



Sustain 3S03 Course Report | Fall 2014

A Letter from the Senior Manager

In September 2014, another fantastic cohort of students took part in Sustain 3S03 – Implementing Sustainable Change. Students from 5 faculties and the Arts & Science Program engaged in interdisciplinary, community-based, student-led, and experiential education related to sustainability.

Led by instructor Dr. Michael Mikulak, with support from Teaching Assistants Julien Gordon, Matthew LeFeuvre, and Stephen Clare, students had the opportunity to examine the concept of sustainability by focusing on specific case studies and examples in relation to larger questions of power, knowledge, and human and non-human agency. Lectures, tutorials, and assignments were focused on developing truly interdisciplinary conversations that consider the different techniques and tools society has at its disposal for addressing the environmental crisis.

To complement their theoretical knowledge of sustainability, students undertook an experiential learning project of their choosing. During the first week of classes, 40 students formed 10 project groups based on their individual interests in sustainability. To offer support, guidance, and ensure students had the opportunity to work with members of the McMaster and broader community, 7 individuals formally accepted the role of Community Project Champion by offering their time, resources, and expert knowledge to assist students in achieving their project goals. Additionally, countless members of the community participated in events, provided feedback through consultation, and offered mentorship. The tremendous amount of community support and engagement is illustrated by each group in the pages to follow under the heading of *Collaborators*.

As you read this report, you will notice that the breadth of student interests related to sustainability is far reaching. Projects range from the construction of a solar power generator, the development and implementation of campus-wide survey on attitudes towards bike sharing, to executing interactive community events that aimed to educate the McMaster community about the importance of the Bruce Trail.

I hope you enjoy reading this report as much as I have enjoyed my experience in working with the individuals who have created it.



Kate Whalen
Senior Manager,
Academic Sustainability Programs





Vision

McMaster developed the Sustainable Future Program for students interested in learning about sustainability while having the opportunity to engage in experiential learning through developing and implementing real-world sustainability initiatives. The Sustainable Future Program (SFP) aims to build reciprocal relationships between students, community members and McMaster University to engage all parties in the journey towards a sustainable future.

Guiding Principles

The guiding principles of the Sustainable Future Program are as follows

- Teach students about sustainability from an interdisciplinary perspective.
- Provide the opportunity for self-directed, interdisciplinary and experiential learning.
- Support student learning within the University and local community.
- Engage undergraduate students in taking part in meaningful, experiential research.
- Foster opportunities for students to place local knowledge and local action within a global context.

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Sustain 3S03 - Implementing Sustainable Change

Class of 2014



Bruce Trail Conservancy Community Outreach Project

Student Authors: Moeed Ahmed, Jasjit Birk, Danielle Bove, Elise Desjardins, Ingrid Farnell, Christina New, Sofia Romero Gonzalez and Lindsey Wellstead



Overview

The Bruce Trail Conservancy (BTC) is a non-profit organisation focused on the conservation and protection of over 800km of public footpath, stretching along the Escarpment from Niagara to Tobermory. 50% of this land remains vulnerable to development. The ability to protect and purchase associated properties is made possible by donations, 50% of which is donated by private donors, who largely fall within an older demographic. A similar trend can be seen within those who volunteer on the trail itself. In order to continue the protection of its diverse ecosystems and the endangered species within, involvement of a younger demographic is necessary.

The Bruce Trail Conservancy Community Outreach Project (BTCCOP) aimed to address the situation through social media campaigning, concluding with a student-led event featuring educational speakers.

Objectives

- 1 Create awareness in the McMaster student body about the BTC
- 2 Organize and host an educational hike and event at McMaster to raise awareness and support for the BTC
- 3 Develop an effective BTC awareness campaign and identify potential marketing strategies to appeal to younger demographics

Reporting

The BTCCOP launched popular social media pages, Facebook, Twitter and Instagram under the handle 'Bruce Trail at Mac'. Through these accounts, we have been able to reach 143 followers with 2000 engagements. These platforms were successful in promoting the Sherman-to-Tiffany Falls Hike. Of the 54 participants that attended, 38% heard of the event through social media.

The Sherman-to-Tiffany Hike familiarized attendees with the Bruce Trail and helped them understand its incredible importance. Moreover, the hike facilitated relationships between McMaster students and the BTC since several of the organization's representatives were present at the hike.

The 'Bruce Trail Your Way' educational event included speakers from the BTC, the Cootes to Escarpment EcoSystem Park and Mountsberg Raptor Centre, whose interactive lecture included a demonstration involving live birds of prey. Attendance peaked at 65 participants: 36 students, 2 staff and 27 community members, 14 of which registered for more information. Survey results showed 100% of attendees left with increased awareness of the BTC, successfully achieving the primary objective of the BTCCOP.



The Sherman-to-Tiffany Hike

Collaborators: We'd like to thank project Champion Jan Graves and Marsha Russell of the BTC for their support and guidance, Wayne Terryberry of McMaster Outdoor Recreation who provided sponsorship as well as mentorship, Kate Whalen from the Academic Sustainability Programs Office who provided logistical support and Tom Omorean who photographed and donated his time for the hike.

Facebook: www.facebook.com/pages/Bruce-Trail-at-Mac

Twitter: www.twitter.com/BruceTrailatMac

Instagram: www.instagram.com/brucetrailatmac

Youtube Hike Video: https://www.youtube.com/watch?v=3Cc_sWgxTPs&feature=youtu.be

Building a Portable Solar Generator

Student Authors: Saad Amjad, Aathiq Hameed, Nilushi Kariyawasam, Nabil Khaja and Onkabetse Lekgwere

Overview

Solar power is a sustainable, renewable, and non-polluting source of energy. Although the creation of solar-powered systems is associated with a high fixed cost, the continued generation of solar energy is low-maintenance and more economical over the long term relative to traditional sources of energy. The focus of this project was to test the feasibility of constructing a “Do it Yourself” solar generator for use on Dr. Michael Mikulak’s teaching farm, Common Ground. Our goal for the generator was to measurably reduce the amount of wasteful energy consumption on the farm while demonstrating the practicality and environmental benefit of solar power to students and members of the community. The generator is also designed to be an emergency backup power source that can sustain farm equipment and act as a reliable source of energy, in the case of a power outage.

Objectives

- 1 Consult local Canadian technology manufacturers to optimize cost, performance, and longevity
- 2 Construct a functioning 1600W portable solar generator for use at a local teaching farm
- 3 Perform a life cycle analysis to compare the environmental impact of the proposed generator to existing infrastructure on the farm

Reporting

Imagine your own 1600W rechargeable power system. We wanted to build a powerful, noiseless, pollution free, cost-effective and most of all portable solar generator. With the help of a local technology manufacturer, Gennex Technologies, we purchased the major components of the solar generator at a subsidized cost of \$1300. These specialized parts cannot be ordered through local hardware stores, and can cost over \$2500 if purchased at the existing market price from other vendors.

The final build is compactly stored in a weather-resistant portable Stanley tool cart with dimensions approximately 1.5 ft by 2.5 ft. The construction process requires some technical expertise. The generator will be used at Dr. Mikulak’s teaching farm. Should the farm lose power, the generator can output up to 1600W of power for up to 3 hours on a load of 100% or 12 hours on a moderate load of 50%. The generator will be used to power a freezer in the effort to keep produce cool while



Team members working on the solar generator



The final product

also powering a 0.75 horse power sump pump in the case of flooding. A peak power report was developed alongside the device to inform users how to angle the panel to maximize its power generation in Hamilton’s climate. Our completed life cycle analysis indicates that the generator can last up to 15 years and the batteries up to 3 years.

Collaborators: We would like to thank Dr. Michael Mikulak for his instructional support and for funding this project, as well as Gennex Technologies for providing all the necessary hardware to make our project possible at a subsidized cost.

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The Green Red Cup

Student Authors: Basmah Ahmed, Cristian Ivascu, Erik Jurriaans, Marijke Jurriaans and Amanda Watkins

Overview

The red plastic cups commonly used at parties are an iconic staple among university students. They're handy, disposable, and widely available, but their composition is far from environmentally friendly. Our mission is to develop a prototype of this iconic red cup that is 100% compostable, while still maintaining the original aesthetic appeal. The Green Red Cup (GR Cup) will help reduce the amount of polystyrene waste, and change people's minds about composting and environmental sustainability. By designing the cup, creating awareness, and developing a business plan, we hope to not only fashion an accessible and sustainable product, but to show people that sustainable products can be easily incorporated into current lifestyles and patterns.

Objectives

- 1 Design and refine the process to create a red polylactic acid (PLA) biodegradable cup and develop a prototype
- 2 Work with local composting programs to find the best way to dispose of cups
- 3 Draft a business plan to be used for potential marketing
- 4 Create awareness about the product and the cause

Reporting

The project began by developing an AutoCad model of the PLA red plastic cup. The model was constrained through a physical template made from medium-density fibreboard meeting size and design requirements of the final cup. This template will be used for thermoforming, the processes used for manufacturing. By purchasing plastic pellets, sheets were produced in-house and used to develop one prototype of the cup. This prototype did not meet shape requirements and will be modified in future revised prototypes.

The current prototype is in the process of being tested for its ability to compost. Walker Environmental Group has entered into an agreement with GR Cup that will allow the first prototype to be tested in its 8-week composting system. This trial will be complete in early 2015.

A 10-question survey was distributed to 50 students to determine purchasing habits, price sensitivity, and consumer interest in sustainable products. This information aided in the draft of a 3-page business plan which used survey responses and secondary resources to determine pricing, product features, packaging, patenting, and the possibility of taking the product to scale. This working draft outlines short-term (6 months) and long-term goals (1-2 years) to guide GR Cup in its initial stages.

Through a Kickstarter campaign, \$707 was raised to purchase the supplies to develop the prototype. GR Cup finished its campaign with 27 supporters and 713 campaign views. Through Facebook, the GR Cup gained 234 followers, with a total reach of 614 unique users. It had its marketing messages shared through MacGreen's and Sustainability @ McMaster's networks, reaching 1,129 students and members of the Hamilton community. GR Cup presented at the McMaster Innovation Showcase, where a two-minute pitch was presented to a panel of judges. This allowed GR Cup to grow its presence in the McMaster start-up community.

Collaborators: Dr. Thompson, Director, M.Eng in Manufacturing Engineering; "Project Champion" and group mentor; Glenn Crossley, Business Development Advisor, Physical Sciences and Engineering; Patent and legal support; MacGreen: Social awareness support and networking; Sustainable Future Project Facebook Group; Aaron Mimmagh, Procurement Manager, Colourfast Printing; Richard Laurin, Account Manager, Designed Structures and Solutions, Ontario, Canada, PolyOne Corporation; Kendall Justiniano, Marketing Direction, Custom Engineered Structures, PolyOne Corporation; Clealand Berwick, Lead Hand, McMaster Engineering & Science Machine Shop; Diana Aquino, Organics Process Analyst, Walker Environmental Group

Web Page: greenredcup.wordpress.com

Facebook: /GreenRedCup

Twitter: @GreenRedCup

Hamilton Bike Share at McMaster

Student Authors: Rachel Brain, Thomas Nokes, Alexandria Rees, Maia Stevenson and Kristina Vucenic



Overview

Bike share projects are a public service that allow individuals to use bicycles on a short-term basis. Hamilton's 1.6-million-dollar bike share initiative will use 4th generation systems, in which the bike share technology is integrated into bicycles rather than docking stations. Many North American campuses have already made a successful transition to this new technology and lifestyle, but uptake of new bike share programs does not always occur smoothly. Identifying barriers to successful uptake among students can guide effective communication and marketing strategies. The experiences of other campuses, combined with survey data collected from students and staff at McMaster University, was used to recommend preemptive measures that will encourage uptake of the bike share system within the McMaster community upon its launch in March 2015.

Objectives

- 1 Conduct background research, and prepare and distribute a survey within the McMaster community
- 2 Analyze survey results, develop recommendations based on survey data and research conducted on other bike share initiatives that can be impactful on a university-wide scale
- 3 Share results with members of the campus community and the SoBi Hamilton team

Reporting

Research on bike share systems in other university-centered cities, such as Montreal and Boston, informed preliminary discussions and the creation of meaningful survey questions. We developed survey questions that incorporated the key concerns of more experienced bike share teams, such as winter weather, safety concerns, and issues with registration. The survey was shared online through Facebook groups and cooperative clubs on campus. Other advertising techniques involved writing the survey link on classroom chalkboards and handing out flyers. Over 470 students and staff responded.

Over 60% of survey respondents named "cost" as a factor likely to prevent them from using the bike share system. When asked what would most encourage them to use the system, 46% answered "including bike share membership in student fees".

Almost 70% of the respondents aged 18 and under had not previously heard of the bike share system. Furthermore, 36% of all students surveyed cited "preferring to use their own bikes" as a barrier to their use of the system. Based on survey data and the experiences of other bike share programs, we developed recommendations for facilitating the uptake of the bike share program at McMaster: reducing rates for new users over a finite period of time, approaching the MSU about including membership fees in student fees, and providing incoming students with information on the system in their welcome packages. Information included in welcome packages should educate students about how SoBi's bike share system works and inform them about the advantages of bike share systems over personal bike ownership.

Our results and recommendations will be shared with SoBi Hamilton in the form of an in-depth written report. We will also share our conclusions with the McMaster community by posting our report on the website of the Sustainable Futures Department and by approaching the MSU with recommendations.

Collaborators: Survey implementation was facilitated by the members of this student group and the McMaster Sustainable Transportation Services (MSTS). The community project champion is Peter Topalovic, and he was responsible for providing information on the SoBi Hamilton system as well as advising the group throughout the project. Chelsea Cox, from SoBi Hamilton, also provided information and guidance throughout the process. An iPad Mini was provided as a prize for one randomly selected respondent. A number of McMaster clubs helped with data collection by distributing our survey link among their members and within their social groups.

Online Report: <http://goo.gl/eP0Qtr>
SoBi Hamilton: <http://hamilton.socialbicycles.com/>

Local Quinoa Project

Student Authors: Crystal Chan, Kimberly Dowell, Ana-Maria Qarri, Julia Redmond and Michael Spencer

Overview

In the last few years, the global demand for quinoa has soared due to its establishment as a superfood. Since quinoa is primarily grown in South America, the high demand has created various sustainability issues, namely, the environmental impacts associated with shipping quinoa around the globe.¹ The project's purpose is to research and develop methods of harvesting and processing quinoa locally and raise awareness about the sustainability issues surrounding commercial quinoa production. The initiative will take place on Common Ground Teaching Farm, with an aim towards scaling up for larger farms. This project will help demystify issues surrounding quinoa by sharing our findings with farmers, business owners and consumers in the area.

Objectives

- 1 Harvest quinoa grown on Common Ground Teaching Farm
- 2 Identify the most efficient method to process and dry the quinoa after it has been harvested
- 3 Determine how to upscale the harvesting and processing of the quinoa for larger yields in future growing seasons
- 4 Determine how to raise awareness to consumers, business owners, farmers and local food activists about growing quinoa in Ontario and the socio-economic benefits to producing quinoa locally

Reporting

To help create awareness about the socio-economic issues associated with conventional quinoa production, Common Ground Teaching Farm in Hamilton has worked collaboratively with us to determine the best methods of harvesting, processing and marketing locally-grown quinoa for consumption. Together, we hand-harvested 0.75 kg of quinoa, which entailed stalk removal and sifting through undesirable plant debris, as well as washed and dried the crop. The best methods of processing were determined based on time efficiency, resource efficiency and utilizing the least amount of labour. This project has gauged the costs and labour associated with harvesting and preparing quinoa for consumption to determine that it could be feasibly grown on a large scale in the more humid than ideal climate of Southern Ontario. Furthermore, the initiative has provided information for consumers about the importance of eating quinoa locally through informational brochures, which will be available in the near future for consumers of community grocery stores or Common Ground Teaching Farm community-supported agriculture (CSA) members. A packaging and logo template has been created for the quinoa grown, which will give a background to buyers about the farm and what it is trying to initiate by growing quinoa. The package and logo will be used for packaging next year's quinoa production, where it will be sold to community grocery stores, such as The Mustard Seed, which have expressed interest in selling it, or CSA members of the Common Ground Teaching Farm.



Crystal and Julia process the first round of quinoa using a screen

Collaborators: In collaboration with Common Ground Teaching Farm, the Local Quinoa Project team harvested, processed and marketed local organic quinoa with support from academic supervisor and community project champion/mentor, Dr. Michael Mikulak, Sessional Professor in the Sustainable Future Program and non-academic supervisor Kate Whalen, Senior Manager, Academic Sustainability Programs. Notable mention goes to The Common Ground Farm for providing local organic quinoa for experimental harvesting and processing.

Common Ground Teaching Farm Website: <http://www.michaelmikulak.com/current-projects/>

¹Romero, S., & Shahriari, S. (2011, March 20). A Food's Global Success Creates a Quandary at Home. The New York Times , A6.

Solar-powered McMaster

Student Authors: Aqsha Adam-Haji and Brandon Huzevka

Overview

The project envisioned proposes an energy efficiency initiative, based on the simple concept of a portable solar-powered generator. This initiative is one part of a larger two-part project to prototype and install a simple, portable solar-powered generator on a local Hamilton farm. The intention of these two projects is to use the farm generator to exemplify to McMaster students, staff, and faculty that sustainable energy sources can be easy to implement and can provide a viable alternative to non-renewable sources. By implementing a solar-powered system on a small organic farm, the process of producing food becomes increasingly sustainable, and promotes self-sufficient food generation. In addition to this, the do-it-yourself (DIY) aspect ensures that the construction of the generator is practical and achievable using simple and locally-sourced individual components.

Objectives

- 1 To learn how to build a DIY solar generator and contribute to the knowledge base for Building a Portable Solar Generator project (see page 6)
- 2 To subsidize some of the costs of the solar panel through external funding sources
- 3 To spread awareness within the McMaster community of students, faculty, and staff regarding the benefits of solar generators

Reporting

We began our project by obtaining solar equipment at a reduced cost through Gennex Technologies. Although there were initially some issues with the delivery of the components, once the miscommunication was resolved the components arrived. As project B commenced the build, we started to document progress and work towards creating an Instructable, that will be available on the website below. Upon the completion of the website, we began to spread awareness throughout the McMaster community through short (5 minute) introductions in classes pertaining to sustainable energy.



The informational website containing content related to sustainable energy resources

Our approach to objective 2 was indirect, as the acquisition of funding was directly tied to grant application. While initially we sought private sponsors to fund a small demonstration, we were unsuccessful in reaching our financial goal. Although this setback was disappointing, we decided to change our approach to the issue of funding by directly applying for grant funds. As the completion of a grant proposal for funding was a parallel course objective, we are currently working towards a grant for a portable solar generator.

Overall, we are confident that we were able to contribute further to the collective consciousness of McMaster students regarding sustainable energy sources. We are thrilled that we were ultimately able to complete our major goals, and are hopeful that many students were inspired by the class talks we gave. Finally, we believe that the website we created will continue to provide knowledge on solar energy for the McMaster, Hamilton, and global communities.

Collaborators: This project was made possible with the support of Community Project Champion Michael Mikulak, in collaboration with Saad Amjad, Aathiq Hameed, Nilushi Kariyawasam, Nabil Khaja, and Onkabetse Lekgwere from Building a Portable Solar Generator. We would like to thank Kate Whalen and the Academic Sustainability Programs Office for guidance and support throughout the project. We would also like to thank Gennex Technologies for providing us with reduced cost components for our project.

Website: <https://solarpoweredmcmaster.wordpress.com/>

Textbooks for Change

Student Authors: Jeremy Bober, Emily Guan and Matthew Thomson

Overview

Textbooks for Change, which is a B-corporation, aims to take the surplus of quality educational material and distribute it to those who lack the resources to purchase expensive textbooks. Drop boxes are set up in high traffic areas in universities/colleges across Ontario where students can donate their unwanted textbooks. These textbooks are then taken to a warehouse where they are evaluated and repurposed. A large portion of the textbooks collected are sent to universities and colleges in Africa that are in need of high quality educational material. Our group brought this campaign to McMaster, in the form of increasing awareness and driving textbook donations so that Textbooks for Change can continue to grow and reshape the educational landscape both at McMaster and abroad.

Objectives

- 1 Provide educational resources to students in countries with socioeconomic disadvantages
- 2 Reducing the environmental impact by recycling and reusing used textbooks
- 3 Spreading the idea of providing used resources to Africa and efficient recycling of disposed textbooks within the student community

Reporting

The goal of this project was to promote Textbooks for Change to the McMaster community. Currently, we have five drop boxes on campus, in the following locations: Mills Library, Thode Library, Health Sciences Library, Innis Library, and DeGroot School of Business. There have been over a hundred textbooks collected from McMaster students on campus in the first two months that the drop boxes have been on campus. These textbooks will eventually be evaluated to see whether they will be donated to African universities/colleges, sold online for profit or recycled sustainably, thereby helping to accomplish two of our main objectives.

Multiple Facebook posts were made on McMaster based groups, and all together, received 50+ "likes" from individuals in the McMaster community. A two-day information event was held at Mills Library to promote Textbooks for Change, and provide additional information to the McMaster community. Over 20 people came and stopped by the booth on the first day to learn more about Textbooks for change, where pamphlets and buttons were also given out to individuals. On the first day of the event, over 20 textbooks were collected from individuals that learned about the event from the Facebook group. There were also 22 individuals that RSVP'd to the event on Facebook. Both of these outcomes contributed to our outreach objective by using social media, pamphlets and events that help promote Textbooks for Change.



Jeremy and Matthew promoting Textbooks for Change

Collaborators: Collaborators involved in this project include our Sustainability 3S03 group: Jeremy Bober, Emily Guan and Matthew Thomson; The founders of Textbooks for Change: Chris Janssen and Tom Hartford; Textbook for Change's Marketing & Media Director: Brady Burke; our Academic Sustainability Programs Office liaison: Kate Whalen.

Website: <http://textbooksforchange.ca/>

Waste Management at St. Joseph's Healthcare Hamilton

Student Author: Anton Gallego, Katya D'Costa, Michael Hissink and Sara Sahota

Overview

Non-hazardous wastes make up approximately 80 to 90% of the waste produced in the average Hamilton hospital. This often consists of food waste, office materials, non-infectious patient waste, disposable masks, gowns and other supplies. Trends in waste disposal at St. Joseph's Healthcare Hamilton (SJHH) suggest an excess of waste, and the need for more sustainable practices. Most recently, SJHH launched the "365 Days of Green" campaign led by the staff-run Environmental Co-operative Program (ECO). Contributing to this campaign is our Waste Reduction project, which aims to identify and help change trends in waste-related attitudes and practices by staff within the hospital. The goals will be accomplished by performing a waste audit and analyzing relevant available data, as well as observing the habits of staff members. The data gathered will be used to create awareness on sustainable practices within the hospital.

Objectives

- 1 Conduct a waste audit on the West 5th and Charlton campus through quantifying and analyzing the waste generated
- 2 Provide recommendations on appropriate disposal techniques and employee practices based on recorded and analyzed observations with behavioural audits
- 3 Design a campaign to create awareness among hospital staff and patrons, collect feedback on opportunities to minimize waste

Reporting

The group toured and assessed the SJHH Charlton campus on Thursday, October 2nd. After discussing necessary areas of improvement with the project champion, an action plan was drafted. A waste audit was performed at the West 5th campus over a period of 6 hours by 4 people. The second audit for the Charlton hospital campus occurred over a span of 2 days and a total of 14 hours by 3 people. The audit entailed weighing all landfill waste and recycling that was generated within 24 hours at both of the campuses. Approximately 20% of bags were opened and sampled, often between 1 and 5 kg from each section of the hospitals. These were opened and sorted into different components, then each component was then weighed and recorded to understand what areas generate more landfill waste than necessary. Behavioural audits were conducted as the group walked through and waited at the hospital during the audit. In these inspections the observations echoed the results found in the waste audit, being that a very large number of coffee cups being tossed in the garbage instead of being recycled, and a large amount of organic food waste was generated in the cafeterias that was not going in the compost bins. Our group provided the recommendation to focus on these problems for waste reduction. These recommendations were incorporated into a PowerPoint presentation, posters, and a survey designed to increase awareness for employees and patrons. The slides and posters outlined the current project of selling reusable travel mugs to reduce coffee cup waste as well as visuals for recycling the paper cups, and the interactive survey asked questions about what can be recycled. The media files were sent to our project champion for distribution and use in the hospital, but will not be implemented until 2015.



Anton and Sara having fun at the audit!

Collaborators: A special thanks to our project champion, Victoria Brzozowski for all her support and guidance and her delicious homemade lunches.



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Designed by the Academic Sustainability Programs Office