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Innovating Sustainability Education through the “Bird’s Eye” Perspective

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I am grateful for the passionate and kind students in this class that allowed the room for Jacob Coddington and myself to grow with them throughout the semester. Thank you to SIU’s Honors Program, specifically Jyotsna Kapur and Elizabeth Donoghue, who have been teachers full of heart, always keen to learn as they teach and support others. I am nothing without those who kindle my spirit, make me climb mountains that I am unsure of, and leave me to question my half-done thoughts. Lastly, it is because of teachers and community leaders believing in student powered change that empowers students to make change.

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Innovating Sustainability Education through the

“Bird’s Eye” Perspective

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Abstract

Various disciplines were used to define sustainability through their lens and set an education space that integrated students into finding needed and creative solutions for the problems affecting their community. This was done through the creation of an University Honors course that took 13 students and put them into a class split into two parts: setting a base foundation of sustainability knowledge through learning the views and struggles of different disciplines every week and then building a sustainability project that caters to the needs of the community.

Inspiration/Mission

The course *Innovations in Sustainability* was inspired by having majors and minors in two different colleges, the College of Liberal Arts and the College of Science and finding a major gap in my educational experience. Although I have engaged in a variety of academic disciplines such as Biology, Chemistry, French, German, and Political Science, I rarely saw communication or synthesis between different departments and majors. I found a narrow education in each classroom that lacked connecting dots between fields and integrative problem-solving of the issues being discussed. I was not told to try to think of solutions for problems in the non-academic world. It made me ask, “Why does a college education not reflect and prepare students for the world and skills needed for after college? Where can students learn how to grow interpersonal communication skills, ask questions, work across fields, and build an idea into reality?” In a world of rapidly dividing expertise and wicked issues, such as climate change, that our world has come to face, the need for holistic thinkers and fearless and cooperative doers grows ever dire.

I have found that these are not just my thoughts and experience. Many people and disciplines don't think they are prepared to face the problems that their community, country, and world are facing. If education can't teach students how to solve problems and change the world, then it will lose relevance to our society. Education must evolve with the world around it.

In Fall 2018, I was accepted into an organization called University Innovation Fellows (UIF). This program is a Stanford design school creation, aiming to empower students to be change-makers at their universities. Although this could be done without the program, the program created immediate connections and resources for the Fellows to work with on their campus as they set about inspiring change. Through this program, I went through a six-week design-thinking training where I analyzed gaps in my university system, identified problems to fix, brainstormed numerous solutions, identified stakeholders that we could work with, and then began trying to inspire others to invest into the idea. It was an engaging and practical method for me and my fellow cohort to use to identify problems in the university system that resonated with us. For me, my dream quickly became about interdisciplinary, experiential learning relating to real-world problems.

I aspired to design a university classroom experience that would bring together students from various majors and backgrounds and engage them in a class where they would work together to create solutions for real issues that we are facing in the world like the following topics: climate change, homelessness, women's issues, food security, and the global refugee crisis. For the first run of the class, it was decided to use sustainability as the focus of the class. I wanted the students to experience sustainability experientially and from all perspectives.

The Process of Making the Class

Although teeming with excitement at the prospect, I was unsure of the practicality of the idea and received a lot of skepticism from advisors in University Innovation Fellows on whether the project was plausible. I went to see my advisor, Elizabeth Donoghue, in the SIU Honors Program about the idea, who acted as a pure force of support that pushed me to set up a meeting with the director of the Honors Program, Jyotsna Kapur. Kapur was both an enthusiast and a meticulous challenger of the idea. She brought her 20 years of teaching experience, background in the arts, and a wary attitude for design-thinking. She was thrilled that students felt invested in their education enough to try to create their own class and informed us that to her knowledge this would be the first student-generated class at the university, but was concerned about the use of design-thinking in the class and the potential loss of intellectual analysis from the students. After she agreed to place the class in the Honors Program curriculum and to be the class advisor, her push for intellectual depth in the course became a regular topic of conversation as we were designing and teaching the class.

We began to meet with professors from around the university, local businesses leaders promoting sustainability, and the Sierra Club. Simply put, we met with every person relating to sustainability that would meet with us to devise a plan for the class. Although there was a vision and basic idea of a format for the class, I knew that I couldn't sufficiently act as an expert in all these fields that I wanted to cover, nor did I consider myself qualified to do so. I considered it best to outsource to existing, leading experts in the fields connected to sustainability. In these meetings with professors and local sustainability businesses, we asked about how their field was connected to sustainability and what sustainability problems they saw at the university. Even if we did not use a person that we met with to be a speaker in the class, we used them as a resource

for students to contact during their projects. This part of creating the class with others laid the groundwork for the resources for the class. Over the summer, Kapur worked with professors and experts to develop class readings for each week of the first half of the class. Students would write journal readings on each of the readings.

Jake Coddington and I also applied to the Green Fund Award, through the SIU Sustainability Green Fee, which is a fund made by students through student tuition money to aid sustainability project ideas at the university. We received \$3,260 for the class. This funding was specifically to cover \$1,500 for the “initial funding for student projects” and \$1,760 for the work compensation of Carly Kasicki and Jake Coddington during the Fall 2019 semester.

Class Format

The class was split into two parts: setting the intellectual groundwork and putting it into practice. The first eight weeks of class, Jake and I worked with faculty from a variety of departments such as Sustainability, Art & Design, Architecture, Engineering, Communications, and Geography to teach the students how sustainability affects their particular field of study. They also worked in tandem with student and community group leaders such as FoodWorks and LEAF (local farmers markets), Carbondale Spring, and Touch of Nature to participate in the class as well, which led to the class traveling to “All Season Farm” and SIU’s “Touch of Nature”. While these class periods included lectures from these guest speakers, design challenges and activities were also conducted to engage the class on an active level and help stimulate brainstorming skills.

The last five weeks, the students were broken up into four teams to create projects that would make a sustainable impact on campus. We used class periods to bring in experts that could give feedback on their projects and as work time. The projects ended up being:

1. A proposal to implement a bee garden on campus
2. The implementation of a “sustainability week” in SIU’s University 101 class (which the provost has approved)
3. A recycling campaign proposal based on the painting of recycle bins to distinguish what material should be put in them
4. A proposal for a bike sharing program on campus

The groups presented their finalized proposals/projects at the end of the semester in front of their faculty and community stakeholders, with half planning to continue work on their projects following the completion of the class. The Honors Program has renewed the class for next fall in the hopes of continuing the push for greater sustainability initiatives on campus.

Analysis of the First Half of the Class: Comprehensive Understanding of Sustainability through Different Fields/Perspectives

Week 1: Leadership Development Program (LDP) and SIU Sustainability Office

The first half of the class started with Geory Kurzhals, director of the SIU Sustainability Office, bringing in exercises to analyze how the students comprehend sustainability. This includes going over misconceptions in sustainability and introducing the students to Drawdown, a list created by scientists that designates the solutions that would combat gas emissions. Geory split students into teams and gave the teams cards with different sustainability terms on them like green-washing, GMO, carbon-neutral, etc.. The teams worked together to research and figure out

the terms, which were later explained to the other teams. The three pillars of sustainability were laid out as society, economy, and the environment and explained the best, long-term solutions will be those that place all aspects into account. Geory incorporated the basics of sustainability into her discussions with the class along with a basic layout of sustainability at SIU. She discussed STARS rating as a method of determining how sustainable a campus is considered and discussed how SIU fits into that rating system. She gave the students a list of the following resources to act as the basis of their research when determining a project:

Official United Nations Sustainable Development Goals (UNSDGs) websites:

<https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<https://sustainabledevelopment.un.org/>

Project Drawdown:

<https://www.drawdown.org/>

STARS Sustainability Tracking, Assessment & Rating System and SIU's 2016 STARS report

<https://stars.aashe.org/>

<https://reports.aashe.org/institutions/southern-illinois-university-carbondale-il/report/2016-11-23/>

Yale Climate Connections:

<https://www.yaleclimateconnections.org/>

SIU Sustainability –full of information, resources, and opportunities related to campus

sustainability: <https://sustainability.siu.edu/>.

Green Fee/Green Fund info: <https://sustainability.siu.edu/green-fee/>

The second half of the class was led by two mentors of the Leadership Development Program. The aim of LDP was to develop a community between the classmates and discuss attributes of highly successful teams. They showed a presentation that explained great teams that achieve results are made by having good relationships with aligned expectations. It also showed the TEAM Model and SOLVE Model to simplify for students what makes a great team and how they might go about solving problems.

The TEAMS Model states trust, emotions, accountability, member norms, and small wins matter in a team. People were split into random groups and then asked to go through a list of values and figure out what they value on the list. They then compared what they valued to the other people in their group. People can better understand themselves and each other if they understand the values that guide them.

The SOLVE Model asks teams to:

- Set roles
- Outline the problem
- List multiple strategies
- Veer toward consensus
- Evaluate results

They ended the class with a team exercise where teams of four had to use the SOLVE Model to organize a shuffled deck of cards in the shortest amount of time. They were then given a second time to do the challenge after discussing how they could improve. Every team did it a second time, all doing better than their first time.

Week 2: Geography

The Director of the School of Environmental Sciences and Sustainability, Justin Schoof, laid the framework for the science and facts around climate change. He gave the *Highlights of the U.S. Climate Science Special Report Executive Summary* and the *Fourth National Climate Assessment Overview* as readings for the class. *The Climate Science Special Report Executive Summary* is a report developed from the collection and analysis of thousands of scientific studies. It introduces the problem of climate change as an “extremely-likely” human-caused issue that is leading to rising surface, atmospheric, and oceanic temperatures, melting glaciers, decreasing snow cover, less sea ice, ocean acidification, and increasing water vapor (Weubbles et al. 2017). Rising temperatures that could reach 9 degrees Fahrenheit by the end of the century, affect agriculture, energy use, human health, water resources, infrastructure, and natural ecosystems. Precipitation extremes can affect water quality, agricultural productivity, human health, vital infrastructure, iconic ecosystems and species, and the likelihood of disasters. The report suggests disasters as being more extreme and frequent. Oceans have absorbed 93% of excess heat caused by greenhouse gas emissions and absorbed more than a quarter of the CO₂ emitted to the atmosphere, increasing its temperature and has risen 7-8 inches since 1900 and increasing the oceans’ acidity. Higher ocean temperatures has caused higher rates of coastal flooding and will continue to increase in intensity and frequency. Oceanic changes are also impacting ocean biodiversity, leaving the planet with altered ecosystems.

Since the report is an accumulation of research, the research techniques vary extensively throughout the studies. Long-term temperature and precipitation observations are a consistent and reliable method as evidence for a warming planet. Multidecadal simulations are used for higher resolution characterization of extreme weather. The report also uses physics and

numerical modeling simulations that project more intense storms and disasters. Satellites are used to detect sea ice age and glacier melts.

Schoof introduces sustainability through the readings by having the students recognize *why* sustainability should be looked at through looking at the facts of climate change and *what* will the world look like without making sustainability a priority. Students understand better how climate change affects them and will affect them. It also reveals the diversity and complexity in climate change issues. Schoof laid out the facts and studies, but gave no indication of how climate change should be solved.

Week 3: Art and Design

Tao Huang and Aaron Scott, professors from SIU's Art and Design Department, introduced the class to the core of design thinking, a method for solving problems, the Hannover Principles, and Wicked Problems. The core readings for the week were *The Core of 'Design Thinking' and Its Application* and the *Hannover Principles*. The design thinking paper addresses that there are many variations of design thinking with some preferred for certain groups or businesses. No matter the exact method used, the idea is useful for dealing with open-ended, complex problems. The logical basis for the reasoning behind design thinking comes from the placing and removing variables from the equation "WHAT + HOW leads to RESULT" with WHAT being a thing, HOW being a working principle, and the RESULT being the observed reaction. One can attempt design reasoning by trying to fill in gaps within the equation by induction, deduction, and abduction. Abduction is obtained when the process is conceived from the value. The paper explains that engineers and designers create their designs off of "a set scenario of value creation" and a working principle. This way of "closed" problem solving is

common across fields and organizations. “Open” problem solving, which is more complex, is starting with only the result and then building the WHAT and HOW. These values can be configured from methods like framing, where a specific standpoint is chosen to tackle a problem.

Huang and Scott introduced the issue of sustainability and climate change by recognizing it as a “wicked problem”- a problem so massive and complex that it cannot be solved from one angle or solution. To understand problems like this, it was explained that although there is no simple fix to the problem, it is important to understand how people and parts are intertwined within a problem. Huang and Scott had the students draw empathy maps for specific wicked problems. Each person explained their wicked problem and map to the class. The Department of Art and Design pushed at the idea that it was about solving the whole puzzle at once, but rather piece by piece, one perspective at a time.

The Hannover Principles was the other reading assignment, speaking on designing with sustainability, specifically environmental impact, and the effect on society in mind. The principles seek to recognize interdependence, create for the long-term, eliminate the concept of waste, and agree on the right for humanity and nature to sustainably co-exist. People need to accept responsibility for the byproducts of their design decisions. The report compares using living machines versus conventional technology as sources of energy and on efficiency, recycling, and lifespans. The point of the report being that people should be rethinking their idea of design into a more sustainable format, where lifespan and environmental impact are a part of the process of creating the product. A natural point that stems from this is getting rid of materialist and throwaway culture - a society built on temporary desires, overproduction of products, and where products are only meant to last a couple seasons before being thrown in a

landfill. Many of the problems that we face today stem from society's values. Therefore, to make change, we must change thoughts.

Week 4: Agriculture

The organizations Foodworks and LEAF, led by Jennifer Paulson and Elizabeth Mikso-DeRuntz respectively, led the class on a field trip to All Seasons Farm, a certified organic farm about 10 minutes south of campus. FoodWorks is a non-profit that gives farmer training and consumer education on sustainable food in an effort to promote long-term farming that generates healthy soil, food, and communities. LEAF is an online farmers market that seeks to support small farmers by providing an online marketplace for their goods and to make ordering local food easier for customers.

A tour with the farmer, Jill Rendleman, was given along with an overview of issues of sustainable food production, health benefits of locally grown food, risks of conventionally grown food, and the costs of organic food. After picking vegetables and spices out of the garden and bringing them to be made into a fresh salad, the students listened to a presentation on the issues in agriculture. The presentation covered greenwashing, environmental impacts from conventional farming, and economic impacts of food buying choices. They also shared issues that they have found in their organizations that they are having and asked the students to brainstorm solutions on issues like better ways to transport without using plastic and how to market local, sustainable foods to students on campus. Paulson and Mikso-DeRuntz used scientific statistics to backdrop the farming issues stated in their argument. They push the concept that local is better due to lower carbon emissions and better nutrient obtainment from the foods as less preservatives need to be used. An alternative side to this is that impoverished

communities often cannot afford the prices of more local food and also can lack the time and knowledge to cook healthy, local food if available to them.

Their readings were two articles from the Wall Street Journal, focusing on the need for sanitary waste disposal and continuous plastic disposal. The article *P & G Faces Backlash* indicates that as markets have surged in India, along with other countries, there has been a significant increase in disposable products. In America, these products end up in landfills or incinerated, but the same waste ends up in rivers and toilets in India, contaminating the water.

The second article *In Plastics War, the Industry Fights Back* lays out the argument that the current sustainability war against single-use plastic bags and polystyrene foam containers is misguided. The article reasons that people are not taking into account the environmental negatives of stated alternative raw materials such as cotton, paper, or corn. The American Chemistry Council commented on a polystyrene foam ban in the state of Maine.

“A ban on polystyrene foodservice packaging could lead to increased solid waste, energy use, water use, and greenhouse gas emissions. Additionally, this ban could have negative economic impacts for local business owners, as a study on similar legislation in New York City showed that for every \$1.00 spent on polystyrene foodservice packaging, restaurants would have to spend nearly \$2.00 on alternatives. (American Chemistry 2019)”

Additionally, the article suggests that people have not been thinking hard enough about the effects of growing cotton and yarn as sustainable alternatives, proposing that these alternatives actually have devastating effects through the depletion of natural resources, oxygen depletion from water bodies, and dangerous chemicals emitted through the farming process. The

article forces people to think further about sustainability practices and how useful or not useful they may actually be, depending on how one looks at it.

Week 5: Architecture

Shannon McDonald, a professor of Architecture, overlapped architecture and sustainability in a discussion focused around retrofitting, new design, and urban transportation. The reading *Thermal Delight* captured the separation of humankind and their environments where humans have created various controls used to manipulate the environment around them, specifically in the creation of buildings. Buildings are used to shelter people from the weather, temperatures, and other living organisms. People try to situate themselves in the perfect temperature of around 70 degrees Fahrenheit. McDonald brought into question this separation that people have created for themselves and the environment, calling on designs to incorporate nature to their advantage. One example brought up in discussion is the placing of buildings to face South to establish natural light into the building for the longest period of time.

The class also looked at the *Living Building Challenge* website where it's focus is maximizing positive sustainability effects that can be achieved through creating and retrofitting products, buildings, and communities. One aspect of the website focuses on biophilic design. This is the practice of connecting people with nature within built environments and communities. The initiative offers resources, teams, and ideas to aid the transitioning of a place. Another discussed concept was the idea of Cradle to Cradle, where a product is useful and reusable. In this concept, the idea is to make a product that can be transitioned into a new use or product after the original product's life cycle has ended. The aim of the class period was to get students to

rethink their vision of products and buildings. “How might students use nature to increase efficiency, sustainability, and design with a reusable mentality?”

Week 6: Energy and Engineering

The engineer for energy usage across SIU, Justin Harrell, and Arash Asrari, an engineering professor, each taught half of the class for Week 6. The reading for the week was *The “New Energy Economy”: An Exercise in Magical Thinking*, a paper on the physics of energy and the idea that the world cannot undergo a “new energy economy” that moves society largely away from hydrocarbons. The paper states that there is no alternative known yet that is as cheap, high-energy density, stable, safe, and portable as hydrocarbons. The claim is that \$1 million dollars spent on solar and wind turbines generates 50 million kilowatt-hours while the same amount of money with natural gas would generate over 300 million kWh in the same time period of 30 years. The push of the paper is to consider shifting away from coal to “cleaner” (smaller carbon footprint) hydrocarbon energies such as natural gas.

Justin Harrell pointed out that when attempting to reduce fossil fuel consumption, discussions are usually based around energy sources rather than consumer demand. His presentation explained the energy sources in the United States and at SIUC. In the US, buildings accounted for 38.7% of primary energy use in 2017 (US EIA Monthly Energy Review 2019). Energy factors for a building include building activity, operating hours, climate zone, building age, materials, technology, and electricity use. US electricity flow in 2018 had 61% energy conversion loss waste with around 35% delivered. The majority energy usage on SIUC campus goes to heating (35%), cooling (33%), lighting (13%), plug loads/equipment (13%), and fan/pumps (6%). Harrell explained where SIUC’s primary energy comes from, with the primary

amount coming from coal. His suggestion for students was to reconsider the potential of natural gas as a primary energy source and the importance of individual human-based lifestyle changes in promoting energy efficiency.

Arash Asari brought up designing technologies in the home to increase power efficiency and lower costs for consumers. One idea was to have an app or device that could place washers and dryers to turn on and off when electricity is the cheapest. People would be able to turn on their washers and dryers from work and save money by washing them at certain times. The same logic applies to charging electric vehicles as well. People could set their device so that their electric car could charge up at the points during the day or night where it would be cheapest. The technology could be set to where the battery is set to reach a specific power percentage by a certain time while balancing the costs of electricity at certain times.

Week 7: Conservation in Community

Student leaders, Jacob Bolton and Grant Depoy, took the lead for week 7, splitting the class period between bringing the students to Evergreen Terraces and Touch of Nature. At Evergreen Terraces, Depoy took the students on a walk around the premise where he talked to them about all the visions that he and Bolton have for the apartments and the people who live there. He brought that Evergreen Terraces is an international community where many international students and their families live, but where they often feel separate from the Carbondale/SIU community which lies a couple miles away. Depoy and Boltons goal is to grow Evergreen Terrace's self-sufficiency and build a tight-knit community through engaging programs focused around forestry, conservation, and sustainability. The two designed and developed a garden that was approved by the dean of residence for the residents to help tend.

This gave many residents the freedom to use local land to grow vegetables that they could bring home and also work with others to do so. Bolton and Depoy also created after school programming for the kids in the community. They have been bringing kids on nature walks while teaching them how to identify trees and various plants. They work to build a community in-tune with nature. In respect to the class, they acted to inspire students. They showed that students can discern the needs of those around us and make change even as students. The second half of the class period was at Touch of Nature, where Steve Gariepy led the class in stories and songs of nature. Gariepy wanted the students to realize and connect with the fact that we are a part of nature.

Bolton and Depoy had the students read the *Talloires Declaration* and *What is the Evergreen Model*. The *Talloires Declaration* was an important milestone in SIU's history. The 10-point action plan is a promise that various universities have signed to make and promote sustainability as a priority at the university. It calls for increased awareness and education involving sustainability and calls for building a culture and institution that caters to interdisciplinary approaches of sustainability. The action is demanded from each institution that all stakeholders are involved from government to foundations to industry in developing an environmentally stable society. The other reading was an explanation of their vision and work, calling for the action of SIU to work interdisciplinarity between departments to fulfill the promises made in the Talloires Declaration and Inclusive Excellence philosophy. Their goals focus on developing a culturally inclusive environmentally conscious community through community programming and landscape development.

Week 8: Thanksgiving Break

Week 9: Creativity and capitalism; ecology and the contemporary arts; designing your projects

The Honors Director Jyostna Kapur led the last week of the class before the students would be given class time to work on and get critiques on their team projects. Kapur wanted to bring in a philosophical element into the class before the students began the full designing and building their projects. Specifically, Kapur sought to give students a new perspective into design-thinking and creativity to reveal that you don't need design-thinking to be creative. There are many methods to creativity with design-thinking being one just recently manufactured. Her three readings for the class were *the "Design Thinking" Delusion*, *On Design Thinking*, and *The Innovation Cult*.

The "Design Thinking" Delusion brings into perspective that design-thinking was created by the company IDEO and was then passed around by various institutions as a method to solving any problem creatively. The method is used to simplify problems into a question and build creative solutions from there. In doing so, design-thinking can simplify the gastly problems that one might be facing, but in the simplification, miss or ignore underlying institutional issues. The set up of design thinking workshops are so that students must think and build under pressure where no thought or creation is placed up for scrutiny until later in the process by product users. This part of the process known as "idea generation" leaves those with the largest multitude and diversified thoughts deemed as an "innovative thinker". The process of design-thinking can be a struggle for those who prefer to sit, study, and analyze problems before doing. This leaves some people to thrive in the design thinking environment while others are forced to be "innovative" in a way that is not their natural bend. Also, the process leaves out why people want the things that they want (aka their values) and leaves the structure of society not scrutinized. The purpose of

design-thinking is to get a workable solution quickly, not for underlying analysis of problems. This can be a positive and a negative as it teaches people how to make change within specific constraints, but also limits thinking and creativity to within those constraints. Overall, I am left to think from this article that design-thinking can be productive for certain thinkers when designing within a system but is not efficient for analyzing and changing the system itself.

The article *On Design Thinking* is a narrative on IDEO coming to the town of Gainesville, Florida to help the mayor make the town more “citizen-friendly” and “design-minded”. The term “design” has changed throughout history from meaning to make things that “solve problems” to now meaning a way of thinking that doesn’t necessarily mean making things. Design is a broad category that can be found anywhere, while design-thinking is found in corporations, governments, and universities where it aids decision-making among academics and executives. The writer, who works as an interaction designer, defines design-thinking as “a particular set of design methods to solve problems that traditionally have fallen outside the purview of design.” Some people have believed that the theory of design thinking should be mathematical and reproducible, promoting the thought that each problem that we come across has right and wrong answers. On the other hand, thinkers like Rittel said that actual problems are always indeterminate and that they require further digging to fully understand the fundamental cause. In this thought, we cannot treat problems as math problems because there is no definitive test of the solutions that we may come up with as an answer. Rittel claimed that many of the problems that we face are “wicked problems”, having no simple solutions. These could be problems like climate change or poverty. Thereby, he claimed that there could not just be one single process of resolution, aka one method, used to solve these problems.

Rittel believed that methodlessness was necessary to not limit oneself. “Nothing has to be or remain as it is or as it appears to be,” he says. Although this method may have worked for him, I understand the utility of having a method by which people can learn. Not everyone has had practice being creative and may need the time to learn how to identify problems, ideate, and build projects. Design thinking can be a useful tool when a team, who does not necessarily know how to be creative, needs to work together to build a project. It can be helpful to teams and individuals to give them a method in which each step they can have creative freedom. Perhaps though, this method could be clarified as a choice as to not limit those who prefer to think/design in other ways.

Lastly, *The Innovation Cult* by Patrick Leary explains the different guises that the word innovation has procured throughout history. Historically, it was seen with a negative connotation as those rebelling against the system. It was those changing the church or the government. Schumpeter, writer of the book *The Theory of Economic Development*, viewed innovation as a product and process. Innovation was exploiting an invention or technological possibility to generate a new commodity. Later, innovation became known as an improved product or process. It was rebelling against the system but with a positive connotation this time. Leary explains innovation as a white-collar activity for those of specific positions within society usually within industry and higher education. Top organizations are felt that they should bring about innovation in their workers by allowing them freedom to work independently and creatively. Leary states that innovation is a way of turning creativity into profit. He pushes that innovation as a philosophy for commodity production has become a commodity itself that “reframes the cruel fortunes of an unequal global economy in a positive light”.

I found this article intimately tied to the utility of design-thinking debate. He says that innovation is not available to everyone, yet information for how to be innovative can be found by anyone who looks for it. The problem that Leary seems to have with the term innovation is that it is always in a positive light. I agree that the term has become popularized to have a positive, new meaning usually tied to industry, but Leary makes it seem that everyone is using the word for a monetary reason. It is a severely pessimistic way of viewing a word that, as he stated, is extremely broad. Yes, it can be used as a buzzword to excite people and get them on board with an idea or product, but shouldn't we be trying to excite people about some things? I want to excite people to make changes in sustainability and I don't see why it should be seen negatively if I gathered my friends in an attempt to think "innovatively" on possible solutions or things that we could be doing. The term innovation is being to energize people around the world in countless communities as a way of feeling empowered to make change. Just because it has been commercialized does not mean that it cannot make a positive difference.

Analysis of the Second Half of the Class: Designing and Building Projects

The second half of the class was used as project time for the students, where they worked on their projects during class. Various professionals from the campus and community came in to critique their projects during this time in hopes of giving the teams different angles of how to build and develop their project. The final project descriptions for each team can be found in Appendix B.

We-Cycle: Focused on finding creative ways to help people recycle better on campus through painted bins.

Theresa May

Danielle Lorentz

Jacqueline Juarez

Cecilia Albert-Black

ECO-101: Focused on the lack of education on sustainability and available resources to students at SIUC by designing a Sustainability Week to be in a class that is required by students.

Hayley Creath

Allena Healy

Abigail King

Save the Bees: Focused on bees going extinct from pesticides everywhere in America. Their idea was a campus run bee garden.

Kaylee Fafoglia

Jessie Murawski

Kathleen Shuffett

The Cycologists: Focused on clean energy and recycling of goods between students through the idea of a bike share program.

Dylan Lopez

Elana Richardson

Arnold Ukagwu

Lessons Learned

- *Build a culture as soon as you can*

- *People do not want to sit for 3 hours straight*
- *There are always going to be students that are not inherently motivated and need to be motivated in different ways.*
- *Teach students how to brainstorm*
- *LDP should have come in when we broke up the students into groups to set the foundation for a good team culture and so that students were setting team expectations with their teammates.*
- *Some lecturers had too much dense information in their discussions and should have explained in more layman or relatable terms.*

The Importance of Interdisciplinary, Project-based Education

We need to make education relevant to students. Education needs to be responsive to the real world. We cannot remain the same education system as we were 20 years ago. I constantly hear that the point of university is for students to learn how to think for themselves and yet, the education system hoping to spur individual thought has been dogmatic in its ways of teaching. Are we preparing students to meet the needs of our society and to tackle wicked problems? Are people learning how to think for themselves? Or are we teaching how to sit, listen, memorize, and regurgitate?

Innovations in Sustainability placed students from various disciplines into a class where they could use their strengths and interests to develop themselves while also developing solutions for community problems. It was a class based on the reality of the world around them. Class was in and out of a classroom, placing students into new environments to immerse all their senses in education. The university system has not adapted to the world and its constantly

developing problems. Students sit quietly waiting for the day for the knowledge being discovered throughout the world right now to make it to their textbooks. They are waiting for the days that they can finally change the world. The purpose of this class was to empower students to realize that they can make change now. This class developed the knowledge base and sharpened the tools that they needed to develop innovative projects that could holistically change their communities. These tools included brainstorming, networking, teamwork, and research. Higher education should be the razor edge of society, pushing the bounds of thought and leading the world to dramatic solutions. This can be done if we have different students working together to create projects based on real problems.

My recommendation is for universities to develop project-based core-curriculums where students marry their creative thinking to real-world application. The required writing class could be turned into the collective composition of stories from war veterans throughout the city or into a research paper that could be sent to the mayor's office on needed public transportation fixes including individual interviews with regular writers. The required biology class could be focused on mapping the ecology of the nearby lake and how humans have impacted plant life over time. Higher education could use experiential, project-based thinking to enhance learning while impacting the world.

Conclusion

Overall, I learned how to effectively work across different departments as well as manage a multi-stakeholder project. I feel humbled that professors saw this as an initiative that they would use their precious time and be part of the vision for this class. I am also humbled by how

difficult it is to be a teacher. I have found many ways to grow and know that the current system and myself can always be improved.

Appendix

A: Syllabus

B: Student Final Project Descriptions

Acknowledgements

I am grateful for the passionate and kind students in this class that allowed the room for Jacob Coddington and myself to grow with them throughout the semester. Thank you to SIU's Honors Program, specifically Jyotsna Kapur and Elizabeth Donoghue, who have been teachers full of heart, always keen to learn as they teach and support others. I am nothing without those who kindle my spirit, make me climb mountains that I am unsure of, and leave me to question my half-done thoughts. Lastly, it is because of teachers and community leaders believing in student-powered change that empowers students to make change.

Biographical Note

Carly Kasicki is an undergraduate senior at Southern Illinois University, where she majors in Biomedical Science, German, and French while minoring in Political Science and Chemistry. She has immersed herself in the cultures of Germany, France, China, Italy, Switzerland, United Arab Emirates, and Thailand. She has been a Paul Simon Public Policy Institute Ambassador, an immunology research assistant, and a University Innovation Fellow out of Stanford's design school.

351M-Multicultural/ 351O-Social Science/351U-Humanities: INNOVATIONS IN SUSTAINABILITY: SURVIVING IN A CHANGING WORLD

Fall 2019: W 3-6, Morris 724

This course was generated by Jacob Coddington and Carly Kasicki (University Innovation Fellows)

Faculty Coordinator: Jyotsna Kapur, Professor, Cinema and Photography & Director, University Honors Program

Jyotsna Kapur: jkapur@siu.edu Office: 110A Morris Phone: 453-1688
Office Hours: Walk-ins (between 10:00 AM-5:00 PM) are welcome, but to make sure that we can chat uninterrupted please stop by the Honors Front desk and make an appointment.

Jacob Coddington: jacob.coddington@siu.edu and Carly Kasicki: carly.kasicki@siu.edu

This is a student-generated course that brings together faculty from the arts, humanities, sciences, and the social sciences to consider the challenges to our survival as a species; and design as a way to conceptualize and find solutions towards sustainable living. The course was initiated by University Innovation Fellows, Jacob Coddington (Graduate student, Master of Business Administration) and Carly Kasicki (majoring in Biological Sciences, French, and German). The course is itself an example of innovation, with students bringing together faculty to address the critical issue of survival -- thus, taking ownership over their education and the richness of knowledge and experience on our campus. It has been in preparation for months and should be an adventure in exploring the possibilities of a comprehensive research university, such as ours.

Weekly meetings will include lectures, discussions, field trips, and project-based work in groups and individually. The first half of the class will be led by faculty, introducing students to concepts, approaches, and histories from their disciplinary strengths; and helping you identify the problem you would like to work on in this class. In the second part, students will work primarily in groups, on specific issues that you have selected to work on.

Course Objectives:

By the end of the course, students should have acquired:

- A working knowledge of how various academic disciplines and communities understand and define *sustainability*.
- An understanding of the history and practice of design as a way to formulate problems and to construct, create, and find solutions that are aware of the aesthetic, functional, political-economic, social, and cultural dimensions of their proposals.
- Experience in working collaboratively on formulating problems, documenting the process of enquiry, and creating plans and/or practical solutions

- Basic skills in presenting and communicating research and findings with others, including, making choices of medium based on the project goals.
- A deepened ability for self-reflection and a sense of ethical responsibility to oneself and others

Readings/texts

Everything is available online or on D2L other than the following:

Heschong, Lisa. *Thermal Delight*. Boston, MA: The MIT Press, 1979.

Readings must be done prior to the class they are assigned for.

Assignments:

1. Idea book: 10%: Keep a journal in which you respond to the weekly readings. Your responses should consider: What did you find most compelling about the readings? What significant aspect did the author/s leave out? If they did, why do you think they did that? Was it the time period, author bias, or available technology? Note passages, sentences, terms you found significant. Finally, what ideas did the reading generate for you? It could be an observation, a plan, something to follow up on. The idea book should include materials other than words, e.g., pictures, poems, tables, data, printed notes—whatever is necessary for you. Name your book. You must always have this book with you in class. In certain classes, you will be given an assignment. This will be your journal entry for that week and can be completed **before or after** the class.
2. Group portfolio: 10%: From Week 4, your group will keep a website/portfolio/blog/folder where you will keep your research, highlighting projects, ideas or problems that you found in association with the assigned readings for the class, record of your experiences and materials you found. This is material that you generate as much for yourself as for others in class. This will also come in handy when you create your group presentations to be workshopped Week 9.
3. Project proposal for the final project: 15%. The proposal should formulate the problem; describe your research, including the method and/or process; outline plan of action; budget; and time line. 3-5 pages. This will be turned in by the group as a whole and must also be put on the group's webpage.
4. Final Project 50%.
 - 10%: evaluation by peers and self-evaluation of individual contribution to the project.
 - 10% for the presentation of your project.
 - 30% on the project and report on challenges, insights, and future recommendations.
5. Class participation 15%

Week 1: Introductions - to each other and the course (08/21)

- Carly and Jake: a vision statement and introduction to the class; Jyotsna syllabus
- **Sustainability: What does that mean?**
Geory Kurtzhals (Director, Office of Sustainability)
- **Leadership and team building:**

Bruce DeRuntz and Diogo Seixas (Engineering and Leadership Development Program)
Students will be broken into groups: 4 groups of 4 each or 5 groups of 3 each will be formed.

Assignment/journal entry:

1. The United Nations Sustainable Development Goals (UNSDGs) help to focus priorities around holistic, world-wide goals.

-Review the following *Official UN SDG websites:*

- <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>
- <https://sustainabledevelopment.un.org/>
- Read about UN News: <https://news.un.org/en/>

-Respond to the following 3 items in 1-2 pages, double spaced:

- The 17 SDGs are meant to be interpreted as parts of a whole systems approach, as opposed to distinct and separate goals to be worked on individually. When intact, the goals are interrelated and mutually reinforcing aspects of the human experience. *Choose 2 goals and explain the interdependence.*
- Choose 1 goal. Find a local organization that addresses this goal in our area. How does this organization implement the SDGs in ways that are sensitive to the bio-cultural uniqueness of your place? Contrast this organization to one that does similar work in another area of the globe. How does their approach differ based on societal and environmental attributes of the region?
- Could SIU more fully address the UNSDGs? What would you like to see SIU do? Why?

2. Explore the [Project Drawdown website](#) and respond to the following in 1-2 pages, double spaced:

-Were any of the listed [Drawdown solutions](#) unexpected? Consider both the solution itself and its ranking on the list. Reflect on why or why not.

-Select 1 solution that you think could be adopted and/or implemented in southern Illinois. Identify the following information for each solution:

- What is the overall rank and name of the sector within which it is categorized?
- What is the potential global impact of the identified solution in terms of reduced CO2 (equivalencies). [This info is provided for you on the website.]
- Why do you think this solution should be adopted in southern Illinois?
- Who would be involved in adopting the solution? Identify 5 groups or roles (include title of person) that should be engaged as a part of the process.
- What are key challenges to adopting this solution in southern Illinois?
- What could members of the southern Illinois community do to help mitigate any challenges identified to adopting or otherwise contribute toward moving this solution forward?
- Can this solution be adopted on an individual level?
 - If not, what are the key challenges to an individual adopting the solution?
 - If so, what can (will) you do to adopt the solution (or a portion of it) into your daily life.
- What is something else that you learned or perhaps that surprises you about this solution?
- Which (one or more) of the United Nations Sustainable Development Goals relate most to the Drawdown solution you selected.

-Could SIU adopt some of the Drawdown solutions? What solutions would you like to see SIU address? Why?

Week 2: Climate Change (08/28): Dr. Justin Schoof (Geography)

Readings (on D21):

- Highlights of the US Global Change Research Program, Climate Science Special Report Overview: Fourth National Climate Association. Two excerpts

Week 3: Understanding Design (09/04)

- Aaron Scott, Tao Huang, and Rob Lopez (Art and Design Department)
- Greg Wendt (Graphic design, Center for Teaching Excellence): brief introduction to Wordpress (and other?) site to present groups' works in progress

Readings—case studies, others TBA.

Week 4: Current state of food production and sustainable food systems (09/11)

- Jennifer Paulson and Elizabeth Mikso-DeRuntz (Foodworks and LEAF)

Field trip to [All Seasons Farm](#), a certified organic farm about [10 minutes south of campus](#). Tour with farmer, Jill Rendleman and overview of issues of sustainable food production; health benefits of locally grown food; risks of conventionally grown food; the costs of organic food. ***Meet at the front entrance of Student Services Building to catch a ride. We will leave sharp at 3:00 PM

There will be snacks, so let us know dietary restrictions.

Learning objectives:

- Students understand the environmental impacts of conventional agriculture (examples: effects of pesticide use on soil, plant, and human health; fertilizer runoff; erosion of topsoil; transportation costs of food...).
- Students understand that sustainable agriculture is a system level approach that works with biology, not against (example: build soil health to create strong plants that resist disease and insect pressure, as opposed to relying on chemical pesticides after a problem has developed)
- Students understand the economic impacts of food buying choices (hidden costs of conventionally produced foods, benefits of local food purchases to local economy, effects on human health).
- Students can identify common “green washing” in food and agriculture (“all natural”, Is certified organic always better?)

- LEAF learning objectives: students understand the weekly amount of plastics used by a small food hub to pack and transport food students need to understand the impact of a growing world population students to understand the environmental costs involved in purchasing plastic items: this includes the transportation and actual currency amounts. Have the student visit a local farm that follows sustainable practices have students brainstorm: how can we use technology to educate our customers and our community what are the other options available.

Readings (on D2L):

Chaudhuri, S. (2019, April 4). P & G Faces Backlash Over Waste. *The Wall Street Journal*, B3.

Chaudhuri, S. (2019, May 21). In Plastics War, the Industry Fights Back. *The Wall Street Journal*, B5.

Week 5: Architecture (09/18)

- **Shannon McDonald (Architecture)**

The architectural presentations for the architecture week will cover sustainability design strategies from three big perspectives:

A. retrofitting/renovation, **B.** new design, and **C.** urban design/transportation.

Each area will be explored to understand the key issues/changes that need to occur to create a Net Zero Building and beyond. These changes will range from adaptations of people and existing building use, simple retrofits or application of materials, passive design strategies for new designs, solar and wind, and new mobility options such as electric and shared vehicles and transit for new visions in living and land use. There will be multiple different assignments that students will be able to choose from for the architecture week of learning. This approach will allow for many options for students to propose for their eight-week research project.

Learning Objectives:

Understand the concepts, goals and benchmarks of New Zero Energy, the 2030 Challenge, the Living Building Challenge and the goals of architects and urban designers in order to meet these challenges.

- *Retrofitting/Renovation as a Design Energy Approach:*
 - What are changes that each one of us can make within a building to assist with net zero energy? Identify at least three.
 - How can you identify existing practices that you see in your building environment that are hindering net zero or sustainability approaches. How might you engage to change these established patterns of use?

- What materials or systems could be added to an existing building to identify the use of energy? Manage it?
- How can you document all of the above to focus on affecting change in an existing building?
- *B. New Architectural Design Strategies for Net Zero Energy and Beyond*
 - What is Passive Design and why is it so important for a successful Net Zero Energy building.
 - List at least three different passive strategies that would be successful in Southern Illinois.
 - How does the sun and wind work with a building design to create a building that uses less energy.
 - Explore and understand 2 recent built examples of Net Zero Energy Buildings.
 - What is solar power and where and how can it be successful?
- *C. Urban Design, Transportation and Net Zero Energy*
 - New mobility such as electric vehicles, shared vehicles and solar powered transit is now becoming part of our built environment. Describe how these new technologies are a part of a sustainability effort.
 - How we live and Land Use changed dramatically in the 20th century, compare and contrast the beginning of the 20th century and the end of the century from a sustainability perspective.
 - List at least three ways we could reorganize the way we live to have a more sustainable approach to land use and transportation.
 - What are the challenges for these new visions.

Assignment for Journal entry:

Choose one of the categories above in preparation for your proposal and final project. Answer the questions identified in the Learning Objectives above. List and describe the different disciplines, at least three strategies and potential real project application. Please provide in a pdf format including ideas, images, references and sources. Refer to readings, Living Building Challenge and multiple other references to define your approach in theoretical, social, personal, community and physical (built world) terms.

Readings

Required:

- Heschong, Lisa. *Thermal Delight*. Boston, MA: The MIT Press, 1979.
- The Living Building Challenge: <https://living-future.org/lbc/>

Recommended

- McDonough, William. *Cradle to Cradle: Remaking the way we Make Things*. New York: Farrar, Straus, and Giroux, 2002. Print.
- Carroon, Jean & Moe, Richard. *Sustainable Preservation: Greening Existing Buildings*. New York. John Wiley & Sons. 2011

- UN Sustainable Development Goals; Sustainable Transport: [Sustainable transport: Sustainable Development Knowledge Platform](#)

Week 6: Energy/Engineering (09/25)

- Justin Harrell and Arash Asrari (Engineering)

About 90% of U.S. greenhouse gas emissions are related to energy production from fossil fuels for use in buildings, transportation, and industry. Most discussions and analysis of climate change mitigation related to energy focus on the energy sources - a move away from fossil fuels. Almost no attention is paid the demand side of the equation, which is odd given that the entire energy system is driven by demand. This week, we will focus on the opportunities that emerge for climate change mitigation when we look at our energy systems from the demand side. We'll consider the roles that integrative design and information technology can play on delivering the energy services desired while reducing costs and emissions.

Readings

Required (on D2L)

- Lovins, Amory B., 2018, "How big is the energy efficiency resource?", *Environ. Res. Lett.* **13** 090401. Online via: <https://rmi.org/insight/how-big-is-the-energy-efficiency-resource/>
- Mills, Mark P, 2019, "The 'New Energy Economy': An Exercise in Magical Thinking", Manhattan Institute. Online via: <https://media4.manhattan-institute.org/sites/default/files/R-0319-MM.pdf>

Recommended

- <https://www.eia.gov/totalenergy/data/monthly/>
 - Explore the current historical national energy data, especially review the energy flow diagrams
- <https://www.eia.gov/energyexplained/>

Assignment/journal entry: (do this before class)

Please consider these questions and be prepared to discuss in class.

The following questions relate to the Mills and Lovins reading

- What are the primary solutions that Mills and Lovins argue are most needed to advance an energy revolution to mitigate climate change?
- How do Lovins and Mills differ in their thinking of how the lessons of the IT revolution can be applied to the energy sector?

- What is main problem that Mills sees with deep reliance of the national electric grid on renewable sources?
- How does Lovins address the criticism that efficiency gains will be swallowed by lower costs and rising populations increasing overall demand and emissions?
- Does Lovins address the timing mismatches between renewable energy production and energy end-use consumption?
- How can we apply integrative design for energy efficiency in an *existing* building? Think about this in the context of your own home.

The following questions relate to the topic of ‘smart grid’.

- How can the mechanism of virtual power plant (VPP) in smart grid lead to a more flexible production?
- How can the concept of demand response (DR) noticeably decrease our reliance on fossil fuels in modern power systems?
- How can underground transmission lines result in more flexibility in power systems operation?

Proposals due on D2L, Sunday 09/29, 11:00 PM

Week 7: Conservation in Community (10/02)

Jacob Bolton and Grant Depoy (Forestry).

Field trips:

- Evergreen Terraces: Introduction to the Evergreen Model. This is a student led project, much like this class, that will be offered in Spring 2020. Proposed by Jacob Bolton and Grant Depoy (Forestry), the class plans to engage the community in Evergreen Terrace (Mostly graduates and international families) to create an international children’s garden which will reflect the rich repertoire of stories children are told about forests and gardens across cultures. 1 hour
- Touch of Nature: 1 hour

Readings

- The 1990 Talloires Declaration - 10 Point Action Plan (signed by Chancellor Jo Ann Argersinger in 1999).
- What is the Evergreen Model? (A short, concise description of the Evergreen Model and a timeline to outline this year's plan. Our diction may align with our discipline and the influence of Bucky Fuller.)
- Dr. Akamani, Human Dimensions in Forestry professor at SIUC, wrote a research article labeled "Barriers to collaborative forest management and implications for building the resilience of forest-dependent communities in the Ashanti region of Ghana", which outlines key concepts we use for the landscape development/community building efforts at Evergreen Terrace.

- BONUS:
https://Int.org/why/7-principles/?gclid=Cj0KCCQjws7TqBRDgARIsAAHLHP525VwywuHj6LfBo0wh78tTNdgOa5bEhjnUE7D03pYzEck624eaPIQaAij5EALw_wcB (Leave No Trace's 7 Principles)

Week 8: SIU Sustainability & Workshop and present your projects. (10/09)

Geory Kurtzhals

A follow-up to the Week 1, Sustainability Introduction and the assignments associated with the UNSDGs (United Nations Sustainable Development Goals), Drawdown, and STARS (Sustainability Tracking, Assessment & Rating System); this class will check in on student understanding of sustainability and share details about SIU Sustainability, including campus resources and opportunities. In preparation for this class, review: <https://sustainability.siu.edu/>.

Assignment/journal entry—to be completed before class:

1. The [Sustainability Tracking, Assessment & Rating System \(STARS\)](#) is a transparent, self-reporting framework for colleges and universities to measure their sustainability performance. SIU reports into the system.

-Familiarize yourself with the [STARS program](#) and [SIU's 2016 report](#).

-Using the online platform (there's no need to export and print a report!), explore credit areas where SIU did not receive full points in 2016. (Note that a credit is named with a letter/number combination and title. Example: "OP-11: Biodiversity.") Of the credits reviewed, choose one where you think you could make a positive impact and **briefly** answer each of the following.

- What would you do to make a positive impact in this area? Briefly outline (1-2 paragraphs) a project that you think you could do to improve the STARS score in this area.
- Who would be involved with the initiative? Identify 3 groups or roles (include title of person) that should be engaged as a part of the process.
- When would the initiative take place?
- What are key challenges to creating the change you are suggesting?
- What could you do to overcome those challenges?
- What resources are needed to fulfill your ideas?
- Which (one or more) of the United Nations Sustainable Development Goals relate most to the idea you've chosen?
- Is your idea associated with one of the Drawdown solutions?
 - If so, explain how they are related.
 - If not, explain why you think it is important to still move forward with the idea.

-Does the STARS platform assess all components of sustainability? If not, what's missing from the STARS reporting platform? BONUS: Write a new credit for the STARS report. What questions should be asked? How many points should the credit be worth?

2. Choose one of the following topics and respond. 2 pages maximum, double spaced, 12 pt. Type, Times New Roman.

The Role of the United Nations:

Examine the term "Sustainable development" using 3 academic resources. How are the United Nation's development goals situated in the larger development literature? What role does the United Nations play in global development?

Think Global, Act Local:

Choose one goal to research more thoroughly. Then choose one target within that goal. Answer the following questions:

Explain in more detail the underlying issue that the target is addressing. Describe the main drivers that create this issue, 2 solutions that address the target goal, and the barriers that make solutions challenging.

News Article:

Choose an article about a current event from a major news publication- Connect the article to a larger cultural, economic, or environmental issue using 2 other sources. Name at least 2 goals that are relevant in a conversation about this issue and describe their connection.

More Resources:

- The role of higher education:
<https://www.aashe.org/role-higher-ed-un-global-goals/>
<https://www.aashe.org/global-priorities-educated-solutions/>
- Integrating the goals into city plans/missions:
NY local review: <https://www1.nyc.gov/site/international/programs/voluntary-local-review.page>
- City of Los Angeles: "Revising National SDG Targets for the City of Los Angeles."
- International Conference: Education as a Driver for SDG's (Goal 4: Quality Education)
<https://www.aashe.org/education-as-the-engine-for-the-global-goals/>
Session summary: Ethics and education <https://ceeindia.org/esdg/Goal%204.7-1.html>
Session summary: Empowering Youth <https://ceeindia.org/esdg/Goal%204.4.html>

Week 9: Creativity and capitalism; ecology and the contemporary arts; designing your projects (10/16)

- Jyotsna Kapur (Cinema and Photography): Design, utopia, and the limits of capital: A brief history to the present.

Read: John Patrick Leary, The Innovation Cult. *Jacobin* 04.16.19.

<https://www.jacobinmag.com/2019/04/innovation-language-of-capitalism-ideology-disruption>

- Elizabeth Donoghue (Communication Studies): How contemporary artists are redefining our understanding of ecology.

Read:

- Environmental Communication: What It Is and Why It Matters
https://theieca.org/sites/default/files/optp/%20OFTP%231-EC_What_and_Why.pdf
- Hendry, Judith, Communication and the Natural World. Introduction. Chapter 1: Communication and the Environment

- Workshop presenting your projects with Greg Wendt (Graphic design, Center for Teaching Excellence)

Week 10: Carbondale Spring; Project Checkups (10/23)

- Introduction to Carbondale Spring. Nick Smaligo (Carbondale Spring)1 hour. Inspire students going forward with their projects, to not be discouraged by struggle. Read: carbondalesspring.org
- Project checkups/work time

Week 11: Project Checkups and work time (10/30)

Week 12: Project Checkups and work time (11/06)

Week 13: Project Checkups and work time (11/13)

Week 14: Project Checkups and work time (11/20)

Week 15: Thanksgiving Break (11/25-29)

Presentation of Projects (12/06): Time and Venue to be determined.

Week 16: Course evaluations; de-briefing

The Bike Team – Dylan Lopez, Elena Richardson, Arnold Ukagwu

Dr. Kapur

UHON 351

6 December 2019

Final Report

What is the problem/issue? Why did you choose it? Why should other people care?

From the very beginning, groups were assigned based on interests either in clean energy or in the recycling of goods. Individually, there were many reasons this topic was chosen – both from personal experience and from noticing promotion of unclean energy on campus. The four original ideas were: a bike/scooter share program, an e-waste recycling system, implementation of an organic store on campus, and installation of light sensors in more buildings. After presenting to panel of speakers and experienced SIU faculty, we found that some of these goals were much harder to accomplish than we had thought. Therefore, in taking this into consideration and recognizing our passion for the concept, we decided that bicycles would be our initiative. From a sustainability standpoint, we felt that this program would be important for student health, reduction of carbon emissions, and possibly being able to recycle abandoned bikes. SIU would benefit from a marketed cycling program in attracting new students, enhancing the outdoorsy opportunities/activities of southern Illinois, and even improving upon the STARS review for the university. The transportation score on the STARS review is bleak as of now, and although a bike share program shouldn't be made solely to improve SIU statistically, it would help. The success that other colleges have had with such programs also proves its need and longevity as a student service.

**How did you research this problem? Did you observe people? Did you interview someone?
How many people did you talk to? Is there statistical evidence for your problem-solution?**

Research regarding this issue began at the city level, given that they had already stated interest in the implementation of a shared transportation program in cooperation with the university.

However, upon attending this city council meeting, it was found that their focus was put on scooters, and more specifically, scooters that weren't sustainable. Yet, although we decided not to play a role in this project specifically, we were able to gain resources on individuals interested in similar programs. After the meeting with the city, we looked at the student sustainability coalition (SSC) for advice on how to approach and manage our stakeholders in moving forward with our own ideas. We were able to brainstorm together with Luis Prado and Grant Depoy on possible routes that could be taken in achieving our goal, whether it be through working with existing departments on campus or even beginning as a small RSO. At this point in time, an RSO seemed like a good idea, but we weren't aware of the hurdles to be jumped in creating an organization like this. We had the understanding that making a bike program under the university as a 'student service' would be more difficult, given that we wouldn't necessarily be the ones in control of the project. Theoretically, an RSO would give us freedom to accomplish whatever we wanted. Yet, the process for gaining membership, registering the group, going through legalities, etc. seemed like more of a long-term goal for us. The initial priority was to actually get bikes out on campus for people to use as soon as possible, and deal with student involvement after the fact. This being said, we decided to find faculty members within the university who had seemed to already express an interest in supporting an idea like ours. Geory Kurtzhals, the director of the Sustainability office at SIU, was able to get us in contact with individuals who she thought would be willing to work with a student led project involving

cycling. She was responsible for informing us about Karen Schauwecker and her involvement in the city council meeting that one of our group members originally attended. In addition to this, she recommended that we speak with Cara Doer, a woman who had been previously interested in starting something similar to a bike share program on campus and worked under the automotive department. At this point in time, we were struggling with our vision and where we wanted to go with the idea. Not only this, but it was discouraging when we attempted to reach out to individuals and didn't get responses time and time again. Thankfully, upon finally being able to meet with Cara, we gained information that allowed us to see how close a bike program was to becoming a reality on campus. During the meeting we learned how she wanted to collect abandoned bikes and fix them in CASA and distribute them to students in need. This conversation helped solidify our vision of what a future bike-friendly campus would look like here in SIU. After discussing with Cara, she encouraged us to get in contact with Shannon McDonald, who had apparently already conducted research regarding bikes. Initially, we set up the meeting to learn more about the GHGs, but we ended up gaining much more. Shannon McDonald taught a student, Shelby Orr, who started working on the bike-friendly campus 3 years ago. From our meeting we got information about the bike racks, a look at their final report, their green fund grant, the website information for bike.siu.edu, a bike survey with the results, and a load of other information we had never even thought about. A week later we were able to schedule a meeting with the director of the REC, Corne, who had information on the previous bike-share program that worked through the REC. We were informed that the program failed due to missing and uncared-for bicycles. He also informed us about colleges in Georgia that refurbished bikes and gave them to students for free for an entire semester all while supplying locks and helmets to the students. Corne pushed the idea of having free renting for students along

with the semester plan which would allow for better accountability from the students. He said that the REC would be willing to house the bikes and deal with checkouts along with providing a day where they teach bike maintenance. At this point in time, our vision seemed to solidify in that we now had: a way to obtain bicycles (bought or refurbished), a place to store the bikes, and even individuals willing to educate on maintenance. Our next goal was to discuss with Carbondale cycle businesses the ways in which they'd be affected by such programs and seeing if they'd like to play a role. Upon visiting Phoenix Cycles, we found that the majority of student business was rooted in the repair services offered – not the actual purchasing of bikes. In order to get city businesses involved, we found that we could simply recommend students to their shop for bike repairs, or even possibly buying parts from them when needed. The last thing we did regarding 'research' and making connections with those interested in our program was attending a meeting at the student sustainability hub (SSB). This meeting had everyone from faculty from DPS, the REC, admissions, the automotive department, SIU cycling professors, Saluki Spokes, etc. Everyone at the meeting agreed to begin the formation of a committee that could help facilitate and service the growth and success of upcoming bicycle programs/things at SIU. Although this didn't begin early enough in time to help our project for the class, it will definitely be a huge resource for the furthering of our bike share program. In return, because we were the only students attending the meeting, we serve as the student voice for the committee and plan to collect survey information for them this spring.

What existing literature/research did you rely on to understand the problem? What did these tell you? What is missing in this literature?

Research for our project came from a variety of sources. We began by discussing what we experienced on campus as far as the amount of people we saw cycling, how many people we saw

wearing helmets, how we cycle at SIU, and even just observing what areas of campus we saw the most bikes. Following this, it was important that we researched what other colleges were doing to sustain a share program at their universities – finding out what worked and what didn't. However, the bulk of our information came with the files Shannon McDonald shared with us regarding her work with Shelby Orr. In these files we were able to find out the numerical representations of where people were using their bikes, how often, and why. The main issue was that the information was slightly outdated, considering that this research ranged anywhere from 2009 to 2016. This is when we decided to make our own survey, and to gear it towards what we wanted to know from students. Shelby's survey was more general, but we needed to ask students more about their lifestyle and usage of automobiles versus bicycles, along with legal questions that would help us regarding locks and helmets.

What solutions are out there? Why are some more successful and others not?

There are many different colleges with many different needs all with their own solution to including more bikes on campus. Cities are also trying to innovate by developing bike-shares and scooter programs in their cities, but not all of them are too successful. A lot of other universities are using electrical scooters to help students get around, but from a sustainable viewpoint we decided that it was not up to par with our original initiative. Looking more into the bike-share programs we found out that many of the systems that don't get much use are due to the pricing of the bikes. This contributed to our decision to make the bike share program free for students, and to go by a semesterly basis. For a short period of time, we also considered doing something like an 'Earn-A-Bike' program, modeled from a community program in Bloomington, Indiana. This would have eliminated the student fees, which tends to be the biggest turn-off. Given that this idea relied upon unpaid volunteer hours and bike repairment knowledge, however, we found that

it probably wouldn't be a good fit for SIU. In whole, each bike-share is modified to what the members need at that specific institution or in that specific area, so we knew that SIU would need to find its own version.

What were the problems and solutions you came up with—what were your top 3? Why did you reject some of them?

The major problem we looked at the beginning of the project was the increasing issue of carbon emissions and increasing sustainability efforts here at SIU. After brainstorming we came up with installing light sensors inside of the dorms and looking into a bike/scooter-share program for campus. Through the bike/scooter-share program we were able to take see that student health was also an issue we were concerned about. To combat this, we also thought of creating an organic store on campus where we could work with local farms that practice sustainable methods to bring better food to students on campus. Another idea we came up with was having places on campus where students could go to turn in old electronics so that they could be recycled. After looking into the electronic recycling, we decided that it was too much of an issue and that we could not make it viable on campus with our current resources. We settled on having the bike/scooter-share program and the organic store being our top choices with attempting to get more light sensors on campus as a backup plan. We decided to not go with the light sensors as they are not the cheapest thing to install since they require rewiring, purchasing, and workers to do it. We ultimately decided that while it was a good thought it was not viable for the project. Between the organic store and the bike/scooter-share program we decided to go with the bikes since we believed it to be the better option for the class. The organic store was something that we came up with not too long after our trip to the organic farm. We decided that it was going to turn out to be a larger project than that of the bikes/scooters and that it would take longer to

implement on campus. Another attractive thing about the bicycle initiative was the fact that we were already informed of people who were interested of similar projects, and who could help us from the get-go.

Tangible Ideas - Including drafts and final

Our initial idea for the bike program was to get Saluki Spokes, Housing, and DPS to help us get bikes that had been abandoned and repurpose them. DPS, who collects the left over bikes, would potentially allow us to take some of the bikes off their hands while Housing could let us get them directly from students through the gift before you go program and give us space to store them. Saluki Spokes would be our place to potentially fix the bikes using their resources and make students more aware of what they do on campus. We thought about having the bikes be about 1 dollar to open and possibly 5 cents/minute. The longer we looked into the project the less likely it would work out the way we wanted.

After deciding that that was not going to work out very well, we decided that opening our minds to other options was a better idea. After meeting with Cara Doerr and Corne, we were able to come up with a better idea of how we could make the project work. Instead of restricting usage through an app with paid times the service would be free for an entire semester, but the student would be liable for any damages. We found that DPS would not be able to give us the bikes due to legality issues, and there was not much more they could do. We decided that getting bikes from Housing through their gift before you go program would be an important factor in obtaining the bikes. Our other option would include applying for the green grant to possibly purchase brand new (single speed, basic) bikes to have a starting fleet. For repair we decided that CASA would have better resources and could repair the bikes using their students. The head of the automotive department confirmed this for us. For storage, the REC center was a place where

we could store our bikes for the share program since they had one before. This outline seemed to be the most plausible outcome for the project since it might possibly bounce off of a current project that Cara had been working on.

Recommendations for continuing the project

The bike-share program has incredible potential as a student service in the future. In continuing the project, it's important to us that it be marketed as a sustainable and health driven initiative. We would hope to gain information regarding carbon emissions from the program as well. This could be done by installing a device that measures how far the bike has traveled over the course of the semester, in which we could estimate how much we were able to reduce possible GHG emissions. Safety is another issue we ran into quite a bit, and it would be advised to talk to someone experienced in transportation legalities to discuss the use and providing of helmets to students. It's possible that we could provide a waiver to students stating that they know they wouldn't wear a helmet anyways, but because we weren't able to discuss this with a professional, we just decided to implement the providing of helmets in our existing plan. One of the last things we discussed, and that we feel could be a very successful thing, is working with the International Student Office to possibly create a relationship with them. If they could agree to provide funding, we could create a scholarship for international students in which they receive their own bike, free of charge, under the name of our program to provide exposure and ultimately encourage bike-riding in general. There's potential to involve many different departments in this initiative, along with possibly creating an RSO in the future, and we believe it's only a matter of time before it kicks off, given the existing support and resources.

UHON Proposal

Brainstorming

Sources:

Link	Info found
http://www.electronicstakeback.com/how-to-recycle-electronics/resources-for-kids/	Foundation info; educates on the basics -E stewards = recyclers who meet the highest standards for how they recycle our stuff, including not just shipping it off to poor countries
https://autopods.io/	Vape waste collector
https://utenvironment.org/projects/trash-to-treasure/ https://utenvironment.org/projects/trash-to-treasure/	Trash to treasure recycling and resale program at a university in Austin
https://www.bevi.co/blog/zero-waste-universities/	How other schools handle sustainability
https://autopods.io/	JUUL pod recycling program, costs \$0, pays \$25 per 500 pods.
http://www.southernrecyclingcenter.com/	Southern Recycling Center: where SIU campus recyclables go, they charge SIU a cost because we send unsorted recyclable waste, they could also be a drop-off source for electronic waste (except batteries).
https://business.officedepot.com/a/content/prelogin/recycling-solutions/	Office Depot: where SIU buys office supplies from, partners for ink and toner recycling, could also receive alkaline batteries to recycle.
https://green.harvard.edu/tools-resources/recycling-poster	Harvard's recycling poster (example of what we could come up with).

Most commonly used plastics

	What is it used for?	Next life	Ease of recycling
Polyethylene Terephthalate (PET) 	Soft drink bottles, food packaging such as punnets	Used to make more PET products	Easy
High Density Polyethylene (HDPE) 	Milk cartons, cleaning products, yoghurt pots, soap dispensers	Garden furniture, pipes and more milk cartons	Easy
Polyvinyl Chloride (PVC) 	Pipe fittings, window fittings, thermal insulation, car parts	Used to make more PVC products	Difficult
Low Density Polyethylene (LDPE) 	Food bags, shopping bags, magazine wrapping	Bin liners, plastic furniture and floor tiles	Manageable
Polypropylene (PP) 	Margarine tubs, microwave meal trays, fibres and filaments for carpet, wall coverings, vehicle upholstery	Clothing fibres, food containers, speed humps	Easy
Polystyrene (PS) 	Some yoghurt pots, takeaway boxes, plastic cutlery, protective packaging, insulation	As more packaging	Difficult
Other 	This includes other forms of plastic including composites, such as salad bags and crisp packets	Goes to landfill	Very difficult



Recyclable



Recyclable at specialist points



Not easily recyclable

Which?

The numbers within the recycling symbol serve as a guide to what can usually be accepted by recycling companies; if we made this info easier to understand we could incorporate some of it into our recycling bin design. Or even just spread information so individuals can determine what they should be recycling on their own

Evidence:

Pictures



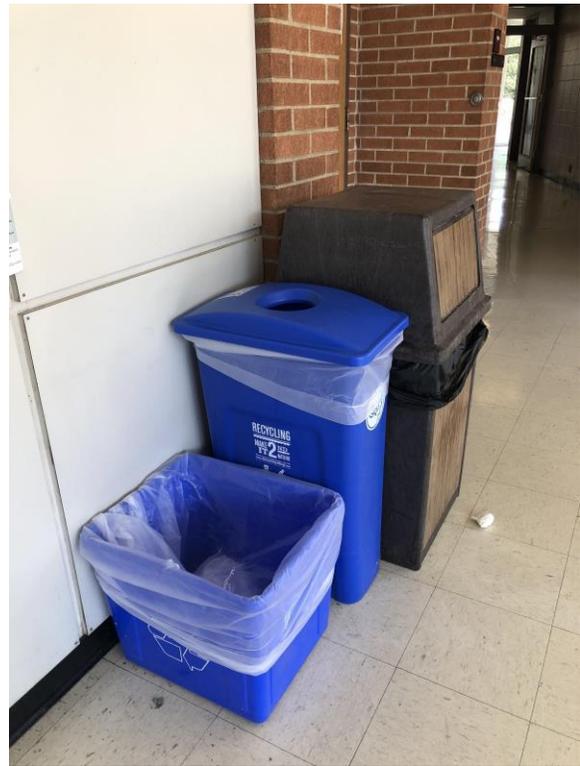
1. Above depicts a very busy intersection on campus where students are going to and from Faner, the library, the student center, and west campus. As you can see there are trash cans but no recycling bins. This area has an emergency station as well which reinforces that this is a high traffic area for students. Placing recycling bins here would benefit campus woods by providing a convenience receptacle for people to discard wastes.



2. These pictures show how people are recycling incorrectly on SIU campus. The blue recycling tub is supposed to be for paper only, yet two paper coffee cups and their lids are seen inside, both of their components unrecyclable, only the sleeve is recyclable. The same example is seen in the paper recycling bin with a narrow opening indicating only flat paper material, yet someone squeezed a whole coffee cup in. The last picture shows a plastic recycling bin which has a plastic straw inside, which is unrecyclable and can clog recycling machinery. The issue seems to be that none of these bins are sufficiently marked as to what is recyclable (not just “plastic” since there are different kinds, same thing with “paper”) and the only things that should be thrown in them.



3. All three of these pictures have the right idea: combine all trash sorting options in the same area to enable and facilitate people to recycle properly. But there are some fallacies seen in the pictures. The plastic and paper bins are colored the same and the “paper” label on the blue bin covered by the plastic bag makes it very confusing to distinguish one from the other. There is also not enough information on *what* is recyclable on any of them, which discourages people from recognizing how to sort their trash, clearly and quickly, before throwing it away. By just having symbols on recyclable materials, there is no way to specify details on recyclability.



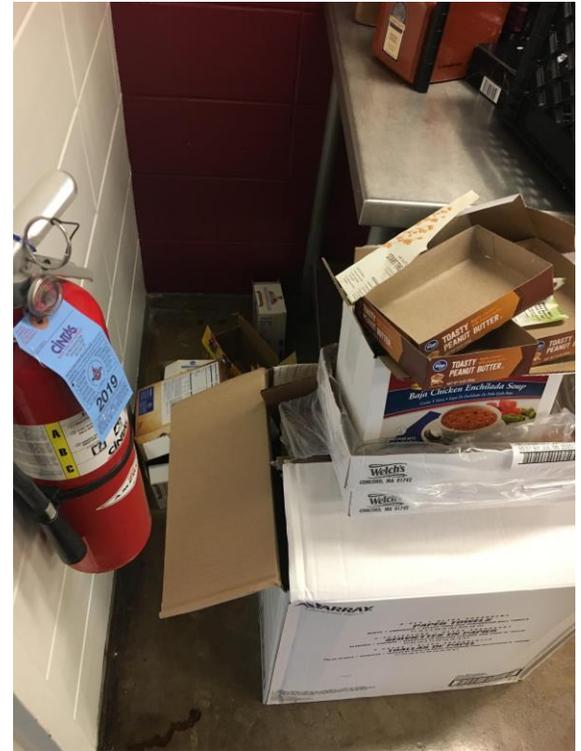
4. To the right is a picture of what goes on behind the concession stands at the SIU arena. The only directions we received as far as discarding waste is that we do not recycle plastics and we should throw all cardboard in one spot. As you can see the boxes are not properly broken down or stripped of non-recyclable elements, which increases the work of recycling plants later down the line. The only spots where there are actual recycling

bins are around the walkways of the stadium which is helpful for fans but makes it more challenging for employees who have to track down a bin or make a pile in a corner.

5. The images above are trash cans that we located at the For Kids Sake Annual Event: Superhero 5k run/walk. “Students For Kids' Sake” is a Registered Student Organization (RSO) at Southern Illinois University Carbondale (SIUC). Incorporated in 2015, this incredible



group of students became so inspired by For Kids' Sake's mission that they started an official RSO with the purpose of establishing a community on SIU's campus that is dedicated to volunteerism and helping the kids in Bangladesh. At the event there were **no** two different cans for trash or recycling. They all looked the same with no direct direction to them. At this event that is co hosted with SIUC, SIUC should be more aware of these issues. If they would of put the effort to put several recycling bins at the race, we would of got large amounts of recycling due to the all the water bottles that were used and handed out during the race. All throughout the race there was only a few trash cans and the rest was thrown in the streets.



Interview 1: Geory Kurtzhals 9/27/2019

Q: Who Collects campus recycling?

A: different areas of campus recycle differently, auxiliaries (like Student Health Services, Student Center, REC Center, Housing) have people that collect recycling within buildings who take it to an outside drop off, then Grounds workers pick it up and take it to Southern Recycling Center (SRC). Non-auxiliary recycling methods have the custodians bring recycling from inside the building to an external loading doc where it's taken to SRC.

Q: What are the requirements for where recycling and trash bins are located on campus? Why do some areas not have recycling and only landfill trash?

A: Old buildings were built when recycling wasn't a consideration in architecture design, therefore it's a slow process to install recycling options in their areas and, according to Geory, they have outdated recycling requirement standard specifics. Newer buildings, such as the Student Services Building and Becker Pavilion, have better recycling facilities since they were designed following stricter recycling codes. Currently, Building Services has grouped sorted trash bins together in some academic building to increase the likelihood for people to recycle as a part of their new standard.

Q: Does recycling on campus cost money?

A: SRC charges SIU for recycling drop off. This is a problem because the current benefits of recycling do not exceed the cost of recycling. The money charged by SRC is used for sorting the recyclables after SIU has dropped them off. If SIU campus were to encourage better sorting and less contamination of recycling categories, SRC might lower their price or even remove the charge.

Q: Where does the Sustainability HUB recycle ink and toner cartridges? Could they also accept batteries?

A: The HUB sends their cartridges to Office Depot since SIU partners with them in purchasing office supplies. Office Depot sends those cartridges to a third party company who actually recycles them. They currently do not recycle batteries. When finding a company that would recycle batteries, make sure they are not in competition with Office Depot.

Interview 2: Students living on west campus (Eeron Valdivia)

Q: Are you aware that you are given mini blue recycling cans at the beginning of the year?

A: At the beginning of the semester I was aware but it was because we were constantly being reminded

Q: Do you recycle inside your dorm?

A: At the beginning I was because I was constantly being reminded, but after the 3rd week I stop.

Q: Why did you stop?

A: I just forgot, or I got too busy. Plus they stopped telling us stuff so I didn't feel the need to keep recycling.

Q: If I may ask, what do you do with the recycling can?

A: I have it behind my bed with another trash can that I do not use. Also a big reason that I do not recycle as much is because I am not as informed as I should be. I know the basic, plastic bottles, paper and cans, but I have no idea how to read certain labels that can determine whether it can be recycled or not. I know that the caps from plastic bottles are not good to recycle but is it actually true? If so, I do not think a lot of people know that. I think we just need to be more informed about it.

Q: With that being said, do you have any suggestions that you believe will help fix this problem inside dorms?

A: More signs, posters and someone actually talking about it. Every once in awhile we have floor meetings, where we talk about certain issues or events that we are having. If the school actually made the RA's take a course or just be more informed about recycling on campus we would probably learn more. Within floor meetings they can start being more frequently, once a month? The meeting can inform us with new information as well as participate in events within the dorms. The RA's can have weekly pick ups of recycling or have games to see how recycles the most and someone gets a prize. The point is just to make it more fun and get people involved. If people do not reach out and are constantly not reminding us, most likely we are not going to do it.

Interview 3: Students living on west campus (Nicholas Winkler)

Q: Are you aware that you are given mini blue recycling cans at the beginning of the year?

A: At the beginning of the semester, I noticed them because I was moving in but other than that I have not thought much about them. No one really told me anything about them.

Q: With that being said, do you currently use your recycling can?

A: I do, but not to recycle. It was small enough to put in the bathroom for trash. Plus I stopped realizing that it was for recycling after being in school for a couple months now. No one has ever talked about it, so I just forgot.

Q: Are you aware of the big trash cans in the hallways for recycling?

A: I am aware of both the big trash cans in the hallways. I always see the one for the trash packed full and sometimes when I pass by the one that is for recycling it has random trash in it as well. But most of the time it is pretty much empty.

Q: How do you think recycling can be improved in the dorms?

A: I think we need to be more informed about it, especially in the dorms. I feel like recycling can be a big thing on West Campus as well as Thompson point, if people start talking about it. My RA for example has never brought it up, so I figured it was not as important as the school

portrays it to be. With that being said, I can probably start by not using the recycling bin as my trash can for the bathroom. We need more people like you or people in general taking more about the situation in dorms.

Interview 4: Geory Kurtzhals 10/1/2019

Q: What is your advice for implementing electronic waste recycling on campus?

A: There have been e-waste events on campus in the past where the Sustainability HUB collaborates with Salukitech for a single-day recycling drop off event. A problem they encountered was who is responsible for transporting the materials from campus to the recycling facility (it ended up being a personal initiative using their own car). Southern Recycling accepts recycling for Illinois residents, which does not include campus recycling, because it's overseen by the Jackson County Health Department. To get more information on legalities of recycling material ownership, contact Carrey Gale from SIUC. The Jackson County Health department also stopped accepting some electronics, which means the Southern Recycling webpage is not up-to-date. Some logistics to consider when wanting to collect e-waste are: do we limit what we accept and the quantity? How do we communicate that to our audience? Will it be a consistent drop-off location or a single-day event? Will the location be monitored by a human? Who? Etc. Another limiting factor for recycling e-waste is the recycling facility's charge/cost per items/weight.

Q: What is your advice for battery recycling on campus?

A: Currently, Office Depot (SIUC's material supplier) recycles batteries, but at a cost. In that case, who would pay for that cost? How often would we fill boxes of recyclable batteries? People can already individually recycle their batteries through the PLP Battery Supply recycling initiative. Another consideration is, are batteries as harmful for the environment as they once were in the past? Many state laws allow alkaline batteries to be thrown out in the landfill because they claim they contain less dangerous elements that will seep into the water. So why recycle them then? It would be worth it to conduct a study if that claim is true, or if it's supported by big battery companies out for their own interest in economic growth (but we don't have the time or the resources to conduct such a study). We also have to consider the carbon footprint of recycling batteries... it may be greater than throwing them out in the landfill, and in that case there would be little purpose in recycling them.

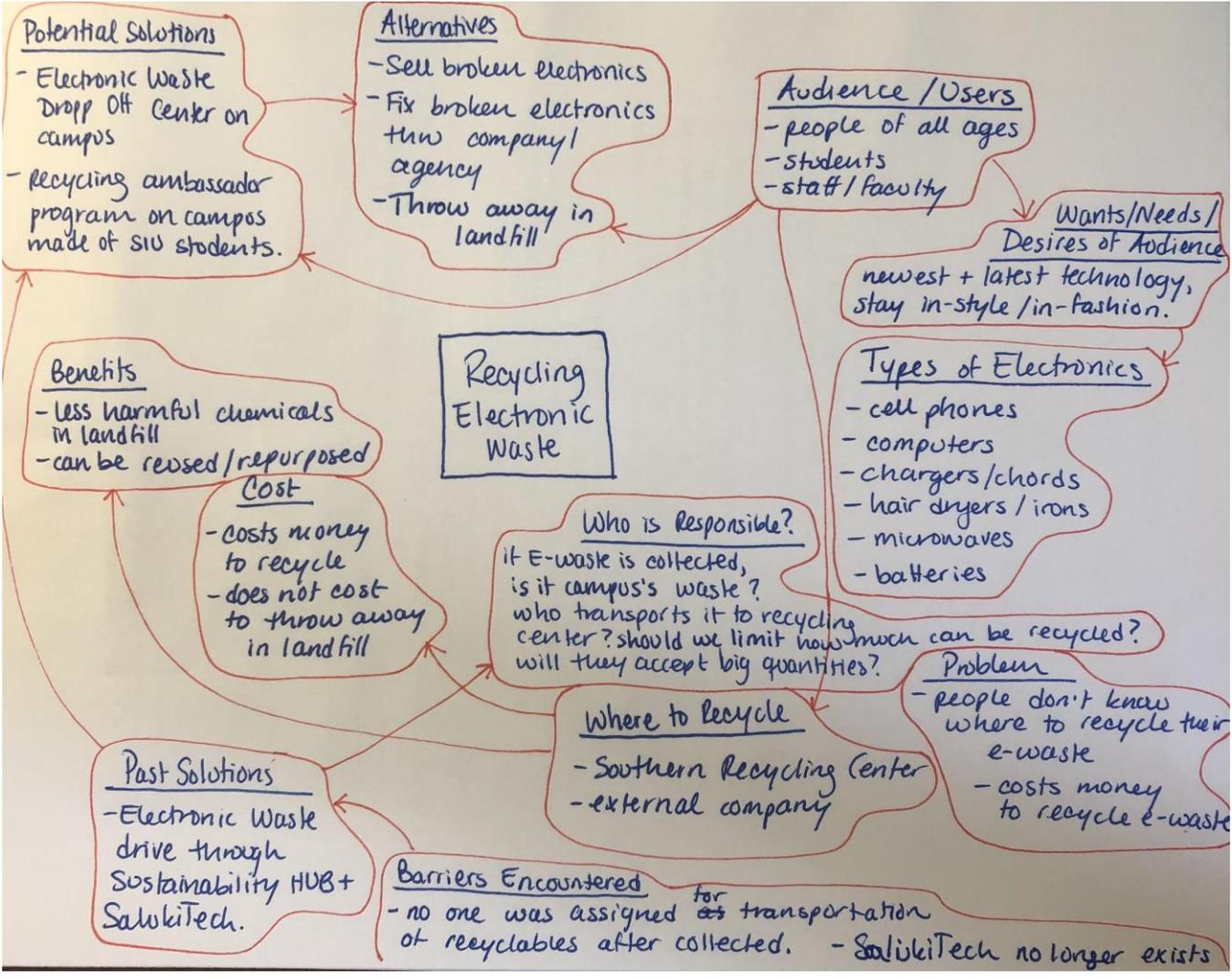
Q: What are your thoughts on coloring/painting trash and recycle bins to help people visually distinguish their trash during the sorting thought process?

A: the Sustainability HUB has been working on grouping the three types of waste bins around campus, Morris being the first and only so far, to help people sort their trash. These bins move constantly, so a poster used to clarify sorting would need to be mobile and creatively displayed to get people's attention. Coloring the bins would require a test-run to evaluate what kind of

paint is the longest-lasting, smoothest, and quickest-drying as well as does it really help people sort better (take into consideration the carbon footprint of the paint, spray paint has VOCs)? And who's going to paint them?

Mind Maps

Recycling Electronic Waste



Potential Solutions

- Electronic Waste Drop Off Center on campus
- Recycling ambassador program on campus made of SUU students.

Alternatives

- Sell broken electronics
- Fix broken electronics thru company/agency
- Throw away in landfill

Audience / Users

- people of all ages
- students
- staff / faculty

Wants/Needs/Desires of Audience

newest + latest technology, stay in-style / in-fashion.

Types of Electronics

- cell phones
- computers
- chargers/chords
- hair dryers / irons
- microwaves
- batteries

Who is Responsible?

if E-waste is collected, is it campus's waste? who transports it to recycling center? should we limit how much can be recycled? will they accept big quantities?

Cost

- costs money to recycle
- does not cost to throw away in landfill

Where to Recycle

- Southern Recycling Center
- external company

Problem

- people don't know where to recycle their e-waste
- costs money to recycle e-waste

Past Solutions

- Electronic Waste drive through Sustainability HUB + SalukiTech.

Barriers Encountered

- no one was assigned for transportation of recyclables after collected.
- SalukiTech no longer exists

Benefits

- less harmful chemicals in landfill
- can be reused/repurposed

Users go through lots of pods
Joull products are considered hazardous waste
eJuice leaks into environment

Problem: Juul pods are extremely prevalent on college campuses and there is no education out there on how to recycle wasted vape cartridges

Auto pods will pay for shipping

Potential Solutions:

- AutoPods company ~ An empty pod recycling program that pays for empty Juul pods
- Designing bins on campus & in bars for discarding empty pods
- Spreading awareness of the hazards of Juul Pods

Wants of Audience:

- Nicotine devices
- Ease of discarding pods
- Disposable pods

Recycling Juul Pods

Alternatives:

- Putting collection bins in dorms
- Juul pod pick-up days
- Offer incentive for quitting juuls

company handles cleaning/sorting process

Benefits: Less waste in nature.

- Proper disposal of dangerous chemicals
- Reduced risk of choking hazards
- Receive compensation for your participation
- Pods used for Art!!

Cost:

- AutoPods pays for shipping but on what size order?
- Funds for collection bins

depends on # of bins

Audience/Users:
21+ College students who vape

also need to consider those obtaining Juuls under 21 y/o

Who is stakeholder:

- Juul company needs to take initiative to educate users
- Campus staff/faculty
- Students who vape
- Bar owners on the strip
- Local stores

& AutoPods company

Problems:

- We don't know how many pods we will receive
- How to redistribute the compensation
- Who will collect pod bins for shipping
- How will we organize shipments
- Company hasn't replied to our email
- Website vague in information
- * Juuls are illegal for people < 21 yrs to possess * = students can get around this but our project can't
- People find it easier to just discard pods in trash vs tracking down a bin

inconvenient

Batteries

Risk of giving off toxic gases

Lithium / Cobalt

Increase potential for human exposure

lead
birth defects

neurological and developmental damage

thrown in households trash

lead to water pollution / depletion among other environmental consequences

causes landfill fires that burn underground for years

possible solutions?

School tied down

Office Dept

how much \$?

transporation

Get \$2 back in rewards per recycled cartridge when you make a \$10 qualifying purchase during same month

ink & toner cartridges, batteries, light bulb and technology

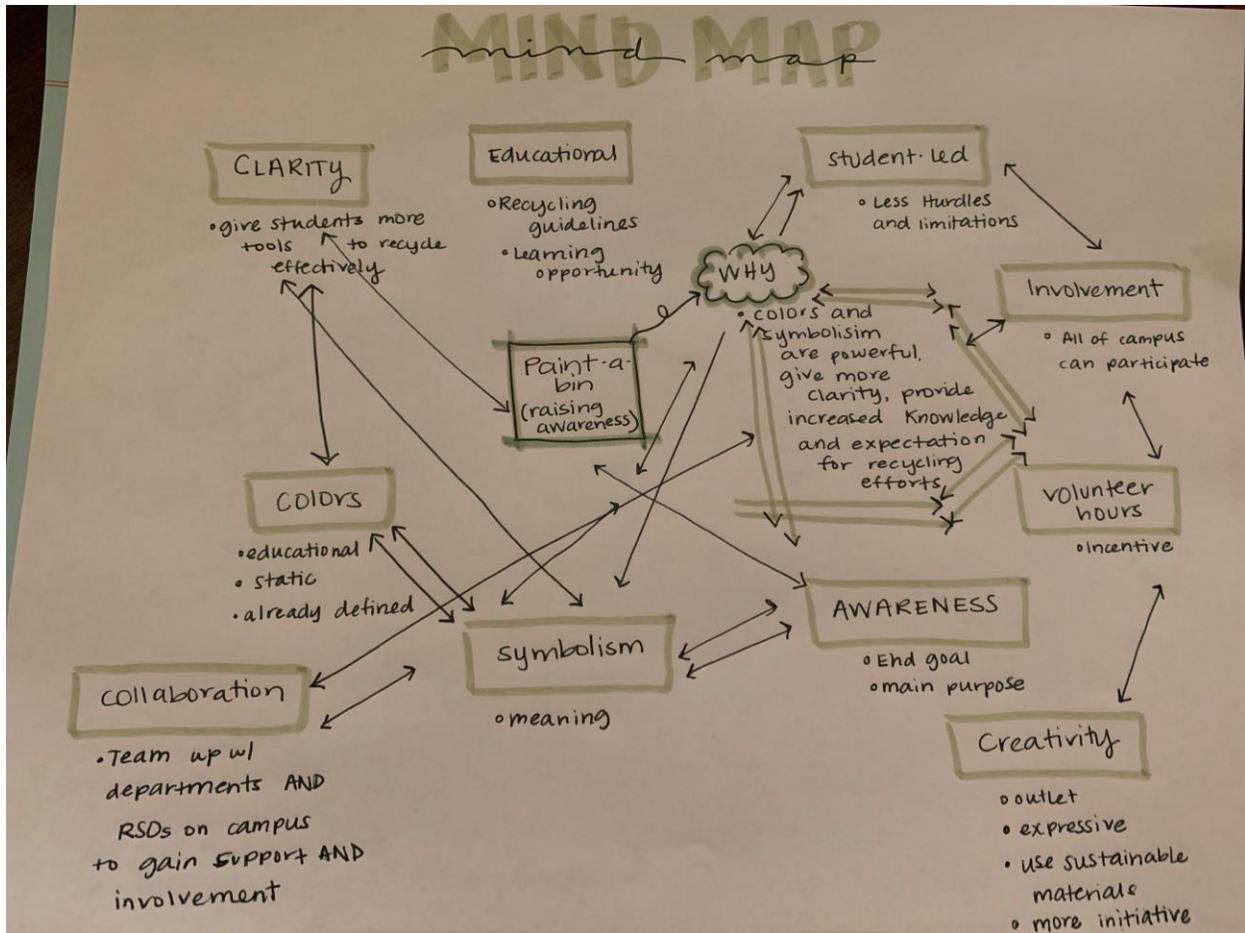
alkaline & dry cell batteries only

Big school = too much supplies

10 cartridges a month

only short amount @ time

Overall, too much work, limitations and not enough \$ back to school



Potential Solutions

1. *Electronic Waste (e-waste) Recycling*

- a. Target Audience: students, faculty, and staff on campus with personal electronics who don't know how or where to recycle them. People who are informed about recycling e-waste will have an easy, quick, and efficient way to do so.
- b. Stakeholders: Southern Recycling Center, Sustainability HUB, Salukitech, group members, SIU Carbondale, Jackson County Health Department.
- c. Budget Estimate
 - Southern Recycling Center only accepts 10 e-waste items at a time: \$0
 - E-waste campus location drop-off at Student Center: \$0
 - Transportation from campus to recycling center using a 10' Uhaul truck: \$20/day plus \$0.89/mile (3.2 miles from SIU Student Center to Southern Recycling Center): \$23 per trip to Recycling Center and back to campus

2. *Juul Pod Recycling (see Mind Map)*

- a. Target Audience: Juul users old enough to buy or have access to nicotine.
- b. Stakeholders:
- c. Budget Estimate:

3. *Battery Recycling*

- a. Target Audience: students, faculty, and staff on campus with no personal experience on battery recycling who don't know how or where to recycle it. People who are informed about recycling battery will have an easy, quick, and efficient way to do so.
- b. Stakeholders: Office Dep: can only take a certain amount per month. So the school would overload them with products every month if they didn't have a restriction. We also can not take them anywhere else because Office Dep. has a contract with SIU and there rival is Staples.
- c. Budget Estimate: Get 2\$ back in rewards per recycled cartridge when you make a qualifying purchase of 10\$ or more during the month. The school would be paying for storage every month to keep the batteries located somewhere. That is extra space that could be used for something else. Because there limit is only 10 per month.

4. *Paint-a-Bin*

- a. Target Audience: students, faculty and staff on campus with minimal recycling awareness or desire. **Purpose:** Painting these bins will provide clarity of recycling expectations, offer creative outlets to those willing to participate, increase symbolism of already established colors within recycling efforts, and allow for collaboration among many different disciplines throughout the campus community in hopes to increase recycling.

- b. Stakeholders: Building managers on campus, art supply company with sustainable values.
- c. Plan: (1) Team up with RSOs that value sustainability to begin this campus-wide project, (2) secure funding for supplies, (3) build relationships with the craft shop, RSOs leaders, and other departments on campus willing to offer volunteer hours for students as an incentive, (4) establish educational value throughout painting the bins, (5) market it as a creative outlet and a way to add value to our campus.
- d. Budget Estimate (Plan): Continue further research on best paint options for the environment (and those with the longest durability), estimate how many bins a gallon of paint can cover, etc. (Rough Estimates): \$400-\$500 painting supplies, \$300 marketing materials (napkin holders, gift cards, posters around campus, etc.)
 - i. <https://www.thegoodtrade.com/features/eco-friendly-paints-for-your-home>
 - ii. Note: We will have to test this for a semester to see if this is an effective effort that is productively increasing the amount of recycling that is occurring throughout the building that gives permission for us to paint bins. The initial costs of this will go towards buying supplies.

Innovations in Sustainability: Surviving in a Changing World

We-Cycle: Final Report

Introduction & Purpose:

The purpose of this semester-long project is for each group in the class to take a sustainability-related problem and either 1) put a solution in practice or, 2) create a plan for the solution. Our group decided to pursue project ideas that would assist in reducing waste and raising recycling awareness. These areas in particular also aligned with our personal passions and we were overzealous to begin brainstorming.

We came up with four ideas that we wanted to implement through Southern Illinois University Carbondale's campus regarding e-waste and encouraging recycling efficacy. Although this initially seemed like an easier approach, we quickly discovered that was not the case. Simple, seemingly implementable ideas became more complex as we got deeper into implementing solutions. As a group, we worked with Geory Kurtzhals in the Sustainability Office on campus. We found that she shared many of the same ideas, in some capacity, and at some time pursued finding solutions without success for a multitude of reasons.

The following report outlines our process beginning with inspiration and research, researching and identifying solutions and finally, choosing a solution to allow our ideas to become tangible.

1. Inspiration & Research:

Our choice inspires new thinking because we want people on campus to see trash cans differently. We hope to give ownership, creative liberties and raise recycling awareness all at the same time by painting a bin! We believe that people need more clarification about what products should be put in a landfill, paper recycling or mixed recycling.

- a) Our choice to address the problem of ineffective/insufficient management of recyclable materials at SIU originated through a process of elimination. We discussed several solutions to pertinent problems regarding waste on campus. After researching several solutions, we agreed to pursue the issue of improper disposal of waste in Morris Library. Through observation, we noticed ineffective use of the available waste receptacles in the library. Though the bins are grouped, students do not adhere to the sticker guidelines on the trash bins. This decision was influenced by considering what would be the most *effective* and *realistic* given *our resources and time frame*. The implications of approaching a solution included: increased cost of recycling services (due to improper sorting), increased cost of recycling services, lack of use by students, and a deficit in general knowledge about proper recycling. As a group, we decided these issues are relevant because the awareness we hope to implement is useful on campus and in

the community. If successful, society, general population and the environment can benefit.

- b) Our research on this problem began in the Sustainability office at SIU, where we met with Geory Kurtzhals to discuss current projects in motion and areas that needed additional attention. In addition, we utilized the STARS report as a basis to gauge how SIU is doing in the realm of sustainability. To generate possible solutions for the problem we wanted to tackle, we investigated sustainable projects being conducted at other universities evaluating the results and generalizability to SIU's specific climate and needs. When selecting a location for our project, we observed high traffic areas around campus, areas lacking recycling bins, and places where improper recycling occurred often. We hypothesized conducting a quantitative study where we measured the frequency of improper recycling occurrences before and after implementation of our bin design. Due to time restrictions, we were unable to conduct this study but would suggest it in the future for the continuation of this project.

- c) As far as existing literature, we relied primarily on the STARS report. From the literature we learned that SIU is ranked moderately in some areas of sustainability, but lacked in waste diversion and minimization. Most of our literary investigation involved how to paint and design our bins. We extensively researched different mediums of paint that would be environmentally friendly and time effective and found that a low VOC spray paint best suited the project. We considered different design patterns (e.g. numerical recycling symbols) and how to best incorporate information on proper recycling directly on the bin. Unfortunately, given the restrictions on campus, we encountered too many problems with trying to allow students to freely paint their designs on the bins.

2. Generate Ideas

Reverting back to our mind maps in the brainstorming phase of this project, we generated four plausible ideas to address four waste-related problems at SIU. The first pertained to the high rates of e-cigarette usage and lack of proper disposal for empty cartridges. Upon further investigation we found a company that was offering monetary compensation in exchange for empty juul pods. The idea met its end because the legal age to purchase e-cigs is 21 in Illinois, making it prohibited to promote the recycling of e-cigs on campus. The second possible project idea we had was a collection box for electronic waste. The issue we wanted to confront was the large quantities of smartphone/laptop/charger waste that tends to accumulate in college students' dorms and apartments. This project was terminated because there were too many confounding factors impeding its' execution--for example who would come collect the waste, how much would it cost for removal, and how to ensure the e-wastes were reaching the appropriate

facilities. The third possibility we explored was a battery collection system put in multiple locations on campus to prevent the toxic chemicals from leaking out into the environment. The blockade we faced with this idea was that the battery collection company would only accept ten batteries per month, which was far less than our project would generate.

3. Make Ideas Tangible

We began the process of making these ideas tangible through mind maps, as shown above in our proposal. This gave us the chance to understand how we needed to build our prototype and make it better throughout the course of the semester. It opened up the floor for discussion as a group -- in this time, we decided we would want to create a "Paint-a-Bin" event. This event was designed to use creative outlets that would allow students on campus to paint trash bins blue or green to raise recycling awareness and give students ownership over their waste and sorting it correctly. We hoped that this would be a form of inbound marketing as people began talking about the trash bins, participating in the event and that this would overall spread recycling awareness, at least in Morris Library. This was our target location on campus due to the fact that trash bin grouping has been implemented by the Sustainability Office. Their efforts of putting labels on the bins was a good idea, but we noticed that often the labels would get covered by the trash bins or covered up in some way which prevented proper recycling/sorting trash. We wanted to do something that would try to address this problem.

However, we first needed to test materials on trash bins to see if this project would be feasible. We needed to see how the paint would dry, how it looked, what materials were needed, etc. We also wanted to be sure that we were using environmentally-friendly paint options. Sadly (and initially), this eliminated spray paint, which would have been the best option for looks and drying time. This then led to our research of paints, materials of the bins in hopes to find what would be the best option. We collaborated with the Craft Shop in the Student Center. They were willing to donate two trash bins to our project so we could create prototypes.

At first, we tried painting the bin with non-toxic acrylic paint. The paint simply smeared back and forth to the bin -- it was not successful. Next, we tried applying a gesso to the bin -- this took a long time to dry before we could apply acrylic paint on top. The paint stuck much better to the bin, but it didn't look very good and after drying, it was very easy to chip off. Next, we sanded the bin by hand with sandpaper. This process took even longer. Once that was complete, we applied both combinations we tried previously (acrylic paint on the sanded metal + gesso on the sanded metal with acrylic paint on top. The sanded metal + gesso + acrylic paint was what looked best on the trash bin. We were happy to see a part of the bin looking like we wanted it to!!

At our next group meeting we critically assessed how this would be possible to prep all the trash bins we wanted painted for an event on campus. Acquiring the bin, sanding each of them down, applying a gesso, and allowing it to dry were the steps required to complete each bin to get it ready for the event we hoped to host. We realized this was not realistic. So we went back to the drawing board, continued brainstorming and what other options we had. We continued our

discussions with people in the craft shop and kept getting the same response -- "Spray paint is your best option for what you're hoping to accomplish." So we discussed finding a spray paint with low VOCs. We were successful, so we ordered the paint and got our second bin donated from the craft shop to create our second prototype. This prototype was successful! The time to prep the bin for painting was significantly reduced and the result was more in alignment with the aesthetic we were hoping to achieve. Though we concluded our optimum paint medium, that was flawed in that ALL spray paints are not very environmentally safe, despite the greenwashing label of being "eco-friendly". This came in direct contradiction to our goal because we wanted to use non-toxic materials to stay in alignment with the higher goals of this class -- sustainability as an everyday practice.

In conclusion, these are all the efforts we exhausted trying to make this "Paint-a-Bin" event we wanted to host tangible. Most of our effort went towards creating this prototype to see if it would be successful. We really wanted this to work. We really wanted to provide an opportunity on campus to have creativity come together with recycling awareness and beginning action steps. However, we realized the process and materials seemed to be working against our desired goal.

4. Recommendations

In terms of moving forward, we think it would be best if there could be environmental activism on campus that would include creative liberties. But we also think that maybe this issues could be addressed differently. Maybe it could take on the course of addressing waste rather than managing it. Maybe the conversation can shift to showing people the effects of their waste through a visual display that forces them to cope with the mess they are creating; the mess that doesn't just "go away". Our group would tasks the next group of individuals that wish to take up a topic such as this to approach it from this perspective -- to be sustainable as possible in the materials they use that will best support the environment that we all share.

Team Save the Bees: Kaylee, Jessie, & Kathleen

The issue we are passionate about:

Our main issue is that the bees are going extinct from the excessive use of pesticides in farms everywhere in America. In Southern Illinois, a lot of the land is used for farming and a lot of those farmers utilize pesticides that are harmful to bees. This spreads to the bee pollination that leads to a large amount of our foods we eat not being able to be carried out due to the bees dying off. Because so many plants and animals rely on bees and their ability to pollinate plants, many of these plants are eaten by humans and animals making them in constant demand, this topic should inspire many to take care of bees to make sure that our plant life, ecosystems, and agricultural industries do not suffer.

Why is this issue important?

According to earthday.org's Save the Bees Campaign, over the past 10 years beekeepers, primarily in the United States and Europe, have been reporting annual hive losses of 30 percent or higher, substantially more than is considered normal or sustainable. One in four wild bee species in the U.S. is at risk of extinction. Plants need bees to pollinate, making bees indispensable pollinators of most ecosystems. There are 369,000 flowering plant species, and 90% of them are dependent on insect pollination. A honeybee can usually visit 50-1000 flowers in one trip; if a bee takes ten trips a day, a colony with 25,000 forager bees can pollinate 250 million flowers in a day. Bees are a keystone species, with other species dependent on them to survive. Many species of animals depend on bees for their survival because their food sources, including nuts, berries, seeds, and fruits, rely on insect pollination. Pollination not only makes food available for other organisms but also allows floral growth, which provides habitats for animals, including other insects and birds. As pollinators disappear, the effect on the health and viability of crops and native plant communities can be disastrous. Pollinators contribute billions to the world economy. The global crop production pollinated by bees is valued at \$577 billion. Pollinators contribute \$24 billion to the U.S. agriculture industry, making up a third of the food consumed by Americans. Some of the main threats to the bee population are the widespread use of pesticides, neonicotinoids and GMOs used by industrial farming, loss of habitat, and pests/diseases/viruses/mold. Southern Illinois has a heavy industrial agricultural community, and many of these farms use Neonicotinoid pesticides/GMOs which have been identified as the main problem relating to bee population decrease. Southern Ill. is a place where farmland is prevalent and all of that land needs pollinators to continue its agricultural economy and environment. With the bee population all across North America at a decline, this could put the agricultural industry as a whole at risk. Crops are used in making food as well as feeding livestock. Including a bee garden with bee hives on a local organic farm can help save the bees while also saving our food.

Brainstorming the project:

This bee garden installed on the lot behind the Ag building and/or the lot by Faner. The bees could benefit the campus environment and if we decide to keep bees we could make a profit

off of the honey after the bee hives are established. In response to the population decline of pollinating insects, such as wild bees and monarch butterflies, researchers at the U.S. Department of Energy's (DOE) Argonne National Laboratory are investigating ways to use "pollinator-friendly solar power." Our proposal would be initially to establish a bee garden/bee hives with the \$1000 grant and then later propose to the Green Fund and Sustainability Hub for solar panels to not only shade the bees and their garden but to contribute to clean energy on campus. Placing solar panels with the bee gardens/hives have proven to optimize the efficiency of the land in use, with regular solar panels the land underneath could not be utilized but in this case, it would go to the bees. The actual garden would include an area where bees can live and have easy access for pollination. We plan to include specific plants that bees are attracted to as pollinators. These can include sunflowers, sage, lavender, and more. Along with some soil and basic gardening tools.

<https://www.anl.gov/article/can-solar-energy-save-the-bees>

Our solution to this issue and our final project information:

Original proposal/prototype:

Constructing a Bee Garden (or multiple) on various places of SIU's campus or near campus to sustain the bee population in Southern Illinois while also maybe soaking up extra rainwater, helping the local plant life. We could also install solar panels above the garden/hives for shading the bees and for clean energy. This could be just a bee garden but we would like to expand it to bee hives to harvest honey and have the solar panels for clean energy. We could work with College of Ag on what would be the best place to put a bee garden. It could even potentially be placed on Evergreen Terrace property as well. Integrating this plan onto SIU's campus would involve getting eco-friendly stakeholders on board to expand/help the project after we get it started such as College of Ag and the Sustainability Hub in charge of the student green fee, maybe even Touch of Nature. We would need to designate a spot of land, tear up the soil, apply new fresh soil, plant the appropriate plants that attract bees, and potentially install bee hives for honeycomb building and harvesting. Such plants would include lavender, fennel, borage, poppy, sage, aster, sunflower and many more. The cost of the gardening is estimating to be around \$300 between soil, gardening tools, and flower seeds. The cost of beekeeping can vary and will need additional cost for winter upkeep and equipment for constant care, which may need to be proposed for more money by the student green fee and the Sustainability Hub. It's estimated to cost \$750. The solar panel installation would be far too much money for this proposal alone. However, once the garden and hives are constructed that would be something we would take to our stakeholders.

Final project:

This bee garden is necessary because Southern Illinois has a heavy industrial agricultural community, and many of these farms use Neonicotinoid pesticides/GMOs which have been identified as the main problem relating to bee population decrease. After looking at research on what pesticides do to bees performed by Cornell University, it has been shown that the chemicals in pesticides (neonicotinoids) can hinder acetylcholine receptors in the bees' muscles which hinder motor function, causing them to die (<https://pollinator.cals.cornell.edu/threats-wild-and->

[managed-bees/pesticides/neonicotinoids/](#)). Southern Ill. is a place where farmland is prevalent and all of that land needs pollinators. With the bee population all across North America at a decline, this could put the agricultural industrial as a whole at risk with all of our local crops used in making food as well as livestock that need to be fed, all depending on pollinators like bees. Including a bee garden with bee hives on a local organic farm can help save the bees while also saving our food.

This garden would entail plants and flowers, bees, and of course maintenance of the garden. The nuc (starter colony + queen) would need to be purchased as a start. Additional items would include wooden hives if the species of bees that we use require hives, a smoker, bee jacket and veils, and gloves. The physical labor for the garden should include fertilization and watering after the ground is prepared, new soil is laid, and flowers are planted. Maintenance for the bees during the dirt season (when the weather is below 50 degrees consistently) will include weekly feeding but after that the bees only need treatment for pests twice a year. Honey collection will follow after the bees produce a plentiful amount. This labor can be done by students who are interested in the education of beekeeping, environmental sciences, and/or sustainability. This can be used as an opportunity for RSO groups to get involved or have actual classes utilize the bee hives and garden. Students from college of agriculture (grant DEPOY AND ryan Hebel) have shown interest in getting their fellow students involved as well as their RSOs the Student sustainability coalition and the horticulture club.

Types of bees that could reside in the garden where a few species we researched from the Illinois Department of Natural Resources to learn what pollinators are the best for our region. Mason bees have been known to pollinate trees in Illinois. They also thrive in wooded areas. The bumblebee is the key pollinator in the state of Illinois and is by far our first choice given that they thrive in a similar climate to Carbondale. These bees have been known to nest in the ground. They have been found to thrive in wetter climates. Plasterer Bees are often found nesting in the ground in and are great for native plants. Plasterer bees prefer to be around sandy soils with thin vegetation. Carpenter bees are another native bee species to Illinois that are good pollinators. Carpenter bees prefer wooded areas where they can nest.

<https://www.dnr.illinois.gov/education/Pages/PollinatorNativeBees.aspx>

This garden would ideally start in spring of 2021. After doing research with local beekeepers, we learned that bees begin pollination in the spring season when temperatures reach above 50 degrees consistently. The plants in the garden will also need that warm weather to thrive. This project would need to begin in the spring season when the weather consistently reaches above 50 degrees getting past the dirt season. This season can vary because of Carbondale's inconsistent weather. If we receive funding from the Student Green Fund, which we will apply for in spring of 2020, we will have one year to spend our funds accordingly, plan our budget, and apply that grant to our garden in spring 2021.

Our budget for this garden is around \$750 however there is some fluctuation in pricing depending on when and where we buy supplies. A nuc, which includes the queen bee and her starter colony, can cost between \$100-150. A jacket and veil to wear for protection can cost between \$80-100 per person. Gloves can cost \$25-30 per person. A smoker to calm the bees while treating them can cost around \$20 or less. The gardening soil and tools can be between

\$200-300. Hives could cost around \$200 total depending on the woodworker. Luckily, we contacted Dr. Gage from the Horticulture department who offered to donate the appropriate flowers and plants to our garden for free. There may be some speed bumps with the survival rate of the bees and the queen bee which may call for more bees to be purchased as well. When our bees are able to produce enough honey to sustain themselves for food and have excess, we may harvest the honey and sell it to make a profit that goes back to the garden. After doing more research on where to buy bees and bee supplies locally, we have been referred to Leedlebees shop in Mulkeytown, IL and the Southern Illinois Bee Association.

Our journey with the bee garden idea began when our original idea of the roof-top garden became too expensive and unrealistic, and after we visited Touch of Nature and Evergreen Terrace. We first started in this class by looking at clean energy projects to do on campus, and we liked the idea of a rooftop garden. Roof gardens have some issues and the last one done on SIU was not as successful as hoped for and costed about \$40,000 for the College of Agricultural Sciences which was way out of our budget. After our trip to evergreen terrace and touch of nature, we thought to switch from a rooftop garden to a bee garden because they brought up the need for more organic gardening use and how pesticide use is an issue. We have done a lot of research about what this garden entails by discussing ideas with professors of the College of Agriculture, local beekeepers, and students within the Horticulture Club and the Student Sustainability Coalition and Geory Kurtzhahl from the Sustainability Hub we loved the idea even more and we found out how many bees are dying in the area from pesticide use like Steven mentioning the bees at Touch of Nature died after power-lines were sprayed with pesticides. With that knowledge, we discovered that the need to save the bees is quite dire, and a bee garden was the perfect project to try and combat the declining bee population here in southern Illinois as well as educate the community on why bees are important.

What we found that most people are doing incorrectly with bee gardens in the area that cause them to fail are mainly that they place their bee hives/gardens too close to places sprayed by pesticides (which is not always in their control). When we spoke to Steve from Touch of Nature where they were caring for their own bees, he brought up that certain colonies of their bees died when they all went to collect pollen that happened to be near a power line that was constantly sprayed by pesticides. We found that it seems to be hard for these other local bee gardens to find the people who are committed to taking care of the bees. Sometimes the queen bee will die or an entire colony will die unexpectedly which can be a large set back financially and time-wise. We found that it is hard to find locations that are never sprayed with pesticides in some way because these large industries are so adamant about killing pests. Because of this, our biggest obstacle was finding a perfect spot to plant this garden and to allow our bees to roam freely without being in danger of pesticide exposure. It became very difficult to get in contact with people from the College of Agricultural sciences who were in charge of our top location picks for the garden, because their department was very disorganized.

After talking with all of our resources we determined that our main stakeholders to help fund the garden the College of Agriculture and its faculty, Touch of Nature, The USDA, The Horticulture Research Center, and the Sustainability Hub/Student Sustainability Council. These are groups we have established to be the most interested in the project and who can donate money or items we need for the garden. We are hoping that after spreading awareness about how

the bee population need help, someone within campus limits will allow us to use a location for this garden. Our top picks for our garden's location would be the Horticulture Research Center, the SIU Center for Sustainable Farming, or Touch of Nature. However, after spreading awareness and doing this project/presentation we are hoping to continue the project and enlist more advice and help to move the project forward.

What we recommend for any groups in the future who plan to do anything with gardening and bees, and for ourselves while continuing this project next semester, is to contact as many local experts as possible for the best realistic information on how to tackle this project. We didn't really use many literature sources, some info was from Earthday.org, the Illinois Department of Natural Resources, Cornell University, which told us about some research on bees however this information was very vague, was not all the time up to date (due to bee research not being in high demand) and we needed to know about how bees function in Carbondale. So, instead we used our time talking to people who know the area, who have been keeping bees in the area, and who know a lot about local agriculture. Because the area of Carbondale is so unique in climate and none of us knew enough about local bee keeping and gardening, we needed more advice and expertise from as many sources who were willing to talk to us. We would also tell future groups to be prepared to keep at this project for a while, more than just for the semester of the class. It takes a lot of planning and budgeting but some resources were great and got so excited about the project that they were willing to donate things like plants for the garden so ask around for donations. We would also recommend talking to students who are very interested in the project like the Horticulture Club and the SSC who are reputable and whom you would trust to take over the garden in later years because it will take constant labor to sustain itself. We would tell these groups to make sure that they find a place run by people who are a bit more organized than the College of Ag and other places ran by the university since they are such a gamble. We might suggest instead getting the city involved and placing the garden somewhere in Carbondale to expand the options of where to place the garden, where there is less of a chance of pesticide exposure, and where the bees maybe aren't around so many people.

Final Project Extra Notes:

Resources:

Grant Depoy (and Ryan and Jacob) College of Ag students

Geory Kurtshahl Sustainability Hub

Stephen Touch of Nature

Power Plant: Abby Frankel, Justin Harrel

Dr. Sipes

Dr. Karla Gage

Kaylee's Advisor Jennifer Stillman (local beekeeper)

Carbondale Spring - Nick

College of Agriculture faculty

Parks district - ask about land

LEAF

USDA in Marion

Question:

How far the bees will travel? Roughly 3 miles

Note:

- Old rail road grounds (70 acres) turn into garden north of campus
- Contact local bee keepers
- Wild flowers grow in clay soil
- Focus on plants AND hives
- Carbondale Springs integrate pollinators in food garden
- Don't limit plot to campus
- Chat with grant about agriculture department and reclaiming land
- Figure out how anyone who wants to contribute to the garden to say sponsor a bee hive
- IDEA: ask for grant from green fee to pay bee keepers until honey is profitable
- IDEA: RSOs and groups sponsor a hive with name/logo on it
- Sarah Louisen - prof with bees
- Evergreen plot may be exposed to pesticides
- Research ways to take honey without harming bees
- Get word about the bee garden
- co -op bee hives?
- 6183035528 - Nick's number

Soft Budget necessities

- Plants (Native)
- Garden tools
- Soil
- Bees
- Hives
- Protective gear

Bee Garden Location:

- Evergreen Terrace
- 70 Arce old railroad yard
- Possible Co-Op with Carbondale Springs
- Horticulture Research center
- Center for Sustainable farming

Media and Presentation

- Magazine
- Powerpoint with magazine information

Why are Bee Gardens Necessary? Why should we be concerned in Southern IL?

According to an article written by Jessica Knoblauch, a senior writer for Earth Justice, the EPA has recently approved of the bee killing pesticide sulfoxaflor. (Written this year!)

- the [USDA has suspended data collection for its annual honeybee survey](#), which provides critical information to farmers and scientists by tracking honeybee populations across the U.S.
- [honeybees pollinate approximately one-third of all the food we eat](#)
- “I’ve had about 90 percent honeybee loss between last spring and this spring. I typically run about 3,000 colonies in our spring count and we instead we had 300.” - beekeeper Jeff Anderson

https://earthjustice.org/blog/2019-july/bees-and-beekeepers-sulfoxaflor-pesticides-epa-die-off-trump?gclid=CjwKCAiAqqTuBRBAEiwA7B66hUd8tbFOIC0v-KZDA6AFvSC1tK mz9ldk1VkZFITwBolcmATeKerjfxoCe_oQAvD_BwE

- Southern Il is a big agriculture area,
 - A lot of pesticides

Hayley Creath
Allena Healy
Abigail King

Final Project

1. Inspiration-Research:

a. What is the problem/issue? Why did you choose it? Why should other people care?

The problem/ issue we wanted to address was the lack of education on sustainability and available resources to students at SIUC. After we realized that we personally did not know where to recycle cardboard at the dorms, this made us think- how many other resources are there that we do not know about? The lack of knowledge on where to recycle cardboard in the dorms fueled and inspired the rest of our project. This ultimately led us to finding a solution and way in which we can communicate and *educate* students on sustainability at SIUC.

We chose this problem to dissect and solve because we all felt a passion to inspire students and reach out, in order to make our campus more sustainable. Our goal was to figure out a way to show freshmen all that SIU has to offer and to change the overall atmosphere of sustainability at SIUC.

Other people should care about this because as Nick from Carbondale Springs emphasized: People see Carbondale as just a temporary place they will stop through and then leave in 4 years. However, we have to change this thinking to where students feel that they have a voice and potential to change Carbondale for future generations. With so much negativism about SIUC and the rumors of it closing it is important to highlight all of the amazing resources SIUC has to offer, and to come together as a community to make change.

b. How did you research this problem? Did you observe people? Did you interview someone? How many people did you talk to? Is there statistical evidence for your problem-solution?

After conducting numerous amounts of research, we identified that educating college students on the topic of recycling has a significant impact on those students. In 2014, the University of Northern Iowa conducted a study titled *A Study of College Student Attitudes and Behaviors Related to Recycling*. "Prior to the institution of this project, the residents of Rider Hall recycled an average of 40 pounds of material per week. After the institution of this program residents recycled an average of 121 pounds of material per week" (UNI). This is one example of how educating students and implementing recycling programs can make a huge impact on a college campus.

<https://scholarworks.uni.edu/cgi/viewcontent.cgi?article=1001&context=etd>

We also asked around through word of mouth if students know where to recycle cardboard on campus and the reoccurring answer was no. Also when all of us were freshman we had piles of cardboard in our room because we did not just want to throw it away, but we did not know where to put it.

c. What existing literature/ research did you rely on to understand the problem? What did these tell you? What is missing in this literature?

We used a lot of resources provided by SIU's sustainability office to build off of for this project. The resources, like videos, green tours, and information on the website, are all really helpful for understanding sustainability on and off campus. We felt like the problem is that people on campus don't know that these resources are available, which is why we decided to tackle this from an educational perspective.

d. What solutions are out there? Why are some successful and others not?

We looked into studies on how sustainability education affects students in practice, including a study done at the University of Northern Iowa. Research suggests that college students' likelihood to recycle and practice other sustainable activities are unbelievably higher when they've been educated on sustainability and campus resources. That is what we founded our idea on and why we feel like this can make such a big difference.

2. The process: What were the problems and solutions you came up with- what were your top 3? Why did you reject some of them?

We started with the idea of putting cardboard recycling bins in the dorms, so students could have easy access to recycling. This was rejected because we found out that there are cardboard dumpsters outside all the dorms that people don't know about.



We then looked into creating an educational video to show in classes, but that did not fit within our ability range and our time span for the project.

That is how we landed on creating a lesson for UNIV101. It reaches a broad audience and, especially after discussing it with Dr. Komarraju and Dr. Engstrom, is more tangible than the video.

3. Tangible ideas: Include your prototypes/drafts and final.

The potential solutions from our original proposal include:

1. Use University 101 as a way to reach out to freshman and show them resources like the sustainability hub and the recycling team. Create a slideshow for teachers to present.
2. Put cardboard recycling bins in the dorms for Amazon boxes and others.
3. Offer incentives for students that get involved through the sustainability club.
4. Create recycling competitions among different departments.

After we narrowed down our solutions we came up with our top solution which was to create a syllabus for the University 101 class and propose the outline to the provost. Below are our prototypes.

Prototype 1: Make Video

- Demonstrating resources around campus
 - Where to recycle at the dorms
 - The Green Fund
 - What is it and what is it being used for in the past and future?
 - Feature the green roof, water bottle refill stations, and lighting
 - <https://sustainability.siu.edu/green-fee/green-fund/>
 - Interview with sustainability director Geory Kurtzhals
 - What sustainability efforts are you most proud of at SIUC's campus?
- Ways students can get involved
 - Volunteer opportunities
 - Recycling at football games, Carbondale Spring, Adopt A Spot
 - Touch of Nature
 - Climate Strikes
 - Interview with the president of SENSE (Students Embracing Nature, Sustainability, and Environmentalism)

- Why do you think students should join SENSE?
 - Ex. favorite activity
- What are you most proud of that SENSE has accomplished?
- Interviews with students about what they know about sustainability on campus
 - Interviews with 2 students
 - 1: What do you do with your cardboard in your dorm? Do you know where it is supposed to be recycled?
 - 2: What resources do you know that are available for sustainability efforts at SIU?

Prototype 2: Saluki Bingo

SALUKI BINGO

Take a selfie recycling your cardboard in the correct bins outside of West and East Campus	Attend an event held on your residence hall floor and take a picture	Go to the study abroad office and express your interests in studying abroad signature:	Take a selfie while working out at the rec center	Go on a Green Tour held on the first Friday of every month at the Sustainability hub @ noon
Go on the SIU Sustainability website and list an RSO that interests you	Write down a solution to make SIU eco friendly!	Take a selfie on the bridge in the Japanese Garden located outside the Coal Research Center (Next to the University Museum)	Apply for a scholarship and write down what you applied for:	Create a Volunteer Portal
Go to the Sustainability Hub located across the E-Sports arena and ask a	Take a picture at an SIU sporting event		Take a picture of you filling up your water bottle at a water bottle refill station	Write down your number one goal for this semester:

question about sustainability Signature here:		FREE SPACE	provided by the SIU green fund	
Take 5 deep breaths	Take a selfie on the green roof of the agriculture building (Located across from Thompson Point)	Walk to class instead of drive	Take a walk around campus lake and take a picture on the new course	Order a Starbucks drink using a reusable cup and take a picture
Eat some ice cream today!	Avoid turning on your lights during the day	Go on the SIU Sustainability website and under "For Students" click "Football Tailgate" and write down the <i>Season Recycling Total</i> _____	Take a shorter shower today	Finish all of the food on your plate

PROTOTYPE 3: Scavenger Hunt

Instructions: Get into groups of 3 or 4 people and complete the tasks listed below in any order. One member from each group must use their phone camera to take pictures for proof of completion. The first group to finish wins.. And receives a prize!

1. Take a selfie with your group at the correct location to recycle cardboard at the dorms.
2. Take a selfie on the green roof on top of the agricultural building.
3. Go to the Japanese Garden outside of the university museum (the North end of Faner) and take a selfie.
4. Fill up your water bottle at a refill station and take a picture.

5. Find the sustainability hub and ask a question about sustainability on campus, and get your paper signed.
6. Find a bike lane and take a picture of it.
7. Take a selfie at the solar powered picnic table by the Morris Library and Agriculture building.
8. Take a picture of something you think SIU can improve on from a sustainability aspect
9. Take a picture in Thompson Woods
10. Write down the most interesting place you visited: _____

Plan for the class curriculum (PILOT):

1. Introduce ourselves
2. Show the video, approximately 5 minutes
3. Pass out and explain the scavenger hunt
4. After all students return from the scavenger hunt, check their pictures
5. Administer short reflective survey
6. Ask if there are any additional questions

FINAL PROTOTYPE:

University 101: Sustainability Week

1. Present Powerpoint

- https://drive.google.com/file/d/1_TfrQiqctJ-H4Hr7RWGeBT4T7p192jNb/view?usp=sharing

2. Show the Student Green Fund Video

- <https://sustainability.siu.edu/green-fee/green-fund/>

3. Take a refreshing trip outside or to a specific green funded project in the video and discuss the guided questions.

4. Play the Kahoot

- <https://create.kahoot.it/share/eco-101/ce37c692-08b4-4a01-9602-8bc5cd4d8c39>

Discussion Questions For Different Colleges

Show the clip of the SIU Green Fund Project Grant and then in order to get the students out of the classroom either go to a general outside area or a specific green fund project from the video. The following are guided questions to discuss.

The SIU Green Fund Project Grant:

<https://sustainability.siu.edu/green-fee/green-fund/>

- **Agricultural Sciences**
 - How can you implement sustainability into agriculture?
 - How can you reduce waste in agriculture?
 - Is there a way to reduce transportation emissions from farm to store?

- **Applied Sciences and Arts**
 - Think of the materials and energy that you use on an everyday basis.
 - How can you reduce energy costs, yet still be efficient?
 - How can you reduce material waste?

- **Business**
 - How can the lake make money?
 - How can you cut costs in maintaining the lake?
 - How can you persuade a company to become more sustainable even though it may cost them more money?
 - Come up with a business idea at SIUC which involves sustainable practices?
 - Think of a business that is already successful; How can you change that specific business to become more sustainable?

- **Education and Human Services**
 - How can you implement sustainability in your everyday career as an individual?
 - How can you educate and spread awareness of sustainability practices in your career? As a teacher? mentor? manager? therapist?
 - What can you do to
 - Split up into groups of 4 or 5 and come up with a hands on activity or game that you can incorporate into an education career field.

- **Engineering**
 - What other areas on campus at SIUC could you use engineering to make the campus more sustainable?
 - Air

- Water
- Waste
- Transportation
- Energy

- **Liberal Arts**

- Think of a way in which you can relate liberal arts and your specific major to sustainability.
- Can it be through education? Marketing? Social media?
- How can you reduce your waste as a student? In your career? In your future endeavors?

- **Mass Communication & Media Arts**

- How can you use sustainability efforts and reduce materials and energy costs?
 - Lighting
 - Clothing
 - Props
 - Set
- How can you reduce your waste as a student? In your career? In your future endeavors?
- How can you influence the people you will communicate to, to be more sustainable?

- **Science**

- How can you implement sustainability into the medical field? What one-use disposable products are used?
 - Reduce Waste?
 - Clean Energy?

General Questions:

- How can you be more sustainable as a person in your everyday life?
- What is your definition of sustainability?
- What can you do at SIUC and/or in the Carbondale community to promote and help sustainability efforts?

Kahoot Questions:

1. Which of the following items will take longer to degrade in a landfill?
 - a.) Diaper
 - b.) Styrofoam cup
 - c.) Aluminum can
 - d.) Banana Peel

2. How much does the average American consume in paper, wood, and other products made from trees each year?
a.) 1 tree b.) 5 trees c.) 7 trees d.) 15 trees
3. How much energy does recycling just one aluminum can save?
a.) Enough to power a microwave for 30 minutes b.) Enough to power the average American home for 4 days c.) Enough to power a computer for 15 minutes d.) Enough to power a TV for 3 hours
4. How many years does it take for plastic bottles to decompose?
a.) 100 years b.) 250 years c.) up to 1000 years d.) 450 years
5. Unplugging your appliances when not in use can save approximately how much energy costs in one year?
a.) \$15 b.) \$50 c.) \$75 d.) \$100
6. Where is the Sustainability Hub located on campus?
7. What percentage of plastic bags are recycled?
a.) Less than one percent b.) 12 percent c.) 55 percent d.) 33 percent
8. What can you recycle at Lowe's?
a.) Light bulbs b.) Plastic bags c.) Batteries d.) all of the above
9. Which of the following requires the most water?
a.) One toilet flush b.) One medium load of wash c.) One ten minute shower d.) One bath
10. According to the EPA, what product takes up the most space in landfills?
a.) Cardboard b.) food waste c.) plastic d.) paper

Post Survey Questions:

1. After watching the video and going on a field trip, do you feel more aware of the resources available on campus related to sustainability?
Yes
No
2. Did you find this class helpful and should it be implemented into future University 101 classes?
Yes
No
3. If there was an environmental class offered as a general education course for science, would you take the class?
Yes
No

4. What NEW resources did you learn about from this class period?

- The Sustainability Hub
- The rooftop garden
- S.E.N.S.E RSO
- The new Student Sustainability Coalition
- Sustainability oriented volunteer opportunities
- Where to recycle
- The green fund

5. On a scale of 1-10 (1 meaning not interested, 10 meaning very interested) how interested are you in sustainability efforts at SIUC?

1 2 3 4 5 6 7 8 9 10

6. Did you now know where to recycle cardboard on campus **before** this class?

- Yes
- No

7. Do you have any recommendations/ suggestions to better improve or change this class period for future Saluki Success sustainability classes?

We believe our final prototype is the best solution. After receiving much constructive criticism and ideas from many people, conducting our pilot class really helped us narrow down our solutions. We realized that the main importance and reason we did this was for the students and to keep them engaged and excited, so we altered our syllabus to do that.

4. Your recommendations/plan for either you continuing or someone else taking on this project.

We have emailed the provost as well as the course advisor for University 101 our final syllabus, along with including all of our contact information as well as Geory's information. We hope to keep in touch with them regarding the class and any changes that are made.

