



## University of Wisconsin-Whitewater - 2019 RecycleMania Case Study

1. Contact info:

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2. Focus of Case study

Would the recycling rates inside Heide Lecture Hall be improved if the small classroom trash and recycling bins were replaced with larger recycling infrastructure located in the hallways?

3. Detailed description of campaign component:

Our lecture classrooms currently have a small trash and recycling bin located near the doorway. The spring 2019 Environmental Science Capstone class conducted research to find ways to increase the recycling rates on campus by studying the effectiveness of these bins and testing alternative options that may increase the recycling rate within our lecture halls. The research involved removing these small bins from the second and third floor of Heide hall and replacing them with large bins that are now located in the hallways. Four waste stations were added to the second floor, and each station was comprised of a 23 gallon trash and recycling bin with lids that encouraged proper waste disposal and signage saying what waste belongs in each bin. The third floor also had 4 waste stations, but they were comprised of three 23 gallon bins, a grey bin for landfill waste, blue bin for cans and bottles, and a green bin for paper. The first floor served as the control for the experiment, meaning the small bins were left inside the classrooms and no hallway bins were added. Weekly waste audits were conducted to measure the results of each set up.

4. Planning steps & timeline to implement:

1. Figure out the scope of the project

a. What floors would bins be added and removed from

i. 1<sup>st</sup> floor: Served as control (no change)

ii. 2<sup>nd</sup> floor: Remove small bins and replace with recycling and landfill bins

iii. 3<sup>rd</sup> floor: Remove small bins and replace with paper, cans and bottles, and landfill bins

b. How would we collect data for each set up (brackets indicate what the specific weight was called in the spreadsheet and all weights were measured in kg)

- i. Collect the trash and recycling on all three floors every Monday and Tuesday evening
- ii. Weigh the first floor trash and recycling separately and record (original totals)
- iii. Separate out all the recycling that ended up in the trash (trash stream contamination)
- iv. Weigh the wrongfully disposed of recycling (trash stream contamination) and reweigh the trash (properly disposed trash)
- v. Separate out the trash that was disposed of in the recycling bins (recycling stream contamination)
- vi. Weigh the wrongfully disposed of trash (recycling stream contamination) and reweigh the recycling (properly disposed recycling)
- vii. Repeat steps 2-5 for the 2<sup>nd</sup> floor
- viii. Repeat steps 2-5 for the 3<sup>rd</sup> floor then...
- ix. Separate the trash out of the paper stream
- x. Weigh the amount of trash (paper stream contamination) and reweigh paper stream (properly disposed paper)
- xi. Steps 1-10 were carried out 14 times throughout the study

c. Data interpretation

- i. Once the data from all 14 samples were added to the spreadsheet we needed to figure out the contamination of trash in the recycling bins and contamination of recyclable material in the trash bins for each floor.
- ii. The average recycling in the trash contamination rates for each floor were found by adding up all the trash totals on the first floor, subtracting out the amount of recycling that ended up in the trash, and dividing by 14.
- iii. We did this for all the floors and the average percentage of contamination of recycling in our trash stream can be seen in the bar graph on figure 5.
- iv. The same process was done for the trash in recycling and those results can be seen in figure 6.
- v. We then found our p value, using a tukey test to discover if there was a significant difference within the 3 floors.

d. Research Presentation

- i. Once our data was analyzed, the group wrote a research paper to explain our findings.
- ii. We also presented our findings to the Environmental Science department.

5. Resources and stakeholders involved

The budget for this project was provided by the UW-Whitewater Sustainability Office. The 20 large garbage bin and lids were purchased from Webstaurant.com for \$800. This project was carried out by coordinating pick up times with the Environmental Capstone course students and UW-Whitewater Custodial Team.

6. Describe the Results of this campaign component

- a. General results (*ex: attracted attention of campus president, campus paper did a news story on the event, etc.*)

This project was seen by hundreds of students and staff that operated in Heide Hall. The results were shown to the Environmental Science department, custodial leads, and Facilities Planning and Management. The students recommended implementing these centralized waste stations in other lecture halls because of the

increase of properly disposed recycling material, and decrease in contamination rate in the waste stream. The custodians the worked on the second and third floors preferred the new set ups because they were much quicker to empty, and the time savings was used to clean their assigned floors more thoroughly.

b. Specific measurable impact figures, if applicable

The amount of recyclable material that ended up in the trash stream averaged 20% on the first floor, 9% on the second floor, and 7% on the third floor (figure 5). The average contamination rate for trash in the recycling stream on the control floor was 31%. The removal of the small garbage bins, and replacement of the 2 bin system on the second floor resulted in a 20% contamination rate for trash in the recycling stream. The 3 bin system on the third floor resulted in 13% contamination for trash in the recycling stream. All lecture halls on campus are currently serviced by the control set-up, but implementation of the second floor set up could decrease contamination of trash in the recycling stream by an 11%, and implementing the 3<sup>rd</sup> floor set up could potential decrease contamination by 18% (figure 6). We found a significant difference in contamination rates for the first and second floor and the first and third floor, but no significant difference between the second and third floor.

7. What would you do differently in the future?

Some limitations from this study was the amount of time we had to work with. The study was conducted over 7 weeks, but a longer study could have seen different results. Many of items that ended up in the recycling stream, but were not recyclable, were wax lined paper coffee cups. In the future, we would specifically state this item on the landfill sign instead of only putting “disposable cups.”

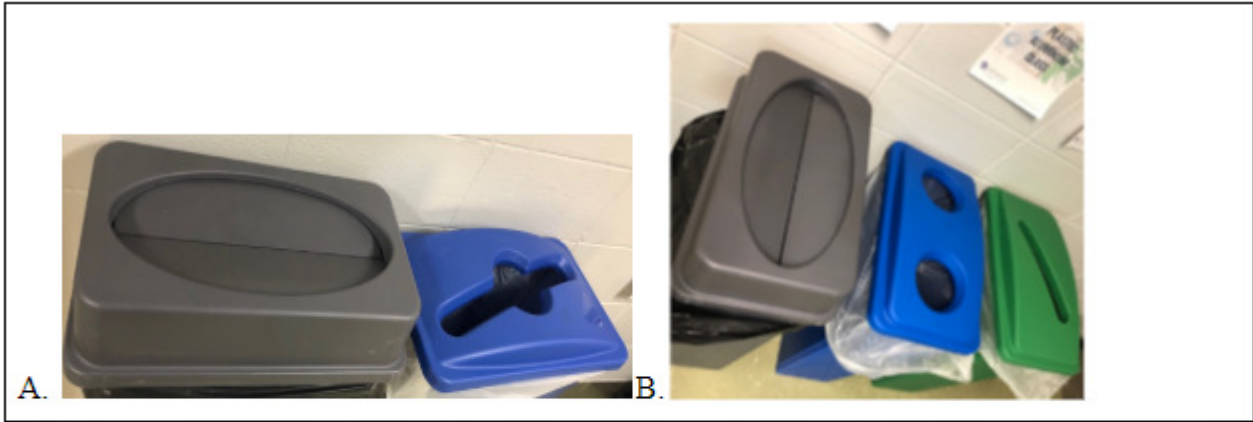
8. What advice would you give to another college that wanted to do a similar effort?

I would recommend that other colleges preform a similar test to see if it has the same results as it did on our campus. If they found that the removal of the classroom garbage bins has a positive result on their recycling rates, I would recommend removing them in all lecture halls and replacing them with large dual stream bins centrally located throughout the hallways. This experiment increased the recycling rates for Heide Hall and hopefully gave students a better understanding of what materials should be recycled. I believe the lids helped shaped the behavior of students because they had to make a conscious decision as to what bin there trash belonged in. The signage is also important for shaping behavior, recycling can be confusing but it is much easier when the correct procedure is written out in front of them.

9. Photos and Graphics



**Fig. 1:** *These are the bins we used during our experiment. (A) are the small garbage and recycling bins located on the first floor: (B) are two stream stations used for waste and recycling located on the second floor. (C) are the three-stream waste bins used for waste, cans, bottles, and paper products located on the third floor.*



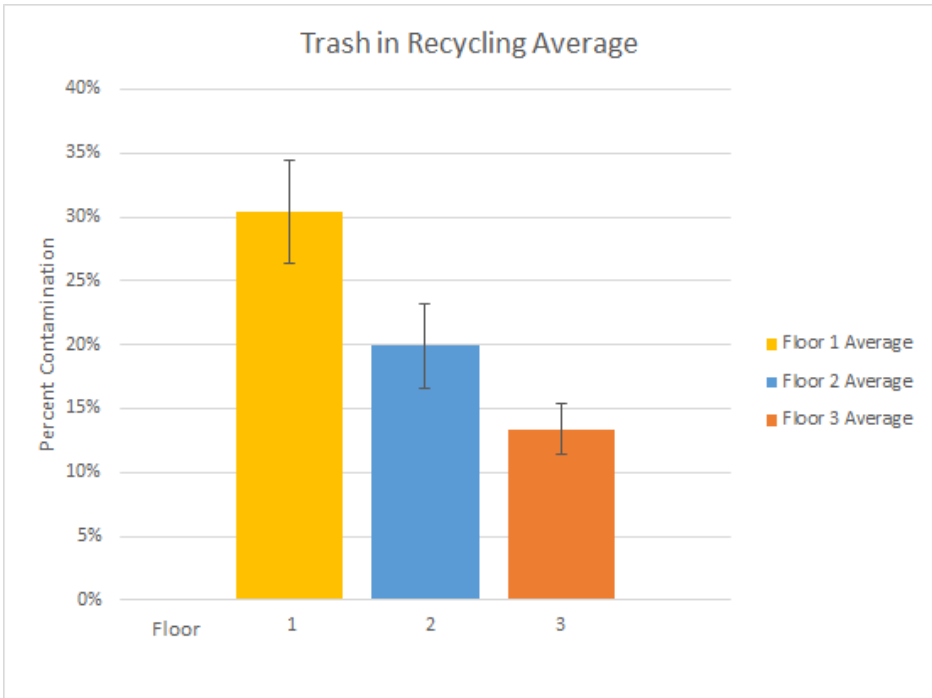
**Fig. 2:** *(A) shows second floors lids shape. The trash bin (grey) lid has the ability to open wide accepting various things. The recycling bin (blue) has a long and circular shape to only accept recycling shaped material (ex. Paper and cans). (B) shows third floors lids shape. The trash bin (grey) lid has the ability to open wide accepting various things. The cans and bottles bin (blue) have two circular entries so that only cans and bottles could be disposed. The paper bin (green) has one long, thin entry so that only paper products could be disposed.*



**Fig 3:** Signage that correlates with each bin.



**Fig. 4:** The graph shows the average percentage of recycling that was disposed into the trash stream per sample, with the standard error represented by the brackets on each bar.



**Fig. 5:** *The graph shows the average percentage of trash that was disposed into the recycling stream per sample, with the standard error represented by the brackets on each bar.*