

## **Recycling Matters: A Study on Improving University Recycling Programs**

### **Elizabeth Dellorco, Rowan University**

Elizabeth is a sophomore chemical engineering major at Rowan University. Her interests include helping the environment and promoting sustainability. She has also done research on machine learning with applications for teaching in schools. Some of her other interests include musical performance, German language studies, and literature.

### **Mr. Anthony Vinh Bui, Rowan University**

Hello, my name is Anthony Bui. I am an aspiring mechanical engineering student at Rowan University and am apart of various organizations. I am Student Government Representative of the Vietnamese Association, and Service chair of AIAA.

### **Jacqueline Johnson, Rowan University**

Jacqueline Johnson is a honors sophomore Mechanical Engineering major at Rowan University. She's involved in ASME, EWB, and is a Girl Scout Gold Award recipient. She hopes to pursue a career in packaging or materials engineering.

### **Mr. Matthew McBride, Rowan University**

Hello I am Matthew McBride and I am a Sophomore Mechanical Engineering student at Rowan University. I am a member of the Bantivoglio Honors Concentration in the Honors College. I am also a member of the Society of Automotive Engineers, American Society of Mechanical Engineers, Co-founder and Vice President of the Rowan Spikeball Club, and Silver Leadership Path. I am interested in furthering my understanding in how I will be able to make the world a better place as an Engineer.

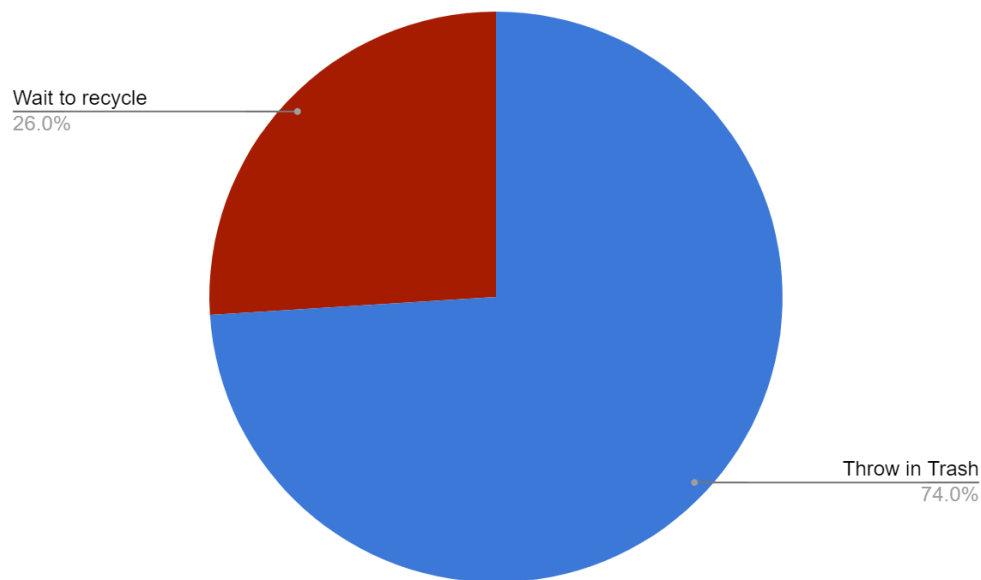
# **Recycling Matters: A Study on Improving University Recycling Programs**

## **Abstract**

This study of the recycling process at Rowan University was undertaken with the goal of revealing and solving such issues as an overabundance of recycling waste incorrectly thrown in different waste areas, an insufficient supply of recycling waste bins, and a lack of knowledge on recycling in general at this university. To solve these issues, we aim to increase the knowledge of faculty and students and the availability and convenience of receptacles, thereby decreasing the trash-waste and confusion. Our solutions to these problems start with providing recycling cans everywhere a trash bin would be available while also making them noticeably different to prevent confusion. The next goal would be to inform new students of the recycling options available to them by providing freshman students with small pamphlets at orientation with general information on recycling at Rowan University. We would also provide these pamphlets to each on-campus student in their dorm when they move in along with a reusable metal straw to decrease plastic use. To remind students about important recycling knowledge, we will have 13 posters up throughout campus at each eatery in case students forget what can be recycled. Finally, to clarify our main goal, we would ask for a speaker, hopefully, the Dean of the School of Earth & Environment, to speak about recycling at each orientation session in the summer. Our projects would result in a total cost of approximately \$46,093.72 and take 14 weeks to implement all our suggestions. The methods used to analyze the current problems were pollings and interviews. The methods used to determine success once completed will be to compare the volume of trash and recycle and the student and faculty outlook on the situation before and after implementation. Despite the pandemic, this objective towards limiting our environmental impact in terms of recycling is still very important, and, keeping current pandemic guidelines and restrictions in mind, it will be adapted appropriately to ensure health and safety guidelines are met.

## Statement Of Problem

Rowan University, one of the fastest-growing universities in the country, has a current student population of close to 20,000 undergraduate students that is expected to continue to increase in the future [1]. Along with a growing campus, the college also promotes various initiatives, one of which includes the practice of recycling with numerous studies and projects. Despite these proactive efforts, a 2020 poll of over 100 current students at Rowan University shows that almost 75% of those that answered would throw away trash if no recycling bins were in sight, as seen in Figure 1.



**Figure 1. Pie chart showing the percent of Rowan University students who would choose to throw recycling in the trash if recycling is not convenient.**

Although this may seem overdramatized at first, this issue of recycling is a much larger campus-wide issue than it may seem at first glance. This is because the common mistake of mixing up trash and recyclables costs the university unnecessary expenses, and there has been data that suggests it can be confusing to know what and where to recycle on campus. Rowan University's student-led newspaper, *The Whit*, wrote about this issue back in 2017, interviewing various people in administration: “‘With the new bins, it’s really hard to tell the trash and

recycling receptacles apart,' said Patricia Hurley of Rowan Environmental Action League (REAL)... When pizza boxes and other greasy cardboard get mixed in with clean cardboard, it can taint the whole bundle, landing it all in the trash. Contamination like this contributes to a quarter of the recycling stream being wasted" [2]. Simple mistakes such as confusion from labels prevent items from being recycled correctly and, as a result, leads to more recyclables being considered waste. Another issue is that there are not enough recycling bins in areas that receive a large volume of waste. According to the newspaper article, many areas lack recycling bins, which results in trash cans filled with recyclable items such as plastic, aluminum cans, cardboard, and food containers [2]. In addition, another article analyzing different colleges found that installing indoor recycling bins in locations such as classrooms increased recycling volume by 65%-250% [3]. These simple errors, such as throwing waste into the wrong bin, lead to unnecessary expenditures in sorting the trash and missed opportunities in being more environmentally friendly in waste management.

Rowan University works with a contractor named Waste Management (WM), who takes away the school's garbage. According to WM, they take the trash to the Wheelabrator, a waste-to-energy plant in Westville, where it is burned to create electricity to power approximately 12,000 homes [2]. While this current management of waste allows for the materials to be put to good usage, other studies refute the actions of incineration of waste and plastics. According to a study done under Yale Climate Connections, waste incineration has the largest climate impact since it can potentially release thousands of pollutants into the air [4]. Recycling falls under waste management, which, on a broader scale, is indirectly linked to the much larger problem of climate change. Climate change has been itself a dilemma across the scientific community. In 2018, the intergovernmental Panel on Climate Change stated that the worst impacts would be felt by the children and elderly in vulnerable populations; climate change not only poses a threat to physical well-being by limiting food and water supply but also to mental health, increasing the fear for an uncertain future [5]. Though many of these effects are examples of serious consequences, they can already be seen taking place at college campuses.

Cycling back to how this all interconnects with recycling at a college campus, it is logical to assume that this issue of recycling not only happens at Rowan University but also across all U.S. colleges. However, it is important to be the voice and step up to take action against the negligence of the plastic waste problem at one university for other universities to follow suit. Recyclables mixing with actual trash, due to the confusion and lack of recycling areas, costs the campus an unnecessary amount of expenses. Combined with the fact that the campus is steadily growing every year, this issue will only continue to grow until it becomes a serious problem. In the words of a fellow student, Kayla Bensley, when asked what her school could do to improve recycling, she answered: “Rowan could do everything better because they do not do anything. When I lived in [the freshman dorm] there weren't any recycling bins on my floor at all, and it is concerning how little they care. I am also pretty sure they do not recycle things put in recycling bins.”

## **Objective**

In order to be able to increase the recycling rate at Rowan University, there has to be a plan put in place. The start of every plan to raise awareness requires an introduction of the problem to the campus community. As seen in other places similar to this university, a SWACO poll in central Ohio shows that “most residents think that recycling at home is convenient (81%), but nearly half (49%) report confusion about what items can be recycled.” [6]. This shows that people around the country need to be educated on what needs to be recycled. This also is a problem at Rowan University. We propose this will be done by a discussion to the freshman during the summer orientations held by Rowan University. There will need to be a knowledgeable university professor hired for this to give the presentation and a time slot allotted during the first day the students are there. A 30-minute presentation will be enough to communicate most of the information effectively. Also when students are moving in at the beginning of the semester, there will be a pamphlet of what can and cannot be recycled left in each dorm, which will also be given out during orientation as well. This pamphlet will include places on campus and in the dorms where students can recycle, what all the recycling numbers mean, common recycling information, as well as the recycling rules for the state. Additionally, to

help discourage the use of plastic straws, there will be a metal reusable straw left for every student in every dorm as well. They will be accompanied by the pamphlet to encourage students to read about the recycling program after seeing the reusable straw.

On Rowan University's outdoor campus there are 74 trash cans and only 30 recycling bins across 800 acres, which would be 0.0375 recycling bins per acre, so small that it is hardly imaginable [1]. This is a large disparity that encourages the students to use trash cans rather than recycling bins. In order to change this, there will be a need to match the number of trash cans with recycling bins, adding 44 more. Since most people, if they do not see a recycling bin, will throw the recyclables in the trash, each of these trash cans will be placed near or next to existing trash cans. We would prefer to be able to buy a fresh new 74 recycling bins so that they will not be attached to the trash cans like they are currently. This will prevent people from accidentally throwing trash into the recycling making the whole can non-recyclable. All 74 bins will be the color blue and have 'RECYCLE' painted on the top making it very easy to identify as a recycling bin. We would also like to have more indoor recycling bins available in all academic buildings, the Student Center, and all residential halls, but this is left up to the university to decide how many they want in each location based on the number of students who are in those buildings on a daily basis.

Inside the university's campus buildings, there will be new posters to enforce the continued use of recycling. 13 posters 24in x 36in that display messages to encourage the use of recycling and describe how it helps the environment will be placed around the campus dining facilities.

## **Technical Approach**

Our two biggest plans of action revolve around reducing plastic waste and increasing the understanding and convenience of recycling at Rowan University.

For a recycling program to be successful, it must target changing people's behaviors, and teaching people and increasing convenience are two of the best methods to change behaviors [3]. The addition of more recycling bins outdoors and indoors will increase convenience. Additionally, color-coding them blue and having 'RECYCLE' painted on the top makes it so they can see at a glance that they are for recycling. This especially helps because of the many people that did not recycle because they were confused about what can be recycled and the 74% of people that threw recycling into the trash can because there were no recycling bins nearby. When asked the question: "Do you think that people don't recycle as much due to the confusing labels of each recycling item?", all seven of the interviewees responded that the labels are confusing and the lack of understanding contributes to the lack of recycling. Outside, there will be a recycling bin located near every trash can so that no one must travel excessive distances to find a recycling bin, therefore increasing convenience. Indoors, there will be at least two recycling bins in each large dining hall and at least one in the small dining areas in the class buildings. For other locations in buildings, the number of recycling bins will be determined by occupancy. By simply increasing the convenience of access, recycling is expected to increase drastically [3].

To increase understanding, all students, faculty, and administration will be sent information regarding what can and cannot be recycled and where they can be recycled. The flyers every incoming student will receive at orientation will display where recycling bins can be found and what items can be recycled at Rowan University. This is a quick and easy way to educate students so that they are able to recycle with no confusion or mistakes. As stated, misplaced items can even contaminate properly recycled items; teaching will prevent that. This information is spread also through a flyer in the move-in information folder and on posters in large communal areas. Some that should be included are in all the dining halls, the Student Center pit, and the residence halls. The university announcements could also include this information in emails. Other possible methods could be creating an app or holding a recycling event. A recycling event would increase participation, which is linked strongly to successful programs [6, 12]. Spreading this knowledge is especially important given the huge difference in

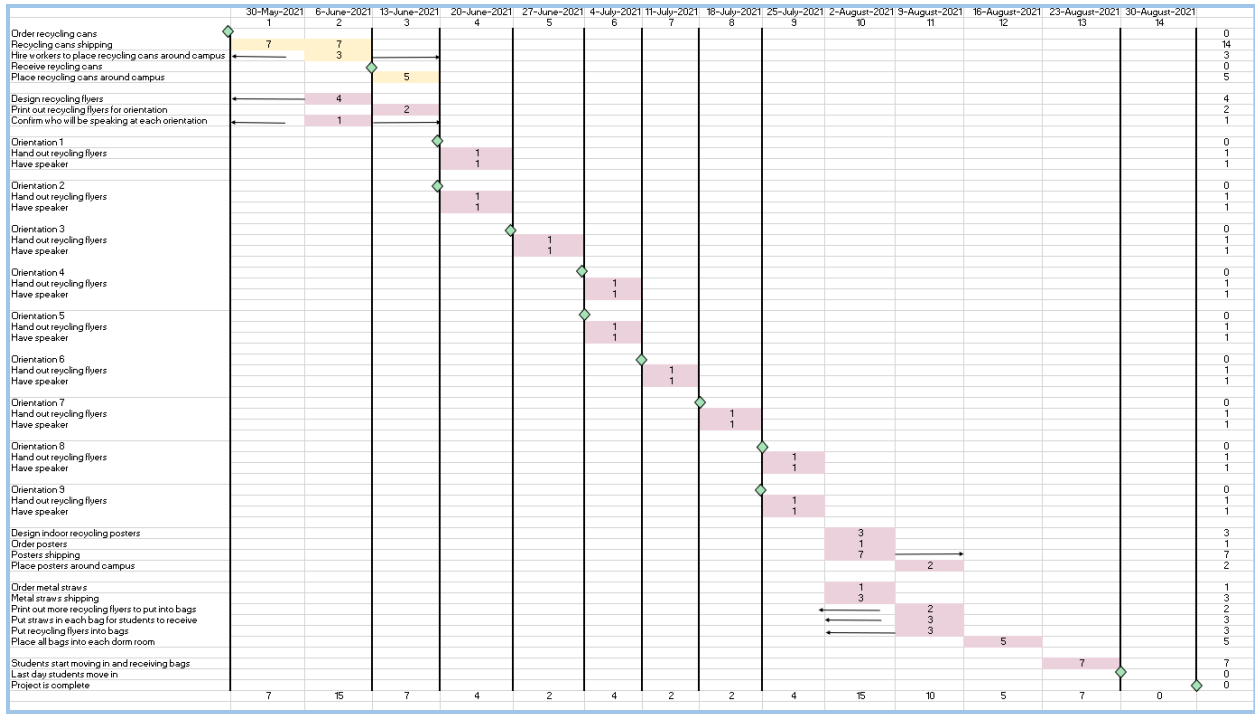
what can be recycled and how it can be recycled depending on where someone lives; the campus includes people from many different locations and backgrounds.

To reduce plastic waste, one step would be to stop providing plastic straws in dining areas. Each student and faculty member would instead be given a free metal straw. We understand that some require these items, so they will still be provided with the necessary accommodations. For example, if a person who needs these items does not have them on hand, then they may request the item and receive it. Additionally, the cost of buying plastic straws would be almost eliminated.

The success of this project will be measured in two parts: comparing the volume of trash to recycle and conducting another survey to view student and faculty outlooks. Comparing the volumes gives quantitative data to demonstrate the progress while knowing people's outlooks can help explain the current status and how to improve. For example, if the general consensus is still that it is confusing, then further instruction needs to be given. It could be through more informative meetings or signs. The quantifiable success will be determined as when the recyclable waste found in the trash makes up less than 10% of the waste and when a positive consensus of at least 85% of faculty and students is reached through surveys.



# Schedule



# Budget

The overall budget for these changes would average about \$46,093.72 without added labor costs. The largest part of this budget is for replacing all current outside recycling bins and adding enough to equal the number of trash cans. Instead of just adding 44 more recycling bins, they all will be replaced so that they all look the same to prevent confusion between the recycling bins and trash cans. 74 blue metal recycling bins, as shown in Appendix A Figure A.2, cost approximately \$39,134.90 with an added \$4,528.77 from tax and shipping costs to be a total of \$43,663.67 [7]. The cans will also display ‘RECYCLE’ on the top as extra help to students.

The next largest cost for our planned solutions is the metal straws, as shown in Appendix A Figure A.1, given to each on-campus student in the room when they move in for them to use instead of plastic straws. To determine the number of straws needed, we counted each bed in each residence hall and apartment complex. The residential halls’ occupancies are Chestnut (384), Evergreen (250), Holly Pointe Commons (1,415), Magnolia (201), Mimosa (310), Mullica

(107), and Willow (203), and the apartment complexes' occupancies are Edgewood Park (372), Rowan Blvd (884), Townhouse (464), Triad (378), Whitney Center (280), and the International House (12)[1]. This gives a maximum total of 5,260 students living on campus. On average, a pack of 100 metal straws costs \$35.00 [8]. If enough straws were ordered for each on-campus student that brings the total of 53 packs of one hundred straws to \$1,885. This leaves only 40 straws leftover, and it would be up to the administration whether they want to order more packs to keep at places like the Student Center and the dining halls to minimize the number of plastic straws being used.

Next are the flyers that we would like to place in each room on campus along with the straws when students move in. Using the calculations from the straws, we need 5,260 recycling flyers to give to each student living on campus as well as a maximum of 4,003 freshmen [9] who would receive the flyer at orientation. The number of freshmen was estimated by dividing the estimated number of undergraduates by four. Since a printed black and white page is about \$0.05[10] this would be \$463.15. Following that is the price of the 24in x 36in recycling posters. We plan to put 13 posters total throughout all the dining halls and at each of the other food stations. Each bond paper colored ink poster would cost about \$6.30 [11] to print bringing the total for all 13 to be \$81.90.

Additionally, someone, such as a professor or administrator, should speak at orientation about how important recycling is and what each student needs to do to recycle more. The Dean of the School of Earth & Environment would be perfect for the speaker role.

## **Expanding**

This study can be applied to any school or even other places of gatherings in general. The main steps that must be taken are to determine the public's opinions about the current status of recycling and to understand the place's current recycling processes. Some specific considerations should include the people's confusion and level of trust. Confusion indicates how much more instruction must be given, and this instruction must be regionalized since recycling practices

change depending on location. The level of trust can be improved by increasing community participation in the planning and implementation process [12]. Some core recommendations for enacting this study in other places are to provide a recycling bin near every trash can, ensure the recycling bins are clearly distinguishable from the trash cans, and put up informative posters or signs nearby. The specific implementation process, budget, conditions, and schedule are place-specific, depending heavily on the location, size, funding, and community.

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## Appendix A

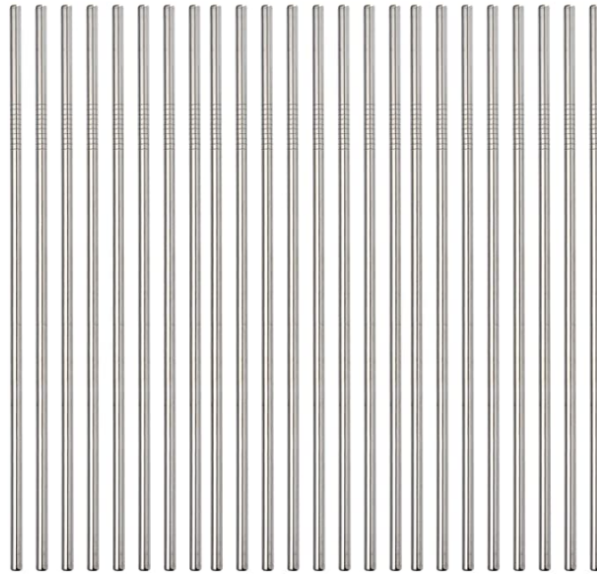


Figure A.1. Metal Straws that will be bought in packs of 100 [8]



Figure A.2. Blue recycling can with 'RECYCLE' displayed on top [7]