ESLP

Education for Sustainable Living Program

University Apartments

Final Report

Spring 2014

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Table of Contents

Executive Summary

Any large housing complex generates huge amounts of waste, and UCLA's University Village Graduate Apartments on Sawtelle Boulevard and Sepulveda Boulevard are no exception. Our overarching goal was to reduce the amount of waste that goes to the landfill by increasing the diversion of recyclables to the recycling center. To test for the most effective methods of encouraging residents to recycle, we divided the University Village into five sections and implemented a different method in each of four sections, with the fifth as the control. The four methods were: (1) providing residents with personal recycling bins, (2) providing residents with door hangers that listed recyclables, (3) replacing the text-based trash enclosure signs with image-based signage, and (4) sending out weekly reminder emails. For five weeks, we collected baseline data, which consisted of weights at pickup time of the three-yard trash and recycling containers in the trash enclosures. After our baseline data collection period, we implemented our encouragement strategies and continued collecting data for another four weeks. Over three of these weeks, the diversion rate increased slightly, but during the fourth week, it plummeted, possibly due to increased waste generation as residents pack up and move out. The next step would be to start a food waste program, because, as seen in our difficulties with raising the diversion rate, recycling can only take the University Village so far.

Additionally, before implementing our encouragement methods, we asked residents to respond to a survey that inquired about their recycling habits and tested them on their recycling knowledge. After our campaign, we asked them to respond to a similar survey. Because there were far fewer responses to the second survey, and most of those surveyed reported not having been exposed to any of our encouragement strategies, comparing the two does not yield definite conclusions. However, we did receive valuable feedback from both.

Background

There seems to be a common misconception among the general public that decomposable waste, such as paper containers and food waste, sent to the landfill will decompose and no longer pose a problem. This is not the case, as we learned during a tour of Athens' Sun Valley Material Recovery Facility. Because of the lack of oxygen underneath layers of waste, decomposition could take hundreds of thousands of years. Therefore, recycling and composting are extremely important components of waste management, as they divert waste away from the landfill.

According to the Environmental Protection Agency (EPA), waste diversion refers to the "prevention and reduction of generated waste through source reduction, recycling, reuse, or composting." Moreover, waste diversion "conserves energy, saves disposal costs and reduces the burden on landfill, generating multiple environmental, financial, and social benefits."

UCLA's goal for waste diversion is Zero Waste by 2020, or 95% diversion from the landfill by 2020. UCLA has reached and surpassed the 75% by 2012 goal; however, individual departments in the system lag. The University Village, which houses graduate students with families, does not have a large scale food waste program, and has long struggled with recycling. Successful recycling in a housing complex is hugely dependent on individual residents and their choices, and is very important because of the huge amounts of household waste generated daily. Getting the 5,000 or more residents at the University Village to recycle is a difficult task by itself. Additional difficulties include language barriers and cultural differences. Students and their families come from diverse backgrounds. For some, recycling is a second nature. For others, recycling is a novel idea. For many, recycling is not new, but single-stream (fully commingled) recycling is. According to the 2010 Greening Graduate Housing action research team, a key issue was that while residents were aware of sustainable practices, they did not have

4

clear knowledge of how they could engage in these practices within the University Apartments and what resources were available to them. For example, many residents surveyed by the Greening Graduate Housing team did not know where recycling containers were located in their complex.

At the University Village, recycling and trash containers are located side by side in 15 waste-disposal enclosures within the complex, so lack of knowledge about the location of recycling containers is not a problem; however, lack of awareness about recyclables is. We noticed during our visit that signs in the enclosures consisted only of a list of recyclables and non-recyclables (see Figure 1). A solution to this problem is better signage, as seen in the 2014 Recycling action research team's project: setting up clearer, image-based signage to facilitate increased recycling in the McGowan Courtyard on campus. A second issue was inconvenience. Residents are not provided with individual recycling receptacles for their apartments, so they must find their own ways to collect and store recyclables between trips to the enclosures.

Figure 1. Text-based signage in waste-disposal enclosure at the University Village.

Objectives & Project Goals

Our overarching project goal, to improve recycling practices in the long term at the University Village graduate apartments, consisted of two components, one quantitative and one qualitative: increasing the recycling diversion rate by 15-20% and educating residents on recyclables and the importance of recycling.

Our project consisted of four phases: (1) background research, (2) materials and logistic plans, (3) implementation, and (4) data analysis. During each of these phases, we had some specific goals. We began by conducting ample background research on recycling and trash waste, recycling programs that have already been implemented elsewhere, and the University Village, our goal being to educate ourselves about recycling, waste management, potential tactics to increase recycling, and the issues facing our target area. Following our background research phase, our team entered the planning phase, with the objectives of formulating ideas using our background research, creating effective materials, and laying out the logistics of implementation.

At the beginning of spring quarter, we entered our implementation phase, during which we put our various recycling encouragement methods in place, in the hopes of eventually determining the most effective approach. After collecting baseline and experimental data as well as survey data, we entered our final phase of data analysis. The objectives of this phase were to complete our audit by organizing the data and to analyze this data to determine how effective our methods were both overall and as individual methods.

As data collection continued, we realized that regardless of whether our data yielded desired results, it would be useful for future projects. The survey responses in particular contained information and recommendations that we were unable to include in our project, but

would be immensely helpful in the future. In addition to our original goal of increasing recycling at the University Village, we also took on the goal of laying groundwork for future improvements.

Research Methodology

Diversion Rate and Pre-Existing Data

Diversion rate is the amount of waste that does not go to landfill (tons) divided by total waste generated (tons), which, at the University Village, because there is no composting program in place, is also equal to recycling (tons) divided by total waste (tons)

$$Diversion\ Rate\ (DR) = (1 - \frac{Landfill\ Waste\ (tons)}{Waste\ Hauled\ (tons)}) \times 100\%$$

Athens provides a report on this at the end of each month. The diversion rates for the past months prior to this project are listed below in Figure 2:

Months	Aug. 2014	Sep. 2014	Oct. 2014	Nov. 2014
Total Waste (Tons)	111.23	118.01	186.35	163.62
Diversion Rate	48%	51%	41%	42%

Source: Athens Services

Figure 2. University Apartments waste tonnage and diversion rate, August-November 2014

This set of data provided us a general idea of the current overall diversion rate at the University Apartments. However, these numbers include waste from other pickup locations, as weights for the report are taken at the waste management center, after other pickups have been made, and differ from the data we collected. Because we wanted to focus specifically on the

University Village, we had the trash and recycling bins weighed at the time of pickup from University Village trash enclosures. To establish more accurate starting figures, we collected weights for five weeks before implementing our encouragement methods.

Recycling Data Processing

The University Village has a total of 15 waste-disposal enclosures with a total of 30 recycling bins and 19 trash bins. On March 23, the staff at the University Village began tracking the weight of waste in each bin. Each time a bin filled up, it was weighed, using scales purchased for this purpose, before the contents were taken to the trash or recycling compactor. The staff then recorded the data, which was sent to and compiled into weekly reports by our team. At the end of our data collection, we analyzed the data for trends in the diversion rate.

However, this method of data collection posed threats to the accuracy of the data in a few ways. Firstly, bins were only weighed when relatively full. Because of this, frequency of data collection for different bins ranged from every day to once every two weeks. This mismatch in frequency causes inconsistencies in the data because less-frequently used bins contain waste from previous weeks, which may skew weekly calculations. Secondly, some of one week's waste may be included in the next week's data, as audits were not always performed on the last day of the week. Lastly, based on the data, the weight of a single bin of waste is around 100-400 pounds, but the number is rounded to the nearest 20. Consequently, error can be as high as 20%, and this lack of precision may also skew the data. To make the data more reflective of weekly diversion rate, the data set is adjusted to mitigate the influences of the first two problems.

For the purposes of this project, each week starts on Monday and ends on Sunday. During any week, when a bin's weight is not examined, the next measurement of that bin is divided by the number of days since the last weighing, effectively redistributing the total amount evenly to

all the days in between. Finally, the weight for the previous week is adjusted by adding the extra

waste (days multiplied by average waste per day) to the original amount.

Materials and Procedure

Over the course of winter quarter, we discussed and refined our encouragement methods.

At the end of winter quarter, we had a solid plan that we planned to implement at the start of the

spring to connect with the residents to spread awareness about our intentions, convey the

importance of undertaking this type of project, and make the changes necessary so people would

be inclined to recycle. In addition to the communicative methods of motivating people to recycle,

we hoped to add a more scientific aspect to our project. After devising each of the conditions, we

hypothesized what could go wrong with each and which would be the most successful. We

hoped that by the end of the project we would know what was effective in motivating people to

recycle. Providing an improved system that consistently yields higher diversion rates would

increase the community's level of sustainability even after the conclusion of our project.
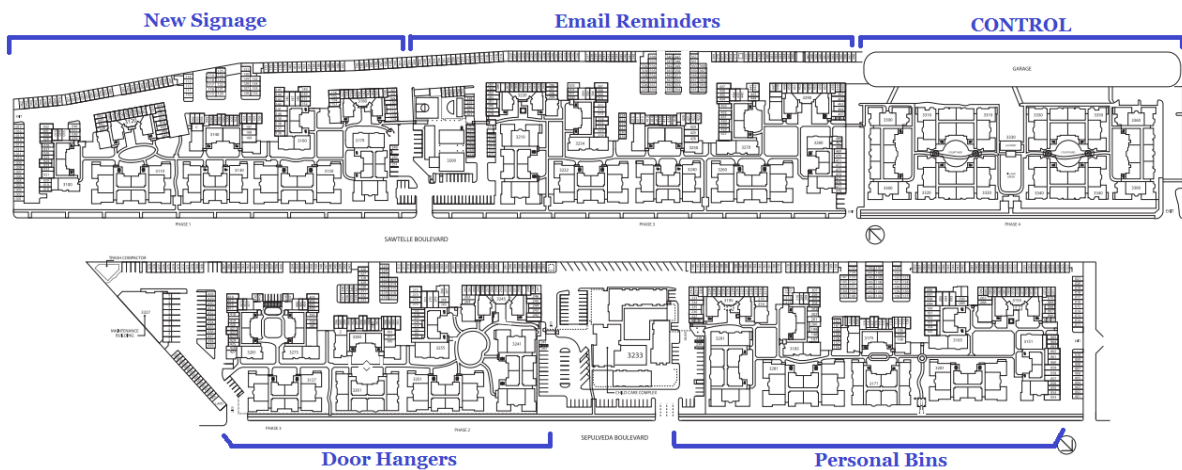

Figure 3. University Village layout and experiment sections.

The layout of the apartments includes 15 trash enclosures. We divided the complex up into five sections, one for each condition, so that each condition would be implemented at apartments adjacent to three of these (Figure 3). Four of the conditions were our encouragement strategies: personal recycling bins, door hangers, image-based signage in the enclosures, and email reminders. The final condition was no change. This allowed us to monitor the natural fluctuation in diversion rate. It also served as a reference point or control variable we could use to measure the effectiveness of our other conditions. The objective was to achieve a higher recycling rate in the trash units that received some type of adjustment.

When spring rolled around we hit the ground running to maximize data collection. At the end of winter quarter, Mr. MacKenzie ordered a scale to weigh the trash. University Village staff members were tasked with recording the weight of the trash and recycling in each enclosure when bins were picked up. We sent a mass email to all the tenants introducing ourselves and our project, along with a survey to get an idea of how much the residents knew about recycling (see Appendix B). For the week of spring break and the first four weeks of spring quarter we made no changes to see where the normal diversion rate stood. We used this data to see how much our methods improved the diversion rate at each section relative to its starting point.

Our conditions were inspired by researchers who have already been involved in extensive recycling efforts elsewhere, as well as the projects of past teams. These conditions were: personal bins, door hangers, improved signage, email reminders, and the control group with no change, and each was implemented at one of the five sections of the apartment complex.

Figure 4. Door hangers front and back designs.

The door hangers were placed and remained on the outer door handle of each apartment

unit, and served as a reminder for residents to make sustainable choices. The front of each door

hanger consisted of the word "recycle" printed in various languages, and the back depicted

recyclables and guidelines (Figure 4).

Figure 5. New image-based signage.

The improved, image-based signage (Figure 5) we implemented served and will continue to serve as a guide to inform people about recyclables and non-recyclables. This idea was inspired by a past recycling team; by utilizing images on our signs, we hoped to cater to the needs of a multi-cultural community and decrease general confusion about recyclables.

Figure 6. Personal recycling bins similar to this one were given to residents.

The addition of personal bins has much potential for increasing diversion since there are currently no recycling bins in each individual apartment unit. Providing residents with their own blue recycling bin, which has a handle for easy carrying, encourages them to think twice before throwing all their waste into the same container, and increases the convenience of recycling.

Finally, we wanted to incorporate direct communication as a means of motivating people to recycle. We thought sending weekly emails encouraging people to recycle might be an effective tactic because residents check their email frequently, and sending constant reminders makes our cause seem more genuine. We decided this could work especially well if we made our emails fun and engaging so that people look forward to opening them (see Appendix D).

According to our original plans, the conditions were supposed to be implemented the following three weeks after the no-change phase, but some necessary materials took longer than expected to create, resulting in postponement of the implementation date. This actually proved beneficial, as having the extra weeks of baseline data helped us realize how much the diversion rate fluctuates from one week to the next. As expected, we had to make some adjustments to our

general outline as the quarter proceeded. Fortunately, we prepared for the worst by reserving a few weeks as a buffer in case anything would delay our plans. Had everything gone without flaw from the start we would have used the additional three weeks to mix and match the conditions in the enclosures in an effort to further boost the diversion rate. Unfortunately, we were not able to experiment with implementing more than one tactic at each unit due to time constraints.

After producing and gathering our supplies and materials, we were ready to make the necessary changes and compare the new data to the old data. We analyzed the results as we received them and tracked the success of the strategies. We continued doing this for four weeks. Additionally, we sent out a final survey inquiring about the effectiveness of our strategies.

Results

Survey Results

The preliminary survey results showed that the 164 participants were generally knowledgeable about recycling: over 95% of those surveyed correctly picked mixed papers, cardboard, and glass as recyclables, which represent the majority of recyclables in a household. The greatest number of residents self-reported that they recycle from 26-50% of the waste in their apartment, which reflected diversion rates at the time (see Appendix B). Some common misconceptions included the erroneous beliefs that plastic straws are not recyclable and that paper must be separated from other recyclables. (The latter used to be the case, but is no longer because of single-stream/fully comingled recycling.) Top recommendations from residents were to start a composting program, to provide individual recycling containers for apartment units, to set up recycling receptacles closer to the apartments, and to provide more information on where waste goes.

The post-study survey did not receive nearly as many responses—only 63—and the majority of participants were either in the control group or did not notice any changes (see Appendix B). Interpretation of results should be taken with this in consideration. That said, results in the second survey did not vary much from results in the first survey. However, we did receive additional feedback on what residents would like to see implemented.

Experiment Results
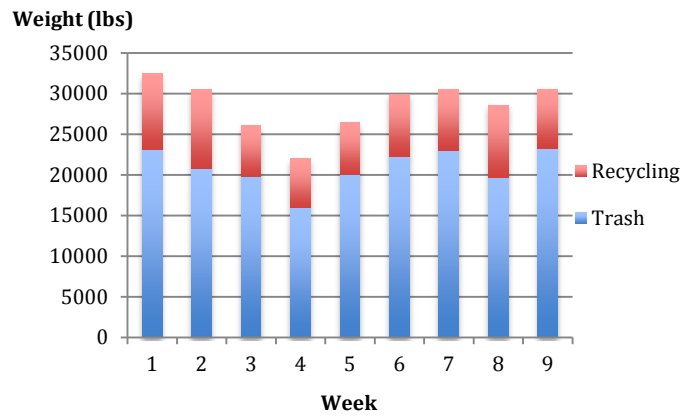
*Figure 7.* Total recycling and trash weights over 9 weeks of data collection.

After compiling and processing the data, we chose to classify the data on a weekly basis. In appendix A, the total weights of recycling and trash are represented. Over the weeks, the total waste generated varied significantly, with a maximum of 32,433 pounds during week 1 of collection and a minimum of 21,970 pounds during week 4 (Figure 7). Recycling and trash weights fluctuated as well. After the four conditions were implemented during weeks 6 and 7, trash weight dropped by 14.4% during week 8 while the recycling weight during the same week increased by 19.4%. Overall diversion rate increased from 24.39% to 31.04% from week 7 to

week 8. However, the rate plummeted from 31.04% to 23.72% from week 8 to week 9 (Figure 8).
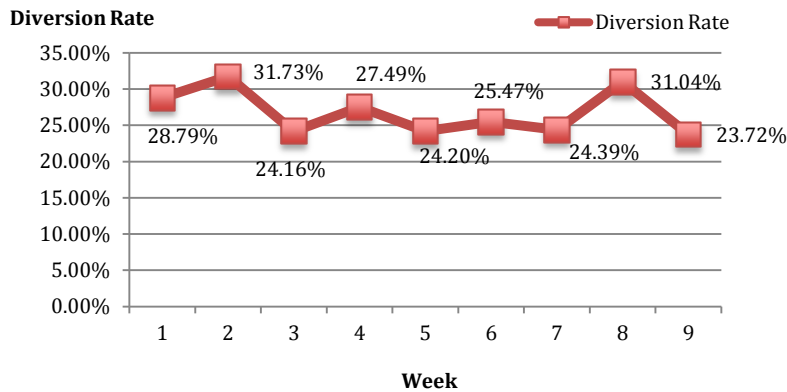
Diversion Rate

Figure 8. Recycling diversion rates over 9 weeks of data collection.

We also compiled recycling data for individual enclosures and bins. For most enclosures, there are more recycling bins (generally two or three) than trash bins (one or two). However, based on actual data, the trash always outweighs recycling for any given week and enclosure. Consequently, trash is picked up more often than recycling and some recycling bins are heavily underused. Over the span of eight weeks, 11 out of 30 recycling bins averaged fewer than 100 pounds of recycling per week, with five averaging fewer than 50 pounds per week. Overall, a trash bin collected an average of 1,083 pounds per week—more than four times the weight of a recycling bin at 257 pounds (see Appendix A).
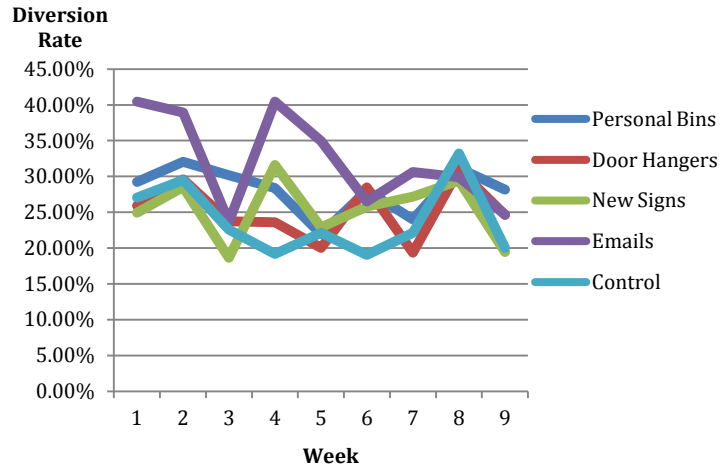
Figure 9. Recycling diversion rates by section over 9 weeks of data collection.

Different conditions were compared against the control group as well as the baseline

period. The individual bins, new signage, and email reminders were implemented during week 6,

while the door hangers were distributed during week 7. Due to the relatively small sample size,

variations over weeks are seen in all conditions and control group. Nevertheless, the diversion

rate increased for most of the conditions after they were implemented. We assumed that the

diversion rate of the control group represented the baseline situation, and then applied this

diversion rate to the total waste of different conditions to calculate the expected recycling

weights. We then calculated the differences between the real recycling level and the expected

level (see Appendix A). After the conditions were implemented, the strategies had a higher

actual recycling level than the expected level. However, during week 8, out of all of the groups,

the control group displayed the highest rate of diversion, and during week 9, diversion rates for

all groups dropped (Figure 9).

16

Discussion

Responses to our surveys demonstrated that many residents are in fact knowledgeable about and interested in recycling, but could benefit from additional information and resources. We were pleasantly surprised by the number of responses to our first survey, and the number of suggestions we received. This information will be extremely useful for future projects, and residents' willingness to contribute feedback should definitely be utilized.

While our overarching goal of increasing the diversion rate was relatively straightforward, the variation in the data collected during our experimental trials were widespread, and several types of analyses were carried out. The first piece of information to make note of is the fact that the numerical figures for the weights of trash, recycling, and diversion rates have quite a range of variation from week to week. It is difficult, however, to pinpoint reasons for fluctuation in the data. Factors that could possibly influence the amount of recycling and trash in each bin enclosure and the University Village as a whole include: the season/time of quarter (e.g. finals week, holidays, move outs, etc.), the location of a particular bin (i.e. a highly traveled area such as those in close proximity to the parking lot), and individual behaviors (i.e. people in one apartment complex area may randomly have a higher or lower percentage of people who tend to recycle).

As previously mentioned, Athens' baseline data from previous months do not directly match our baseline data from the first five weeks of our experiment. The major factor that our team thought was causing some discrepancy was that Athens' numbers may have included some waste from other UCLA locations mixed in with the waste collected from the University Village. Furthermore, one must note that Athens' data on trash and recycling collection was analyzed on a monthly basis over the span of several months, as opposed to our data, which was collected and

17

analyzed on a weekly basis over a little more than two months. Thus, it makes sense that the baseline data between our collection and Athens' collection differ somewhat in value. Since having more data in any experimental research provides more accurate and precise results, we would have benefitted from allotting more time (over the course of our twenty weeks) to collect data using the actual experimental conditions. Because we underestimated the amount of time needed to plan and create all of the materials that our team needed to implement our ideas, our data collection period was shortened by a couple of weeks.

In terms of the experimental trials that our team implemented, it is difficult to come to any sweeping conclusions on their quantitative effectiveness. Both our control and experimental diversion rate percentages were lower in value that the diversion percentages presented to us by Athens over the course of August to November 2014. This can most likely be attributed to the aforementioned reasons for possible discrepancies in our number figures when compared to Athens' data. Moreover, if our methods did increase residents' awareness of recycling, the fluctuations in overall diversion rate and each section's diversion rate mask the effects, if any. Thus, it is difficult to conclude exactly how much these conditions contributed to the overall diversion rate increase and the decrease during the final week of data collection. We can conclude, however, that in order to increase the diversion rate significantly, methods other than simply encouraging recycling must be put in place—for example, a composting program.

Recommendations

The University Apartments Action Research Team entered this research project with two penultimate goals: to increase recycling diversion and to clearly communicate proper waste management among residents. Though our project may not have actually achieved the former, through our survey, we were able to provide residents a forum in which to express the ways that

18

they thought things could be improved – in a sense, drawing policy potential from the community the policy affects. That being said, we encourage future follow-up teams to consider many of the recommendations provided by the residents in order to keep recycling diversion up. We have outlined some of their suggestions (as gleaned from the survey we distributed) below. We would like to note that in future experiments that are similar to ours, the team should collaborate at the very beginning of the project to decide on how the data can be collected and compiled in a more standardized and scientifically-sound manner. Planning ahead of time exactly how to collect the data and what numbers needed to be recorded could really streamline the later analysis of the collected data later.

One action that our team hoped to take at the start of our project was the production of a short film to be screened at the Village's orientation at the beginning of each school year as residents move in, detailing the process for apartment recycling and clarifying confusion as to which materials can and cannot be recycled according to the Athens Service and Allen Company policies. We collected some potential footage for this video during our team's tour of the Athens Recycling Facility in Sun Valley, as we had hoped to provide residents more insight into the fate of their trash. We recommend that this footage be supplemented by media that provides explicit instruction as to how to recycle in the Village specifically. While our team did not have enough time to undertake this task, we really think that having a creative team to produce and screen these materials would be beneficial—and it seems as though many of the residents who participated in our survey agree. A number of the residents indicated, without our prompting, that screening a video showing the effects of waste mismanagement and teaching the appropriate way to recycle would be visually effective and could help increase recycling diversion in the apartments.

We also advise Mr. MacKenzie to draw attention to some of our remaining technical concerns. At the conclusion of our study, we wanted to help Mr. MacKenzie implement the most effective strategy in all of the University Village apartments. Seeing as no one strategy was significantly more effective than another, we encourage the implementation of as many of the strategies as possible throughout the whole complex. As discussed earlier, the way diversion rates are calculated seemed to vary from party to party, so we recommend that a standardized method for calculating diversion rates be developed and used across the board in order to reduce confusion. Since we implemented some new strategies but did not have enough time to conduct a full-scale study, we would recommend the introduction of a waste audit in the University Village, where trash is actually sorted in order to really see what constitutes the majority of trash and how diversion of recycling and compost within that trash can be best improved. ESLP Action Research is a fine resource, but we would encourage groups beyond undergraduates to initiate this. One of our biggest challenges was working somewhat remotely, so we would prefer to see a group that is actually present at (or at least closer to) the University Village undertake this research. This kind of audit would also benefit from a longer sample time period. Lastly, we simply encourage more discussion about sustainability with the residents. Based upon our survey, people seem interested in talking and learning about where their waste is going. In order to maintain clear communication, we invite greater transparency about trash, providing residents with information and making sure they are aware of their current diversion.

Finally, from our past two quarters, we have discovered that "sustainability in apartment living" is a very broad subject that encompasses many environmentally friendly practices, and our project confronts just one of them: recycling. This is an excellent preliminary step in the right direction but we found that the University Apartments would likely benefit from the

continuation of other ESLP ART projects in its sector. In the initial development of our project, our team considered the impact that drawing attention toward energy and water conservation in the apartments could have, however, we came to find many other areas with room for improvement as well. In particular, after our tour at Athens and reflecting upon our own data collection, we really encourage the development of a food waste/compost program. According to some of our references at Athens, including Athens Operations Supervisor Spence Davenport, food waste constitutes the majority of trash weight. Implementing a compost program at the Village is a nearly surefire way to increase recycling diversion and reduce a lot of unnecessary waste.

Conclusion

The University Apartments Action Research Team's ambitions, at the start, were grand: we aimed not just to change numbers but to change a *paradigm* in the University Village apartments. We took time to research the variety of ways people were encouraged to recycle in many different settings, and discussed implementation of strategies that we thought would best fit the conditions under which the University Village operates. We sketched out a timeline that would allow us to observe the effects of each strategy in a different region of the housing, as well as multiple strategies in tandem with one another, for a sufficient period. With a concrete plan backed by previous studies and the approval of our stakeholder, Ken MacKenzie, we confidently anticipated successful implementation of our project as winter quarter ended.

At the beginning of spring quarter, we faced some challenges that set us back a bit in completing some of our goals. We encountered a few communication, time, and design issues in

the implementation of our project. As a result, we were only able to collect control data for the first four weeks of the quarter, and data for each of the strategies for four weeks after that. Encountering these difficulties and noting a lack of significant change in the recycling diversion rates for the majority of the weeks of test data made it easy for our team to feel as though we were not living up to the standards we had set for ourselves. Reflecting upon our project, however, we recognize we were not unsuccessful at all. As our project comes to an end, the residents in the University Village will ultimately be left with permanent signage and individual recycling bins, which will hopefully be implemented in the other sections of the complex as well, and can be kept indefinitely. Another avenue that we were certainly successful in was, at the very least, drawing attention toward recycling in the Village. Survey responses were high and many suggestions as to how to improve recycling were offered, indicating clear interest and beginning a necessary conversation in the community. We have set the stage for more research to be conducted in this area, and we do encourage more efforts to be made toward improving sustainability in the University Village. What we have found is that much benefit emerges from asking the residents what they need. A community knows itself best, and its two cents should undoubtedly be considered. This perhaps the most important lesson of all, something that all future teams should be sure to take into account as they implement their own projects.

To conclude, we would like to acknowledge and thank the people who made this project possible: ART advisors Cully Nordby, Carl Maida, and Nurit Katz, directors Danh Lai and Ellen Lomonico, the staff at Athens' Sun Valley MRF, and most importantly, our stakeholder Ken MacKenzie and his staff, who invested a huge amount of time and effort into this project and were a bottomless source of support, information, and resources. We sincerely hope that our work will continue to benefit the University Apartments in the coming years.
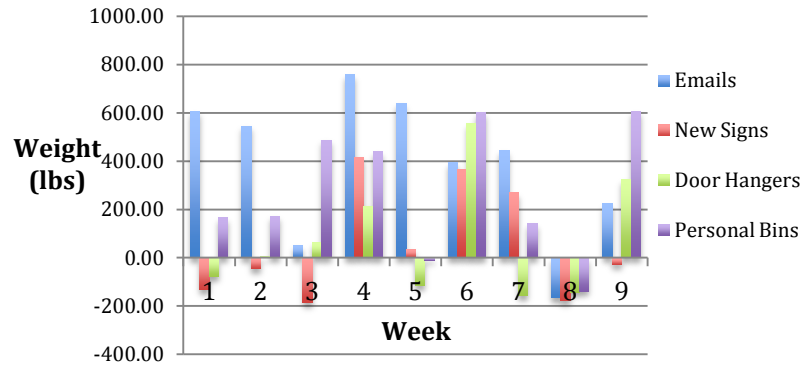
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Appendix A

Total Recycling Weights by Bin			
LOCATION NAME	**TOTAL WEIGHT (lbs)**	**LOCATION NAME**	**TOTAL WEIGHT (lbs)**
SAWTELLE		**SEPULVEDA**	
3120 Sawtelle Blvd., Bin #1 (Between 3120 & 3140)	4250	3155 Sepulveda Blvd., Bin #1	2620
3120 Sawtelle Blvd., Bin #2 (Between 3120 & 3140)	1400	3155 Sepulveda Blvd., Bin #2	385
3160 Sawtelle Blvd., Bin #1 (Between 3140 & 3160)	3660	3165 Sepulveda Blvd., Bin #1 (Between 3165 & 3175)	3820
3160 Sawtelle Blvd., Bin #2 (Between 3140 & 3160)	720	3165 Sepulveda Blvd., Bin #2 (Between 3165 & 3175)	1200
3220 Sawtelle Blvd., Bin #1	4400	3185 Sepulveda Blvd., Bin #1 (Between 3175 & 3185)	2982
3220 Sawtelle Blvd., Bin #2	960	3185 Sepulveda Blvd., Bin #2 (Between 3175 & 3185)	560
3234 Sawtelle Blvd., Bin #1 (Between 3234 & 3250)	3460	3195 Sepulveda Blvd., Bin #1 (Between 3195 & 3245)	2500
3234 Sawtelle Blvd., Bin #2 (Between 3234 & 3250)	340	3195 Sepulveda Blvd., Bin #2 (Between 3195 & 3245)	690
3250 Sawtelle Blvd., Bin #1 (Between 3250 & 3270)	3340	3245 Sepulveda Blvd., Bin #1	3065
3250 Sawtelle Blvd., Bin #2 (Between 3250 & 3270)	340	3255 Sepulveda Blvd., Bin #1 (Between 3255 & 3265)	2720
3360 Sawtelle Blvd., Bin #1	3520	3255 Sepulveda Blvd., Bin #2 (Between 3255 & 3265)	760
3360 Sawtelle Blvd., Bin #2	1120	3265 Sepulveda Blvd., Bin #1	1840
3370 Sawtelle Blvd., Bin #1 (Between 3300 & 3370)	4440	3265 Sepulveda Blvd., Bin #2	150
3370 Sawtelle Blvd., Bin #2 (Between 3300 & 3370)	2700	3281 Sepulveda Blvd., Bin #1 (Between 3275 & 3281)	2780
3370 Sawtelle Blvd., Bin #3 (Between 3300 & 3370)	220	3327 Sepulveda Blvd., Bin #1	640

Difference against Expected Recycling

Bar chart titled "Difference against Expected Recycling" with Y-axis labeled "Weight (lbs)" ranging from -400.00 to 1000.00, and X-axis labeled "Week" with values 1 through 9. Legend: Emails (blue), New Signs (red), Door Hangers (green), Personal Bins (purple).

Appendix B

Preliminary Survey Questions

On a scale of 1-5, please rate your current knowledge of items that are and are not recyclable.

	1	2	3	4	5	
I don't know anything about which items are recyclable and which are not	○	○	○	○	○	I know exactly which items are recyclable and which are not

Which of the following items do you believe are recyclable? (Check all that apply.)

- ☐ Plastic bottles
- ☐ Empty coffee and soda cups
- ☐ Mixed papers (newspaper, white paper, lined paper, etc.)
- ☐ Clean aluminum
- ☐ Cardboard
- ☐ Plastic utensils
- ☐ Empty plastic food containers
- ☐ Empty cardboard food containers
- ☐ Chip bags
- ☐ Candy and granola bar wrappers
- ☐ Condiment packets
- ☐ Cosmetic/medical items
- ☐ Plastic straws
- ☐ Food waste
- ☐ Ceramics
- ☐ Styrofoam
- ☐ Milk/juice cartons
- ☐ Glass

On a scale of 1-5, how easy is it for you to recycle in University Village currently?

	1	2	3	4	5	
Extremely difficult	○	○	○	○	○	Extremely easy

About how much of the total waste generated in your apartment do you recycle?

- ○ 0%
- ○ 1% - 25%
- ○ 26% - 50%
- ○ 51% - 75%
- ○ 76% - 99%
- ○ 100%

Where have you learned or gained information about recycling? (Check all that apply.)

- ☐ Academic resources
- ☐ Friends, family, or peers
- ☐ Signs or posters
- ☐ Internet resources
- ☐ Not sure
- ☐ I haven't received any information
- ☐ Other: _____

How many UCLA students live in your household?

_____

How many children live in your household?

_____

How many non-student adults live in your household?

_____

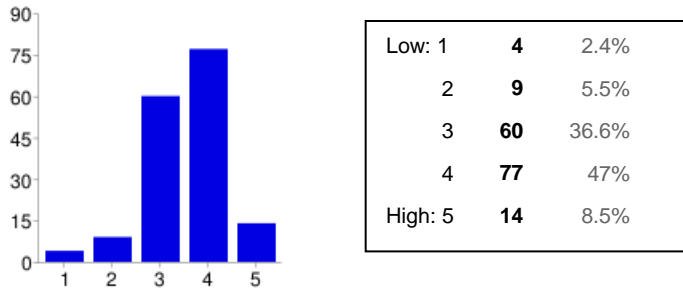**Which languages do you speak in your household? (Check all that apply.)**

- ☐ English
- ☐ Spanish
- ☐ Mandarin
- ☐ Korean
- ☐ Cantonese
- ☐ Japanese
- ☐ French
- ☐ Hebrew
- ☐ Tagalog
- ☐ Hindi
- ☐ Other: _____

Why do you think it might it be difficult for residents in the University Village to recycle?
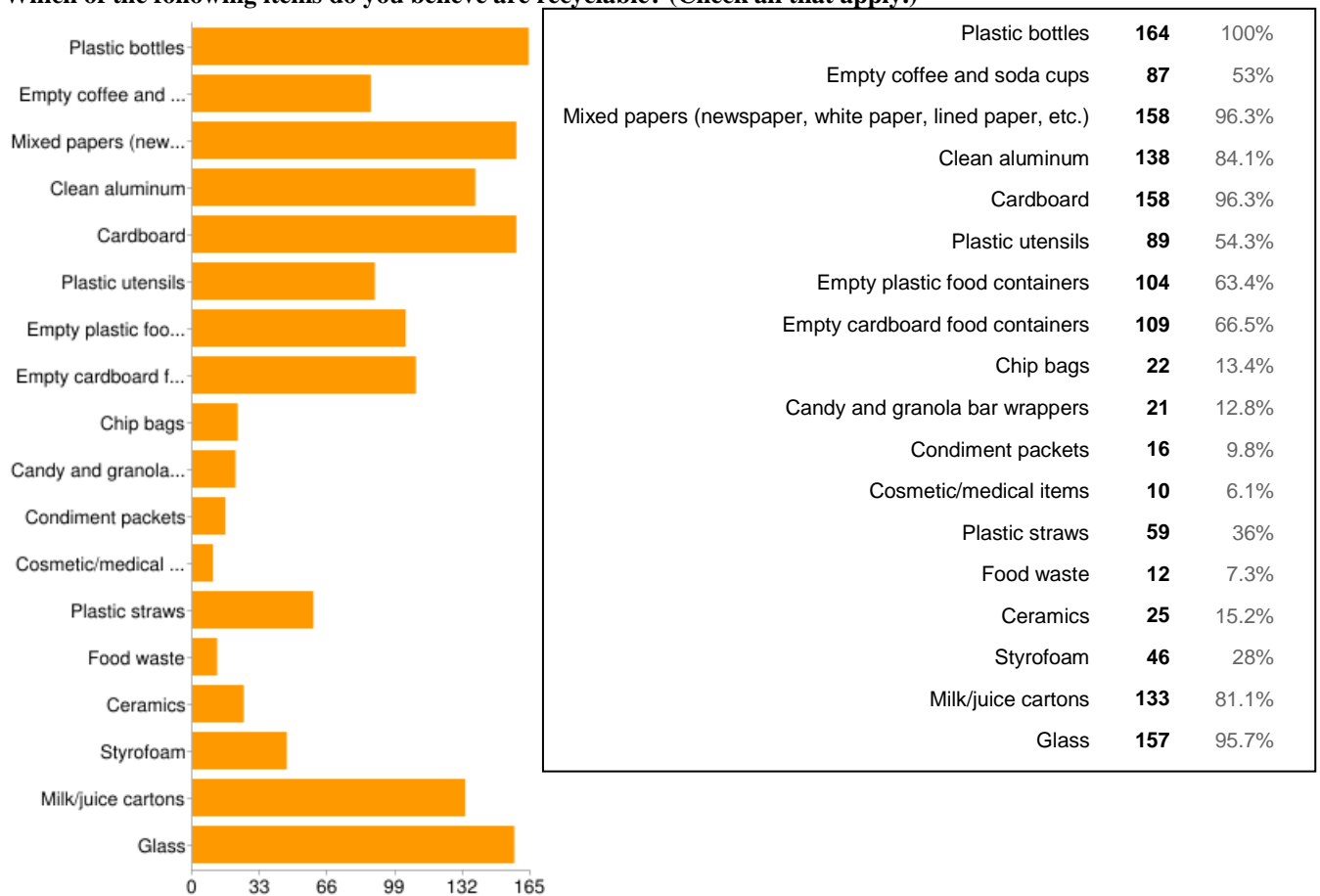
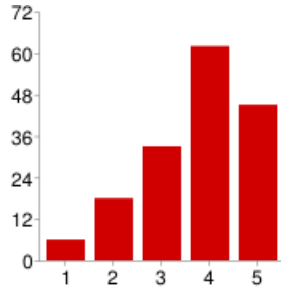**Please provide your building address.**

_____

Survey #1 Results

On a scale of 1-5, please rate your current knowledge of items that are and are not recyclable.

Low: 1	**4**	2.4%
2	**9**	5.5%
3	**60**	36.6%
4	**77**	47%
High: 5	**14**	8.5%

Which of the following items do you believe are recyclable? (Check all that apply.)

Plastic bottles	**164**	100%
Empty coffee and soda cups	**87**	53%
Mixed papers (newspaper, white paper, lined paper, etc.)	**158**	96.3%
Clean aluminum	**138**	84.1%
Cardboard	**158**	96.3%
Plastic utensils	**89**	54.3%
Empty plastic food containers	**104**	63.4%
Empty cardboard food containers	**109**	66.5%
Chip bags	**22**	13.4%
Candy and granola bar wrappers	**21**	12.8%
Condiment packets	**16**	9.8%
Cosmetic/medical items	**10**	6.1%
Plastic straws	**59**	36%
Food waste	**12**	7.3%
Ceramics	**25**	15.2%
Styrofoam	**46**	28%
Milk/juice cartons	**133**	81.1%
Glass	**157**	95.7%

28

On a scale of 1-5, how easy is it for you to recycle in University Village currently?

Extremely difficult: 1	**6**	3.7%
2	**18**	11%
3	**33**	20.1%
4	**62**	37.8%
Extremely easy: 5	**45**	27.4%

About how much of the total waste generated in your apartment do you recycle?
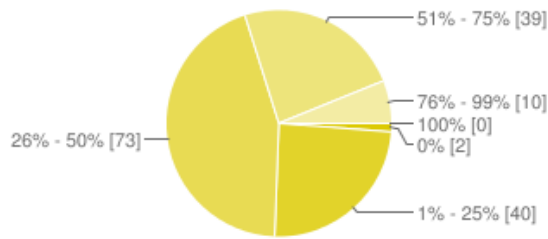
0%	**2**	1.2%
1% - 25%	**40**	24.4%
26% - 50%	**73**	44.5%
51% - 75%	**39**	23.8%
76% - 99%	**10**	6.1%
100%	**0**	0%

Where have you learned or gained information about recycling? (Check all that apply.)
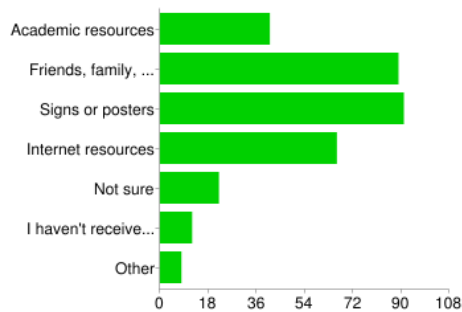
Academic resources	**41**	25%
Friends, family, or peers	**89**	54.3%
Signs or posters	**91**	55.5%
Internet resources	**66**	40.2%
Not sure	**22**	13.4%
I haven't received any information	**12**	7.3%
Other	**8**	4.9%

Which languages do you speak in your household? (Check all that apply.)
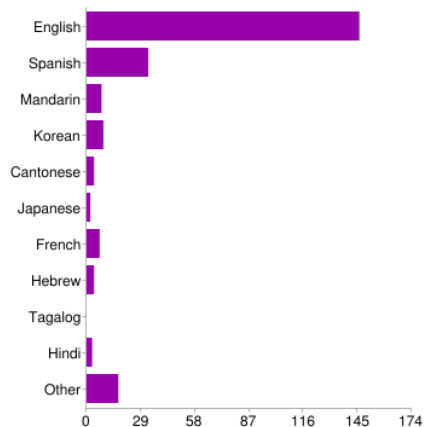
English	**146**	90.1%
Spanish	**33**	20.4%
Mandarin	**8**	4.9%
Korean	**9**	5.6%
Cantonese	**4**	2.5%
Japanese	**2**	1.2%
French	**7**	4.3%
Hebrew	**4**	2.5%
Tagalog	**0**	0%
Hindi	**3**	1.9%
Other	**17**	10.5%

Post-Study Survey

On a scale of 1 to 5, how much do you think your ability to recycle in University Village has improved over the past 2 months?

	1	2	3	4	5	
Did not change	○	○	○	○	○	Improved quite a bit

Did your apartment unit receive any of the following over the past 2 months?

- ○ Individual recycling bins
- ○ Changed signage in trash enclosures
- ○ Informative recycling door hangers
- ○ Weekly recycling email reminders
- ○ None of the above

On a scale of 1-5, please rate your current knowledge of items that are and are not recyclable.

	1	2	3	4	5	
I don't know anything about which items are recyclable and which are not	○	○	○	○	○	I know exactly which items are recyclable and which are not

Which of the following items do you believe are recyclable? (Check all that apply.)

- ☐ Plastic bottles
- ☐ Empty coffee and soda cups
- ☐ Mixed papers (newspaper, white paper, lined paper, etc.)
- ☐ Clean aluminum
- ☐ Cardboard
- ☐ Plastic utensils
- ☐ Empty plastic food containers
- ☐ Empty cardboard food containers
- ☐ Chip bags
- ☐ Candy and granola bar wrappers
- ☐ Condiment packets
- ☐ Cosmetic/medical items
- ☐ Plastic straws
- ☐ Food waste
- ☐ Ceramics
- ☐ Styrofoam
- ☐ Milk/juice cartons
- ☐ Glass

Where have you learned or gained information about recycling? (Check all that apply.)

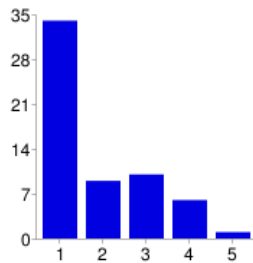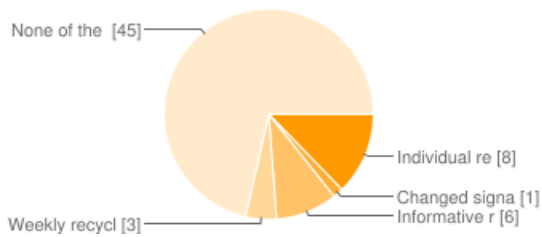- ☐ Resources provided to me by the University Village

30

Survey #2 Results

On a scale of 1 to 5, how much do you think your ability to recycle in University Village has improved over the past 2 months?

Did not change: 1	**34**	56.7%
2	**9**	15%
3	**10**	16.7%
4	**6**	10%
Improved quite a bit : 5	**1**	1.7%

Did your apartment unit receive any of the following over the past 2 months?

Individual recycling bins	**8**	12.7%
Changed signage in trash enclosures	**1**	1.6%
Informative recycling door hangers	**6**	9.5%
Weekly recycling email reminders	**3**	4.8%
None of the above	**45**	71.4%

Appendix C

Existing plastic, glass, and aluminum recycling receptacles at the University Village, located in stairwells

Battery recycling, located in laundry rooms

The team visits a trash enclosure at the University Village

Reminder Email #3

A Checklist For Inspiring A Greener Lifestyle

We all want to do our part in reducing our individual footprints, but how can we live more sustainably on a day-to-day basis?

- Only consume what you need! Especially when food shopping, ask yourself: do I really need this?
- Only replace older appliances/items when they are no longer able to perform the role they were intended to.
- Reuse as much as possible! If an item comes packaged in a plastic bag, try to reuse the bag yourself before recycling.
- If you no longer have a use for an item, but it still works, try selling or donating it at a thrift store or on the Internet.
- Compost garden and food waste when possible.
- Know where your waste goes! University Village recycling and trash is processed by the Allan Company in Santa Monica. Check out their policies here: http://www.allancompany.com.

(Image: , Source: Sustainable Communities North East Initiative, Allan Company)

Remember to Reduce, Reuse, and Recycle!
REDUCE purchases of non-recyclable items and and non-recyclable packaging (e.g. chips bags, candy wrappers, styrofoam)
REUSE items like glass bottles and food containers, use reusable water bottles and shopping bags
RECYCLE! 75% of waste is recyclable. When in doubt, recycle!

Thanks for taking care of our community and our world!

UCLA University Apartments Action Research Team: Katie Pastor, Annie Cheng, Alessandro Lallas, Lauren Ogata, George Yang