

Table of Contents

Background	3
Theory and Device Design	4
Construction	9
Implementation	10
Reflection	11
Conclusion.....	12
Works Cited	15

Background

Initially our group had the intention of separating trash to mitigate the amount of waste that our high school sends of H-Power and subsequently the landfill. We were inspired by the multi-compartment trash cans at WholeFoods that strongly encourage people to sort their waste instead of throwing everything into one container. However, following our conversation with Mrs. Slagel, our group decided to forgo our first proposal of setting up recycling and compost bins closer to the already existing trash cans in Kōnia as we did not expect to see the results that we hoped to in the time frame that we had. We came to the conclusion that it was too big of a task to not only set up the new bins but also get the students and faculty to use them in a matter of ten weeks.

The following week Amy Brinker, the head of sustainability for all of Kamehameha, came to our class to help us in the early stages of our project. We informed her of what our group wanted to do at first and how at the moment we had no clue what we were going to try to “make Kamehameha a better place.” During the conversation that we had with her she introduced us to the idea of taking just one item out of the trash cycle, specifically cardboard. Shortly thereafter our group decided that this would be our undertaking. Amy had informed us that kalo farmers in Hakipu‘u are having to buy cardboard to keep the weeds down on the kuāuna, or mounds that separate the different lo‘i patches. Our goal for this project then became to collect as much cardboard as we could on our high school campus and give it to kalo farmers and other individuals as this would still reduce the amount of cardboard waste that KS sends to H-Power and alleviate some financial burden from the farmers because they would no longer need to pay for the cardboard.

Theory and Device Design

Prior to this project we had no clue that 24.1 million tons of cardboard is discarded and thrown away every year in America. Mr. Slagel, an English teacher and Cat and Dog Club advisor, notified us that much of the cardboard that is collected on our upper campus is put in the green bins under the stairs by his room. His wife went on to tell us that in 1988 she initiated the overall recycling program at our school. Over time it has evolved, but it remains completely voluntary on the part of the teachers. Mr. Slagel said that some weeks people drop off a lot of cardboard into his green bins, but other weeks there isn't so much. With this project we planned on monitoring the amount of cardboard that accumulates at three different spots: Mr. Slagel's green bins, 'Akahi, and the Print and Copy Center. From there we wanted to communicate with different kalo farmers and organizations that are currently, or are considering using old corrugated cardboard to keep weeds at bay to inform them of when and where they can pick-up cardboard from our campus.

As shown in below in Fig. 1¹, starting on Monday, April 24, we began checking the green bins near Mr. Slagel's office every Monday. This is because the West O'ahu Aggregate Co. Inc. comes up to campus every Tuesday to haul away these paper recyclables. Mrs. Slagel informed us that the school now has a contract with the West O'ahu Aggregate Co. Inc. (WOA) and that we pay them \$300 every week. This money is derived from the money that students pay at traffic court for parking violations and such. If we are able to significantly reduce the amount of cardboard, the primary item that WOA

¹ The difference between Fig. 1 in this report and Fig. 1 in our detailed design is that Fig. 1 in our detailed design was what we planned on doing whereas Fig. 1 here is what actually ended up happening

picks up, then perhaps they will be able to come bi-weekly instead of weekly, meaning that the traffic court money could be allotted to other projects on campus.

Monday	Tuesday	Wednesday	Thursday	Friday
<p><u>April 24</u></p> <p>Mokauea learning trip</p> <p>Collected data on how full the green bins are near Slagel's room</p>	<p><u>25</u></p> <p>Emailed Amy Brinker to get contact information for farmers interested in using the cardboard we collect</p>	<p><u>26</u></p> <p>Began taking notes on where cardboard accumulates on campus</p>	<p><u>27</u></p> <p>Continued taking notes on where cardboard accumulates on campus</p>	<p><u>28</u></p> <p>Continued taking notes on where cardboard accumulates on campus</p>
<p><u>May 1</u></p> <p>Collected data on how full the green bins are near Slagel's room</p>	<p><u>2</u></p> <p>Met with 'Akahi and Print and Copy Center</p>	<p><u>3</u></p> <p>Reached out to Kai Waine'e and Alison Leary</p>	<p><u>4</u></p> <p>Began going around campus to collect cardboard ourselves</p>	<p><u>5</u></p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Emailed Amy Brinker again as she had yet to respond to previous email</p>
<p><u>8</u></p> <p>Collected data on how full the green bins are near Slagel's room</p> <p>Continued going around campus to collect cardboard ourselves</p>	<p><u>9</u></p> <p>Amy Brinker responded and gave us Taylor Kellerman's contact information</p> <p>Emailed Taylor Kellerman</p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Began planning out presentation</p>	<p><u>10</u></p> <p>Emailed Kai Waine'e again as he had yet to respond to previous email</p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Continued planning out presentation</p>	<p><u>11</u></p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Continued planning out presentation</p> <p>Called Taylor Kellerman</p>	<p><u>12</u></p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Continued planning out presentation</p>
<p><u>15</u></p> <p>Collected data on how full the green bins are near Slagel's room</p> <p>Continued going around campus to collect cardboard ourselves</p>	<p><u>16</u></p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Continued planning out presentation</p>	<p><u>17</u></p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Finished up presentation and began timing it out</p>	<p><u>18</u></p> <p>Continued going around campus to collect cardboard ourselves</p> <p>Practiced for presentation</p>	<p><u>19</u></p> <p>Ho'oulu iā Kamehameha Presentations</p>

Continued planning out presentation	Texted Taylor Kellerman as he had not called back			
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Figure 1. Schedule of what our group did during the last four weeks of the project.

Also shown in Fig. 1 is when we ended up talking to Christa Collins, the Flik director. We had emailed Alejandro, who runs the 'Akahi kitchen, but he forwarded our email to Ms. Collins as he thought that she would be more valuable to talk to than him. When talking to Ms. Collins she was quite excited to be part of our project, her only reservation was how the cardboard would be stored until it was picked up. We mentioned that we were already going to get in contact with Kai Waine'e, the head of grounds support, and would mention this minor predicament to him. Half an hour after our meeting with Ms. Collins we had a meeting with Cynthia Saelua down at the OSC. We didn't get the same response from Ms. Saelua as we did from Ms. Collins, which was a little difficult, but she had good reason. She said that when project are sent to the OSC they printed, then repackaged in the same containers that the original blank paper came in. Unfortunately, the reason why we chose not to focus our efforts here was because Ms. Saelua said that one the boxes leave her office they are out of her control and in the hands of whatever department ordered them. She noted that if we still wanted to use those boxes from the OSC it would be smarter for us to talk to the different high school departments that order bulk prints from there. Our group also had planned to help Amy Brinker and one of her colleagues Jen conduct a waste audit on campus to find out exactly how much cardboard is making its way into the trash cans in upper, but due to conflicts in our schedules we were unable to do so.

The reason why we chose to first focus our efforts on getting the cardboard to kalo farmers is because Amy Brinker said that many of them are already using cardboard to

keep down the weeds, but they are having to buy the cardboard, cutting into their already small profit margin. On April 14th Kiana and Maka spent the day at Ho'okua'āina, a lo'i located at the foothills of Olomana, run by Uncle Dean and Aunty Michelle Wilhelm. While there they noticed that a number of his kuāuna are covered with plastic tarp. When asking him what the purpose of the tarp was, he said, "Just like in the lo'i the weeds come. We have so many patches that I don't got time to weed every one every single day, so I lay the tarp. Without the tarp sometimes the weeds grow so tall, [you] can't even see the kalo in the patches. We buy rolls of this stuff from Hardware Hawai'i." They questioned his use of tarp compared to other materials and his response was, "Yeah, I've heard of other guys using cardboard and fiber mats, but that's expensive. Tarp, tarps cheap."

From the experience that they had at Ho'okua'āina, Uncle Dean and many other like him would greatly benefit from using the cardboard that our school is currently shipping away using barrels of gallons of oil. Not to mention that cardboard is a paper product that over time will disintegrate and become part of the land again, unlike the plastic tarp that will stay as plastic forever and add to the landfills. AJ Feducia, a writer for Flux Hawai'i, interviewed Zachary Nathan, a farmer who is utilizing cardboard to prevent weeds from overtaking his plants. He says, "We're trying to mimic nature. We cut cardboard [up] to smother weeds and give the topsoil a chance to rejuvenate." As seen in Fig. 2, Fig. 3, and Fig. 4, below Uncle Dean uses quite a bit of plastic tarp, so by people like him utilizing our old cardboard, it is like killing two birds with one stone.



Figure 2. Rachel, an intern at Ho'okua'āina, carrying buckets for weeds on the tarp covered kuāuna. It gets quite hard to walk on the tarp when it heats up from the sun beaming on it all day.



Figure 3. Sitting on the tarp covered kuāuna at Uncle Dean's lo'i.



Figure 4. Uncle Dean working in his lo'i in Maunawili where he must cover the kuāuna with plastic tarp, a cheaper, but non-biodegradable alternative to cardboard to block weeds from popping up.

Construction

Our group was able to put this project into effect with the help of many faculty and staff as well as with quite a bit of planning on our part. At first as we stated to Mr. Blake that our project was going to pertain to trash segregation on campus, however we realized that this idea is just too broad and unaccomplishable within the time frame given. So, to start this project our group had to begin with getting in communication with faculty around the campus to find out statistics about recycling and the materials we are trying to focus on. We made contact with the Slagel 'ohana who were a huge help in getting our project off the ground, especially Mrs. Slagel, as she guided us in our idea to disregard the trash segregation idea and go to work on our cardboard idea. From there we had to then start communication, which was the hardest step and by far the most irritating step. Kiana was

very diligent, sending out emails to Amy Brinker, about contact information and project ideas in general. Kiana then reached out to Christa Collins, director of Akahi, to see how we could stop their cardboard from winding up with their “regular” trash (ie. food waste, plastics, etc.). Following that Kiana set up a meeting with Cynthia Saelua pertaining to the use of their cardboard boxes at the OSC.

The biggest problem we ran into was adults not responding to our emails, specifically Amy Brinker and Kai Waine‘e / Alison Leary. Our teachers and other faculty members always stress the importance of checking our emails, but when it comes to them, I guess it’s just not the same. We could not stand waiting around and doing nothing because adults weren’t getting back to us, so instead we took the initiative and started collecting cardboard ourselves. Then, less than two weeks before our presentation date Amy Brinker emailed us back and put us in contact with Taylor Kellerman, a lo‘i farmer located in Hakipu‘u. He emailed us within hours of Amy forwarding our email to him. We responded to his email, but he did not respond to our email. He wrote his phone number in the email he sent us, so a few days after not hearing back from him we decided to give him a call. Oddly, he did not pick up, so we left him a voice mail. We are still unsure if Taylor Kellerman is interested in using the cardboard that we have been collecting, but we will reach out to him one more time before moving on and getting in contact with the next two lo‘i on our list, which are Ho‘okua‘āina and Punalu‘u.

Implementation

The project we were assigned was to bring notice to a problem on our campus and come up with a positive solution to solve it. Our campus has to supply over three thousand students and staff, the output of cardboard boxes and cardboard material is significant to

the use that can be recycled. We wanted to put to use this excess cardboard with the help of faculty and staff in different departments around our campus. As a group we took it upon ourselves to go and get the cardboard, because the original system that we wanted to implement did not come to fruition due to the lack of response from Kai Waine'e. Dylan and Kama did a good job at this going from department to department on the lookout for cardboard. Every day as a group we would go out collecting any cardboard we could find. We noticed that at after the first week of collecting cardboard ourselves that the SPC was the biggest contributor, giving us access to unlimited amounts of cardboard that is back in their storage room.

The area that we have been keeping the cardboard that we have been collecting is getting pretty full. We are waiting until May 20 to hear back from Taylor Kellerman, because Amy Brinker had put us in contact with him. However, we already know that Uncle Dean is more than interested in using cardboard because he has never tried this technique of weed control before. This project has the potential to serve people all over the island. Our project can be very useful for any farmers who need it as weed mitigation and as a group that is our mission to help those in need.

Reflection

Overall, this experience has taught us the importance of communication. We have also learned how to be flexible. At first, our project was to be conducted on trash segregation. However, after speaking with Mrs. Slagel, we decided to specifically focus on cardboard. We thought we'd make more of an impact, and that it'd be easier to collect and store.

We set up meetings with 'Akahi and the Copy Center at Kekūanao'a. 'Akahi was more than willing to help us and donate their cardboard boxes, however, we had to provide a container and space for them to store the cardboard throughout the week. To do this, we had to work through our Operatives Team. After many emails, they weren't responsive. Our emails with Amy Brinker also took many attempts and days of waiting for a response. When we were finally able to touch bases with her, she directed us to a new contact, Taylor Kellerman who work at Hakipu'u Lo'i.

A majority of time of our project was spent playing the "waiting game". Although we weren't able to receive cardboard from the major areas on campus that we had planned, we still were able to find cardboard individually by going to different classrooms. We learned to be flexible and find solutions, instead of complaining about the problems.

From the beginning of our project, it was evident to us that adults are exactly like students. During our presentation at the faculty meeting up until the unresponsive emails, we learned that adults aren't perfect! If we were to do anything differently, it would be trying harder and pushing harder to get through our contact list.

Communication is essential for a successful project. It is also necessary to work with humility, stay calm, be patient, and always find the solution, instead of being a part of the problem. We didn't think at the beginning of this project that it'd be so difficult to collect cardboard, however, after running into different obstacles, we learned that nothing comes easy.

Conclusion

Ho'olako, the title of our specific project, means to supply, equip, furnish, or provide. Through our project we have accomplished what that title means and

more. However, our work is not finished yet. We want to create a lasting impact on this campus and try to keep this project going even when we are long gone. All the teachers we have been talking to around campus are becoming more aware of all their cardboard usage. Now they are cognizant of that and they know we are doing this project, so they just store all their cardboard on the side and wait for us to pick it up. It is pretty unreal to see some of the impact we are making already, and how helpful some teachers and adults can be when they are aware of what is going on. We would love to see a group like NHS or the Cat and Dog Huggers pick up our project next year where we left off so that all of the time and effort we put into it this year does not go to waste. NHS already picks up the blue bins from our homerooms every week or every other week, so we don't think that it would be too much to ask them to pick up one more item on their route.

Throughout this project we came across multiple speed bumps, notably communication and organization. We learned how to persevere in order to get in contact with the people that we needed to. The room that we are using to store our cardboard is not nearly full. It is amazing now to look back on all of the pictures that we took to see how the room went from being completely empty, to having just a few pizza boxes, and now barely being able to see the back of the room because there are so many boxes. All we had to do was be persistent and keep talking to the adults and sooner or later they were going to help us. Our project is quite significant as it is first cardboard specific recycling project on our campus. Never needing to use cardboard on campus again is a nice thought, but at the moment it is simply not feasible. Our group feels that while our school continues to use cardboard, the least they can do is recycle, or more specifically repurpose it when they are done. There are no cardboard recycling plants on the island,

so it would need to be shipped to Alabama or another state that does have one. However, the cardboard would first need to travel by plane or ship to get there, which we believe somewhat defeats the point of even recycling it. By giving the cardboard we collect on campus to lo'i farmers and other individual who are interested in using cardboard as a natural weed mat, we alleviate the need to shipping it.

Once we coordinate a regular pick-up with the farmers, our project will have almost an immediate positive impact on the community, and helping the community is all we could ever ask for in a project.

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