

Worcester Polytechnic Institute:
Recommendations
for the
Centro Cultural Costarricense-Norteamericano (CCCN)



2 March, 2020

San Jose, Costa Rica

Presented by Cameron Henchy, Carina Kennedy, Monét Norales, Timothy Ryan

This document is a summary of the findings by Cameron Henchy, Carina Kennedy, Monét Norales and Timothy Ryan from 15 January to 2 March while working with the Centro Cultural Costarricense-Norteamericano.

Acknowledgements

We would like to thank the following members of the Centro Cultural Costarricense-Norteamericano for their cooperation and support of our project:

- Sra. Lilly Sevilla Gamboa
- Sr. Carlos Rodolfo Cortés
- Sra. Sonia Salas Abarca
- Sr. Guillermo Madriz Salas
- Sra. Karen Estrada
- All other individuals that were interviewed and/or surveyed

We would also like to thank our advisors Professor James A. Chiarelli and Professor Darko Volkov for their generous guidance and assistance.

About

We are a group of students from Worcester Polytechnic Institute in Worcester, Massachusetts. We worked with the Centro Cultural Costarricense-Norteamericano (hereinafter referred to as the "CCCN") in accordance with our Interactive Qualifying Project (IQP). We were initially tasked with the inquiry of a Carbon Footprint Certification. However, upon arrival to the CCCN San Pedro campus, our task was diverted. Through firsthand observation of the San Pedro campus, our new goal became clear: create awareness of the Get Green Program. While we could focus on obtaining a Carbon Footprint Certification, we were first tasked with analyzing the CCCN and the sustainable efforts that are practiced at the organization's San Pedro campus. Upon analysis of the Centro Cultural, we proposed practical solutions, as noted in the *Recommendations* section of this article.

Findings

Our initial observation of the physical CCCN San Pedro campus included a lack of visuals and posters expressing the goals of the CCCN that related to sustainability. Additionally, we were provided a Microsoft PowerPoint document detailing the efforts

of the Get Green Program. However, upon arrival to the San Pedro campus, the only initiative that was evident were the recycling bins. Efforts such as the stickers that were placed on the lights to remind individuals to turn off the lights when leaving a room had been removed. Upon consultation with Sr. Carlos Cortés, the Get Green Program has experienced a decrease in participation. This program ultimately ceased to exist when the individual who ran the program left the Centro Cultural approximately five years ago. Our interviews and surveys provided valuable information for the course of action for the CCCN. The following sections detail the results and conclusions of those documents, as well as a summary of our observations at the Centro Cultural Costarricense-Norteamericano.

We surveyed 3804 students and 210 employees. We received responses from 668 students and 81 employees. The following is an analysis of the results:

Notable Survey Results:

“How Old Are You?”

It is worthy to note that 52.53% of the student population is below the age of 25. This data is significant in the creation of educational programs about the Get Green Program and environmentally conscious practices. A target audience can be established using this information, as well.

“How Far is the CCCN from Where You’re Coming From to go to English Classes?”

On average, employees are traveling from approximately 13 kilometers away. Students travel from 19 kilometers away. The commute is approximately 50 minutes long, for employees as well as students.

“How Do You Travel to the CCCN?”

For the following question, individuals could select multiple answers, as the method of transportation is subject to change on a daily basis. As evident from the charts above, the main method of travel to and from the CCCN is the bus system in San Jose. The trends are very similar between the two surveys, as 43.27% of students travel by bus and 41.07% of employees use this method of public transportation. The bus system is the most popular method of transportation and bicycle is the least popular,

with 1.08% and 2.68% participation by the students and employees, respectively. Only 25.00% of employees and 22.72% of students drive their own car. This is important, as one strategy to reduce the potential Scope 3 sources of greenhouse gases of the CCCN is to encourage the use of public transportation such as buses and taxis/Uber.

“Do You Know About the CCCN’s Get Green Program?”

After conducting the employee interviews, it was evident that most individuals that are employed by the CCCN knew of the Get Green Program. However, a few employees had not heard of such a program or did not know what the program does for the CCCN. According to the employee survey, that observation was supported, as some members knew of the program while a majority had limited knowledge or did not know of it at all. In total, 24.69% of employees know of the Get Green Program, 39.51% had a general idea of what the program is, and a shocking 35.80% did not know what it is. In contrast to the even distribution of the employee survey, 90.17% of students did not have any prior knowledge of the Get Green Program. Only a mere 1.72% of students replied that they knew of the program. We hypothesize that the students that do not know of the program are from a younger generation, since the Get Green Program was disbanded approximately five years ago. For this reason, we proposed infographics to appeal to the younger generation to spread awareness of the Get Green Program, as well as various other environmentally conscious efforts.

“How Frequently Do You Recycle in the CCCN Using the Recycling Bins?”

Similar to the previous question regarding the Get Green Program, students do not have the knowledge that the employees have regarding environmentally beneficial efforts. When asked, “How frequently do you recycle in the CCCN using the recycling bins?”, employees were more likely to respond positively, while the student population evidently does not recycle as often. Only 32.76% of students always recycle, while 37.04% of employees recycle using the recycling bins. However, the percentage of students who do not recycle is a notable observation from the survey. In total, 24.80% of students responded that they do not recycle while at the CCCN. In contrast, 3.70% of employees stated that they do not recycle at the CCCN.

Students may not recycle due to the limited time that they spend at the CCCN. Additionally, they may not have materials that need to be recycled, such as paper or disposable water bottles. However, we can conclude that the source of the issue is a lack

of knowledge of proper recycling habits. In the free response section of our survey, we ask the individuals what the CCCN can do to achieve carbon neutrality and reduce its impact on the environment. Many of the responses from the students include references to classes or informational sessions to teach the students about recycling and encourage them to do so. Our proposed poster ideas include teaching these individuals at the CCCN about recycling and that they are helping the environment and the CCCN. We hypothesized that students may not recycle because they do not know how to and do not know what happens to the recycled material once it leaves the CCCN. We believe if they have knowledge of the recycling process and that the recycled goods are not delivered to a landfill with other waste materials, they will be more likely to recycle. Additionally, promoting environmental consciousness will encourage all students to participate in the effort of becoming carbon neutral.

“Do You Know the CCCN’s Guidelines About What Can and Cannot be Recycled?”

Evidence of the lack of knowledge regarding proper recycling habits is included in the question regarding the recycling guidelines of the CCCN. The CCCN recycles paper/cardboard, plastic, aluminum, glass, and organic material. This broad range of materials may confuse students and employees regarding what objects can go in each bin. A picture of the recycling bins is included below:



According to the student survey, 53.04% of students do not have any knowledge of the recycling guidelines. In contrast, only 3.70% of employees responded “No”. At least 96.30% of employees know what they can and cannot recycle or have a general idea, while only 46.96% of students know what can and cannot be recycled in each bin.

“What Material Do You Recycle Most Often at the CCCN?”

After interviewing members of each department at the CCCN, it is no surprise that the most recycled material for employees is paper. In the interviews, every employee stated that paper is the main source of waste in their respective department. This claim is supported by the employee survey, in which 40.34% of the total material recycled was paper. Plastic was the second most common recycled material for employees, accounting for 29.55% of the total recycled material. However, the student survey was slightly different. As each department, especially the academic department, is striving to become paperless, students may not have paper that they can recycle. For that reason, plastic was the most recycled material by students. Plastic accounted for 40.51% of recycled materials for the student population, while paper was the second most recycled material at 28.98% of total recycled material. We can hypothesize that the plastic use of the students is from single-use bottles or containers. However, further investigation is necessary to identify the cause of the plastic use. After that conclusion is made, we can then analyze methods to eliminate the use of plastics by the students, helping the CCCN become more environmentally friendly.

“Do You Know Where the Garbage and Recycling Go After Throwing It Away?”

As mentioned in the analysis of the question “How Frequently Do You Recycle in the CCCN Using the Recycling Bins?”, knowledge of the recycling process may incentivize students and employees to engage in recycling and encourage others to participate as well. In response to the question “Do you know where the garbage and recycling go after throwing it away?”, the lack of knowledge of both student and employee populations was very prevalent. In total, 65.43% of employees and 71.29% of students do not know where garbage and recycling go after it is thrown away. This is not the fault of these individuals; it is the lack of education on the recycling process that we hope will be improved through the implementation of our recommended initiatives at the CCCN in the near future. Our proposed posters and educational sessions will promote conventional recycling practices as well as create an environmental consciousness of the CCCN that will benefit its sustainable goals. Education on the process of recycling and the recycling certificate that guarantees recycled materials are properly disposed of may increase participation in recycling and other environmentally conscious efforts.

Conclusions

One prevalent conclusion that can be drawn from the gathered data is that education is necessary for the CCCN to become the sustainable organization that it strives to be. The CCCN has already implemented various environmentally friendly alternatives to traditional methods of operation (ex. solar panels instead of grid electricity, waterless urinals, energy efficient LEDs). However, we have included recommendations in the section below regarding environmentally conscious practices, as well as educational techniques that can be implemented to improve the sustainable atmosphere of the CCCN.

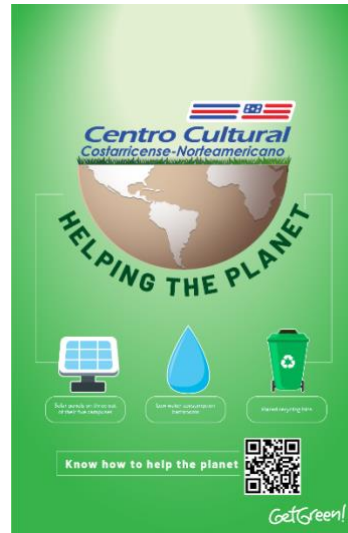
Recommendations

Short Term:



- Create awareness of the Get Green Initiative
 - Creating awareness will increase community involvement in the Get Green Program. Many of the issues we observed with the Get Green Program are related to a lack of knowledge or commitment to the program by the CCCN community. Informing individuals of the stakes, the measures already taken, and proper practices will help remedy these issues. Community involvement (including students and staff) will encourage others to take action as well. If individuals such as students practice environmentally friendly habits and encourage others to do so, an atmosphere at the CCCN that is built around sustainability will be created. We hypothesize that positive reinforcement will enable others to participate in various actions such as recycling and turning lights off when it is not necessary, all of which are beneficial to the CCCN's goal of carbon neutrality and sustainability.
 - Through the creation and implementation of various posters and infographics throughout the campuses, presentations, and extracurricular activities, information can be spread to employees, as well as students. The posters must be permanent fixtures around the campuses, as it is

contradictory and hypocritical to express the importance of recycling and reducing the use of paper on a disposable poster or pamphlet. Below are some sample posters produced by the marketing department at the CCCN:



- Create a dedicated committee to lead the Get Green Program
 - Establishing a group dedicated to the operation of the Get Green Program will ensure the continuation of the program in the future. This committee shall oversee the planning and funding of future initiatives along with the ongoing effort of raising awareness through the use of emails, posters, lectures and potential guest speakers.
 - This volunteer group can consist of collaborators from each department, as well as students and teachers that are dedicated to the maintenance of a sustainable environment at the CCCN.
 - This group will be responsible for:
 - Communicating information about the Get Green Program and its current initiatives. This can be achieved via email, physical posters at the CCCN, as well as verbally communicated to students by the teachers.
 - Establishing a budget for the Get Green Initiative

- Eliminate paper in each department
 - Throughout our interview process, the most prevalent source of waste was identified as paper. We believe that the amount of paper in the Centro Cultural can be greatly reduced. We acknowledge that the Centro Cultural cannot become paperless in the foreseeable future, due to legal constraints. However, most of our interviewees stated that the amount of paper in the offices can be reduced.

Long Term:



- Implement a greywater recycling system
 - A greywater recycling system will take water from faucets and sinks and use it for the flushing of toilets. This will help to further reduce the water usage of the Centro-Cultural.
 - For more information, visit <https://greyter.com/> or <http://www.aesarabia.com/grey-water-treatment-system/>
 - Price:
 - Varies greatly from project to project, depending on needs and complexity
 - Might expect something in the range of \$10,000-\$20,000
 - Other accommodations
 - As the plumbing infrastructure of the CCCN would have to be altered to accommodate a greywater recycling system, a few problems arise. As construction would be necessary, the offices of many collaborators would potentially be temporarily unavailable. A temporary office for these individuals would be required.

Additionally, classrooms may also be affected, and temporary classrooms for the students would be required., as well.

- Create purchasing guidelines that are adhered to throughout the entirety of the Centro-Cultural
 - Creating purchasing guidelines will ensure that all the products used at the CCCN were created in a sustainable matter. These guidelines can apply to items ranging from cleaning products (for which such guidelines already exist) to the food used in the cafeteria to the office supplies used within each department
 - A sample of such purchasing guidelines has been attached to the document.
 - Cost – Will depend on the price difference between environmentally friendly products and those currently in use
- Finish the installation of solar panels across all campuses

Other Initiatives:

- Add timers to lights / use more natural light
 - Cost – \$85-\$200 per light switch
 - 50,000 CRC - 114,600 CRC per light switch
- Place recycling bins in ALL classrooms
 - Cost – \$6.13 per bin
 - 3,610 CRC per bin
- Encourage opening windows instead of using AC
 - Cost – Included in raising awareness
- Discourage the use of single occupancy vehicles in favor of public transportation or non-vehicular modes of transport
 - Cost – Included in raising awareness
- Compost at sites where it is practical

Green Purchasing Policy Sample:



DRAFT Green Purchasing Policy DRAFT

WPI recognizes that the products that the Institute purchases can profoundly affect the environment through their use and ultimate disposal. Purchased services may also have substantial environmental impact. The community is strongly encouraged to take a pro-active position in recognizing and exploring opportunities to procure "environmentally friendly" materials/equipment. It is the intent of WPI to integrate environmental considerations into acquisition decisions, while maintaining cost and value standards.

The intent of this policy is to reduce the adverse environmental impact of our purchased products and services. By including environmental considerations in our purchasing decisions, along with concerns about price, performance, and availability, we will remain fiscally responsible while promoting practices that do not harm human health, are less polluting, that minimize waste, maximize use of bio-based or recycled materials, conserve energy and water, and reduce the consumption or disposal of hazardous materials.

Nothing in this policy shall be interpreted as requiring a buyer or contractor to procure products that do not perform well for their intended use or are not available at a reasonable price or in a reasonable period of time.

WPI Faculty and Staff can contribute to improving the environment by:

- Consolidating orders,
- Using electronic rather than paper catalogs,
- Making use of Life Cycle Cost Analysis where appropriate,
- Buying items that contain recycled material,
- Choosing items made from renewable resources,
- Opting for the non-hazardous alternative,
- Looking for the most energy efficient model,
- Buying locally,
- Buying only what is needed to minimize waste.

In determining whether a product is environmentally preferable, the following attributes should be considered:

- Durable, not single use or disposable
- Made of recycled materials
- Biodegradable
- Recyclable or capable of being safely disposed
- Made from raw materials obtained in an environmentally sound, sustainable manner
- Produced by companies with good environmental track records
- Cause minimal environmental damage during normal use or maintenance
- Carcinogen-free and low toxicity
- Compostable
- Energy efficient
- Heavy metal free (e.g., no lead, mercury, cadmium)
- Made from rapidly renewable materials
- Reduced greenhouse gas emissions
- Reduced packaging
- Resource efficiency
- Upgradeable
- Water efficient

Images:

Recycling Symbol

https://upload.wikimedia.org/wikipedia/commons/7/7b/Recycling_symbol.svg

Solar Panels

<https://www.publicdomainpictures.net/en/view-image.php?image=9099&picture=solar-panels>

Water Recycling

<http://www.clker.com/clipart-2777.html>