

Are Awareness and Convenience The Main Factors Inhibiting Progressive Recycling
Behaviors on Carthage College's Campus?

By

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Abstract

The discussion of sustainability can be directly applied to businesses, and even more narrowly, colleges and universities. With these institutions in place to help promise better futures, it's only fitting that they too are engaged in sustainable decision making. In 2016, the United States reached a staggering 215 kilograms of paper use per person (State of Global Paper Industry). In recent years, over 400 million tonnes of paper was consumed globally within the year (State of Global Paper Industry). Far too often, businesses associate the concept of “going green” with losing profit. Businesses with intent to grow and last can greatly benefit from integrating this sustainability into their planning. So far, there have been various higher education institutions around the United States developing ways of reducing their paper waste. A closer look into Carthage’s progress thus far found what was working and what was missing in terms of waste reduction. Two major factors are concluded to be imperative in making Carthage a more sustainable campus: awareness and convenience. These factors are analyzed through conducting a campus-wide survey that addresses the recycling behaviors and paper usage of students, faculty and staff at Carthage College.

Introduction

People commonly advocate the idea that one person can make a substantial impact. This idea is promoted for better work ethic, involvement, and most of all, hope. What requires addressing then, is not that a person can make an impact, but how to do so and why they should do it. An issue that requires many people to make this impact is the constant degradation of the Earth. Oftentimes, when asking people to become more sustainable, an additional motive aside from preserving the Earth and its resources is needed. A fairly universal motive is that of material wealth. It serves the purpose of being a visible and tangible incentive. Applying a price tag to the need to conserve may seem like an unorthodox strategy of persuasion, but it may be the most effective way in reaching multiple discourses. The dilemma of the why's and how's of sustainability can be directly applied to businesses, and even more narrowly, colleges and universities. With these institutions in place to help promise better futures, it's only fitting that they

too are engaged in sustainable decision making. The amount of resources consumed and left unreplenished every year by higher-education institutions is insurmountable. In the time span of 2015-2016, there were 7,021 degree-granting institutions recorded in the United States, all contributing varying levels of waste to landfills (Educational Institutions). As these institutions are currently educating and housing future degree holders, it can be overwhelming to truly acknowledge the amount of waste created, and the potential number of waste-eliminators. This paper focuses on one category of that waste, paper.

Literature Review

1. Paper

Due to its mass production and usage, taking paper for granted has become a worldwide dilemma. In 2016, the United States reached a staggering 215 kilograms of paper use per person (State of Global Paper Industry). A standard sheet of A4 paper can require the consumption of up to twenty litres of water in its production process (State of Global Paper Industry). Despite the unsustainable water usage and decline in forest ecosystems, humans are still using and abusing paper materials at an increasing rate.

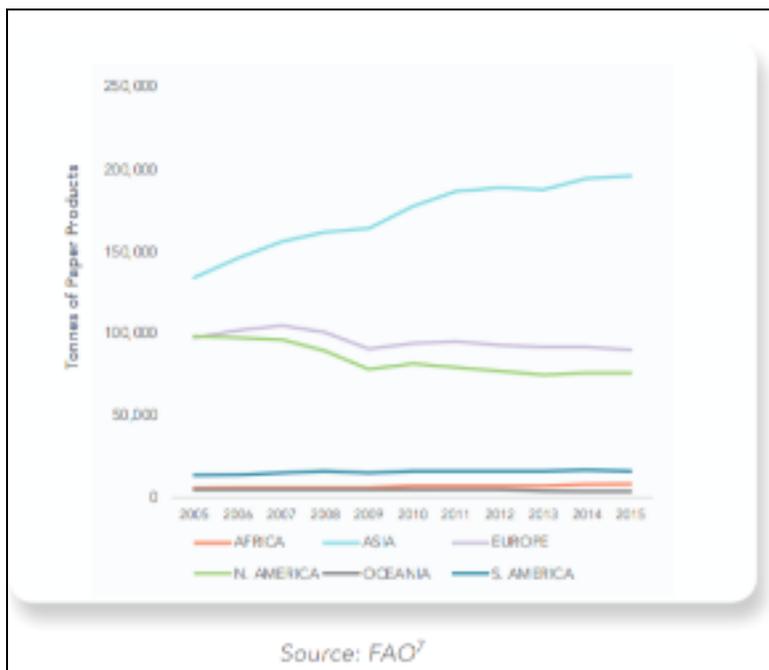


Figure 1. The global annual paper consumption per region in tonnes

Figure 1 depicts the paper usage per region from 2005-2015. As displayed, Asia has rapidly increased its consumption over the fifteen-year span, while other regions have had more gradual trends in their paper usage.

The effects of the growing consumption can be in part measured by loss of forest coverage. Figure 2 and Figure 3 illustrate the global change in forest coverage over a 25-year timeline.

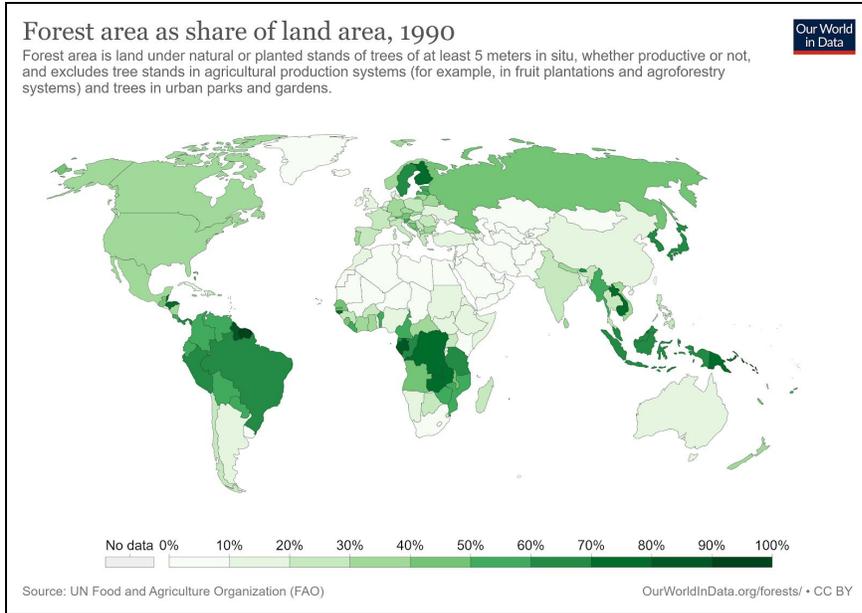


Figure 2. Global forest coverage in 1990

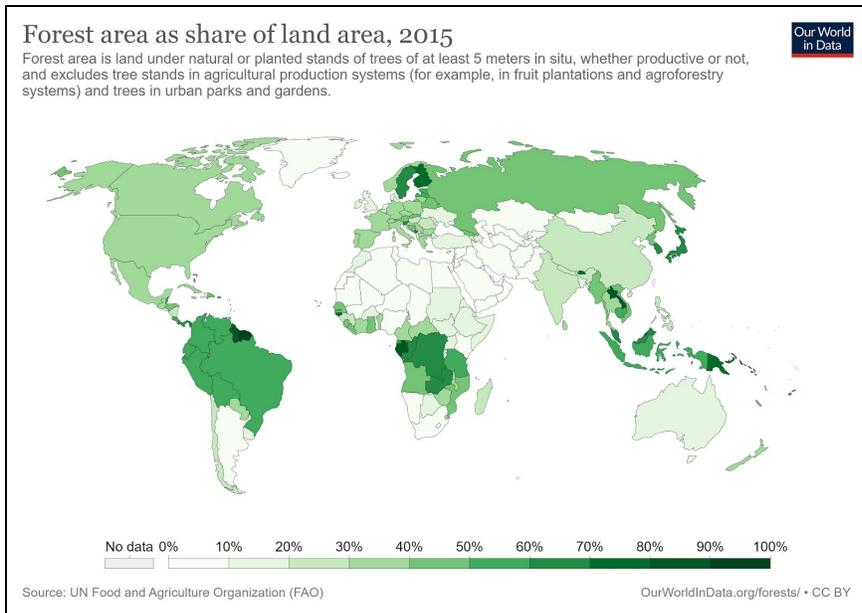


Figure 3. Global forest coverage in 2015

The darkness in shading resembles the density of forests. Figure 2 displays data from the year of 1990, and Figure 3 displays 2015’s global data. While some areas are fairly consistent in their coverage, such as North America, other regions including South America and Asia have a clear decline in forests. There are several reasons for this difference, including law, trade, and regional values. Increased focus on the production of paper is needed, in order to develop more sustainable means of production. There needs to be a greater shift away from the use of virgin fibre in creating the pulp for paper production. An alternative to virgin fibre is producing pulp through wood alternatives, such as agricultural waste fibre (State of Global Paper Industry). These alternatives should be further implemented into the pulp production process, because of the destruction that virgin fibre use creates in the environment. According to the Environmental Paper Network, “burning of trees for energy for pulping is the single biggest source of emissions by the industry.” An increased recyclable content for paper products also needs to be in development. The recyclable content in newsprint and packaging is just over fifty percent, whereas the amount recyclable in printing and writing paper is eight percent on average (State of Global Paper Industry). The responsibility of creating change falls on everyone, however companies that purchase paper should be particularly aware of where the fibre is sourced, and are responsible for their awareness of other alternatives to virgin fibre as a means of paper production (State of Global Paper Industry). Figure 4 demonstrates the impact that converting from virgin fibre to recycled paper has in terms of saving energy.

	1 metric tonne of 100% RECYCLED PAPER instead of virgin paper SAVES	1 metric tonne of 100% RECYCLED NEWSPRINT instead of virgin paper SAVES
FRESH WOOD AND EQUIVALENT TREES	4.4 metric tonnes of wood, equivalent to 26 trees	2.3 metric tonnes of wood, equivalent to 14 trees
TOTAL ENERGY	39%	23%
GREENHOUSE GASES	58%	64%
WATER USAGE	9%	25%
OCEAN ACIDIFICATION	56%	74%
HAZARDOUS AIR POLLUTANTS (HAP)	13%	46%
MERCURY EMISSIONS	20%	38%
DIOXIN EMISSIONS	26%	93%

Figure 4. The energy saves by transitioning from virgin paper to recycled paper

As displayed, the implementation of recycling targets a wide range of environmental concerns, including greenhouse gases, water usage, ocean acidification, and overall pollution levels.

2. Sustainability

There are multiple ways to describe sustainability, as different environments require more or less complex living situations. The most highly recognized definition for the term is from the UN World Commission on Environment and Development, stating that “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (UCLA Sustainability). Whether an individual chooses to follow a sustainable lifestyle is their choice. In terms of paper, sustainable usage is far from currently being in effect. According to the Executive Summary On The State of the Global Paper Industry, people are using paper at an unsustainable rate. In recent years, over 400 million tonnes of paper was consumed globally within the year (State of Global Paper Industry). Some regions are larger contributors to the problem, notably Asia, whose consumption is only increasing. Other areas such as Africa only contribute 2% toward the global paper consumption (State of Global Paper Industry). The rate of consumption is not only unsustainable in terms of deforestation. The destruction caused by paper usage applies also to the high levels of waste contributed to landfills.

3. Implementation

A series of waste-mitigation strategies have already been developed across universities and colleges in the United States. It is important to consider the process of creating these plans, and more importantly who would be held responsible in ensuring their full integration. A survey conducted in the United Kingdom sought out companies to inquire about the need for management when it comes to reinforcing sustainable behavior (Zibarras et al. 3). The survey included 1,000 organizations in its sample size, retrieving 101 responses (Zibarras et al. 3). The most conclusive results from the research were that: 1. Management is key in integrating sustainable practices, and 2. The most popular practices in sustainability includes the recycling of waste materials, which 82% of the

companies reported doing (Zibarras et al. 3). The survey concluded the three most impactful facilitators in promoting environmental practices to be:

1. Engagement and commitment from staff (95 per cent indicated that this was important or very important).
2. Managers' support and openness to pro-environmental practices (93 per cent indicated that this was important or very important).
3. Senior management commitment (90 per cent indicated that this was important or very important)

(Zibarras et al. 9)

These results can be applied to higher-educational institutions in finding ways that administrative practices can prompt faculty, staff, and students to make more environmentally-friendly decisions. If those in charge can show dedication to such an issue, surely others can follow. A compelling aspect of the “how” argument centers around moral responsibilities. The right intentions and strategies may be developed and in place, but if those involved in making changes are not engaged, there will be no progress. An interesting consideration for those in management is the moral environment of a workplace. In a study of 146 fortune 500 companies, it was discovered that larger corporation sizes more often had an individual employed to handle ethical concerns and as well as a network confidentiality policy (Reichert et al.). Larger firms were also more consistent in having a “formal written environmental policy” and are “more inclined to invest in new ways to reduce the production of various types of waste” (Reichert et al.). These findings indicate that regardless of size, businesses can still integrate environmental practices into their workplaces, and will see benefits in doing so.

4. *Profitability for Businesses*

Far too often, businesses associate the concept of “going green” with losing profit. One book, *Lean and Green: Profit for Your Workplace and the Environment* by Pamela Gordon targets this misconception and discusses success stories from businesses around the globe pertaining to creating a more sustainable work environment. Gordon’s book

recognizes the concern in place for businesses to maximize their benefits while cutting costs, but it presents actual scenarios in which businesses meet sustainable goals in financially suitable ways. An example highlighted in the work comes from the LSI Logic Corporation in Gresham, Oregon (Gordon 6). This particular company specializes in “custom semi-conductors for communications products” (Gordon 6). LSI Logic Corporation was commended because of its cuts on water usage (Gordon 6). The company manages to require 63 percent less water due to a system of reusability (Gordon 6). Another more commonly known company, Sony Electronics, was also on the list of success stories. Among recycling and reducing, Sony managed to create a recycling system for sludge to create cement (Gordon 6). Sony’s efforts overall presented a 30 percent decrease in waste disposed of per unit in sales (Gordon 6). These stories touch on the “why” argument of sustainability in workplaces. They are examples for other companies to study, acknowledge, and follow. They demonstrate the feasibility of implementing strategies to cut back on waste, while still maintaining and even increasing profits. The book, *The Green Workplace* asks the question: “Can we save the environment without destroying our economy?” (Stringer). This inquiry ties into companies’ concerns regarding the ‘costs’ of sustainability. Another component that goes hand and hand with expenses is convenience of changing business’s behaviors. Stringer argues that it will not be out of altruism that saves the planet, rather it will require a convenience factor. Convenience helps to influence those in disagreement with making changes. It is realized that green initiatives save organizations money and help enhance profitability (Stringer). This is due to a simple deduction: “where resources are being spent is where opportunities for savings can be found” (Stringer). The concept of sustainability is formed around saving. Conserving and preserving resources for generations to come is at the core of all sustainable ideas. Businesses with intent to grow and last can greatly benefit from integrating this perspective into their planning.

5. Finding the Motivation

A compelling question posed regarding the integration of sustainable practice is how to motivate individuals, especially in a place of work or study. Humans lead busy lives,

constantly managed by the restricted amount of time in a day. One study sought to determine the factors that encourage people to integrate sustainability, an idea they call 'eco-initiatives'. The study specifies these behaviors to be both "discretionary" and "pro-environmental" (Stritch and Christensen). The research involved data from employees located in a large urban area in the southeast United States. The study concludes that eco-initiatives are motivated through "connectedness to nature, organizational commitment, and PSM [public service motivation]" (Stritch and Christensen). These findings are crucial in indicating which businesses can be predicted to have more success in implementing sustainable practices, as well as how to ensure that other businesses can also find success with implementation.

6. Previously Integrated Plans

So far, there have been various higher education institutions around the United States developing ways of reducing their paper waste. These institutions have shared their success stories of saving money, becoming more marketable to incoming students, and creating a more sustainable environment that can last for future generations. One university, the University of Technology in Sydney, Australia, began incorporating a series of objectives in order to create a more sustainable environment (Atherton and Giurco). One of these objectives centered around developing strategies on paper reduction. Within the timespan of the study, the target was to decrease paper purchases by 20 percent and to increase recycling of paper by 30 percent (Atherton and Giurco). This plan is a simple yet effective approach on taking action in terms of paper waste management. It can provide a realistic idea of how best to reduce overall use of this resource. Approaches similar to this one are convenient and present more feasibility with their integration.

One particular institution that has truly made sustainability a priority is Penn State. The university implemented a variety of projects that reduced energy demands. The result? Many of them "paid for themselves within 10 years through lower energy bills" (Charles). The university's most recent progress has been the installation of solar power as an energy resource (Charles). Despite being a university that accommodates

tens of thousands of people, it has managed to reduce its emissions by a third since 2004 (Charles). With the help of solar energy and the outpouring of support received campus-wide for sustainability, Penn State envisions an 80% reduction in emissions by 2050 (Charles). The institution's ambition for sustainability first took off during the 1990s, through the efforts of Christopher Uhl, a biology professor at the school (Charles). He cleverly used the campus's academic integrity to his benefit, by first calculating the emissions of Penn State's buildings, and then assigning grades to the college based on his calculations.

Loyola University, a Jesuit school located in Chicago, Illinois, has made noticeable steps toward being a sustainable campus. Its Institute of Environmental Sustainability has recognized the impact that one university can make. The campus has agreed to a series of commitments, including the Illinois Campus Sustainability Compact, The Catholic Coalition on Climate Change's St. Francis Pledge, American College & University Presidents' Climate Commitment, and The Talloires Declaration. The efforts put in place have been documented and the progress made by the campus since 2008 has been recorded for water, energy, and carbon. Since 2010, Loyola's waste has been recorded and its landfill contributions have been compared to its recycling efforts for the lakeside campus. In 2010 it was recorded that over 1000 tons of waste were contributed to landfills for the campus alone. This dropped significantly to under 600 tons of waste contribution in 2016. Comparatively, recycling and composting on campus have been at a steady rate since 2010, aside from a drop in efforts during 2013. Overall, the university has created a community of integrity, specifically in reference to its sustainable efforts. This integrity is developed through the hard work of several leaders at the head of campus committees, each aiming to reach certain sustainable goals. These committees include: the Sustainability Committee, directed by Aaron Durnbaugh, The Green Initiative Fund Council, CampuScape Committee, Transportation Committee, and Campus Green Teams and Sustainability Committees. Creating and maintaining committees as resources for the public creates an outlet for the community that helps to better develop a sustainable culture.

7. *Carthage College*

a. Recycling

On its way to becoming a “greener” campus, Carthage College offers a single-stream, or “commingled” recycling system for individuals to use. These systems allow all recyclable items to be thrown into the same container, and sorted later. The convenience is there, allowing students an easy and manageable way to recycle. This method of recycling has seen increased recycling rates because of its ease, and it requires less space to store the collection containers. The simplicity behind the procedure would suggest an increase in recycling rates. After speaking with Ted Fares, the Associate Vice President of Campus Operations at Carthage College, an idea of single-stream recycling’s effectiveness was gathered. He stated that starting last year there began an objective to increase recycling on campus to 50% in three years (Fares). Currently, Fares quotes the school hovering around 35-40% in recycled materials. He explained that the recycling is measured by volume, per truck it is collected in (Fares). The same procedure is done for the waste collection. Carol Sabbar, the Director of Library and Instructional Technology Services at Carthage College, simplified this need to recycle: it saves money. The school is charged for the amount of waste it accumulates because of the contribution to landfills (Sabbar). Conversely, Carthage is not charged for its recycling quantities (Sabbar). If recycling in turn saves the school money, its integration is all the more valuable for increased profitability. The problem is not that there are little efforts of integration, but that there appears to be little awareness. For instance, Ted Fares explained his objective of recycling in the dorms. He had purchased 1800 blue recycling bins last year, and instructed the Environmental Services Department staff to place a trash bin in a dorm only if it was accompanied by a recycling bin (Fares). He knowingly stated that the students would not be compelled to take their recycling to the bins outside their dorm rooms, so he had envisioned a different system (Fares). His system involved having students move their bags of recycling to the end of the hallways of their residence halls for the Environmental Services Department to pick up and take to the recycling bins (Fares). This system is convenient for the students as they do not have to leave their

residence halls to recycle, and it can be made aware through the action of Residence Hall floor meetings, signage in the hallway, and emails.

b. Paper Usage

All students, staff, and faculty at Carthage College have access to an online application called Papercut. This application tracks the number of pages an individual prints, and provides a summary of their paper usage over their time at Carthage. Papercut was purchased for the college in 2015 in an effort to cut back on the amount of paper being consumed (Sabbar). On an individual's account, there is a graph that displays the individual's printing trends over the start of each year, and a calculation of how much of a tree their paper consumption is equivalent to. There is an estimate of how much carbon dioxide the student's print jobs have consumed since starting at Carthage College, and an estimated comparison of what this would be in terms of the duration of a running light bulb. Each individual's 'Environmental Dashboard' provides Carthage's summary of paper usage over that individual's time at the college.

Figure 2 displays the summarized data for Carthage College since 2016, one year after the school purchased the PaperCut application. The students are provided a limit of eighty dollars a year to spend on printing. Carol Sabbar explained that this value was estimated based on Alverno College's students' usage since purchasing the Papercut app for their campus. The dollar value also acts as another marketing tool for the college.



Figure 5. The paper use of Carthage College from 2016-2019.

There is a rough estimate for the cost of a single sheet of paper: \$0.05 (Sabbar). However, as page count increases for a print job, the cost per page decreases. Provided the \$0.05/page estimate, an annual balance of \$80 for each student offers an allowance of 1,600 pages of paper per year. For a course load of 18 credits per semester, an average student has access to print 44.44 pages of paper for every credit within the year. Since most courses offered are 4-credit courses, the eighty-dollar allowance works out to being 177.78 pages of paper for every 4-credit course within the year. It may be valuable for the school to adjust the balance currently allotted. At eighty dollars a year, there is little reason for students to worry about printing over their budget. As a result, what may be occurring is students are instead printing unnecessarily, thus abusing the privilege of having unlimited printing. Sabbar clarified that it would not be feasible to set the limit based on pieces of paper, due to colored paper costing more. She explained that adjusting the dollar value would require speaking with the Carthage College Student Government, as they had been in charge of deciding the PaperCut balance in the first place. This alteration could have an overall significant impact on Carthage's paper usage and costs. With decreasing the amount of paper used for printing comes both a decrease in paper purchases and in paper contributions to landfills. It also can inspire more efficient means of communicating and educating, by requiring students, faculty, and staff to reevaluate the need to print materials versus utilizing various forms of media.

Methods

I. Examining Recycling Efforts at Carthage College

The estimated effectiveness of the current recycling programs is measured on an annual basis and the data is presented on a document titled a "Happy Sheet." This document is created by Jason Dondlinger, the Account Manager for Waste Management. The most recent Happy Sheet, created for the year of 2018, can be seen below as Figure 6.

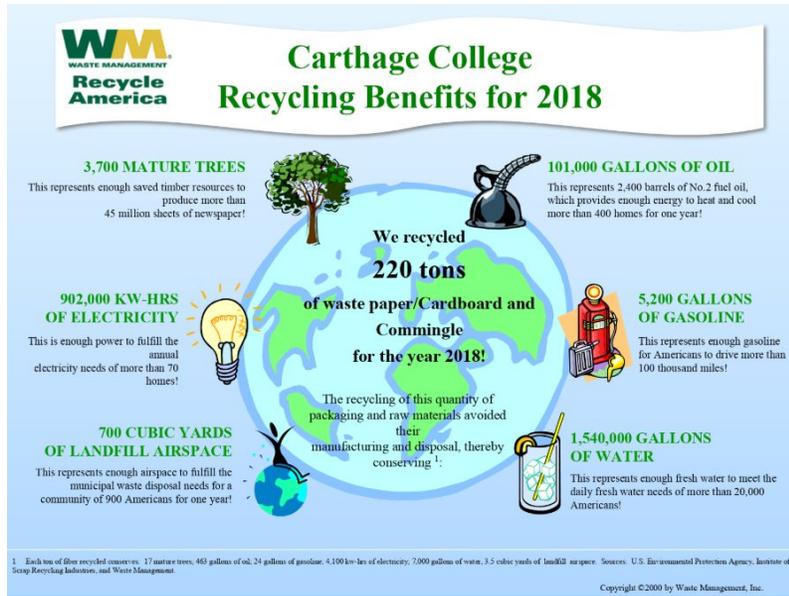


Figure 6. The Recycling Benefits for Carthage College in 2018

Displayed is the amount in tons of waste paper, cardboard, and commingle recycled for the year of 2018 (Dondlinger). This amount translates the amount recycled to more conceptual ideas of what the college saved. For instance, Carthage’s recycling behaviors in 2018 was equivalent to saving 3,700 mature trees (Dondlinger). This is based on the Environmental Protection Agency’s estimate that one ton of recycled material is equivalent to saving 17 mature trees. Using these comparisons can be a great tool to communicate the necessity of recycling. Understanding a more visual representation of the benefits of recycling can help individuals recognize the effectiveness of their own contributions. Figure 7 graphs the recycled amounts for Carthage since 2015, based on Dondlinger’s calculations.

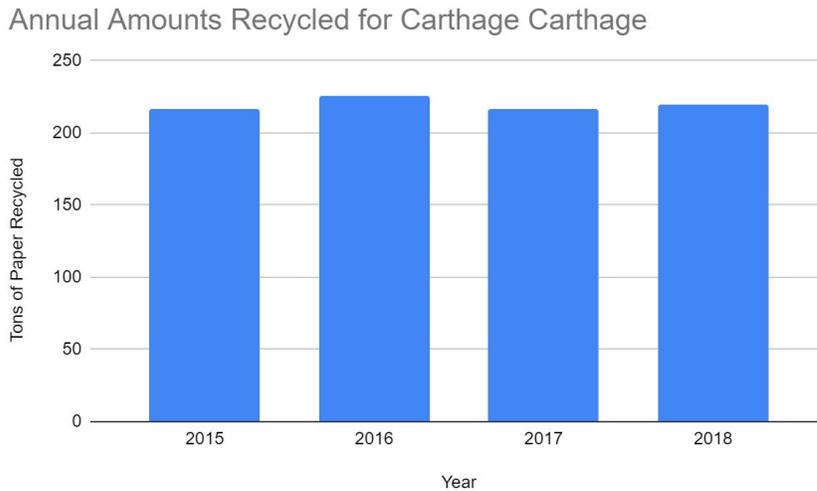


Figure 7. Annual amounts of recycled material for Carthage College from 2015-2018. As it is shown, there is little fluctuation in the amount of recycling over the four-year time span. This data can be compared to the effectiveness of a program developed in 2015 to help decrease paper consumption, called PaperCut.

II. Awareness and Convenience

A closer look into Carthage's progress thus far found what was working and what was missing in terms of waste reduction. Two major factors are concluded to be imperative in making Carthage a more sustainable campus: awareness and convenience. It was found that, while efforts had been in place for students, they did not last because not enough people knew about them or they required too many added steps. In order to determine whether these assumptions are correct regarding campus awareness, a Google Forms survey was created with inquiries involving recycling, Papercut, general paper usage, and more. The survey is tailored for responses from faculty, staff, and students on campus to retrieve as much information about awareness as possible. The survey asks the respondent to first identify as faculty, staff, or student. It includes questions specifically for students regarding their year, major, and whether they reside on or off campus. These questions are in place to negate any biases that may come from respondents. The survey is entirely voluntary and small compensation is provided randomly to one respondent to help increase response rates. The survey was conducted

from March 6, 2020 to March 18, 2020, retrieving 49 total responses from Carthage faculty, students, and staff. Responses pertaining to the PaperCut application help to determine whether there is sufficient awareness across campus about the application in general. These particular responses are beneficial in deciding an appropriate annual balance that will be substantial for users while aiming to decrease paper consumption. Respondents can also provide useful knowledge on whether recycling awareness is at the level it could be campus-wide. The survey's data can potentially be used as a mechanism of change to make Carthage College more sustainable. Responses can enlighten individuals like Carol Sabbar and Ted Fares regarding their strategies for sustainability and whether they are effective.

Results

Represented on Figure 8 are the survey results regarding single-stream recycling awareness. Out of the 49 respondents, 28 expressed a lack of knowledge on the process of single-stream recycling, compared to 21 responses expressing understanding of the process.

Awareness of Carthage College Faculty/Students/Staff Regarding Single-Stream Recycling

Figure 8

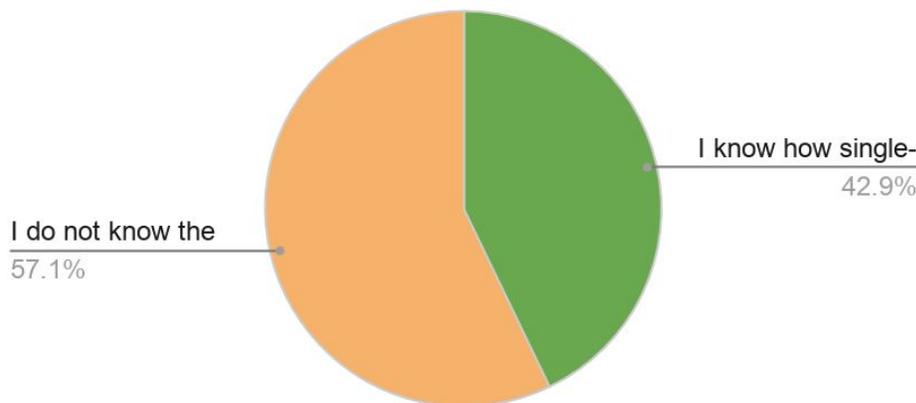


Figure 8. The survey results for awareness of recycling at Carthage College.

In reference to Figure 9, the average number of pages used was calculated to be 1712.76. The graph is left-skewed, with the majority of respondents having used under 20,000 pages.

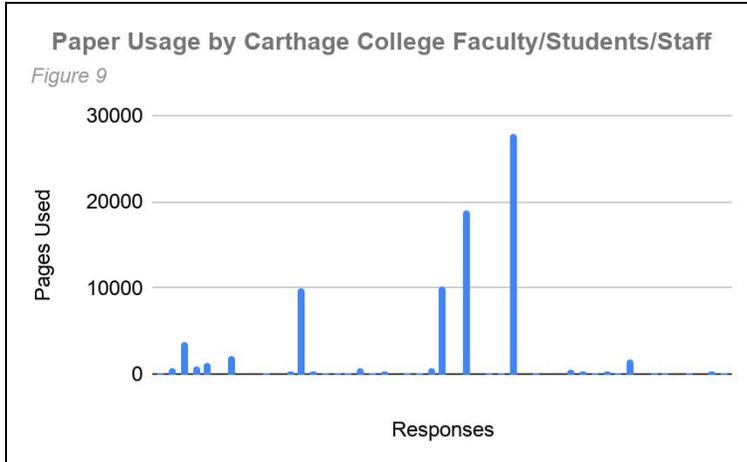


Figure 9. The number of pages used by respondents of the survey conducted at Carthage College according to the Papercut application.

Figure 10 projects the results regarding online class material from the survey. These results conclude that 28.6% of respondents reported over 50% of their class material online, 44.9% estimated between 25-50% of their class material being online, and 6.1% recorded less than 10% as their amount of online class material. Out of the 49 respondents, 20.4% preferred to not answer this question. One hundred percent of the respondents that preferred not to answer reported that they were staff.

Percent of Online Class Material Estimated by Carthage College Respondents

Figure 10

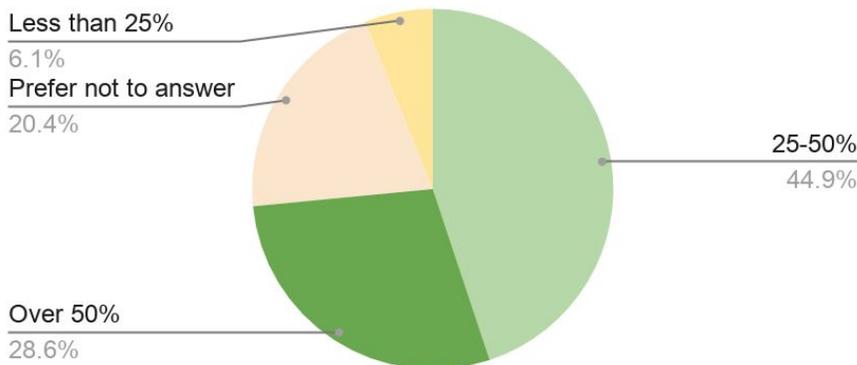


Figure 10. The survey results for the percentage of online class material at Carthage College.

Survey results regarding recycling behavior can be seen on Figure 11. According to the respondents, 36.7% recycle in their dorms, 36.7% recycle in their offices, 24.5% reported recycling elsewhere, and only 2.0% stated that they rarely recycle.

Recycling Behaviors for Carthage College Respondents

Figure 11

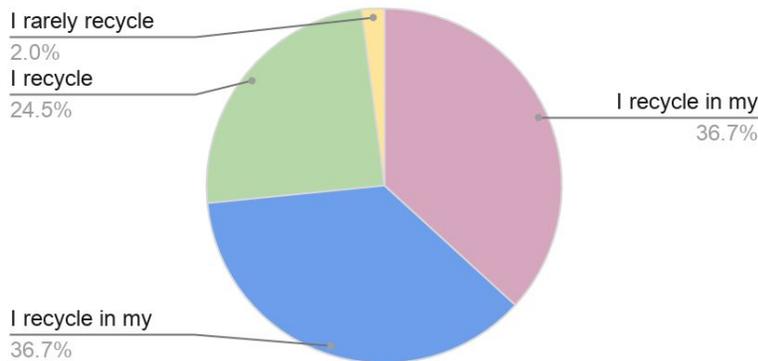


Figure 11. The survey results regarding recycling behaviors for Carthage College faculty, students, and staff.

The concluding question of the survey was open-ended, asking the respondent their thoughts on Carthage's efforts toward recycling and sustainability. From the 49 respondents overall, 37 chose to answer this open-ended prompt.

Conclusions

Based on the results projected on Figure 8, there is an increased need for single-stream recycling awareness. Development of more effective communication strategies can inform students, faculty, and staff about the recycling and printing processes on campus. Full understanding of these processes is imperative for their integration, and this can be achieved with a more engaged education of the processes. Recognizing which methods do or do not work in terms of increasing awareness is the first step in creating more interactive programs.

The results from the survey regarding recycling behaviors are optimistic, however there is room for improvement. With only two percent of the respondents reporting rarity in their recycling tendencies, it is hopeful that further sustainable behaviors can be easily encouraged on campus with the right strategy. Eighteen of the respondents

stated they recycle in their dorms, reinforcing the need to make recycling in the residence halls more convenient and understood. Carthage can increase recycling behaviors by placing more recycling bins around campus. This will in turn lead to more convenience of recycling and less contribution to landfills, overall saving the college money. To satisfy this convenience, larger recycling bins can be made available in residence halls for greater recycling needs, and additional bins can be implemented in classrooms across campus.

The cost pertaining to the survey's recorded average page use based on Figure 9 was calculated to be \$85.64 at roughly five cents a page (Sabbar). This amount exceeds the current Papercut balance of eighty dollars and therefore does not support the researcher's hypothesis deeming the eighty dollar balance unnecessary. Although the researcher's hypothesis was not supported and the claim of needing a lower Papercut balance can be rejected, Figure 9 raises the question of increased sustainability regarding paper usage. The Papercut statistics shown on an individual's application provide the paper usage beginning with the current school year. Some of the responses on the survey reported using over ten thousand pages of paper. At the cost of five cents per page, the total cost for ten thousand pages is five hundred dollars, over six times the Papercut balance of eighty dollars a year.

Of the respondents that reported using ten thousand pages or more on Figure 9, one hundred percent identified as professors and having printers in their offices. It is more affordable for professors to print in the mailroom versus printing through independent printers throughout campus. The affordability applies to both the departments and to the college as a whole. The machines used in the mailroom are larger and thus more efficient in printing greater quantities (Sabbar). According to the survey, two-thirds of these respondents stated they use their printer "multiple times a week" and one-third stated using their printer "daily." In order to decrease the amount of paper consumed on campus, Carthage College can more strongly encourage the use of the public printers, advocating their cost-effectiveness and promoting more sustainable behavior. From the 49 respondents, 21 reported having a printer in their office or dorm

room, with ten of these reports stating they use their printer “multiple times a week” or “daily.” Out of the 28 respondents reporting they do not own a printer, 96.4% stated they use the Papercut application. Out of the 21 respondents who own a printer in their dorm or office, only 50% stated they use the Papercut application. Through stricter guidelines of personal printer usage, and encouragement to utilize the Papercut application, faculty, staff, and students can better gauge their overall paper usage and make more conscientious decisions when deciding to print.

According to Figure 10, an increase in the amount of online class material can be implemented. Out of the respondents, 28.6% estimated that over half their class material was online. Through increasing the amount of online class material, professors can simultaneously cut back on paper usage and save their departments money. Making class material accessible online provides students the choice as to whether they would prefer a hard copy. Additionally, when respondents were asked about preference of online syllabi versus printed syllabi, only 12% preferred a printed syllabus. By transitioning to online syllabi, Carthage can see economic benefits while practicing sustainable behaviors. An online syllabus can be easily accessed via Google Docs. A syllabus of this kind would allow for offline access and editing. Based on the course schedule for the Spring 2020 semester, Carthage offered 794 classes, and the college reports an average class size ratio of twelve students to one professor (“Quick Facts”). Thus, if every class printed a one-page syllabus for each of the students, a total of 9,528 sheets of paper were used during the Spring 2020 semester on syllabi alone. This is equivalent to \$476.40, based on the \$0.05 cost per page of paper. By transitioning to online syllabi, the college could potentially save one thousand dollars per academic year, as well as over 21,000 sheets of paper. Keeping student preferences in mind, students can still choose to print syllabi for their own use. The financial and environmental incentives of online materials, as well as the option to print, can be communicated to the Carthage community. This can be further encouraged through monthly newsletters to Carthage students, faculty, and staff, highlighting the savings created by virtual transitioning.

The open-ended responses at the conclusion of the survey provide insight into methods of improving Carthage in terms of recycling and sustainability. From the 37 responses, 21 mentioned improving the ease of recycling on campus, 25 mentioned improving the transparency of the recycling process on campus, and 21 mentioned improving campus sustainability efforts.

Discussion

Results from the survey illuminate the foundation of this paper: Carthage College needs to increase the awareness and convenience of recycling and sustainable behaviors on campus. Based on Figure 8, over half of respondents are unaware of the recycling process that occurs on campus. A better understanding of single-stream recycling can help promote sustainable behaviors by reassuring the campus community that their efforts are constructive, and can help to encourage these efforts. Support of consistent recycling behaviors will help promote a sustainable culture. Increased awareness of single-stream recycling can be implemented through descriptive labels on recycling bins, defining the process. Other strategies to increase awareness include releasing monthly newsletters to Carthage email addresses to remind the community of recycling benefits, and holding more community-wide and campus-wide events that instill a competitive attitude regarding sustainability.

Carthage can better predict how and where to implement sustainable features by conducting more surveys. In this way, the college can create more realistic goals that reflect the needs of the campus. Through being increasingly open to feedback, Carthage can prompt its campus to be more comfortable in expressing concerns on a constructive platform. Especially in regard to sustainability, the campus could greatly benefit from receiving continuous feedback from those that use its resources the most. Furthermore, the integration of more surveys helps to establish a greater sense of community, and in turn can potentially contribute to a sustainable campus culture. In reference to the surveys, it is important to consider how many and how frequently they should be conducted. Consistency with providing surveys helps develop an importance behind them, and grants more opportunity for individuals to take part had they missed a prior

opportunity to speak their mind. Surveys also help to rule out assumptions. For example, an assumption could be made that reusable cups are not accessible on campus. Through conducting surveys, Carthage can better gauge whether demands are being met with access to reusable cups. This could lead to the college saving money on purchasing plastic cups if the majority of students preferred to utilize reusable cups. Through consistent feedback and attentiveness toward campus needs, Carthage can maximize their profits while implementing a more sustainable atmosphere.

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