2024 SAR Zero Waste Communication Team Final Report: Evaluating and Piloting Waste Sorting Signage in Ackerman Student Union

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Abstract

Correctly sorting waste into landfill, recycling, and compost is a crucial aspect of sustainability and will help UCLA achieve its goal of diverting 90% of waste from landfills. Our project aims to help UCLA reach this goal while raising awareness of sustainability practices on campus; we seek to accomplish this by redesigning signage on tri-stream waste bins and garnering opinions on waste sorting at UCLA. Our project will build upon the work of past SAR teams, including the 2022 Zero Waste Team, who focused on determining the extent of contamination in the academic building's waste bins. Our research answers: *How can the signage of the tri-stream waste bins in Ackerman Student Union be redesigned to increase the percentage of waste that is sorted correctly?* and: *What are the opinions of students and staff on waste sorting and how can these opinions be used to improve waste sorting in the future?* We used a focus group, visual waste audits, pilot signage, a survey, and interviews to answer these questions. Our findings include the importance of simple signage with brand-specific imagery. According to our survey, the pilot signs were easy to understand and helpful, and the majority of respondents reference waste sorting signage consistently. The waste audit did not show a statistically significant increase in correct waste sorting, which pointed toward the limited impact of our new signage on actual waste sorting. However, our methods revealed that waste sorting can be improved with proper staff training, student education, and updated infrastructure within all of UCLA's food areas.

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Introduction

In recent years, the need for more sustainable practices on college campuses has become increasingly evident, prompting the implementation of zero-waste initiatives. Zero-waste initiatives aim to reduce, reuse, and recycle resources to the greatest possible extent, particularly on college campuses where waste is abundant. Clear, well-designed signage can be used as a pivotal zero-waste strategy. On college campuses, including UCLA, it has the potential to communicate crucial information and foster behavioral changes when it comes to influencing correct waste-sorting behaviors for students, staff, and visitors. A 2023 case study on sustainable waste management across college campuses revealed that 20% of waste generated on campuses has the potential to enter the "circular economy paradigm," or a system where materials never become waste, through effective composting and reuse (Abad-Segura et al., 2023). Between 2019 and 2022, ASUCLA-run facilities consistently represented between 3-8% of the total waste generated on the UCLA campus, and the diversion rate remained relatively stable at only 43% during this period (UCLA Office of Sustainability, 2022). Therefore, ASUCLA has been shown to continue to contribute a significant portion of waste to UCLA's campus, underscoring the importance of implementing effective waste management practices within ASUCLA when considering broader campus zero waste goals.

Our goal is to aid UCLA in reaching its goal of diverting 90% of waste from the landfill to either compost or recycling by making waste sorting a clearer process (UCLA SP Waste, 2022). Given this, our primary research question is: *How can the signage of the tri-stream waste bins in Ackerman Student Union be redesigned to increase the percentage of waste that is sorted*

correctly? We were inspired by the 2022 SAR Zero Waste team's methods of auditing academic buildings, and we completed two visual waste audits of food areas on UCLA's campus in addition to a focus group, new signage, a survey, and informational interviews. Following the first waste audit, we expanded our methods to include a secondary question: *What are the opinions of students and staff on waste sorting and how can these opinions be used to improve waste sorting in the future*? Given these two guiding research questions, the primary variables of our study are the amount of waste sorted correctly, the content of the signs themselves, and the opinions of students and staff at UCLA.

Methods

Focus Group

We held a focus group on February 23, 2024, with six undergraduate participants from varying majors and backgrounds to gain a better understanding of student opinions on waste sorting. This information was needed to inform our public opinion survey and current and future options for improving waste sorting signage. We advertised our focus group by flyering on Bruinwalk, posting flyers around campus, and sending them to class group chats three weeks before the focus group was held. These tactics ensured that people from various grades, majors, and demographics saw the information. We also incentivized participation with a $30 Bruin Card deposit, provided by TGIF, to unbiasedly encourage interest. We created a list of questions to gauge student opinions on waste sorting on campus and facilitate an honest conversation on what could be improved. This list of questions was divided into three broad topics: evaluating the participants' past knowledge of waste sorting practices, gauging their attitudes towards different signage, and how their future behavior may be positively influenced (see Appendix A). To help us gain a better understanding of students’ opinions on landfill, recycling, and compost signs we also acquired PDFs of current signs and created examples of our own (see Figures A1, A2, A3, and A4), so that participants could have a point of reference and highlight specific details that made signs effective or ineffective.

Initial Waste Audit

Following the focus group, we performed an initial visual waste audit of ASUCLA food courts between February 27th and March 4th. This served as a control in our research by providing a baseline for the percentage of waste sorted correctly in each bin. We recorded waste in the landfill, recycling, and compost bins in the Court of Sciences (“Bomb Shelter”), and the tri-stream waste bins in level one of the Ackerman Student Union food court. To ensure uniformity in our data we created maps of both areas that displayed the location of each waste bin, and we assigned a different number to every bin (see Figures B1 and B2). We took photos of the top layer of waste in each of these bins on two different days, one day in the morning and one in the afternoon, to gain a larger, more randomized sample of data (see Figure B3). We created a spreadsheet organized by area and bin type. We wrote down every item visibly present in each bin, and then from a dropdown menu in the spreadsheet we indicated which bin the item should have been placed in, either compost, recycling, or landfill, based on data from our stakeholder and UCLA’s waste hauler (see Table B1). This standardized data organization enabled us to determine the proportion of waste sorted correctly for each category. Visual auditing allowed for more efficient data collection and larger sample size, increasing the representation of waste sorting at ASUCLA-designated areas on campus.

Implementing and Designing New Signage

Following the initial waste audit, we posted our new signage in the Ackerman Student Union food court level one starting week six of the spring quarter (see Figures C1, C2, and C3) leaving the “Bomb Shelter” the same to act as a control group. The signage was informed by our

focus group and waste audit which demonstrated the potential of using brand-specific images, fewer words, and a less cluttered design. We also incorporated equity, diversity, and inclusion considerations by focusing on pictures over words to avoid any language barriers. Additionally, the design was made more accessible by referring to UCLA's text and image accessibility rules (UCLA, n.d.). During the sign's implementation, we conducted a second visual waste audit during week eight to assess if the new signs changed the waste sorting habits of students, staff, or campus visitors.

Second Waste Audit

After we installed these new signs in Ackerman Food Court level one, we conducted a second visual waste audit from May 13th to May 16th using the same procedures as the first waste audit. We used this data to perform statistical tests of significance to compare the proportion of waste sorted correctly for each category. This helped us to determine the signs' effectiveness in each area we audited.

Public Opinion Survey

To determine the success of our signs beyond quantitative data, we also posted flyers, with a QR code linked to a survey, near the new signs and in other places across campus. This allowed us to gather feedback on the updated signs from a wider range of people. The questionnaire was informed by our focus group findings and incentivized by entry into a raffle for a UCLA store gift card of $150. This helped us determine whether students felt the signs were making a difference and to find ways to improve our pilot designs. The survey also

included questions on barriers to waste sorting and possible improvements in general (see Appendix D). To manage bias we ensured that our questions were worded clearly and concisely and we worked to avoid any charged language that may hint at a “correct” answer. We also shared this survey with our stakeholders, SAR faculty advisors, and ASUCLA representatives who each gave their approval on the survey before it was released.

Informational Interviews

We interviewed workers at a few ASUCLA restaurants about the processes involved in waste sorting on campus, specifically the managers of Panda Express and Veggie Grill, and an employee who worked at the combined locations of ASUCLA Wetzel’s Pretzels, Lollicup, and Sambazon. This gave us an employee perspective on waste sorting, an aspect that was missing from the focus group and the surveys. We inquired about the waste sorting procedures implemented in the back-of-house areas of these establishments, the details of any training involved in teaching proper waste sorting, and the waste sorting protocol in the main eating areas of the food court (see Appendix E).

Limitations

Throughout our project, we faced several challenges when conducting our methods and analyzing our results. These limitations were out of our control, so while they negatively impacted our data, we found ways to account for these anomalies in our analysis and results.

Duration of Sign Implementation

Due to campus closures throughout the spring quarter, we were only able to implement our new signage in Ackerman Union starting at the beginning of Week 6 on May 6th. Our original goal was to implement them much earlier in the quarter, around Week 2 or 3. This meant that we had a significantly shorter period of time for our waste audit to be conducted, which contributed to a smaller scope of data than we had originally anticipated. Additionally, the shorter implementation time caused a reduced exposure to the signs which may have altered people's waste-sorting behaviors in response to the signage. Again, we acknowledge this in our results and discussion and interpret our data accordingly.

Limited Survey Sample

The participants in our survey were 78.2% women and 17.3% men. We intentionally offered a monetary incentive that we assumed would appeal to a wide variety of people. However, we cannot control who completes the survey, so we could not ensure a diverse sample population. Additionally, our survey answers and results may have been biased based on the fact that 79% of our respondents rated their interest in sustainability at either a 4 or 5, meaning they

had a somewhat high or high interest in sustainability. We attempted to address these limitations and gain a less biased perspective on waste sorting by supplementing the survey with informational interviews. Furthermore, the survey had 110 responses which was not enough to produce evidence of significant correlations during our bivariate analysis. We acknowledge this shortcoming in our data and analyze the results accordingly.

Results

Focus Group Results

After conducting our focus group, there were a few key takeaways that helped us design our signs to be clearer and more helpful for waste sorting. The first takeaway was that the former signs in the Ackerman Student Union food court were too cluttered with images. The focus group participants agreed that our signs should have less items and words on them with more white space. This would make the signs easier to look at, allowing people to gain a better understanding from just a quick glance. To achieve this, we took away redundant images. For example, we only included one glass bottle on the updated recycling sign, rather than including all three glass bottles that were featured on the original sign (see Figure D3).

The second central idea was that our signs should use pictures, rather than words, to convey our message. The focus group had similar reasoning for this point as they did for decluttering the signs: they want to be able to quickly reference the signage when throwing away their waste. Therefore, we decided to use very minimal words, only using them to caption our images.

Lastly, students liked the idea of including brand-specific items on the signs. Since our updated signs would be designed specifically for the Ackerman Student Union food court, we included some of the most common items from the popular restaurants in Ackerman. For example, on our compost sign, we included a Wetzel's Pretzels bag and an Epicuria pizza box (see Figure D1). This allowed the items that students were throwing away to match the items on the signs more precisely, thus making sorting easier.

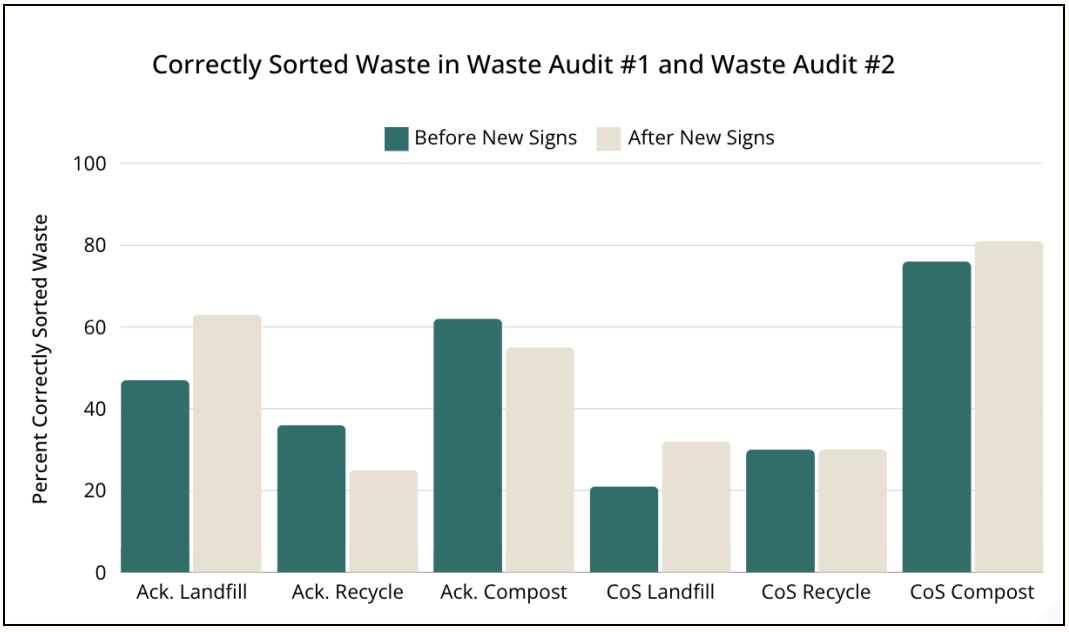
Waste Audit Results

We performed a two-sample proportion hypothesis test for each bin type and location to analyze our waste audits. These tests allowed us to answer the question: *Was there a difference in the proportion of correctly sorted waste before and after the addition of our updated signage*?

To conduct our test, every piece of waste audited counted towards the sample size of each bin or location type. Each piece of waste would go into the "correctly sorted" or "incorrectly sorted" category to create our proportions. Our null hypothesis was that there was no difference between the proportions before and after our signage, while our alternative hypothesis was that the proportions were different before and after the addition of our signage. In total, we performed six of these tests, with each test corresponding to the bin type and location. These categories and their corresponding proportions can be seen below in Figure 1.

Figure 1

Bar Chart of Waste Audit Results



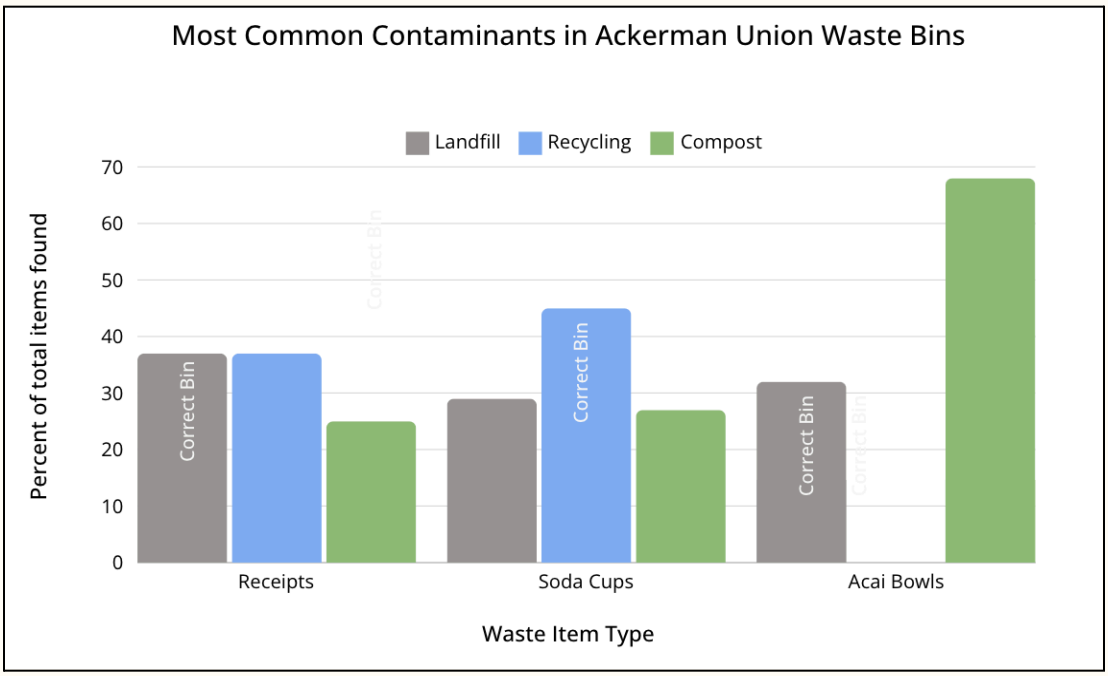
As shown in Figure 1, there was a difference in the proportion of correctly sorted waste before and after the addition of our signage for each bin type, but only three of those results were significant. According to our results, in Ackerman Student Union, the proportion of correctly sorted waste in the landfill significantly increased, but the proportion of correctly sorted waste in the recycling significantly decreased after we added our signs. In the Court of Sciences, our control group, the proportion of correctly sorted waste in the landfill significantly increased.

Overall, these results give us little information about our signs' effects on student waste sorting. Since the landfill had a significant increase in both Ackerman and the Court of Sciences, the claim that our signs were responsible for the change in Ackerman is negated. Furthermore, it can also be observed that the recycling bins in Ackerman show a decrease in the proportion of correctly sorted waste following the implementation of new signage.

Using the waste audit, we also identified the most common contaminants in each bin type; these were the items people had the hardest time sorting correctly. After adding our new signs, people had the most difficulty sorting soda cups, acai bowls, and receipts. Soda cups and receipts were generally present in almost every bin type and were some of the most common waste items in the waste audit. As seen in Figure 2 below, people did not tend to put these items in any one bin in particular, showing a lack of understanding about how they should be sorted. In the case of acai bowls, students often mistake them for compost.

Figure 2

Bar Chart of Waste Audit Results for Most Common Contaminants



We were also able to see how effective the introduction of pizza stands (collection bins where students can leave their empty pizza boxes) is for diverting pizza boxes from going into the wrong bins. The pizza stands address an important issue; pizza boxes are a common source of contamination in the recycling and landfill bins, and, since they take up a lot of space, are a contributor to causing bins to overflow. Before the addition of pizza stands, we found a total of 47 pizza boxes in waste bins, and after the addition of pizza stands, we found a total of 30 pizza boxes in waste bins. This number will hopefully continue to drop as students become aware of the pizza stands, as we did our second waste audit right after the pizza stands were added.

Survey Results

We gained 110 responses to our survey from the UCLA community: 99 from students, 14 from staff or faculty, 5 from visitors, and 1 from an alumnus. As for the demographics of our respondents, while we had a mostly UCLA-representative racial breakdown of respondents (see Figure F1), our survey had a large gender discrepancy with 78.2% of respondents women, 17.3% men, and 6.3% nonbinary, genderqueer, or other. However, from students, we did receive responses from a wide range of class years (see Figure F2) as well as majors, although the largest fields we received responses from were Life Sciences (45.5%), Social Sciences (16.4%), Physical Sciences (12.7%), Engineering (5.5%) and Humanities (4.5%) (see Figure F3). While Life Sciences is the field with the most students and our demographics mostly follow the proportion of students in each major at UCLA, the percentage of Life Science majors who responded is much higher than the percentage of Social Science majors, which is the only other field with a population rivaling that of the Life Sciences; therefore, there is an oversaturation of responses from the Life Sciences field, possibly affecting the results of our survey (UCLA Facts & Figures, n.d.).

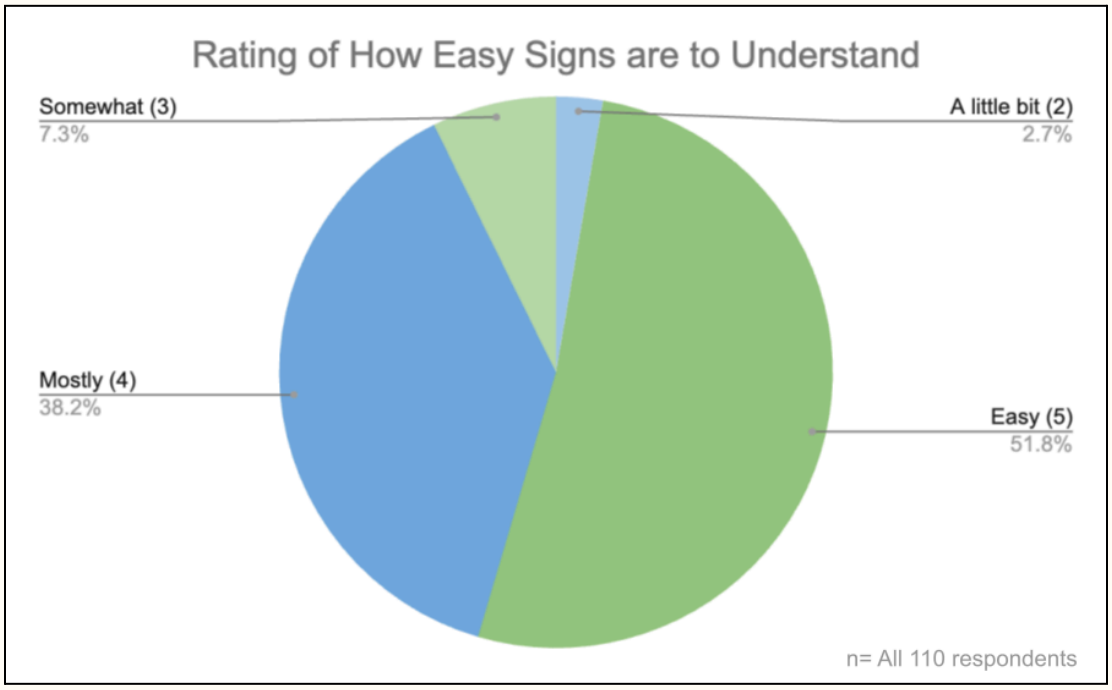
We asked respondents to rate their interest in sustainability on a scale of 1 to 5, with 1 meaning no interest and 5 meaning a high interest. 50% of respondents rated their interest a 4, followed by 29.1% rating it a 5, and 18.2% rating it a 3. From this, we know that our survey mostly gained responses from people already interested in sustainability in their everyday lives. We then asked them to rate their knowledge of waste-sorting policies on a scale of 1 to 5, 43.6% rated a 3, while 36.4% rated a 4 (see Figure F4). Therefore, we can see that even those interested

in sustainability have somewhat less knowledge of waste-sorting policies, and the majority of our respondents believe they have a solid understanding of waste sorting.

For our next questions, we presented our three new Ackerman Student Union waste-sorting signs in the survey for respondents to reference. When asked to rate how easy our signs are to understand on a scale of 1 to 5, 38.2% responded with a 4, and 51.8% responded with a 5, showing that our signs are very easy to understand for the large majority of the respondents (see Figure 3 below).

Figure 3

Pie Chart of Survey Results for Sign Understanding

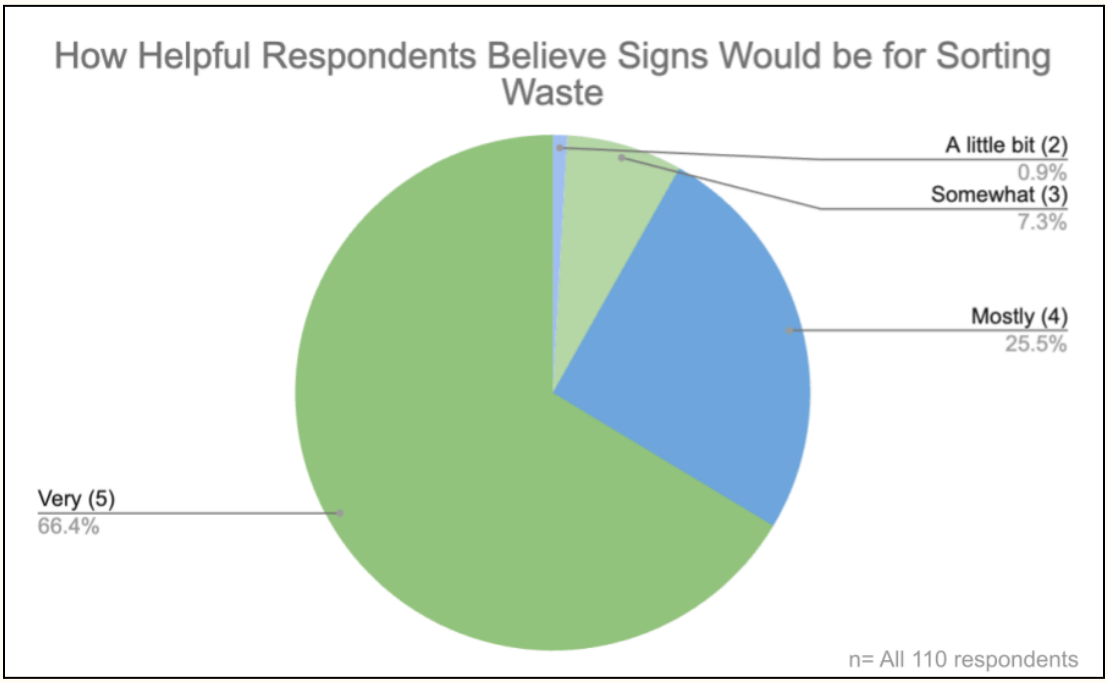


When asked to explain their choices, many people liked the clear pictures, saying the signs were very self-explanatory, while a few criticized that there were still some items not depicted on the signs. We then asked how helpful the signs would be for waste sorting in food court areas on a scale of 1 to 5, 0.9% rated them a 2, 7.3% rated them a 3, 25.5% rated them a 4,

and 66.4% rated them a 5 (see Figure 4 below). In the explanations for their choices, many said they found the signs accessible and easy to reference quickly to eliminate confusion.

Figure 4

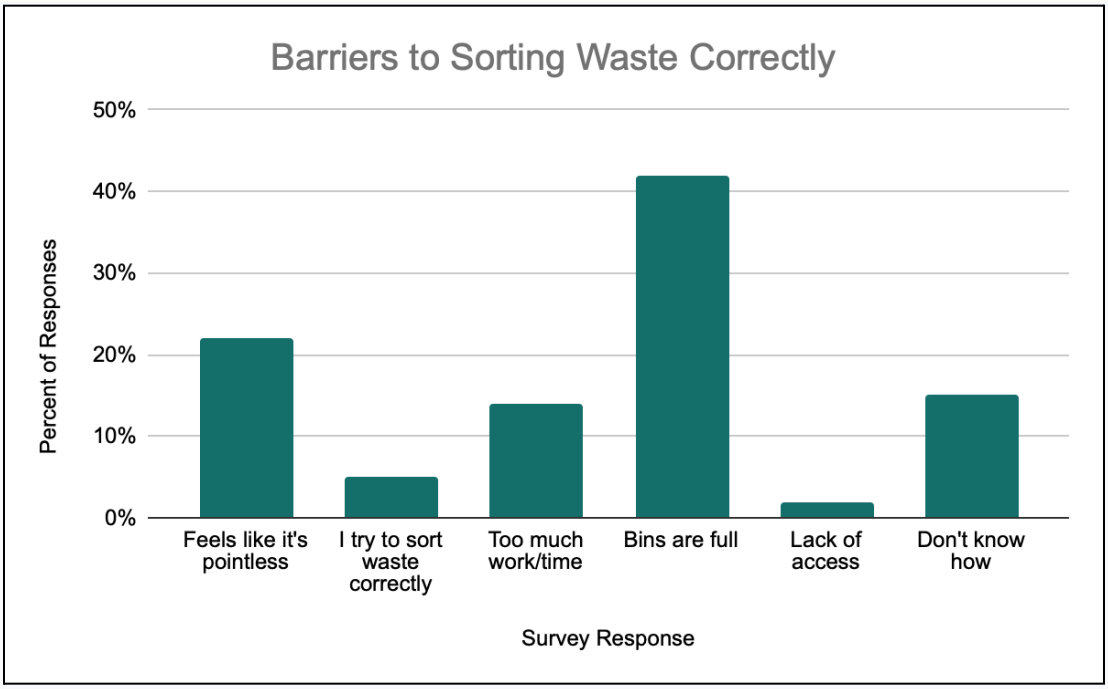
Pie Chart of Survey Results for Sign Helpfulness



We also found that the majority of students (71.8%) in our survey reference waste sorting signage “always” or “almost always” (see Figure F5). For the most common barriers to proper waste sorting, we found “Bins are full,” “Feels like it’s pointless,” and “Don’t know how” to be the top three inhibitors (see Figure 5 below).

Figure 5

Bar Chart of Barriers to Sorting Waste Correctly



Finally, respondents provided suggestions to improve waste sorting on campus, and many people suggested having more waste bins for all three categories around campus, emptying overflowing bins more often, and removing bins that appear to be tri-stream but are just one bin. Further, several wanted clarification on the recyclability of unwashed recyclables and more in-depth waste-sorting instructions on campus in general.

Because of our lower number of responses, we could not determine any correlations between gender, race, major, role on campus, year in school, or interest in sustainability and the rating of the signs' helpfulness, understandability, or usefulness as a reference. We were able to compare some of our results with data from the SAR Zero Waste Communication team's 2022 survey results and found that the number of people who cited not knowing how to sort waste properly as a barrier has decreased from 49.1% to 20%, while the amount who selected not

having enough time to sort waste properly increased from 5.9% to 18.2% in our study (UCLA Sustainability Action Research, 2022). Further, in both studies, the necessary cleanliness of recyclable materials was questioned several times, and having all three bins more easily accessible was suggested often.

Interviews

We conducted a series of interviews with ASUCLA restaurant staff in level one of the Ackerman Student Union food court. The goal of these interviews was to have a better understanding of back-of-the-house management and waste sorting and employee training on the tri-stream waste system. We interviewed an employee who works at the restaurant combination of Lollicup, Wetzel's Pretzels, and Sambazon. We also interviewed managers from VeggieGrill and Panda Express. When discussing waste management with restaurant staff and management we discovered inconsistencies between the ways that different restaurants manage their waste.

From our interviews, we learned how employees at each restaurant manage waste. The worker from Lollicup, Wetzel's Pretzels, and Sambazon did not feel they had been properly trained to use compost when working. For example, when working at Wetzel's Pretzels, employees rarely use the compost bins for food waste and instead primarily use landfill bins. While Sambazon does have a compost bin behind the counter, employees regularly put receipts in the compost bin which is a source of contamination that they are not taught about due to the lack of training on composting. They also mentioned the lack of signage on the back of the house waste bins, making it more difficult for employees to properly sort waste due to the lack of training and guidance. Wrong-colored bags are often used multiple times a week when the ASUCLA restaurants run out even though more are available downstairs. Since Athens Services

waste hauler ultimately sorts waste based on trash bag color, this creates the potential for a lot of missorted waste even when students and staff sort it correctly.

Interviews with VeggieGrill and Panda Express managers demonstrated that different chains had different policies and that this could create issues in ASUCLA's larger waste sorting system. According to VeggieGrill's manager, VeggieGrill's company policy includes composting food waste and employees are trained on proper composting and recycling. The manager of Panda Express, on the other hand, stated that composting was not part of company policy and the ASUCLA Panda Express does not have a compost bin. Cardboard and plastic were put into recycling, while the rest of the waste was put into landfill bins. The manager of Panda Express did communicate interest in starting a compost system for the restaurant, however, he confirmed to us that training for employees was based on the company's policies and not the policies of ASUCLA. This revealed that one limitation of ASUCLA waste management can be accredited to the differences in policy between ASUCLA and the policy of specific chain restaurants that operate in Ackerman Student Union.

By talking to employees we learned of several issues in ASUCLA's waste management system that need to be addressed. Beyond issues with waste sorting, food waste itself was also a concern expressed by employees. Employees are unable to take home leftover food, leading to large amounts of wasted food with management not looking to reduce food waste or consider solutions to this problem.

Final Deliverable

Our final deliverable is a concise infographic containing the results of our research, compiling essential information from our methods (See Appendix G). This infographic is

available to any parties we have worked with, including ASUCLA and our stakeholder. The final deliverable also provides our stakeholder with recommendations based on these results. By compiling this information in infographic format we will make our findings clear and accessible for anyone interested in using our findings to make sustainable changes on campus. The signs we have designed throughout our project also serve as a deliverable for our stakeholder and ASUCLA to reference. The signs alongside the survey responses evaluating them can serve as a reference for future waste sorting signage at UCLA and help ASUCLA improve the signs in other food court areas on campus.

Discussion

This project provides UCLA's Zero Waste Team and ASUCLA with new data on waste sorting trends and opinions from students, staff, and UCLA visitors. The signage we posted in Ackerman Union will be there indefinitely, and we hope our conclusions and recommendations will help our stakeholder and ASUCLA improve UCLA's waste sorting rates in future quarters.

The implications of our research include a discrepancy between the survey results and the waste audit which points toward the limits of our project as well as the disparity between opinions about waste sorting and people's actions. While our surveyees responded positively to the waste-sorting signage, the waste audit showed that the new signs did not significantly increase the percentage of waste sorted correctly. This could be due to a wide range of factors that our project could not control, including limitations such as the bins being full, people having different prior knowledge of waste-sorting practices, whether people look at the signs before sorting, which food items were the most popular during our collection weeks, and which students used the bins. Our waste audit was also limited to a small sample size, and our survey could have been overly representative of those who care more about sustainability. In the future, a more accurate and thorough waste audit by weight could be done in a controlled environment alongside a more extensive survey to test the impact of signage more accurately.

Through our waste audit and conversations with our stakeholder, we found that packaging is a big issue at the UCLA food courts. This issue includes the presence of plastic bags and plastic bottles at non-ASUCLA chain restaurants as well as packaging being incorrectly labeled as compostable when it is not. We realize there are many barriers to changing packaging,

such as what is accepted as compost by UCLA's waste hauler and contracts with restaurants, but we encourage ASUCLA and UCLA to commit to making all packaging on campus sustainable and accurately labeled. Furthermore, because overflowing waste bins are such a significant barrier to correct waste sorting, we recommend trying to address this issue without putting additional strain on workers. One example of addressing this issue is the recent addition of pizza box stands at the food courts, which help reduce the space pizza boxes would take up in the regular waste bins.

Another implication of our research is that people on UCLA's campus need more education on where the waste goes after it is discarded and what this process looks like. We can see that students care about sustainability, but our research has shown that many people do not believe that sorting waste matters or face knowledge barriers to correct sorting practices. Raising this awareness can help wide-reaching sustainability efforts. As previously recommended by other research projects, there should be sustainability information and waste-sorting guidance in new student orientation, as well as an explanation of why we sort waste and its importance. If ASUCLA hopes to reduce the amount of contamination and landfill waste, it is also important to establish proper training for employees and managers on waste management at UCLA. ASUCLA should implement training on back-of-house waste sorting for employees, perhaps in their employee onboarding. We recommend that this kind of education be the main focus of future Zero Waste initiatives since it has been shown that improved signage alone is not enough to reach UCLA's goal of diverting 90 percent of waste from the landfill. Furthermore, training staff to sort back-of-house waste and place the correct color bags in each waste bin can be easily taught and enforced. As with many sustainability initiatives, a cultural shift toward sustainable practices will be the most effective way to encourage people to sort waste correctly.

While our pilot signage was limited to Ackerman Union level one, in the future we urge ASUCLA or student groups to redesign other food court signage to be more accurate. While we did not see a significant difference from the signage in our waste audit, it is clear from our survey that people consistently use waste signage, and correcting it is an easy fix that could potentially increase the percentage of waste sorted correctly. Additionally, our research was mostly limited to consumer waste bins, with the only back-of-house research being our interviews with restaurant staff. Therefore, we recommend that further research be completed on back-of-house waste sorting practices at food courts to improve correct waste sorting rates.

Conclusions and Recommendations

In conclusion, our research provides insights into waste sorting trends and opinions at UCLA food courts that can help guide improvements to waste diversion rates on campus. While our pilot signage did not lead to a significant difference in sorting rates, our survey shows that people consistently use and appreciate clear waste signage. However, our research demonstrates that signage alone is not sufficient to improve waste sorting rates. Additional measures are needed, with a focus on education and awareness. We recommend that UCLA and/or ASUCLA:

1. Include sustainability information and waste-sorting guidance in new student orientation, explaining why proper waste sorting matters.
2. Implement training on back-of-house waste sorting for ASUCLA employees during onboarding.
3. Ensure all food court packaging is sustainable and accurately labeled for composting and recycling.
4. Address overflowing waste bins without putting additional strain on workers.
5. Conduct further research into back-of-house waste sorting practices at the food areas on campus.
6. Update waste-sorting signage at other campus food areas.

Ultimately, a cultural shift toward sustainable practices will be most effective in improving waste diversion rates on campus. All campus entities must work together to prioritize UCLA's zero waste goals through education and improved infrastructure. With continued effort, UCLA and ASUCLA can make significant progress toward a sustainable campus.

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Appendix A

Focus Group Questions and Figures

Focus Group Questions

1: Knowledge (past) (15 mins)
- Do you know how to sort waste?
  - Have you noticed waste signage on campus?
- Have you been involved in any sustainability efforts on campus or off campus?
  - If so, what kinds of experiences?
- What is your experience with sorting waste?
  - How have you sorted waste at home, school, or work?

2: Attitudes (present) (25 mins)
- How do you feel about the current instructional signs for waste sorting? **(show current facilities management signs)**
- When you approach a waste bin with three sections on campus describe what goes through your head.
- Is there anything stopping you from being able to sort the waste correctly?
- How do you feel about waste signage that includes images of specific items at the food court? **(show our edited sign)**
  - What do you like and dislike? Would this sign help you?
- Plastic has numbers indicating whether it's recyclable… how would you feel about these numbers being included on signage? **(show sign)**
  - What do you like and dislike? Would this sign help you?
- How do you feel about a 3D sign? **(show sign)**
  - What do you like and dislike? Would this sign help you?

3: Behavior (future) (10 min)
- Do you have any recommendations or suggestions for future signs?
- What would you like to see UCLA improve upon in terms of its waste management and sorting?

- Ask participants if they have any final thoughts

Figure A1

UCLA Facilities Management 3-stream waste sorting signage

Note. Located inside and outside of academic buildings above bins, 2024.

Figure A2

Edited sign with brand-specific items and “must be clean no food” text

Figure A3

Edited sign with recycling numbers

Figure A4

3D sign from another university

Appendix B

Waste Audit Methodology

Figure B1

Map of Waste Bins in The Court of Sciences Bomb Shelter

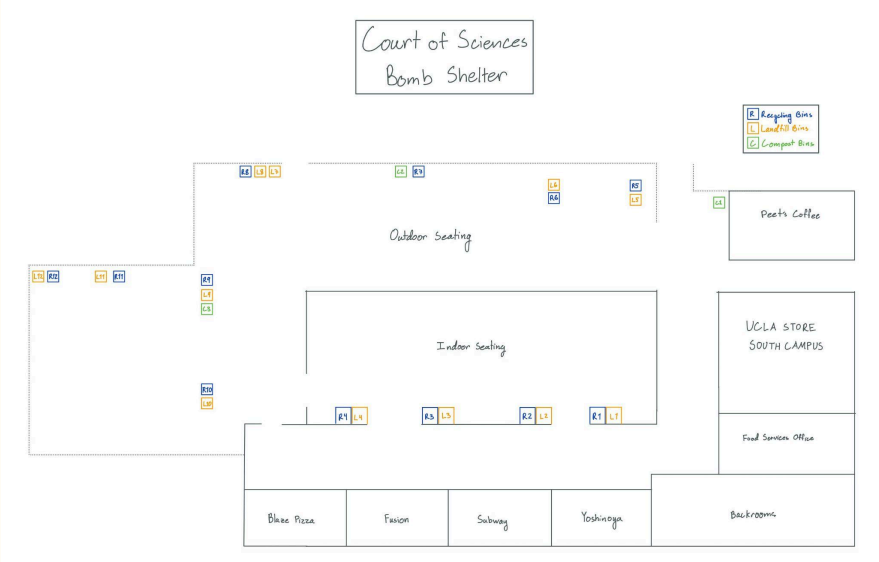


Figure B2

Map of Waste Bins in Ackerman Food Court Level 1

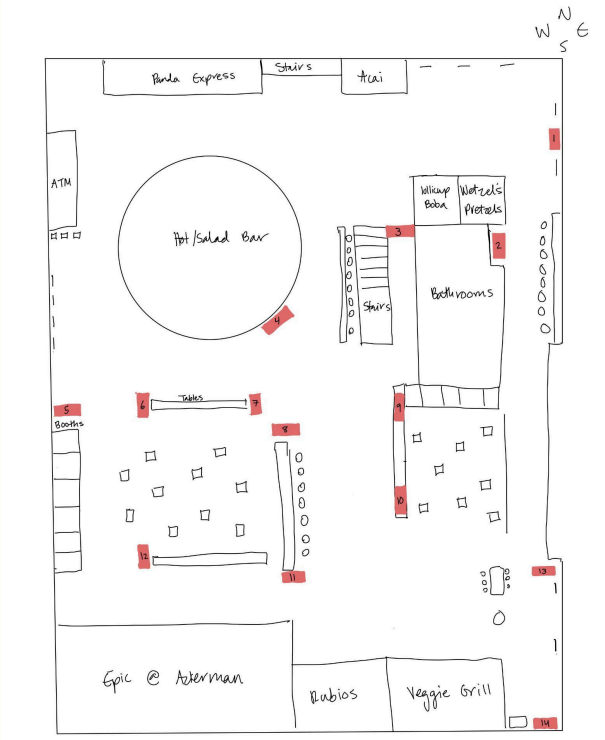


Figure B3

Example of Waste Audit Pictures

Table B1

Waste Audit Analysis Spreadsheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		R1		R2			R3			R4			R5	
2	2/28 3:26			2/28 3:30 PM			2/28 3:25 PM		Lollicup back of house trash	2/28 3:19 PM			2/29 7:31 PM	
3	Item	Where it (probably) should have gone	Notes	Item	Where it should (probably) have gone	Notes	Item	Where it should (probably) have gone	Notes	Item	Where it should (probably) have gone	Notes	Item	Where it should (probably) have gone
4	coffee cup	Recycle		can	Recycle		plastic jug	Recycle		plastic cup	Recycle		plastic cup	Recycle
5	plastic straw wrapper	Landfill		paper	Recycle		plastic jug	Recycle		"compost cup"	Landfill	unsure.	plastic cup	Recycle
6	plastic cup	Recycle		paper	Recycle		plastic jug	Recycle		plastic container	Recycle		plastic container	Recycle
7	plastic straw	Landfill		3/1 10:45 AM			plastic jug	Recycle		paper	Recycle		receipt	Landfill
8	paper straw wrapper	Recycle		paper	Recycle		plastic jug	Recycle		receipt	Landfill		napkin	Compost
9	can	Recycle		plastic	Recycle		plastic jug	Recycle		soda cup	Landfill		napkin	Compost
10	can	Recycle		glove	Landfill		milk carton	Recycle		soda cup	Landfill		3/4 3:57 PM	
11	paper bag	Recycle		plastic utensil	Landfill		"compost" cup	Landfill	waiting on jade	soda can	Recycle		soda can	Recycle
12	soiled paper bag	Compost		sauce packet	Landfill		3/1 10:50 AM			napkin	Compost		soda can	Recycle
13	plastic cup	Recycle					plastic container	Recycle		3/1 10:49 AM			fortune cookie	Landfill
14	3/1 10:44 AM						plastic film	Landfill		soft plastic	Landfill		cardboard	Recycle
15	plastic bag	Landfill					plastic jug	Recycle		plastic cup	Recycle		plastic container	Recycle
16	receipt	Landfill					box	Recycle		napkin	Compost		plastic film	Landfill
17	plastic container	Recycle					box	Recycle					"compost" cup	Landfill
18							hard plastic	Recycle					paper nametag?	Landfill
19							can	Recycle						
20	Percent sorted correctly do not delete these cells plz	41.07142857												

Appendix C

Updated Waste Signage Deliverable

Figure C1

Figure C2


LANDFILL
Wetzel's Pretzels
BRAND CUPS
STRAWS
COFFEE CUPS
CONDIMENT PACKETS
PLASTIC UTENSILS
RECEIPTS
KIND
Lay's
Classic
rubio's
COASTAL GRILL
SNACK WRAPPERS
PLASTIC BAGS
ASUCLA

Figure C3


RECYCLE
EMPTY PLASTIC CUPS
EMPTY PLASTIC BOTTLES
CLEAN PAPER
PLASTIC CONTAINER LIDS
EMPTY ALUMINUM CANS/BOTTLES
EMPTY GLASS CONTAINERS
ASUCLA

Appendix D

Public Opinion Survey

A chance to win a $150 UCLA Store gift card by sharing your opinions! Participate in this survey on waste sorting and signage in UCLA's food courts. Please try to answer the questions as accurately as possible! Who we are: https://www.ioes.ucla.edu/sar

Are you a UCLA student, staff, faculty or just visiting? (Select all that apply)*

- ☐ Student
- ☐ Staff
- ☐ Faculty
- ☐ Visiting
- ☐ Other:

If you selected staff, what is your role/where do you work?

What gender do you identify with? (Select all that apply)*

- ☐ Man
- ☐ Woman
- ☐ Nonbinary
- ☐ Trans
- ☐ Genderqueer
- ☐ Prefer not to answer
- ☐ Other:

How would you describe your race and/or ethnicity? (Select all that apply)*

- ☐ American Indian or Alaskan Native

- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic or Latino/a/e/x
- ☐ Middle Eastern or North African
- ☐ Native Hawai`ian or Pacific Islander
- ☐ White
- ☐ Prefer not to answer
- ☐ Other:

If you are a student, what is your major? (Select all that apply)

- ☐ Arts and Music
- ☐ Life Sciences (Biology, Physiological Science, Ecology, Behavior and Evolution)
- ☐ Physical Sciences (Biochemistry, Math, Statistics, Climate Science, Physics, Geology)
- ☐ Computer Science
- ☐ Business and Economics
- ☐ Engineering
- ☐ Social Sciences (Political Science, Anthropology, Communications)
- ☐ Humanities (English, Philosophy)
- ☐ Law
- ☐ Medicine/Nursing/Dentistry
- ☐ Public Affairs
- ☐ Other:

If you are a student, what year are you? (Select all that apply)

- ☐ First year
- ☐ Second year
- ☐ Third year
- ☐ Fourth year
- ☐ Fifth year +

- ☐ First year transfer
- ☐ Second year transfer +
- ☐ Graduate student
- ☐ Other:

Rate your interest in sustainability.

- Not at all interested (1) to Extremely interested and passionate (5)

Rate your knowledge of waste sorting policies.*

- Limited understanding (I have no clue) (1) to Extremely knowledgeable (I know exactly what goes in recycling, compost, and trash) (5)

Rate how easy these signs (see Appendix A) are to understand. Please explain your choice.

- Very difficult (1) to Very easy(5)

How helpful would these signs be for sorting waste in UCLA food courts (Ackerman, Bomb Shelter, etc.) if you saw them above the bins? Please explain your choice.

- Not helpful at all(1) to Very helpful(5)

How often do you reference signage to sort your waste? *

- I never look at the signs(1) to I always look at the signs (5)

What is stopping you from sorting waste correctly?*

- ☐ Don't know how
- ☐ Too much work/time
- ☐ Feels like it's pointless
- ☐ Bins are full
- ☐ Other:

Are there any suggestions you have to improve waste sorting signage on campus, or other thoughts about signs and waste sorting in general?

Appendix E

ASUCLA Informational Interview Questions

Interview Questions for Panda Express

- How does Panda Express separate waste in the back of the house?
- Would Panda Express be interested in composting waste?
- How does Panda Express train employees on waste sorting?
- In what ways do company policy and ASUCLA policy differ?

Interview Questions for VeggieGrill

- How do you go about waste sorting?
    - What does your process look like, and are things separated?
- What are some challenges you observe with waste sorting?
- Do you notice anything specific about customers when it comes to waste sorting?
- Who puts the different colored bags in the waste bins, and is this something that is taught?
- Were you taught proper waste sorting practices when you were trained?

Interview Questions for Lollicup/Wetzel's Pretzels/Sambazon

- How do you go about waste sorting?
    - What does your process look like, and are things separated?
- What are some challenges you observe with waste sorting?
- Do you notice anything specific about customers when it comes to waste sorting?
- Who puts the different colored bags in the waste bins, and is this something that is taught?
- Were you taught proper waste sorting practices when you were trained?

Appendix F

Waste Sorting Survey Responses

Figure F1

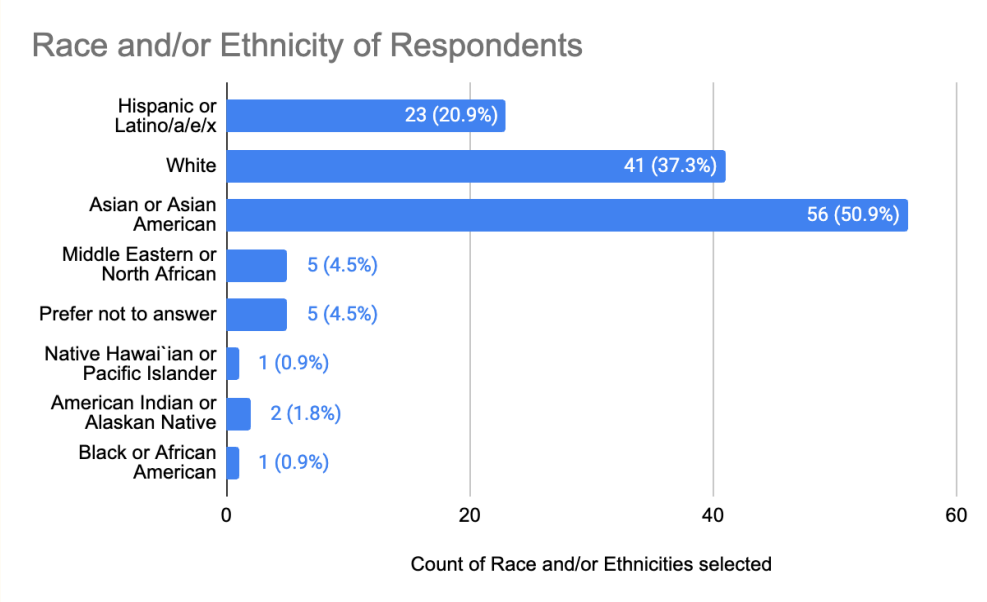


Figure F2

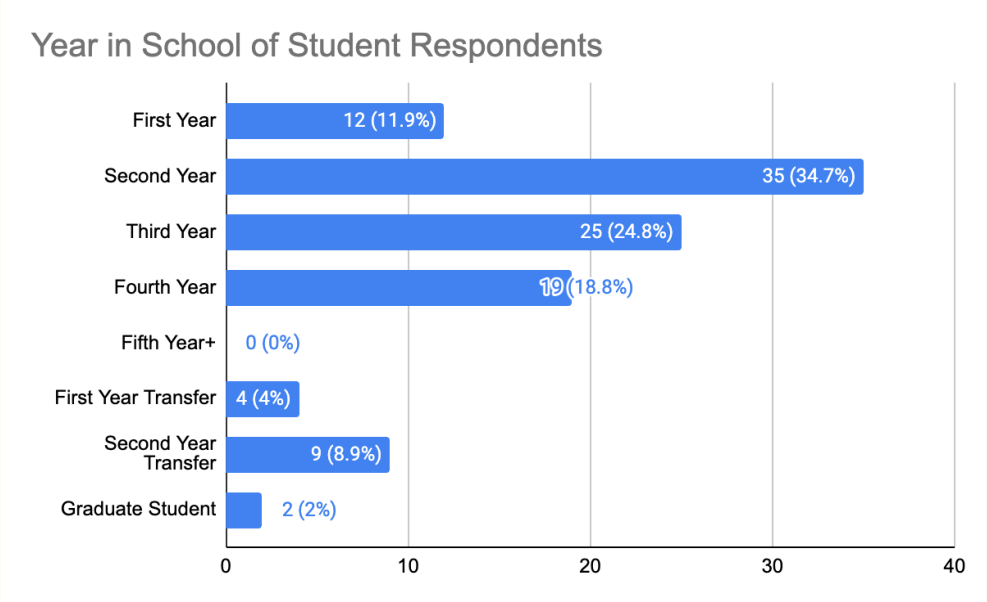


Figure F3

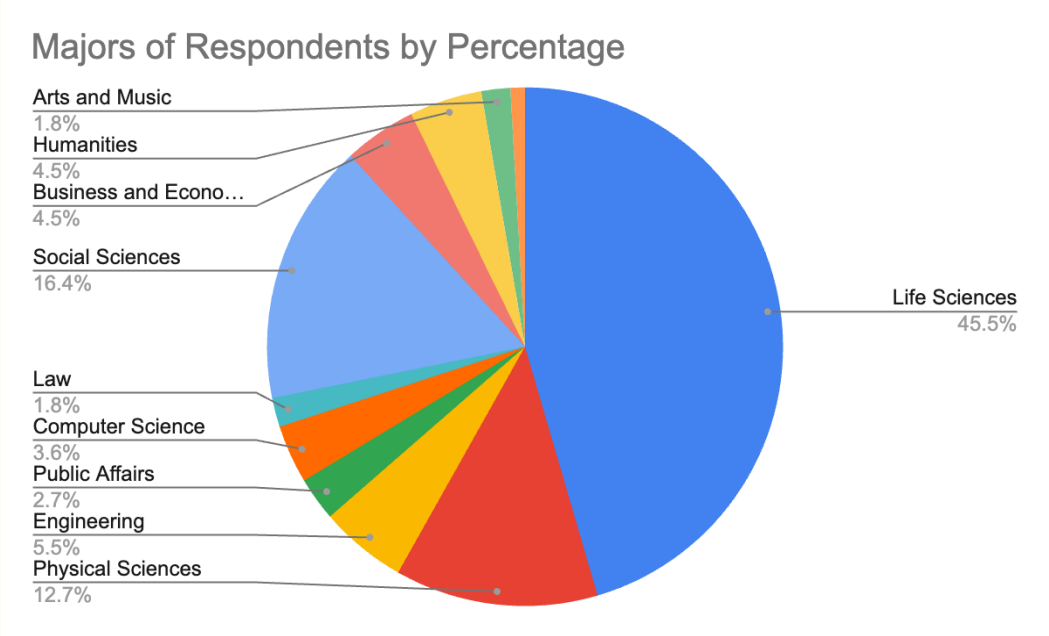


Figure F4

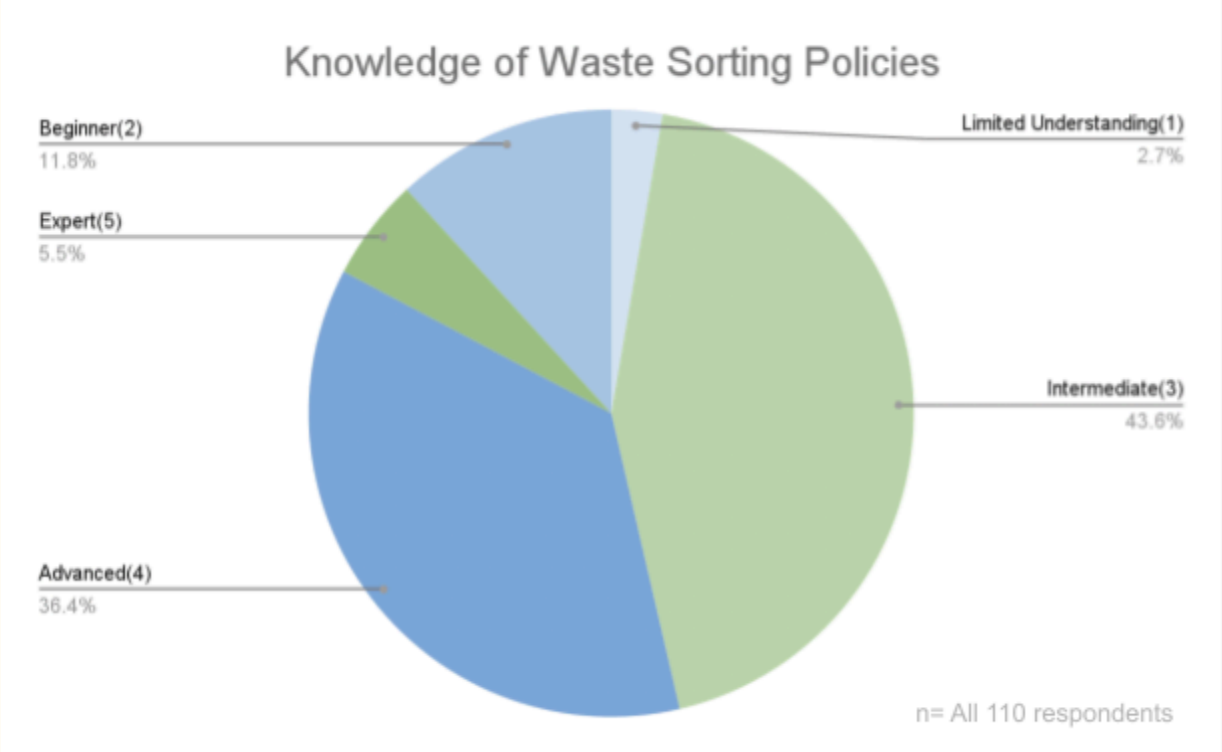
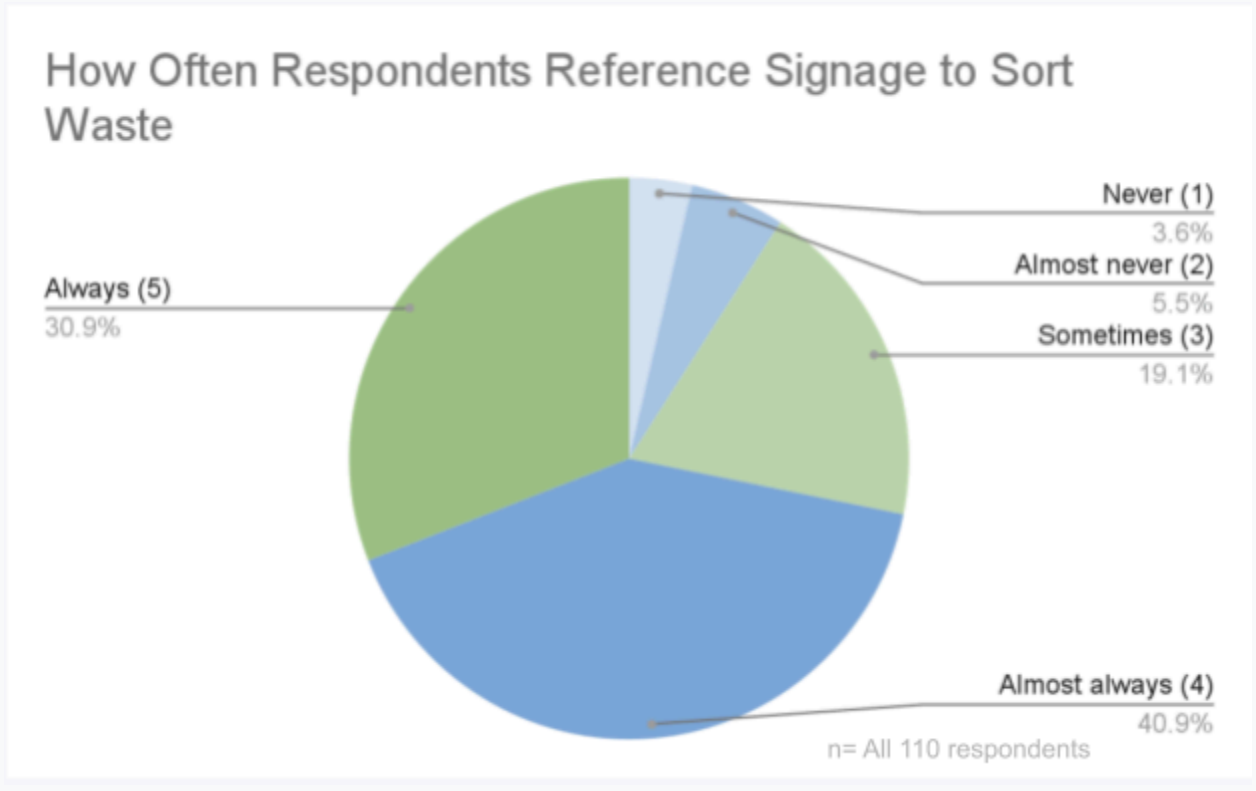


Figure F5


How Often Respondents Reference Signage to Sort Waste
Never (1)
3.6%
Almost never (2)
5.5%
Sometimes (3)
19.1%
Always (5)
30.9%
Almost always (4)
40.9%
n= All 110 respondents

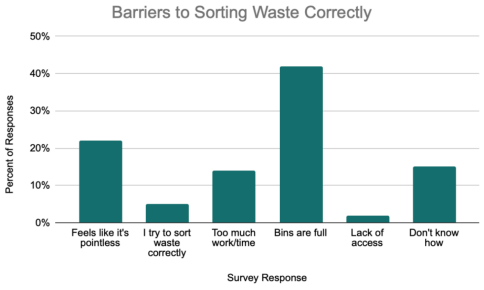
Appendix G

Infographic Deliverable

SAR Zero Waste Communication

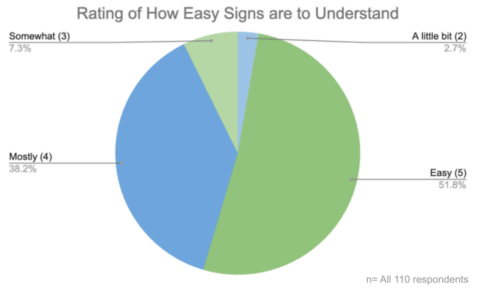
Survey Results

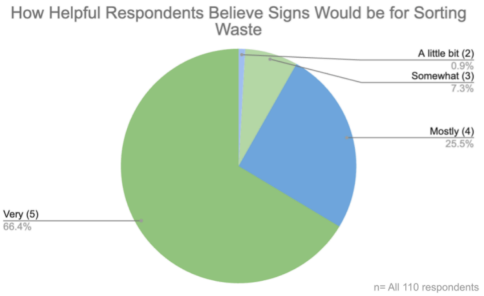
We posted the survey QR code near our new waste-sorting signs and across campus. The survey was informed by our focus group findings and reveals student and staff opinions on waste sorting. We got 110 responses.



SAR Zero Waste Communication

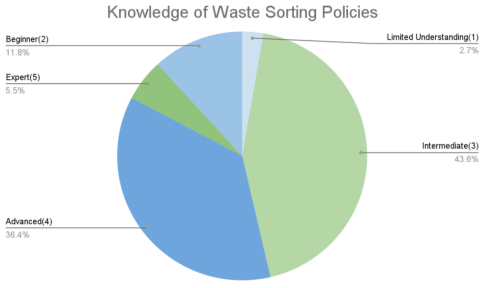
Survey Results

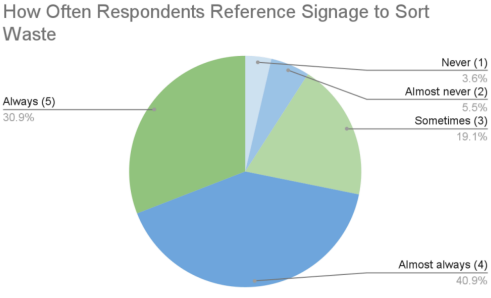




SAR Zero Waste Communication

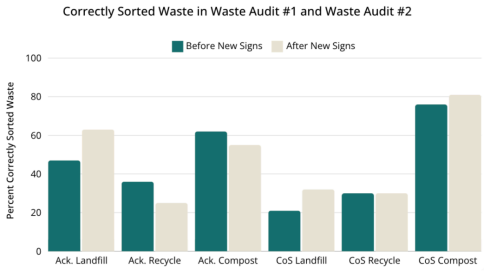
Survey Results

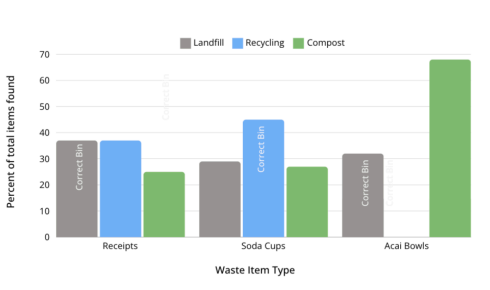




SAR Zero Waste Communication

Waste Audit Results





SAR Zero Waste Communication

Signage

SAR Zero Waste Communication

Signage

SAR Zero Waste Communication

Signage

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Full Report