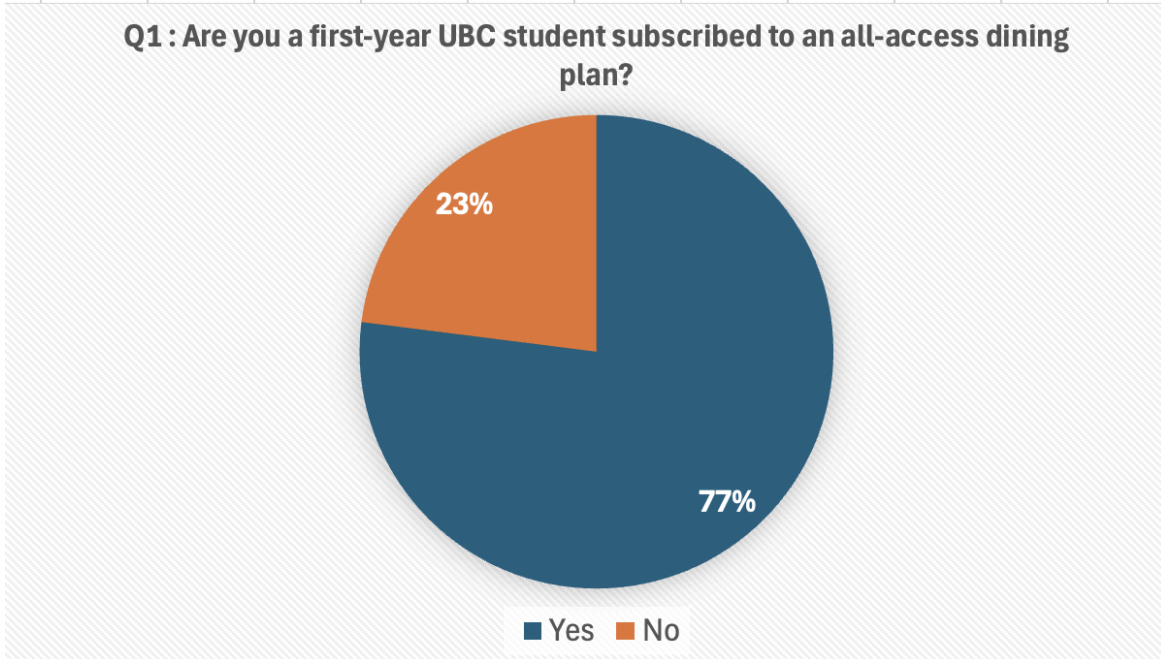


Figure 1: Survey population

The online survey received a total of 81 responses. A clear majority of the online survey participants (77%) were first-year students who had subscribed to an all-access dining plan at UBC, and the remaining 23% were not in their first year.

Dining Hall Locations of Survey

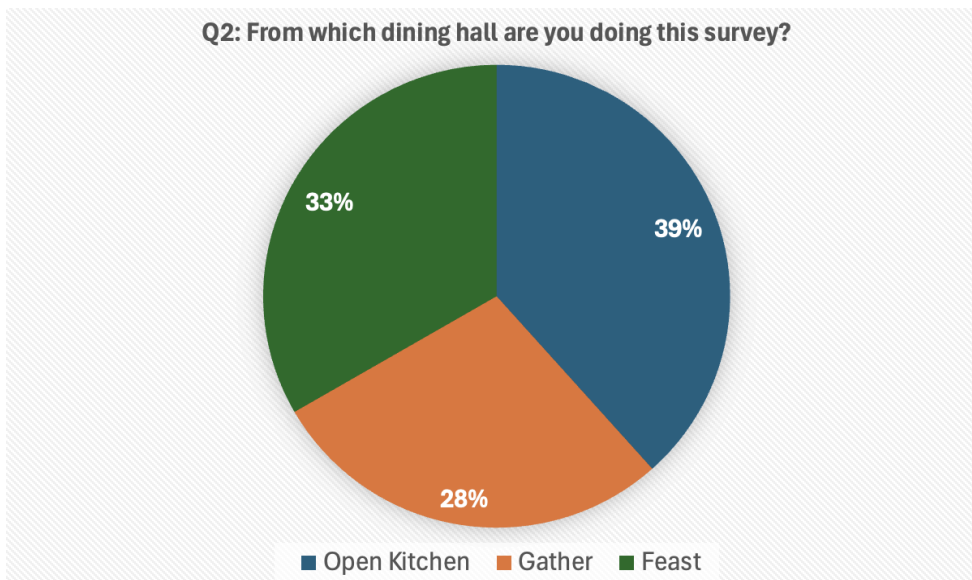


Figure 2: Distribution of Participants by Dining Hall Location

The survey participants were distributed across three dining halls at UBC. The majority, 39%, were associated with the Open Kitchen, followed by 33% at Feast, and 28% at Gather.

Frequency of Participants' Dining Hall Visits Per Day

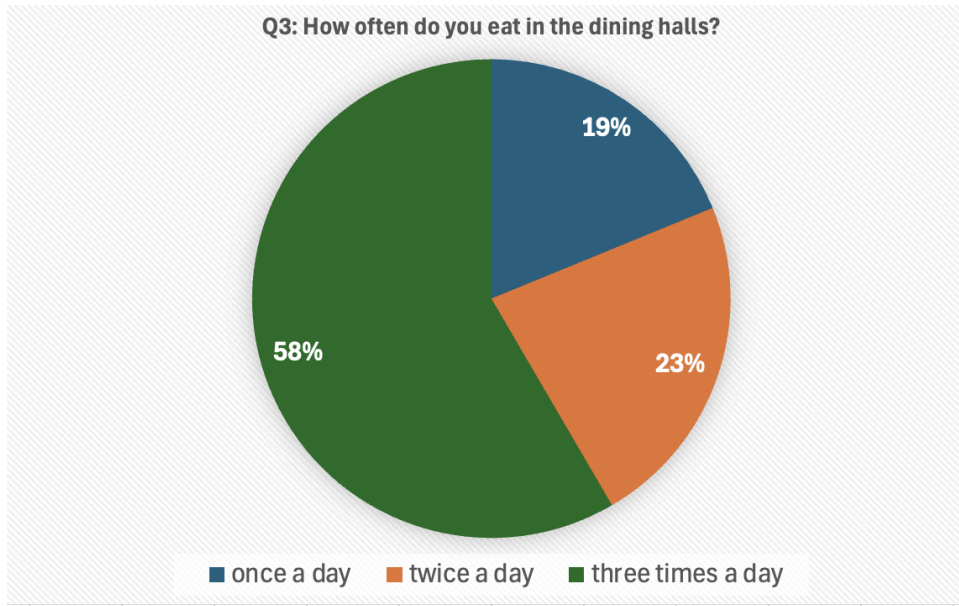


Figure 3: Frequency of Dining Hall Visits by Participants

Figure 3 reveals that the dining halls are a central part of daily routines for most respondents, with 58% reporting they eat there three times a day. This suggests that a majority rely on the dining halls for all their meals, reflecting their importance in meeting daily nutritional needs. A smaller proportion eats twice (23%) or once (19%) a day, indicating some variability in dining habits. These figures highlight the dining halls' critical role in providing consistent meal options for regular patrons.

Perceptions of Portion Sizes Served in Dining Halls

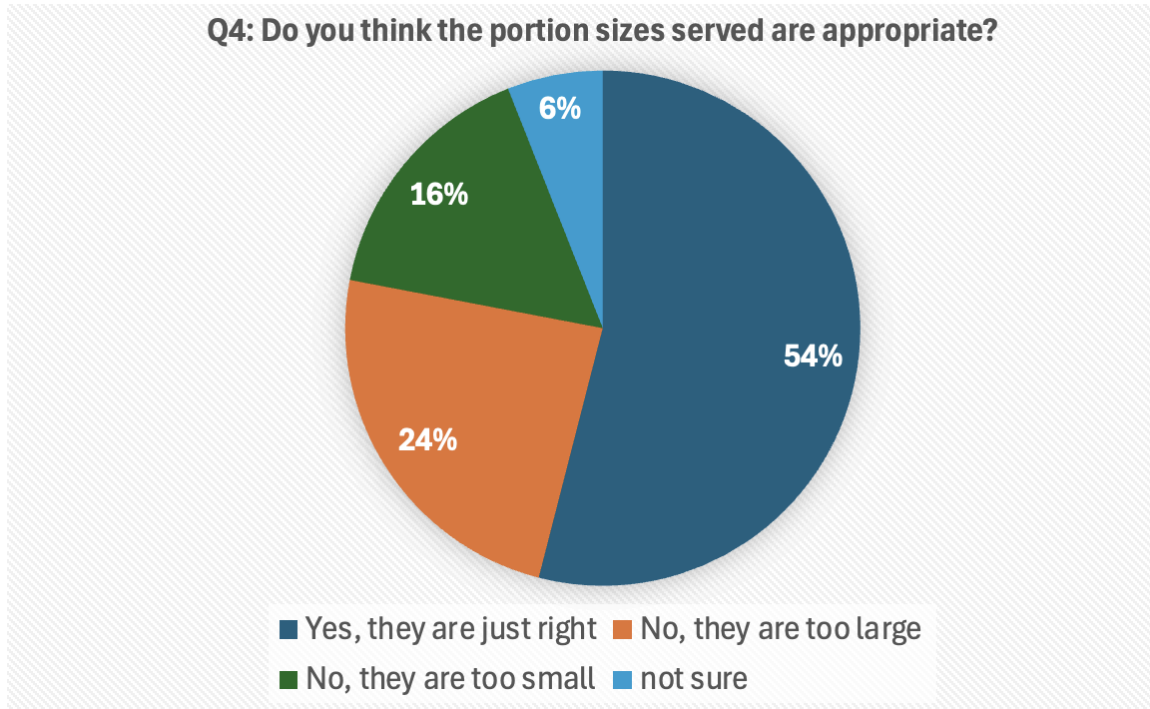


Figure 4: Participants' Perceptions of Portion Size Appropriateness in Dining Halls

Figure 4 shows that 54% of respondents believe the portion sizes are appropriate, suggesting that the dining halls meet the expectations or dietary needs of more than half of the survey participants. However, about 40% expressed dissatisfaction, with 24% finding portions too small and 16% considering them too large, indicating potential areas for improvement. The remaining 6% were unsure, which may reflect inconsistent experiences or neutral opinions.

Frequency of Leaving Food on the Plate in Dining Halls

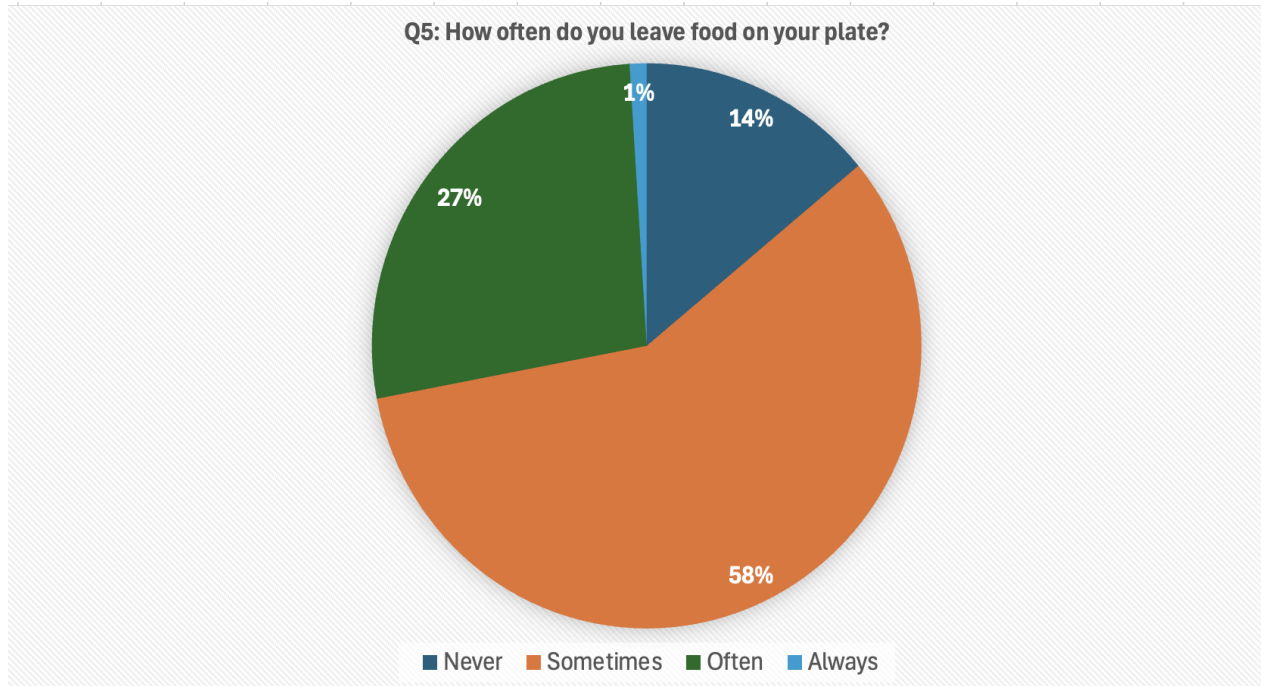


Figure 5: Participants' Perceptions of Portion Size Appropriateness in Dining Halls

Figure 5 reveals that food waste is a notable issue in access dining halls, as a significantly high percentage- 58% of respondents admitted to "sometimes" leaving food on their plate, while 27% said they "often" do so. Only a small fraction, 14%, claim to "never" leave food behind, and just 1% always leave food.

The primary reason for food waste

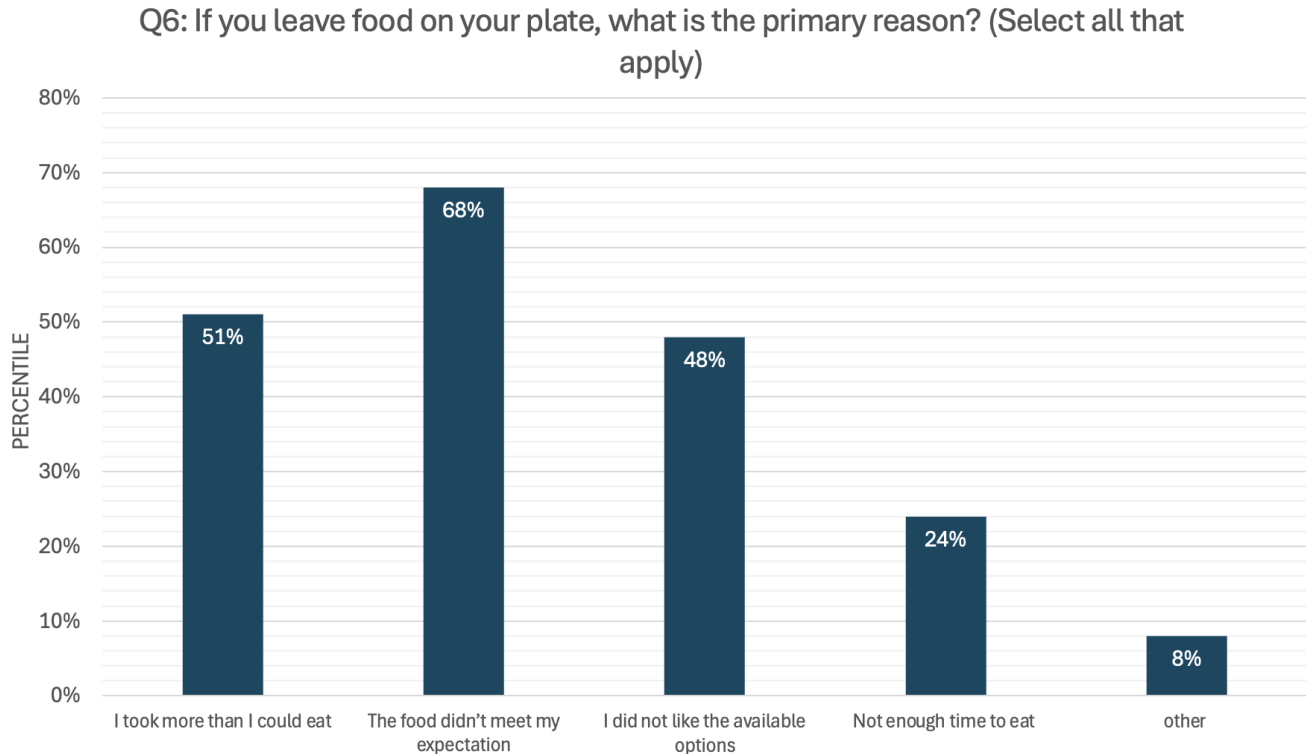


Figure 6: Participants' Perceptions of Portion Size Appropriateness in Dining Halls

As shown in figure 6, the most common reason for leaving food on plates was that the food 'did not meet expectations', with 68% of respondents indicating this issue. This suggests that students express dissatisfaction with the quality, taste, or preparation of the food offered in the dining hall. Additionally, 51% of respondents admitted taking more food than they could eat, highlighting a possible gap in preferred average portion size awareness or self-regulation during meal service. Meanwhile, 48% of respondents expressed dissatisfaction with the available options, pointing toward a need for greater variety or more appealing choices. Interestingly, 24% of respondents reported insufficient time to eat as a contributing factor, suggesting a potential misalignment between meal times and students' busy schedules. Lastly, 8% selected "other" reasons, which could reflect unique, individual factors not covered by the main categories.

Awareness about food waste

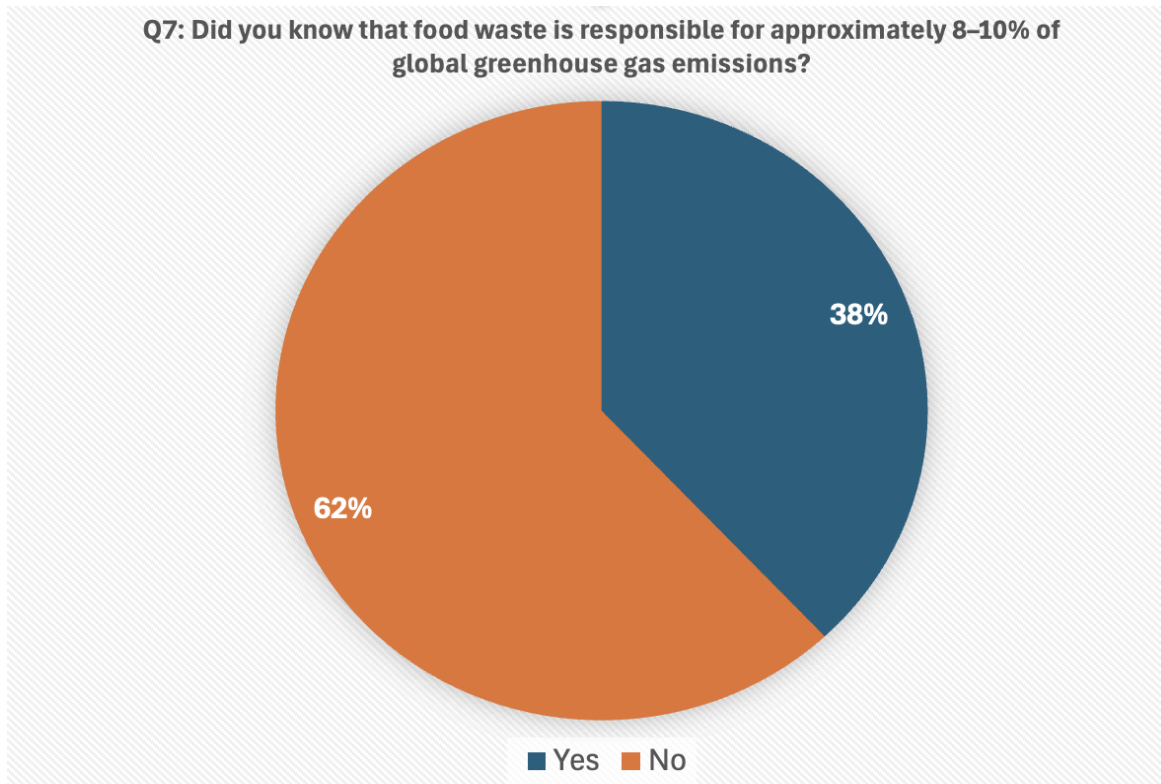


Figure 7: Awareness of Food Waste Contribution to Global Greenhouse Gas Emissions

Figure 7 shows a lack of awareness about the environmental impact of food waste, as 62% of respondents were unaware that food waste contributes to 8–10% of global greenhouse gas emissions. The remaining 38% were informed on this issue, indicating room for improvement in education and awareness campaigns. However, these results highlight the need to address food waste behaviour while raising awareness about its environmental consequences.

Actions to reduce food waste

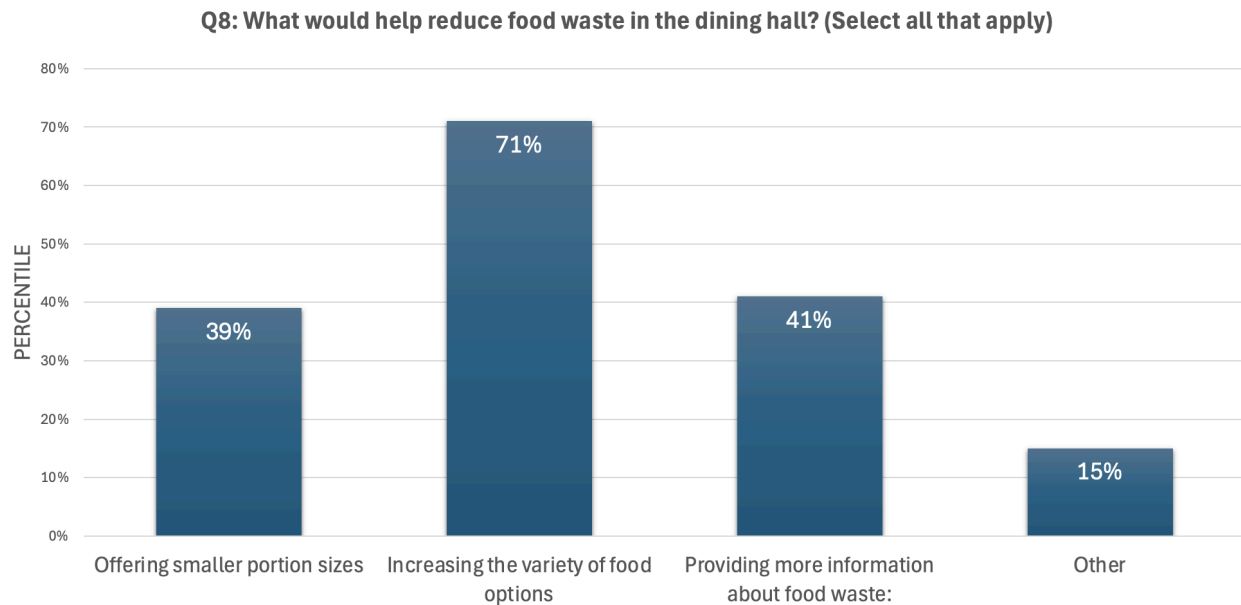


Figure 8: Awareness of Food Waste Contribution to Global Greenhouse Gas Emissions

As shown in Figure 8, the most popular suggestion to reduce food waste, supported by 71% of respondents, was increasing the variety of food options, indicating a strong desire for diverse and appealing menu choices that better meet the expectations of diners. Providing more information about food waste was the second most common response, with 41% of respondents suggesting that education could help students make more mindful choices. Offering smaller portion sizes was recommended by 39% of respondents, highlighting the potential to reduce over-serving and subsequent waste. Only 15% of respondents provided "other" suggestions, which may reflect specific ideas or unique concerns. Together, these findings suggest that a combination of improved food variety, educational campaigns, and portion control could be effective strategies for addressing food waste in dining halls.

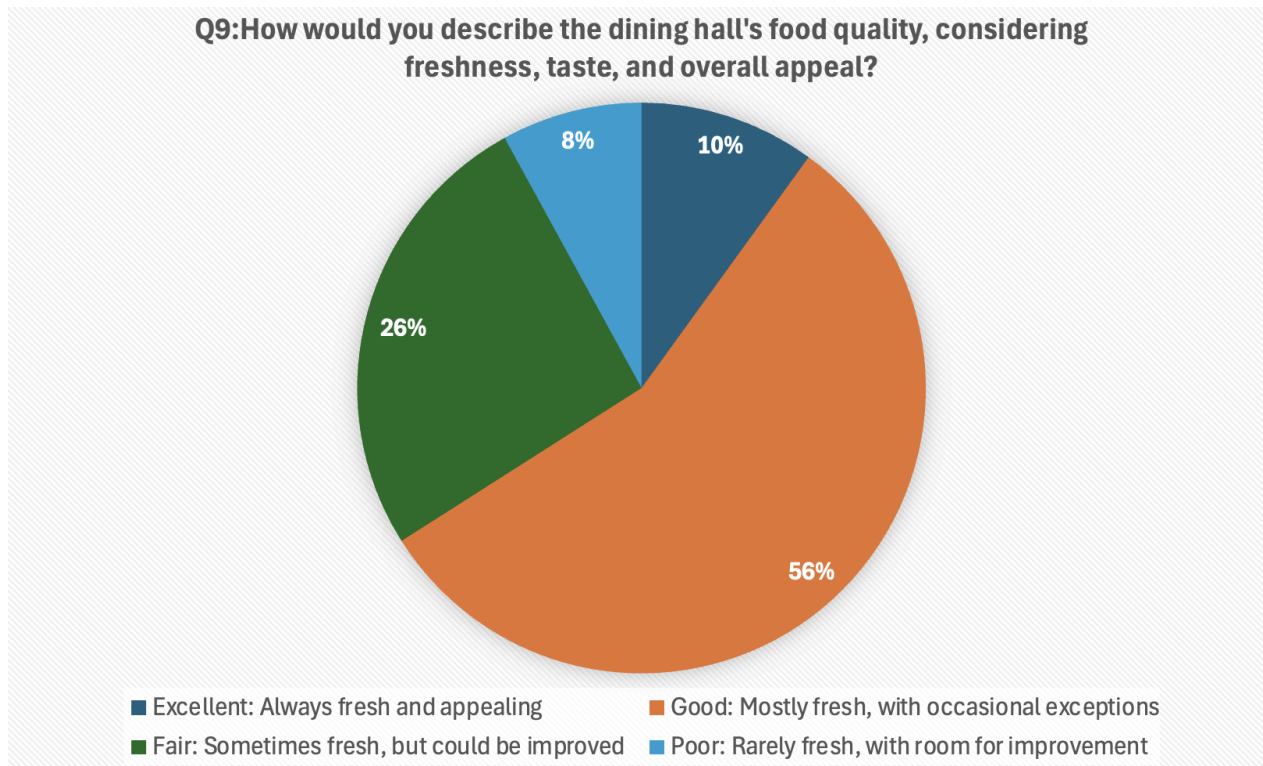


Figure 9: Perceptions of Dining Hall Food Quality Based on Freshness, Taste, and Overall Appeal

Figure 9 shows that a majority (56%) rate the dining hall's food quality as "Good" and a smaller group (10%) view it as "Excellent" indicating it is mostly fresh and appealing with occasional exceptions. However, 26% feel it is only "Fair," suggesting that the food could be improved in freshness or appeal while an even smaller 8% find it "Poor," This distribution suggests a generally positive perception of food quality, however more than 1/3 of the participants expressed dissatisfaction suggesting that improved freshness and taste needed to be addressed through targeted enhancements.

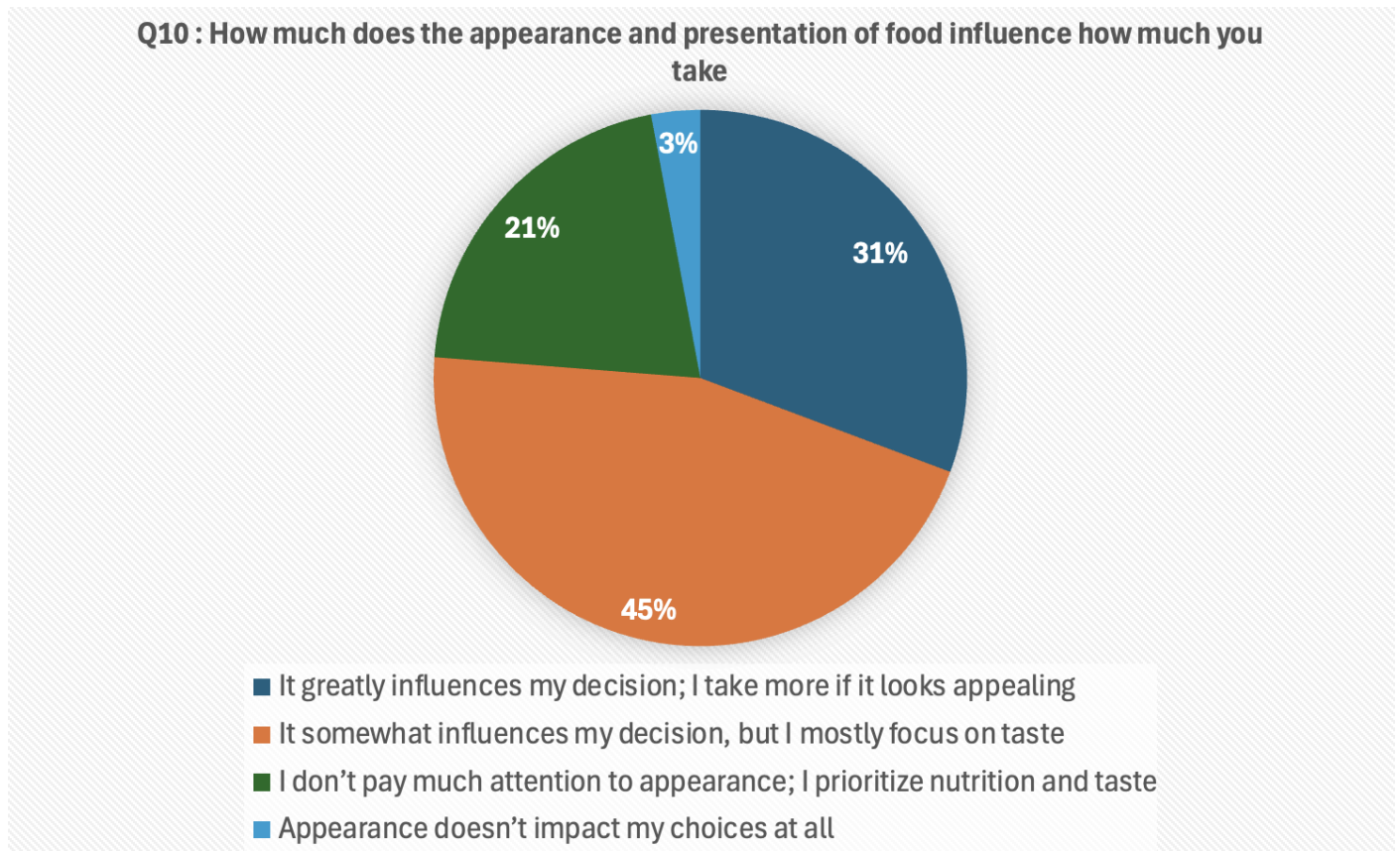


Figure 10: Influence of Food Appearance and Presentation on Students' Food Choices

Figure 10 highlights how food presentation influences consumption as 76% of the participants agree that it is a determining factor. A significant 45% report that appearance "somewhat influences" their decisions, with an additional 31% saying it "greatly influences" how much they take if the food looks appealing. Meanwhile, 21% prioritize nutrition and taste over appearance, and 3% state that appearance has no impact on their choices. These results clearly emphasize the importance of visual appeal in encouraging food consumption, suggesting that presentation could play a key role in reducing waste and enhancing satisfaction.

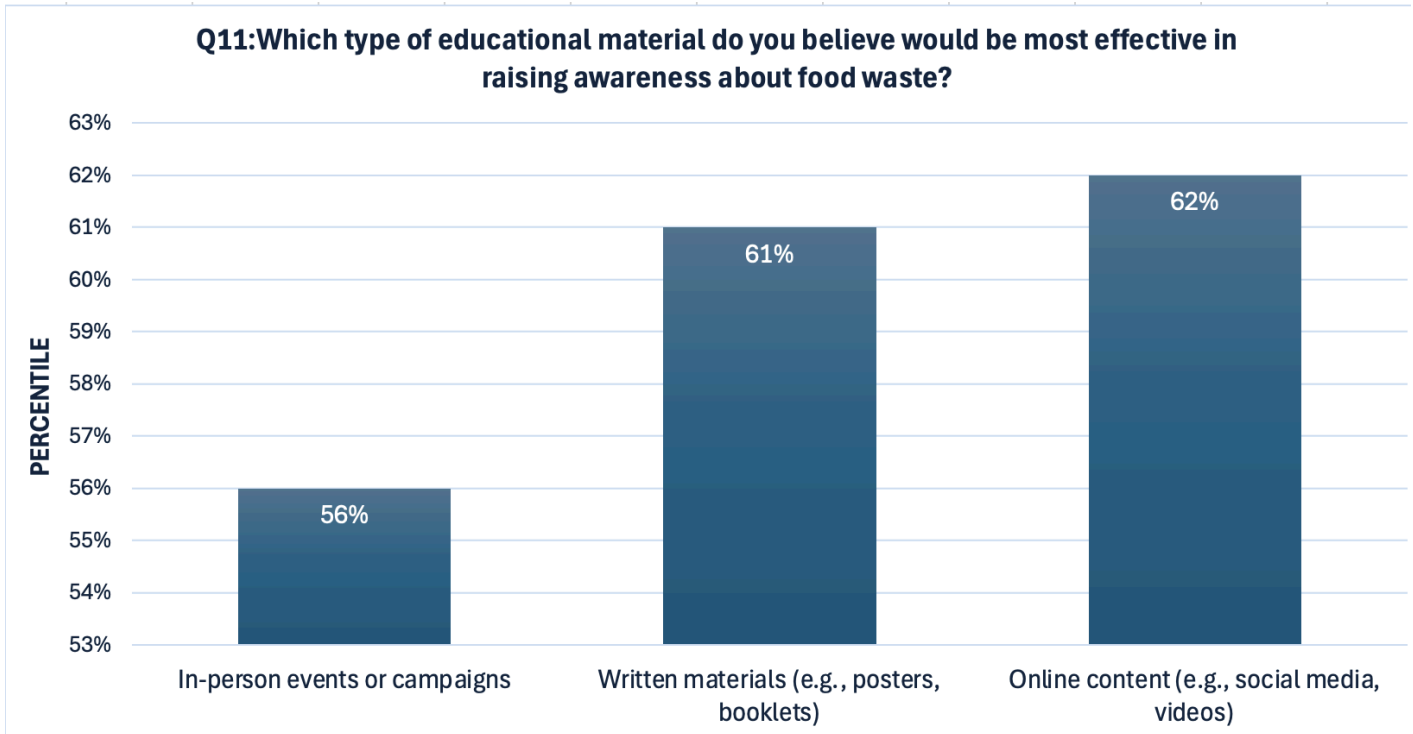


Figure 11: Effectiveness of Educational Materials in Raising Awareness About Food Waste

Considering that 62% of respondents were unaware that food waste contributes to 8–10% of global greenhouse gas emissions, it was important to inquire what kind of educational/informational materials would be most effective in increasing awareness amongst the student community regarding food waste. Based on figure 11, students choose online sources of education (62%) and written materials (61%) as the most preferred sources of information. This was followed by 56% of respondents that showed preference for in-person initiatives and campaigns as a way of spreading the word about food waste as a pressing issue.

Awareness of Portion Size Customization

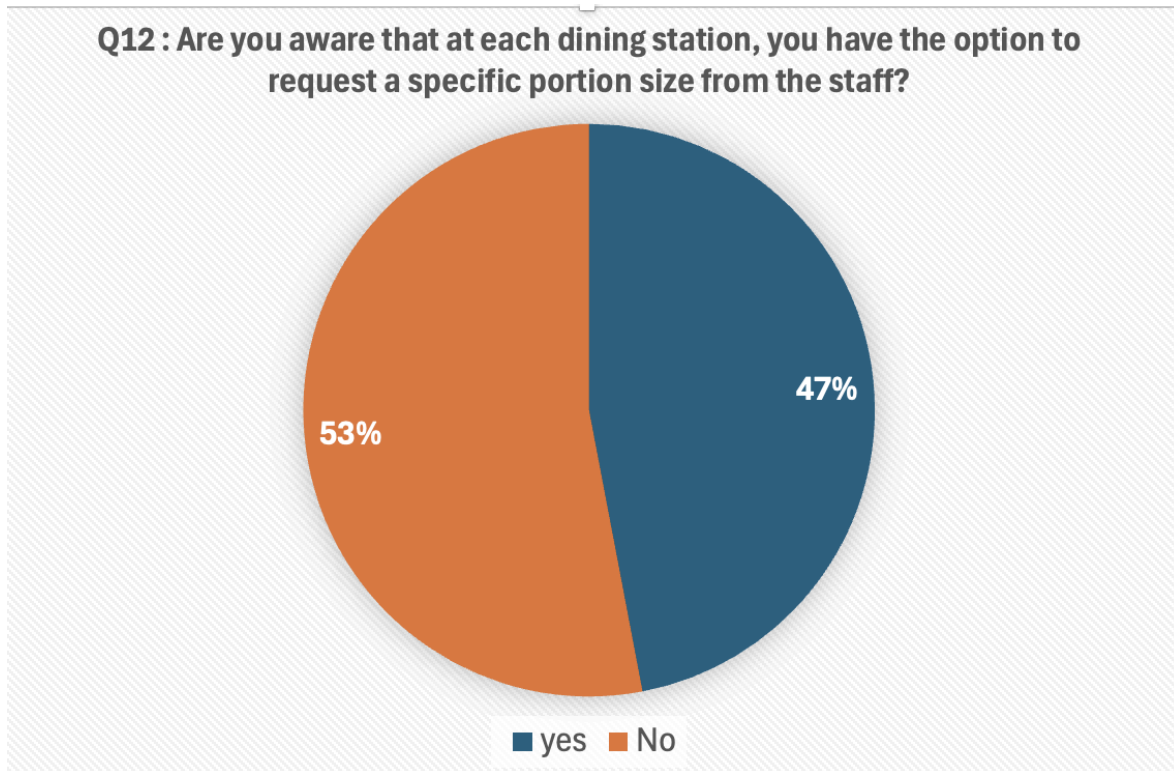


Figure 12: Student Awareness of the Option to Request Specific Portion Sizes in Dining Halls

This figure illustrates the awareness levels among students regarding the ability to request specific portion sizes at dining stations. The results indicate that 53% of respondents were unaware of this option, while 47% were aware. These findings suggest an opportunity for dining halls to enhance communication about customizable portion options, which could contribute to reducing food waste and improving student satisfaction.

3.1.3 In-Person Booth Interview Results

The methodology involved collecting qualitative data from in-person booths to enhance the findings from the online survey. Four students participated in interviews across all three All-Access dining halls, yielding 15, 15, and 17 responses from Gather, Open Kitchen, and Feast, respectively. To generate a detailed report, the qualitative data was converted into quantitative data through categorization of student responses into various subcategories. The outcomes reflect the five questions posed to students during the interviews, and the provided anecdotes illustrate the definitions of each subcategory.

Question 1 : When you leave food uneaten, is it usually because of specific dishes or ingredients?

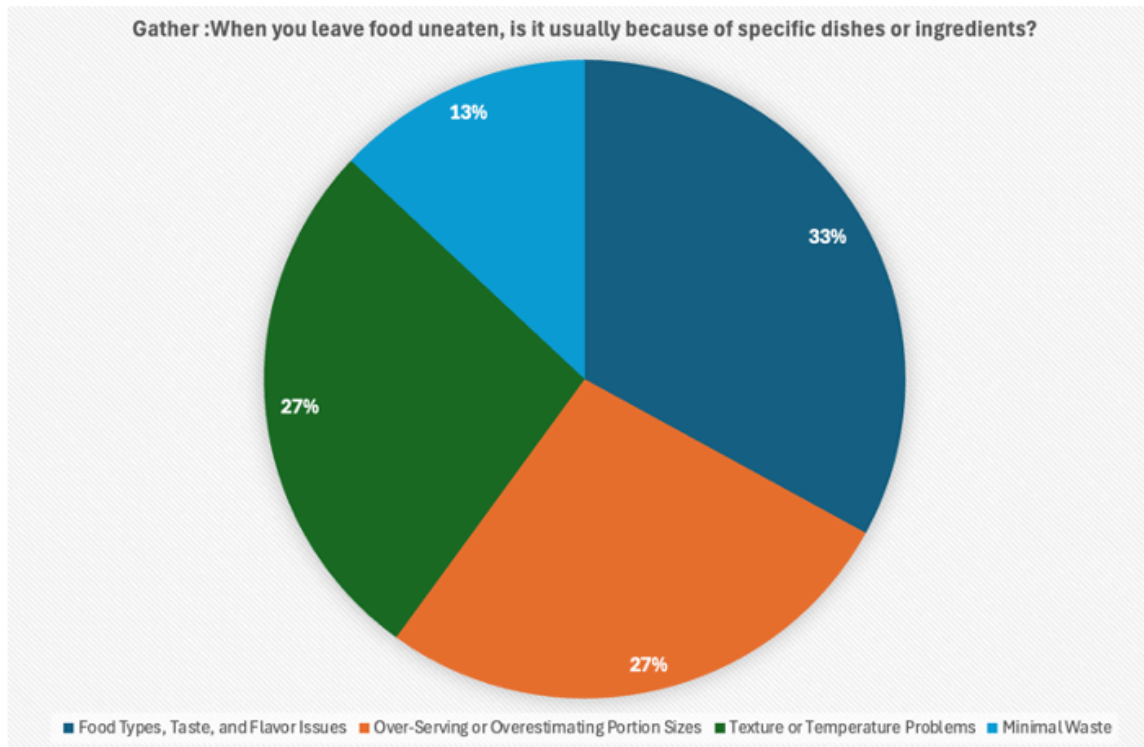


Figure 13 : Reasons for Uneaten Food at Gather

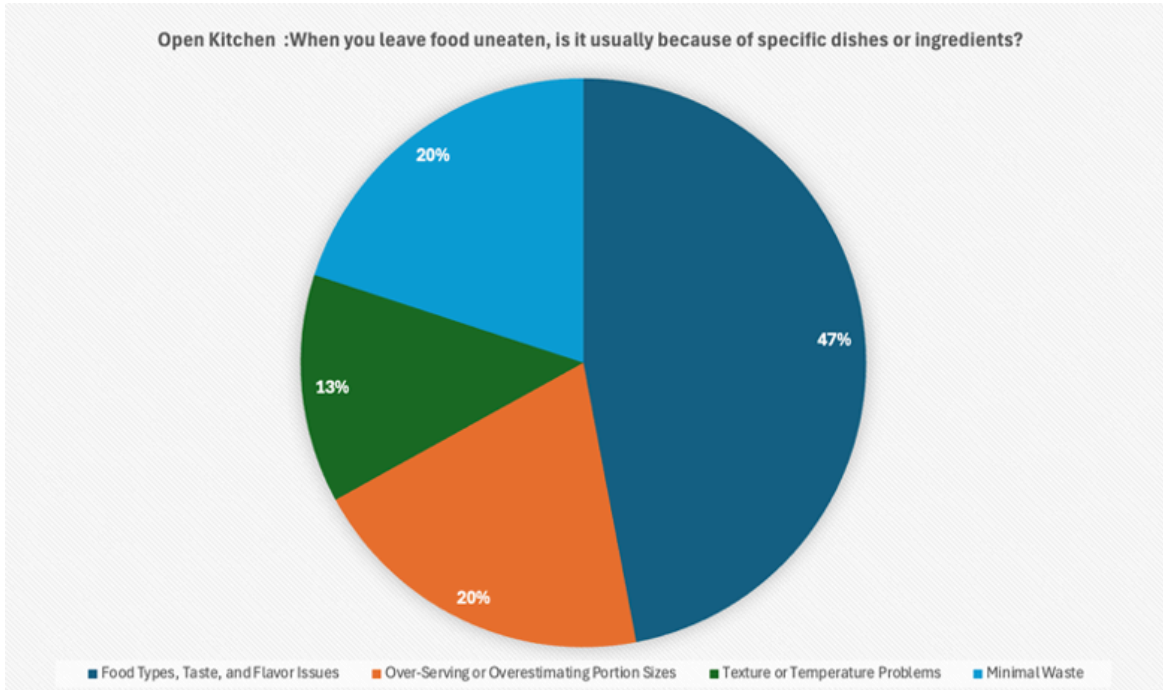


Figure 14 : Reasons for Uneaten Food at Open Kitchen

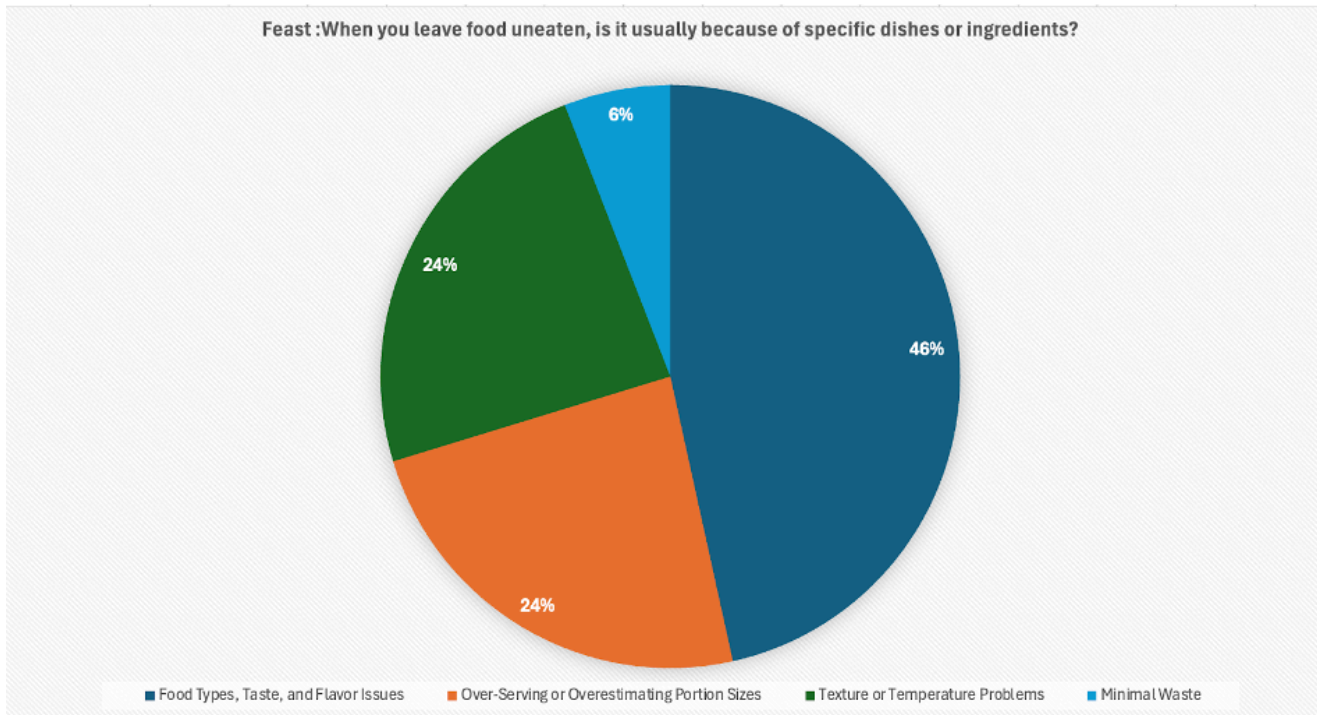


Figure 15 : Reasons for Uneaten Food at Feast

Taste and flavor issues are the primary contributors of food waste at Gather, Open Kitchen, and Feast events, appearing as the most common reason for uneaten food (33%–47%). Secondary concerns include over-serving or overestimation of portion sizes, as well as texture or temperature issues. The lowest percentage (6%–20%) is attributed to food waste prevention, implying taste and portion sizes take precedence over conscious efforts at reducing waste. To address this, improving the taste and ingredient choices, offering better portion control, enhancing preparation standards (e.g., texture and temperature), and raising awareness about food waste.

2. How does the availability and presentation of food options affect how much you take and potentially waste?

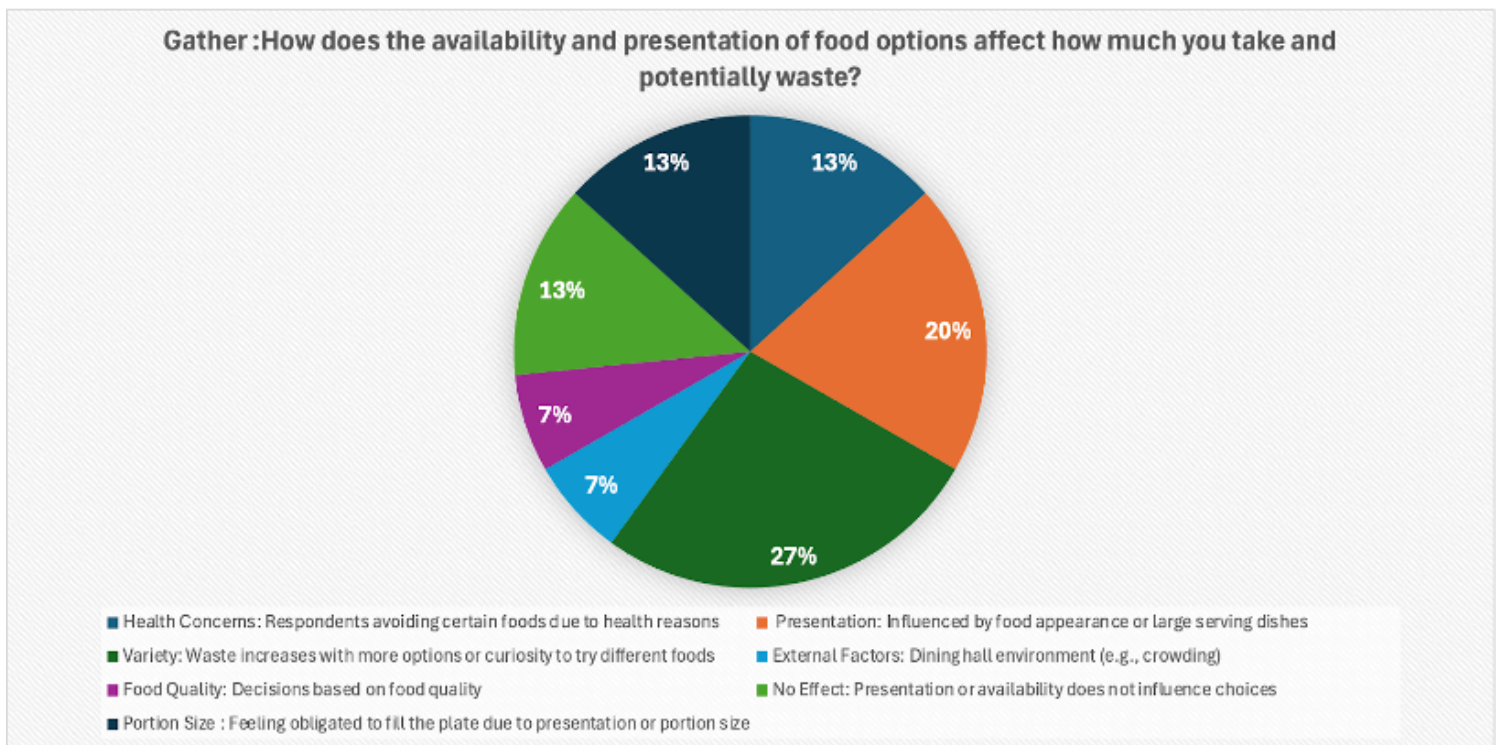


Figure 16 : Impact of Food Availability and Presentation on Food Waste at Gather

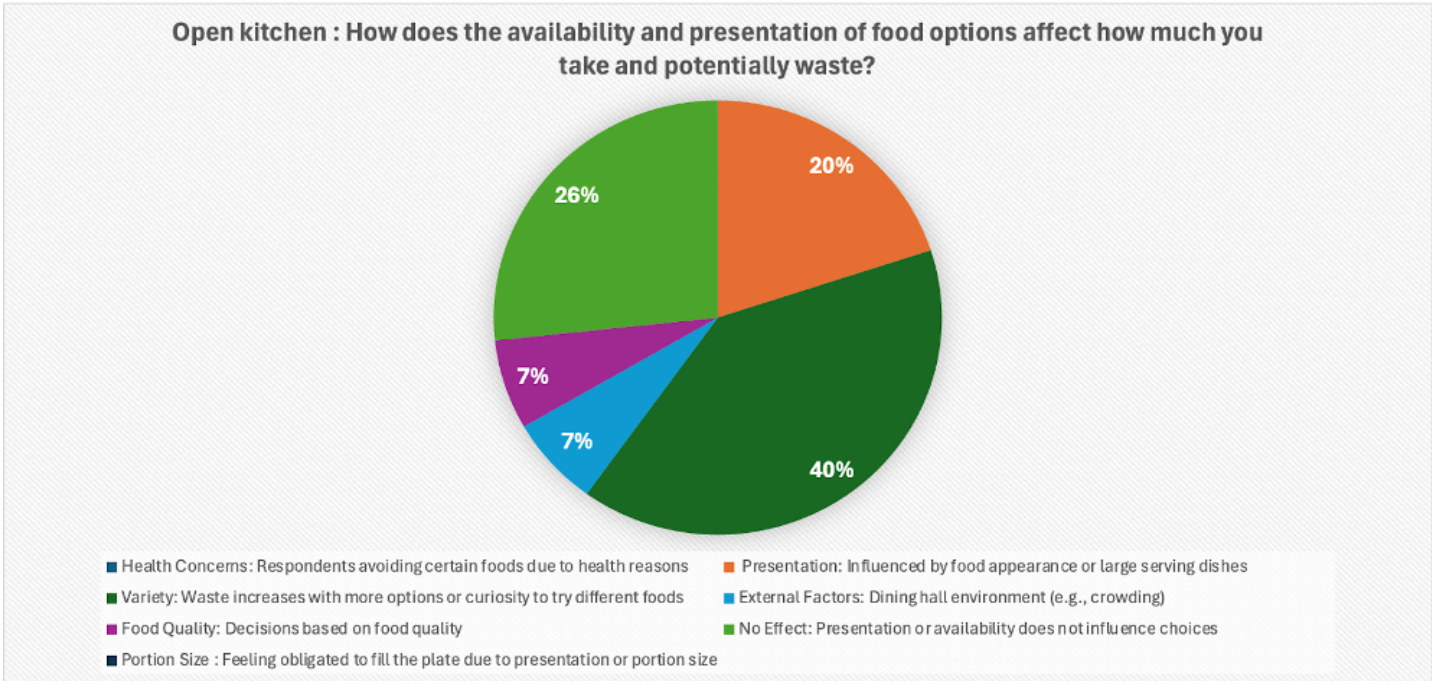


Figure 17 : Impact of Food Availability and Presentation on Food Waste at Open Kitchen

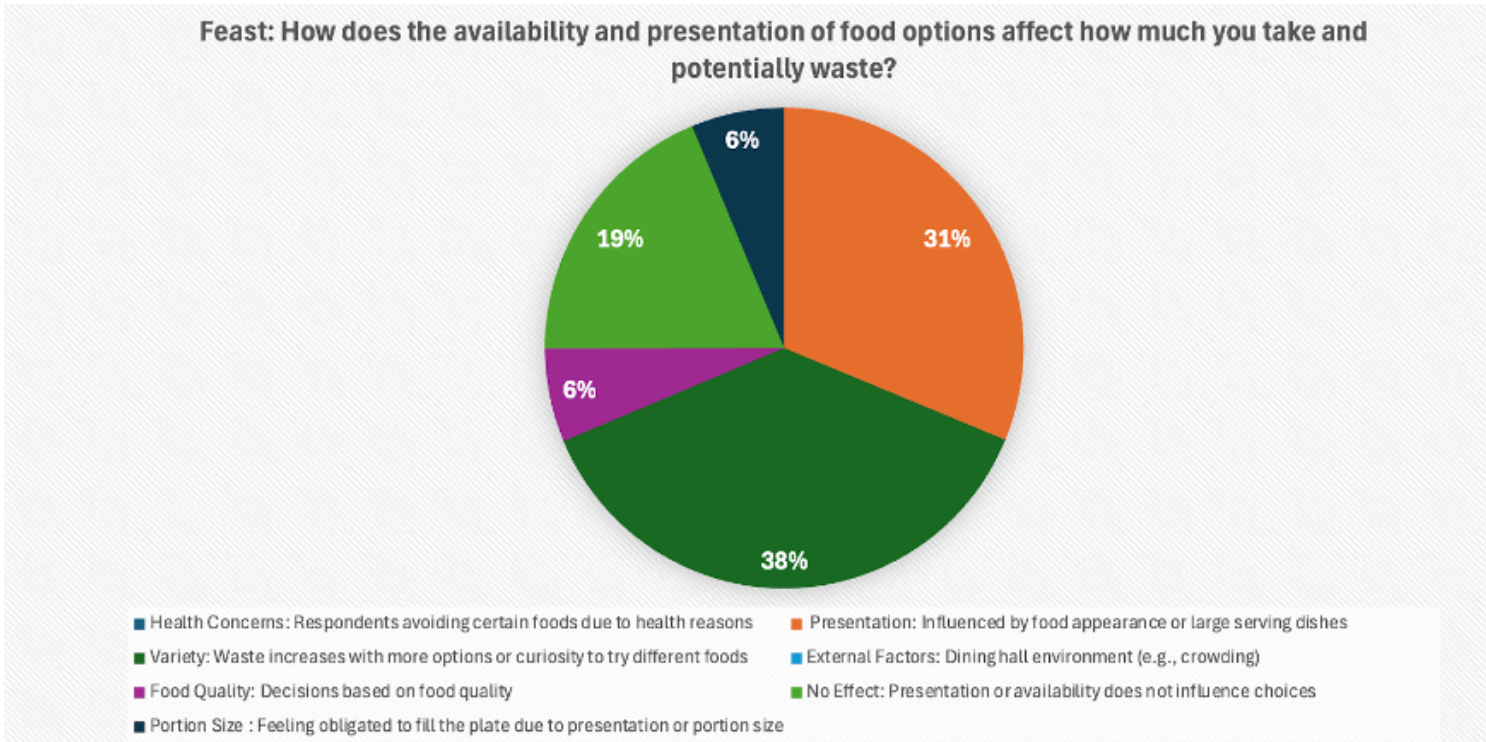


Figure 18 : Impact of Food Availability and Presentation on Food Waste at Feast

The most important and unanimous recommendation for minimizing food waste in all three access dining halls (Gather, Open Kitchen, and Feast) is portion management, with 41% to 45% supporting lessened or modifiable portion sizes. Similarly, a change in the variety of food options/ alterations in food options being offered (20% on average) was the second most popular suggestion for reduction in food waste. Other responses across all three halls highlight the need for enhancing food quality (12%–13%) and offering portion size flexibility (8%–16%). While less significant, these address other reasons for unmet expectations of respondents as discussed in the online survey.

3. Follow-up: Do you believe that being more informed about the environmental impact of food waste would change your habits? Why or why not?

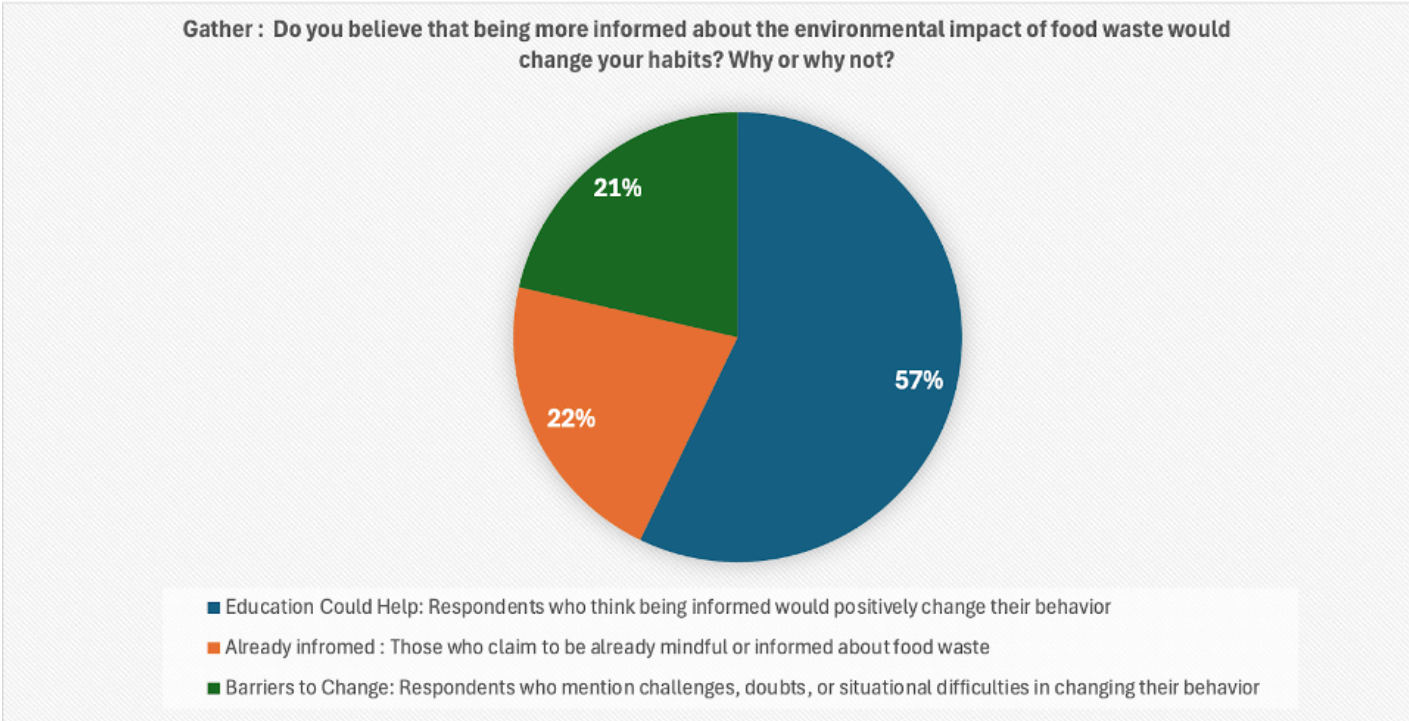
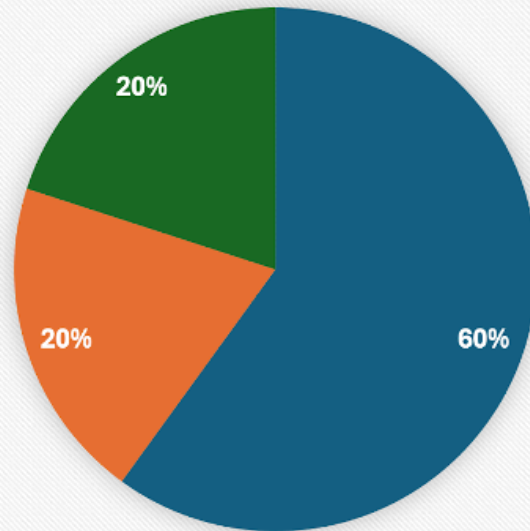


Figure 19: Impact of Environmental Awareness on Food Waste Habits at Gather

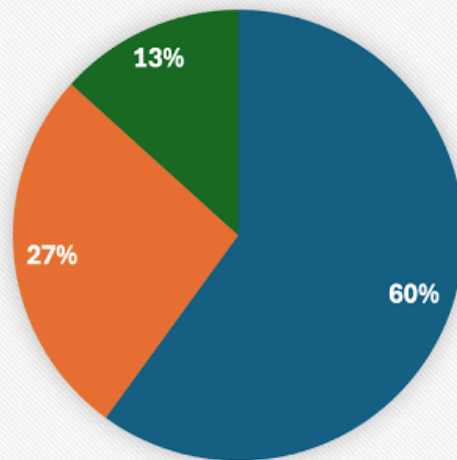
Open Kitchen: Do you believe that being more informed about the environmental impact of food waste would change your habits? Why or why not?



- Education Could Help: Respondents who think being informed would positively change their behavior
- Already informed : Those who claim to be already mindful or informed about food waste
- Barriers to Change: Respondents who mention challenges, doubts, or situational difficulties in changing their behavior

Figure 20: Impact of Environmental Awareness on Food Waste Habits at Open Kitchen

Feast: Do you believe that being more informed about the environmental impact of food waste would change your habits? Why or why not?



- Education Could Help: Respondents who think being informed would positively change their behavior
- Already informed : Those who claim to be already mindful or informed about food waste
- Barriers to Change: Respondents who mention challenges, doubts, or situational difficulties in changing their behavior

Figure 21: Impact of Environmental Awareness on Food Waste Habits at Feast

Education about the environmental impact of food waste appears to be a critical factor in influencing behavior across Gather, Open Kitchen, and Feast dining halls. In Gather, 57% of respondents believed that increased information could positively change their habits, while 22% claimed to already be mindful of food waste, and 21% identified barriers to change, such as situational difficulties or doubts. Similarly, at Open Kitchen, 60% of respondents thought education could help, with 20% feeling already informed and another 20% pointing to barriers. Feast had the highest percentage (60%) of respondents who believed education could drive behavioral change, while 27% considered themselves informed, and 13% cited obstacles to changing their habits.

4. If you could directly control how much food you receive or the way food is served, what changes would you make to reduce waste?

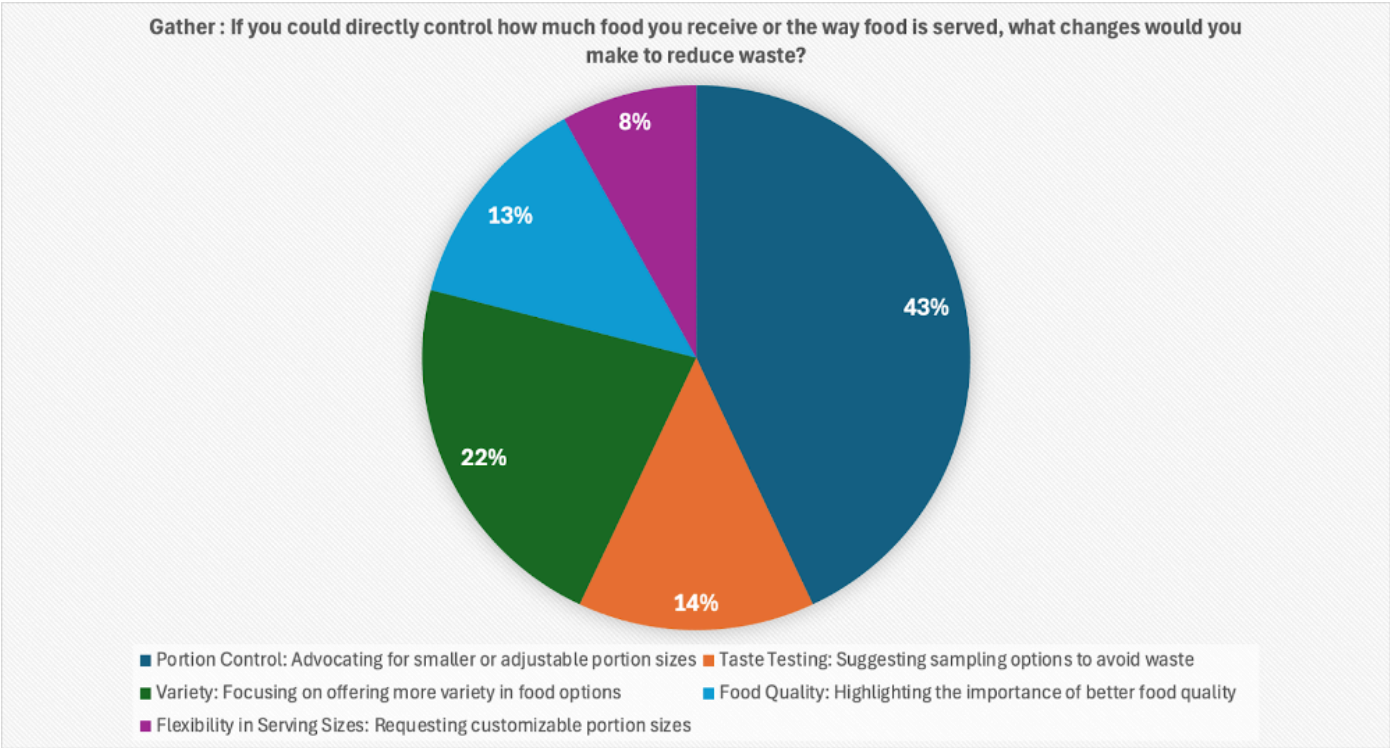


Figure 22 : Key Strategies Proposed by Students to Reduce Food Waste at Gather

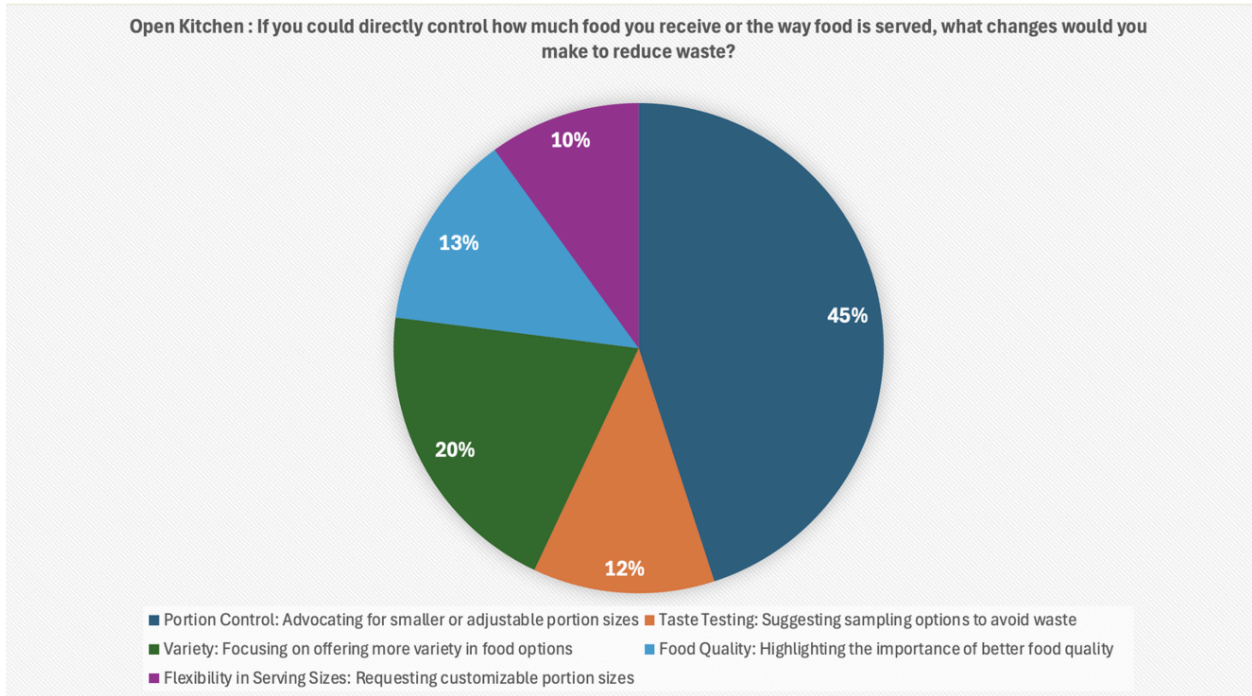


Figure 23 : Key Strategies Proposed by Students to Reduce Food Waste at Open Kitchen

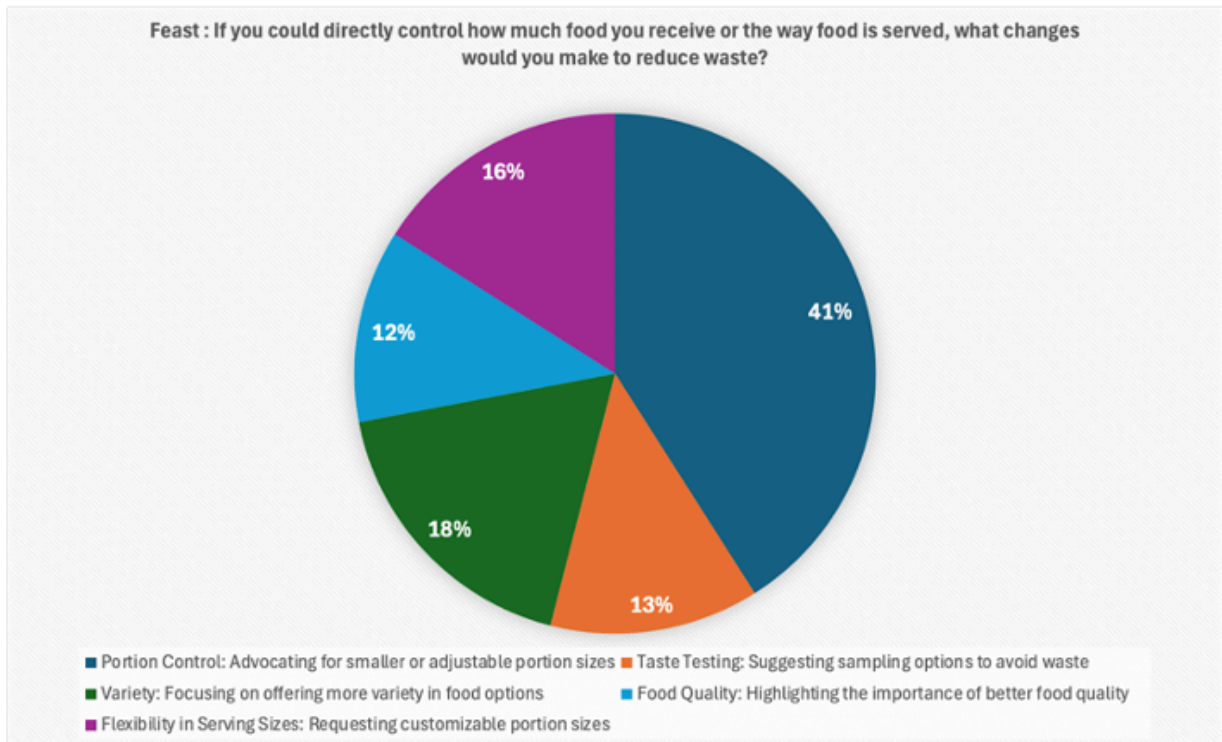


Figure 24 : Key Strategies Proposed by Students to Reduce Food Waste at Feast

When asked about changes they would make to reduce food waste, students across Gather, Open Kitchen, and Feast dining halls highlighted the importance of portion control as the most significant factor. At Gather, 43% of respondents advocated for smaller or adjustable portion sizes, followed by 22% who focused on increasing variety in food options and 14% who suggested taste testing to avoid waste. Open Kitchen reflected a similar trend, with 45% prioritizing portion control and 20% emphasizing food variety. Flexibility in serving sizes and taste testing were secondary considerations, each accounting for 13% and 12%, respectively. At Feast, 41% of respondents reiterated the importance of portion control, while 18% focused on variety, and 16% on flexibility in serving sizes. Taste testing and food quality improvements were less significant but still represented in responses.

5. Imagine you were hired by UBC Food Services, and your task is to reduce post-consumer food waste. What actions would you take to minimize food waste among students?

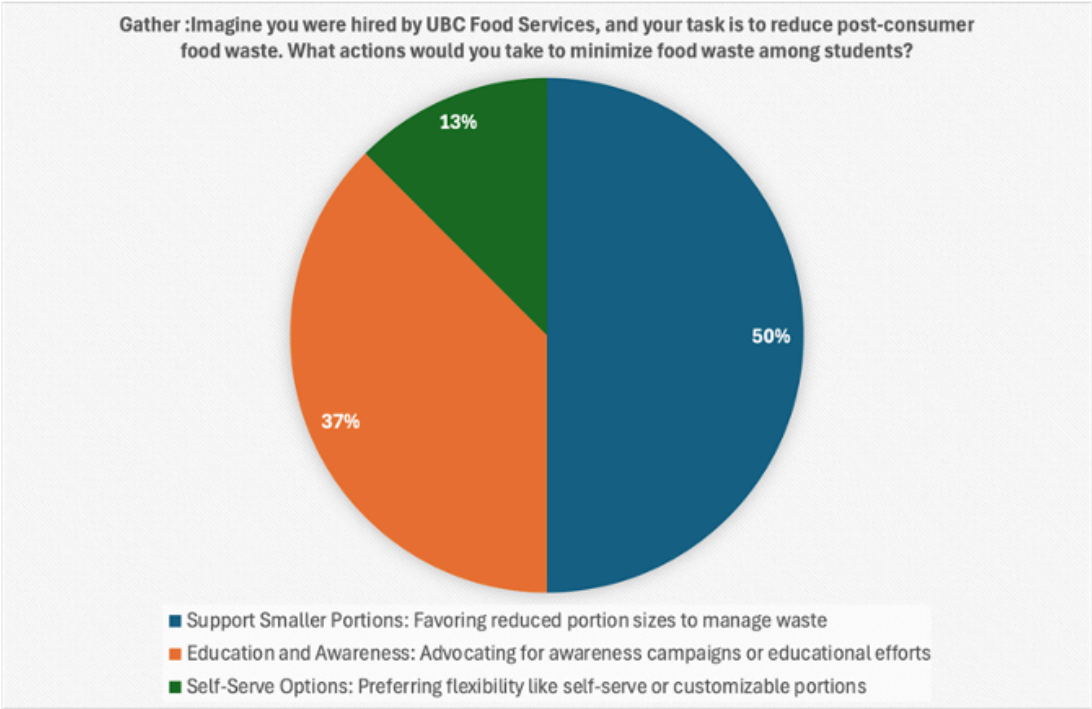


Figure 25: Proposed Actions to Minimize Post-Consumer Food Waste by Students at Gather

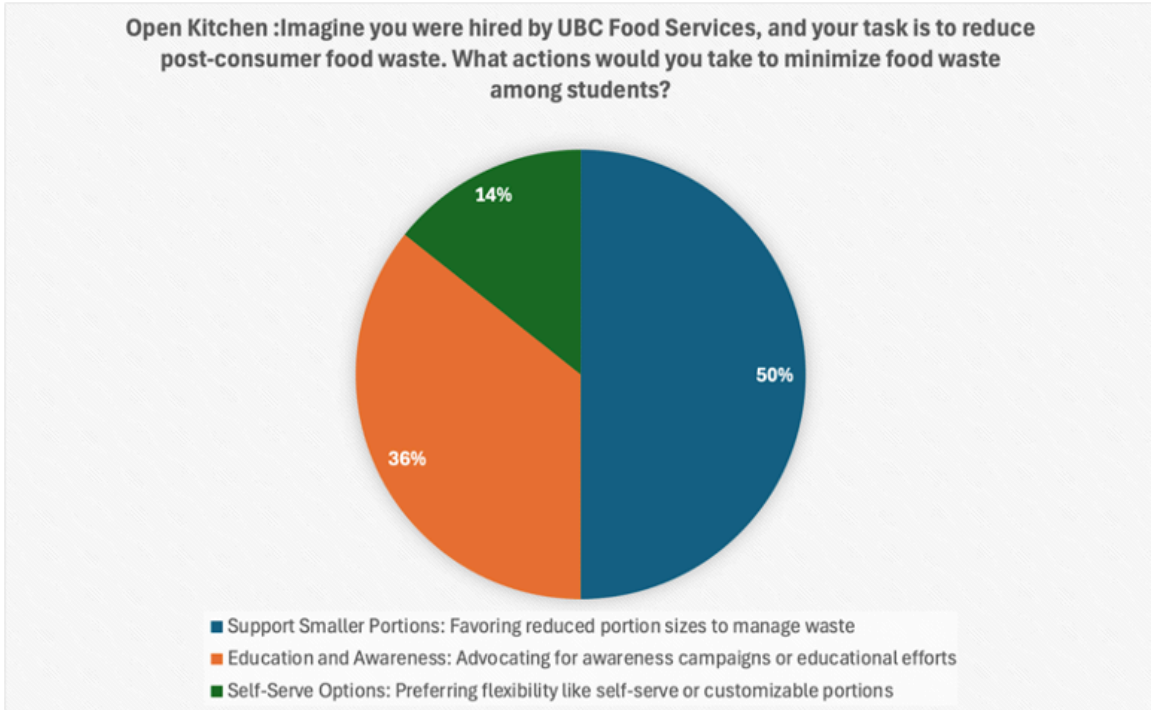


Figure 26: Proposed Actions to Minimize Post-Consumer Food Waste by Students at Open Kitchen

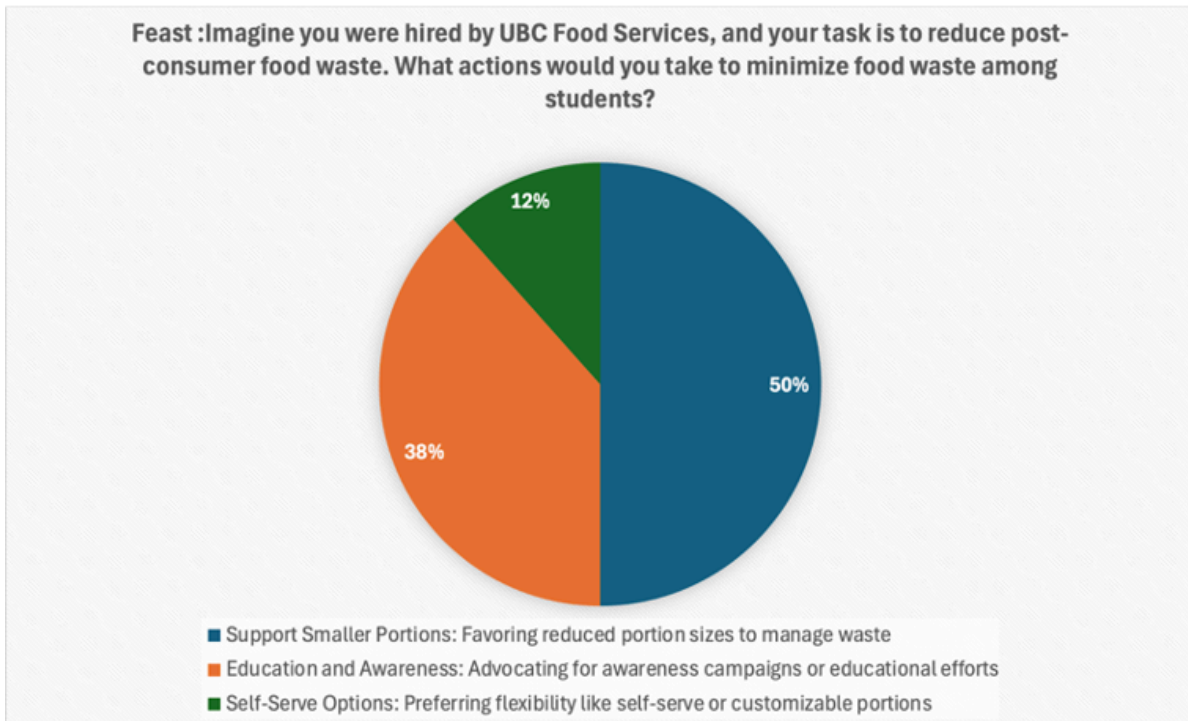


Figure 27: Proposed Actions to Minimize Post-Consumer Food Waste by Students at Feast

When asked what actions they would take to minimize food waste if hired by UBC Food Services, students across Gather, Open Kitchen, and Feast dining halls overwhelmingly emphasized the importance of supporting smaller portion sizes. In both Gather and Open Kitchen, 50% of respondents prioritized portion control as the most effective strategy to reduce waste. Education and awareness campaigns were the second most suggested action, accounting for 37% at Gather and 36% at Open Kitchen, followed by self-serve options at 13% and 14%, respectively. At Feast, a similar trend emerged, with 50% supporting smaller portions and 38% advocating for educational efforts, while self-serve options were a lesser focus at 12%.

4. Discussion and Recommendation

This research highlights two primary areas for addressing post-consumer food waste at UBC's all-access dining halls: awareness and portion control.

Awareness Campaigns

A significant finding from this study is the knowledge gap among students regarding the global impacts of food waste and its environmental consequences. Survey responses revealed that 62% of students were unaware of the role food waste plays in greenhouse gas emissions. Online resources and informational campaigns emerged as the most favored strategies for raising awareness, reflecting student preferences for accessible and engaging educational content.

Currently, the absence of dining etiquette signs and food waste prevention messages in UBC's dining halls limits opportunities for students to consider the broader implications of their food choices. Research by Whitehair et al. (2013) demonstrates that awareness campaigns tailored to university students in dining settings can significantly reduce food waste by addressing knowledge gaps and fostering responsible consumption behaviors. This aligns with the need for environmental messaging and interactive efforts to engage students in reducing waste.

Furthermore, Baldwin (2015) emphasizes the effectiveness of interactive digital displays, social media campaigns, and waste awareness signage in promoting more conscientious eating behaviors. Incorporating real-time waste reduction statistics, tips for mindful eating, and impactful environmental messages within dining hall spaces could create a more informed and

conscientious dining environment. These strategies would ensure that students are not only aware of the food waste crisis but also feel empowered to contribute to its mitigation.

Portion Control

Responses also underscored the need for portion control as a critical strategy for waste reduction. Approximately 50% of students identified oversized portions as a key contributor to food waste. Furthermore, 41%–45% of respondents suggested smaller or adjustable portions as effective solutions. Freedman (2010) found that reducing portion sizes reduced food intake and plate waste among student populations, underscoring the importance of portion control strategies.

An alternative approach to achieving portion customization is by introducing self-service stations for side dishes, such as vegetables and mashed potatoes, allowing students to select only what they wish to consume. This approach is supported by Wiriyanich et al. (2020), who highlighted the success of reducing portion amounts while offering customizable food additions in minimizing food waste. Similarly based on the findings of this study, offering smaller default portions with the option to request more aligns with students' preferences for flexibility while minimizing excess food. Such practices have been shown to reduce waste significantly by tailoring servings to individual appetites and preferences.

Food Quality

While the majority of students rated the food quality as good or excellent, about one third of respondents noted room for improvement. Enhancing the dining experience through regular menu reviews, taste-testing opportunities, and the inclusion of diverse cuisines could further improve satisfaction. Although food quality was not a primary driver of waste in this study, addressing these concerns could indirectly contribute to waste reduction by ensuring meals meet broader student expectations.

As noted in the data, dissatisfaction often stemmed from limited flavor options, inadequate temperature control, and insufficient diversity in dishes. Previous studies have shown that higher ratings of satisfaction correlate with less food being wasted, as students are more likely to consume meals that align with their preferences (Nikolaus, 2018). Conducting pilot studies, such as those exemplified in the report "Understanding Food Waste Drivers and Food Preferences

Among 1st Year Student Residences to Reduce All Access Dining Waste and GHG Emissions," would allow for a detailed exploration of specific factors contributing to food waste in each dining hall. For instance, focusing on one dining hall at a time—such as Open Kitchen, Gather, or Feast—would help identify location-specific causes of waste and lead to customized, actionable solutions. Expanding these studies to other all-access dining halls would ensure a comprehensive approach to reducing food waste across UBC's dining facilities while aligning with the unique needs of their respective patrons.

5. Conclusion

By addressing the awareness gap and implementing portion control strategies such as customizable serving options, UBC dining halls can significantly reduce post-consumer food waste. These efforts, complemented by targeted educational campaigns and subtle enhancements to food quality, have the potential to create a more sustainable and responsible dining culture at UBC. The suggestions are strongly supported by evidence from prior studies, such as Whitehair et al. (2013), Baldwin (2015), Freedman (2010), and others, whose findings validate the efficacy of awareness campaigns, portion control measures, and tailored food services in reducing waste.

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Appendix

Survey data

https://drive.google.com/file/d/1zXtMnLaCOFpdVFEd6HOy7Q5JP1NbihiY/view?usp=drive_link

In-Person interview

Gather

Total responses : 15

1. When you leave food uneaten, is it usually because of specific dishes or ingredients? or is there another reason

1. Took more than I could eat; but also sometimes the food is too cold.
2. I usually don't leave food, but if I do it is because the taste is not ideal.
3. Take too much dessert and then I wasted it because I realize it's not very healthy
4. I have a stomach issue, so I can't eat everything. However, I think sometimes the texture of the food is off, and noodles are undercooked.
5. I tend to waste more dessert because I'm on a diet.
6. It's usually because I took something I didn't like the flavor. For example the other day I took this stew and the flavor was not good, and the ratio between the liquid and other parts was off.
7. Food sometimes feels soggy by the time I eat it.
8. Desserts tend to be too sweet, so I leave them halfway.
9. Occasionally, some of the meat is raw, like the chicken.
10. I usually don't waste as much.
11. Portions are often too large, especially the sides like vegetables.
12. I don't like when the veggies are overcooked; they taste bland.
13. Portions are too big so I can't finish it.

14. I tend to overestimate how much I can eat, so I take more. But the portion sizes are too big as well.
15. I leave some items because I find the texture off-putting.

2. How does the availability and presentation of food options affect how much you take and potentially waste? Do you find yourself more likely to waste food when there are more options or if certain foods are presented in a specific way?

1. I tend to motivate people not to waste food, but most of the food I waste is sweets because I know they are unhealthy. So I prevent myself from eating them even though I take some.
2. I take more sweets/desserts than I need.
3. The main course is what I waste more.
4. I take a bigger portions of something I like when there are more options.
5. It doesn't affect me; I take what I feel like eating and am not influenced by the presentation.
6. I like the variety, and I would say there should be more variety because when there are only a few options, I have to take something I don't like and I end up wasting it.
7. More variety makes me curious, so I take more than I can eat.
8. Desserts always look nice, so I take them but rarely finish.
9. Large platters make it tempting to pile up on my plate.
10. It does not affect my choice; I'll take what I like.
11. Actually, for me, it's about how crowded the dining hall is. If it's crowded, I grab more food in a hurry, adding to the waste.
12. I'm tempted to take more when food is in large serving dishes.
13. It does not affect how much I waste; for me, it's about the food quality.
14. I feel obligated to try different things when they look diverse.
15. I feel pressured to fill my plate if portions look small.

3. Do you believe that being more informed about the environmental impact of food waste would change your habits? Why or why not?

1. Yes , because I would be more careful to not waste

2. No, if I can't eat, I can't eat.
3. No, I'm very informed, and I try to prevent food waste.
4. Knowing more would likely help me reduce waste.
5. I don't think about it often but could be open to learning more.
6. My behavior might change slightly with more information.
7. I'm aware, so I try to minimize waste, but it's challenging.
8. Being informed would definitely make me waste less food.
9. Yes, but I often forget in the moment.
10. I try to be mindful, but I still end up wasting occasionally.
11. Yes, I'm very conscious and try not to waste any food.
12. I think education about food waste could change my habits.
13. No, I rarely think about the environmental impact when eating, but I think I can benefit from education.
14. I'd like to reduce waste but find it hard in a buffet setting.
15. Yes, but it's hard to balance between choice and consumption.

4. If you could directly control how much food you receive or the way food is served, what changes would you make to reduce waste?

1. It would help me if I was in control of my food portion—not just taking smaller portions by default.
2. That would be beneficial.
3. It would help a little, but not as much as other factors. The proportion of food matters more; knowing what something would taste like is also important.
4. I'd like smaller portions so I can try different things without waste.
5. I would prefer sample sizes of new dishes.
6. Having a customizable serving size would be beneficial.
7. A “taste before taking” option would help me avoid waste.
8. I'd like to see more labeling with portion size suggestions (e.g., posters).
9. It's not the portion size for me; it's more about the variety of food. If there is something I like, I tend to eat all of it.

10. Not portion sizes—I would like to have more variety. For example, I like to try new foods from different countries.
11. Taste is the main factor in why I waste food.
12. If portions were smaller, I'd avoid unwanted food waste.
13. I think portion control would be useful.
14. For me, the quality is my primary reason; otherwise, portions are a good amount.
15. Allowing more flexibility in portion size would reduce waste.

5. Imagine you were hired by UBC Food Services, and your task is to reduce post-consumer food waste. What actions would you take to minimize food waste among students?

1. I would make portion sizes more adjustable. Make more stations self served.
2. Having options for portion size would be my first move.
3. Implement Smaller default portions.
4. I think education, such as posters, could motivate us to waste less so I would create posters.
5. I would raise awareness, like you just did by telling us that 10% of global greenhouse gas emissions come from food waste.
6. I think awareness campaigns are the best solution.
7. I feel smaller portions could work, especially with the sides.
8. I would focus on food quality, especially the chicken.
9. I'd welcome smaller portions.
10. I think more variety in food options, such as ethnic food servings.
11. Maybe posters or campaigns to raise awareness of how our food waste affects the world.
12. Smaller portions are the best option.
13. Making more options self-serve.
14. One plate per person policy.
15. I think awareness campaigns or social media movements could be beneficial.

Open Kitchen

Total responses : 15

1. When you leave food uneaten, is it usually because of specific dishes or ingredients? or is there another reason

1. All of the above.
2. All of the above.
3. I usually fill myself with sides and won't be able to finish my main food.
4. Ingredients are not good, like cauliflower; otherwise I eat everything else.
5. Some ingredients, like cilantro, make me lose my appetite.
6. Some food are not cooked enough like the chicken its very pink.
7. I tend to overestimate how much I can eat.
8. Flavor—bland.
9. Texture—too soft.
10. I take too much.
11. I don't waste much.
12. Some desserts are too sweet, like the cookies , so I only eat a small part.
13. The balance between the liquid portion of soup and other parts is off.
14. Some meals are too bland for my taste, so I leave portions.
15. Temperature—sometimes the burgers are cold when I take them from the station.

2. How does the availability and presentation of food options affect how much you take and potentially waste? Do you find yourself more likely to waste food when there are more options or if certain foods are presented in a specific way?

1. If crowded, I end up taking extra food just to avoid coming back, which sometimes leads to waste.
2. Lots of options make me want to try everything.
3. Doesn't affect me much.
4. I feel tempted to try everything when the options are new.
5. When there's a lot of variety, I find it hard to stick to small portions.
6. If options are grouped, I take a little of each, adding to waste.
7. If the food is displayed attractively, I take more than I need.
8. The way foods are arranged makes me want to try different things.

9. When there are a lot of options and they all look appealing I want try all of them so I take small portion of each but wont be able to finish.
10. I mostly waste more because of the taste.
11. I take more when there is more.
12. I don't waste much.
13. When there aren't many choices, I have to pick one, and I end up wasting it a lot because I can't get what I really want. .
14. I only take as much as I can eat.
15. I like having a variety of options available. But that also make me waste more

3. Do you believe that being more informed about the environmental impact of food waste would change your habits? Why or why not?

1. Yes.
2. I'm aware, but it's hard to always act on it in a dining hall.
3. I think about it, especially with produce and vegetables.
4. I don't usually think about it, but I'm open to learning more about it.
5. I care, but sometimes it's hard to avoid waste completely.
6. I'd like to waste less but could use more awareness.
7. Yes.
8. I try to minimize waste, but I sometimes forget in a rush.
9. I think awareness has helped me avoid extra food.
10. It's something I think about, but I could use more reminders.
11. I feel guilty wasting food and try to take smaller portions.
12. I think more awareness would encourage me to change.
13. I'd like more information to see where my impact lies.
14. Yes.
15. Awareness helps, but it's hard to change my habits entirely.

4. If you could directly control how much food you receive or the way food is served, what changes would you make to reduce waste?

1. Yes.
2. Yes.

3. I think food quality is the main issue.
4. I don't think it affects me much.
5. I'd like more options, but to reduce food waste, we can get smaller servings of main dishes.
6. I'd prefer to customize my side dishes based on my appetite.
7. The ability to request "sample" portions would help.
8. Being able to adjust portions after tasting would reduce waste.
9. I'd prefer having a choice in portion size for each dish.
10. A variety of small-plate options would allow me to try without waste.
11. I'd like to control my portions to prevent wasting complex dishes.
12. If I could have more options for half-sized portions, it'd help.
13. Being able to customize each part of my meal would help a lot.
14. More single-serve containers would help me control portions.
15. Smaller portion sizes for each item would reduce waste.

5. Imagine you were hired by UBC Food Services, and your task is to reduce post-consumer food waste. What actions would you take to minimize food waste among students?

1. I would implement smaller portions strategies.
2. Give more control for food portions.
3. Educating more people—forexample we could have an event or a small activity on imagine a dayto inform student about food waste.
4. Smaller portions would be great.
5. I believe providing posters regarding world hunger and some stats can help reduce waste.
6. I would create posters to remind studnet aout food waste.
7. Creating a Small portions strategy policy.
8. A slight portion reduction would be good, but not too strict.
9. I believe we should have an event yearly, like on National Food Waste Day.This way we can educate student about food waste.
10. More awareness by educating the visitors via pamphlets.
11. More variety of foods in smaller portions.
12. Implementing Smaller portions policy.
13. I'd change my behavior if portions were smaller but not limited.
14. More variety in portion options would help better.
15. Creating Poster to remind studnet about the effects of food waste.

Feast

Total responses : 17

1. When you leave food uneaten, is it usually because of specific dishes or ingredients? or is there another reason

1. Texture.
2. Flavor.
3. Looks more appealing than it is—average food.
4. I don't waste much.
5. Portion sizes are too big.
6. I take more than I could eat.
7. Undercooked—chicken is too pink; most of the food is undercooked, especially meat and chicken.
8. I don't like the seasoning; I don't like how it tastes. Took too much, but the food is decent.
9. Certain menu items are sometimes bad. For example, on Friday before reading week, the beef was very bland and tasted bad.
10. Too full; took too much. The chef pop-ups are really good, but the burrito bowl was bad.
11. Lentil red sauce and lentils were bad.
12. Beef and pork are good but I don't like the vegetables for the side dish.
13. The bread is often dry, so I end up not eating it all.
14. My biggest issue is that most of the time, the chicken is raw—I mean pink raw.
15. The desserts are sometimes too sweet, so I eat only half.
16. The food is good; I just take too much.
17. The food's flavor is sometimes bland, but overall, I like the food.

2. How does the availability and presentation of food options affect how much you take and potentially waste? Do you find yourself more likely to waste food when there are more options or if certain foods are presented in a specific way?

1. More portions available make me waste more.
2. More variety, and I end up not eating everything.
3. When I see more food, I want to take all of it.
4. No, I take how much I can eat.
5. More variety causes food waste.

6. The food here is too bland; they need to use more spices.
7. I tend to waste more if the display is very colorful.
8. I tend to waste less when portions are presented individually.
9. I find it hard to resist when the food options are neatly plated.
10. Having more snack-like options makes me grab more than I need.
11. I'm less likely to waste if foods are in small serving dishes.
12. I usually take how much I can eat; it's not about portion sizes for me.
13. I tend to overestimate what I can eat when there are many options.
14. With more appetizers, I tend to over-serve and waste some.
15. I tend to avoid waste when I don't see a lot of variety.
16. I tend to waste more when desserts are attractively arranged.
17. I waste more when everything is pre-portioned.

3. Do you believe that being more informed about the environmental impact of food waste would change your habits? Why or why not?

1. Yes.
2. Yes.
3. Yes.
4. Yes, posters to inform students can have a bigger impact.
5. I'm aware. I'm conscious of being bad about it, but sometimes I want to try something really badly.
6. Yes, I already try not to waste. Posters are very helpful.
7. I always try to minimize waste, keeping the environment in mind.
8. I try to waste less, knowing the impact on the environment.
9. I feel guilty about wasting food, so I try to avoid it.
10. I think it would help if we had reminders about waste.
11. I'd like to reduce my waste, but it's hard to stick to.
12. Awareness would help, but I need practical tips to waste less.
13. Yes, being more informed would help me waste less.
14. I think information on food waste could help students like me.
15. I'd like to learn more about the impact; it'd help me waste less.
16. Yes, I believe education could make me waste less.
17. I'd waste less if I knew more about the environmental effects.

4. If you could directly control how much food you receive or the way food is served, what changes would you make to reduce waste?

1. I believe having pre-portioned is the best way.
2. I think if we make the portion sizes customized to students' needs we can reduce food waste.
3. Yes, portion control.
4. Serving smaller portions encourages people to take less food, which helps reduce food waste.
5. Portions are too small, so when I take the second one, I get full. If I could customize, it'd help.
6. Yes.
7. I'd love to see more variety in the options, especially Asian foods.
8. A "taste sample" option would help me take only what I like.
9. I'd love the option to adjust portions for side dishes.
10. If portions were adjustable, I'd waste a lot less.
11. An option to add more if needed would be helpful.
12. I'd waste less if I could taste the food first, then add more.
13. Small servings of different items would help minimize waste.
14. If I could choose sides individually, I'd waste less.
15. Having adjustable portions would reduce my waste.
16. If sides were customizable, I could take what I can eat.
17. I believe food quality should be improved, especially the chicken.

5. Imagine you were hired by UBC Food Services, and your task is to reduce post-consumer food waste. What actions would you take to minimize food waste among students?

1. Catering portion sizes.
2. More customized portion sizes.
3. Smaller portions and students were still hungry they could go back for more.
4. Ethnic food is not good; testers should be provided.
5. One plate at a time, and you can go back if you need more—not ideal, but it works.
6. Self-serve is better for some items.
7. Smaller portions would help, but I would make it more flexible for student to take as much as they need.

8. I would implement policies that encourage awareness such as posters.
9. I think reminders would work best.
10. A friendly reminder would help without feeling restrictive.
11. Awareness campaigns would be very effective.
12. I'd waste less if portions were smaller but with options to add. so that's what I would do
13. Actions to raise awareness such as posters, events, channels.
14. Smaller default portions would help, with the option of customizing them further.
15. Awareness about waste would help.
16. I'd support smaller portions with flexibility.
17. Smaller servings would be a positive change for me regarding food waste.