Fostering a Culture of Sustainability at Worcester Polytechnic Institute

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Abstract

The goal of this project was to evaluate initiatives related to increasing engagement with sustainability in the WPI community & suggest recommendations for improved strategies. The project team conducted research through literature, a survey, and interviews to understand how WPI and other universities are currently engaging their members about sustainability. Our research concluded that many WPI members are unaware of campus initiatives or do not know how to participate in them, finding that staff lack adequate sustainability resources. The data collected for this IQP led to a set of recommendations to meet WPI's sustainability community engagement goals, which includes: reimplementing the World Cafe, increasing event communications, and implementing sustainability onboarding training.

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CHAPTER 1. Introduction

Our planet is currently facing several crises such as climate change, pollution, and resource depletion. Everyone has an impact on all these problems, making engagement on sustainable practices crucial to protect planet Earth. Sustainability-focused groups exist on many college campuses, and often aim to not only practice sustainable acts, but to educate other university members on how they can help out.

The WPI community is home to sustainability-focused groups, such as the WPI Green Team. Groups like these often host events at WPI focused around making WPI more sustainable, including the E-Waste Drive, Race to Zero Waste, Earthfest, etc. These events are open to anyone on-campus, often to people outside of WPI as well, and also are a way to get people engaged with sustainability.

Despite the efforts made by such groups to get WPI members engaged and interested in sustainability, previous and current survey data indicates both a lack of interest and lack of knowledge of sustainability efforts being made on WPI's campus. Many WPI members are completely unaware of these efforts being made on their own campus, and often do not care to learn about them nor participate in them. Current sustainability engagement efforts at WPI are focused on students, neglecting the faculty and staff that compose a large part of WPI's population. To address these problems, this project aims to find inclusive ways to make all members of WPI's community aware and involved in sustainability initiatives. The goal of this project is to evaluate current and future initiatives related to increasing engagement with sustainability in the WPI community and suggest recommendations for improved strategies.

CHAPTER 2. Background

To better understand the issues related to sustainability community engagement, background information and research was synthesized. This section will explore information about sustainability at WPI. This section will then explore how other colleges tackle sustainability related engagement issues on their campuses. This section will also provide research on the human psychology and motivating factors behind making environmentally responsible decisions. This information will help support our methods section.

2.1 WPI Sustainability Plan

The Office of Sustainability at Worcester Polytechnic Institute (WPI) has created and published a sustainability plan every 5 years since February 2014. These plans outline sustainability goals and objectives the institute aims to meet or make progress towards during a 5 year time span (Worcester Polytechnic Institute, 2020). The institute guides its sustainability efforts and goals on three guiding principles: environmental stewardship, economic security and social justice. Environmental stewardship embodies the idea that humans must recognize and minimize the impact of their activities to preserve and respect our natural world. Economic Security represents the understanding that all members of society, no matter their background, should be able to support them and their family's well being. Social Justice describes the idea that respect for everyone in society allows for equitable wealth, opportunities and privileges for all (Worcester Polytechnic Institute, 2020). Along with these three principles serving as pillars, WPI also entwines its institutional core values into its sustainability initiatives. These core values include: diversity, equity, and inclusion; innovation, entrepreneurship, and value creation; project-based learning and STEM; design thinking and maker culture (Worcester Polytechnic Institute, 2020).

In the latest plan created for the years 2020-2025, the Office of Sustainability focused on increased community involvement and engagement to create a plan that properly reflects the wants and insights of the WPI community. The Office of Sustainability hosted a series of community engagement events to gather input and feedback from students and faculty to do so.

The plan was launched in December 2018 with an event that invited all members of the community to participate in a feedback session to identify goals and priorities regarding sustainability. Then in February 2019, the Office of Sustainability hosted a "world cafe" to organize how the goals and priorities could be possibly put into action by groups on campus. Lastly in April 2019, sustainability goals and objective tasks were refined and compiled in a final feedback session. After evaluating the feasibility of the plan with the Office of Finance and Operations and the Office of Provost, the plan was published to the public in the fall of 2020 (Worcester Polytechnic Institute, 2020).

The 2020-2025 WPI sustainability plan includes goals and objectives for the institute in four main areas:

1. **Goal 1: Academic Programs and Initiatives** — WPI graduates will leave campus with the mindset and abilities to develop sustainable solutions to the world's problems (Worcester Polytechnic Institute, 2020, p. 12).

2. **Goal 2: Operations and Facilities** — Principles of sustainability guide our actions as well as our academic and research programs (Worcester Polytechnic Institute, 2020, p. 12).

3. **Goal 3: Research and Scholarship —** Research and scholarship will make significant contributions to the technologies,the policies, and the mindset to help assure a sustainable world (Worcester Polytechnic Institute, 2020, p. 12).

4. **Goal 4: Community Engagement** — Every member of the WPI community will engage in sustainability-related education, awareness, action, and service in order to achieve positive, long lasting change for all our communities (Worcester Polytechnic Institute, 2020, p. 12).

2.1.1 Goal 4: Community Engagement

WPI recognizes within its sustainability plan that community engagement is vital for meeting the institution's sustainability goals. The community engagement goal is to ensure that "every member of the WPI community will engage in sustainability related education,

awareness, action, and service, in order to achieve positive, long-lasting change for all our communities" (Worcester Polytechnic Institute, 2020, p. 12). Within the community engagement goal, two main objectives are outlined:

1. **Objective C1: All In for a "Culture of Sustainability"** — All members of the WPI community are aware of sustainability challenges, opportunities for positive action, and how to integrate sustainability goals and values into their roles in relation to WPI (Worcester Polytechnic Institute, 2020, p. 21).
2. **Objective C2: Meeting Community Needs Beyond WPI** — WPI engages with communities beyond the WPI campus to meet their sustainability needs, through effective dissemination, project engagement, partnering, and initiatives (e.g., STEM, PBL) (Worcester Polytechnic Institute, 2020, p. 21).

2.1.2 Objective C1: All In for a Culture of Sustainability

The first objective of the community engagement goal is maintaining a "culture of sustainability." The idea of a "culture of sustainability" is described as a culture "in which all WPI community members are engaged in activities that embrace and advance sustainability; and in which WPI recognizes and communicates sustainability impacts across all organizational, community, and academic activities" (Worcester Polytechnic Institute, 2020, p. 41). Within this objective, there are three sub-objectives that promote and maintain a "culture of sustainability:"

1. **Objective C1.1**: All members of the WPI community are aware of sustainability challenges, opportunities for positive action, and how to integrate sustainability goals and values into their roles in relation to WPI (Worcester Polytechnic Institute, 2020).
2. **Objective C1.2**: The impact of WPI community members' activities on sustainability is demonstrated through assessment and encouraged through recognition (Worcester Polytechnic Institute, 2020).

3. **Objective C1.3**: WPI advances social justice initiatives and ensures that all sustainability-related programs promote diversity, equity, and inclusion (Worcester Polytechnic Institute, 2020).

The three sub-objectives along with the tasks needed to achieve the sub-objective, the desired 5-year outcomes of the sub-objective and the responsible party that is measuring and ensuring progress are detailed in Figure 1, Figure 2 and Figure 3.

Objective C1.1: All members of the WPI community are aware of sustainability challenges, opportunities for positive action, and how to integrate sustainability goals and values into their roles in relation to WPI.		
Community Engagement Tasks	**5 Year Outcome**	**Responsible Party**
Task 1: WPI will engage and inform WPI stakeholders through a variety of communication venues (e.g., events, websites, social media, pitch competitions, resource fairs, conversations, etc.).	90% of campus is aware of sustainability objectives through increased communications	Office of Sustainability; Marketing and Communications
Task 2: WPI will increase the level of awareness of sustainability events, activities, and opportunities at WPI to ensure that all stakeholders are reached.	25% increase in participation	Office of Sustainability; Marketing and Communications; Student Affairs
Task 3: WPI will expand the living inventory of sustainability activities, metrics, and accomplishments, on and beyond campus.	Inventory is accessible to WPI and beyond	Office of Sustainability
Task 4: WPI will facilitate easy access to all proposed and completed student projects related to sustainability.	Project database is accessible to WPI and beyond	IT and Library Services
Task 5: WPI will creatively promote community engagement in sustainability, and promote the campus as a living laboratory for sustainability action.	Number of active engagements in sustainability throughout the campus community increases	Office of Sustainability; Marketing and Communications; Student Affairs; Provost's Office

Figure 1: Objective C1.1 of 2020-25 WPI Sustainability Plan (Worcester Polytechnic Institute, 2020, p. 41).

Objective C1.2: The impact of WPI community members' activities on sustainability is demonstrated through assessment and encouraged through recognition.		
Community Engagement Tasks	**5 Year Outcome**	**Responsible Party**
Task 1: WPI will assess progress toward adopting a culture of sustainability at WPI (e.g., awareness, values, beliefs),	Strong culture of sustainability across campus is seen by increase in event participation	Office of Sustainability
Task 2: WPI will evaluate and increase the levels of engagement in sustainability-related academics, clubs, events, activities, and programming.	A 10% increase is seen in engagement of sustainability programming	Office of Sustainability
Task 3: WPI will effectively publicize sustainability metrics and accomplishments.	Number of updates increases each term	Office of Sustainability
Task 4: WPI will incorporate components of sustainability into performance reviews based on sustainability measures.	Components of sustainability is incorporated into review process	Talent and Inclusion
Task 5: WPI will advance the reward and recognition of sustainability achievements through the development of a variety of sustainability awards.	Number of staff and student sustainability awards increase	Office of Sustainability

Figure 2: Objective C1.2 of 2020-25 WPI Sustainability Plan (Worcester Polytechnic Institute, 2020, p. 41).

Objective C1.3: WPI advances social justice initiatives and ensures that all sustainability-related programs promote diversity, equity, and inclusion.		
Community Engagement Tasks	**5 Year Outcome**	**Responsible Party**
Task 1: WPI will integrate concepts of social justice and human needs into sustainability-related initiatives and activities.	Increase in number of initiatives is integrated through a wide array of activities	Office of Sustainability; Talent and Inclusion
Task 2: WPI will assess and advance diversity, equity, and inclusion in sustainability education and activities.	DEI is incorporated into all activities	Office of Sustainability; Talent and Inclusion

Figure 3: Objective C1.3 of 2020-25 WPI Sustainability Plan (Worcester Polytechnic Institute, 2020, p. 41).

The 5-year outcomes of the community engagement tasks provide a benchmark to evaluate each objective. The survey created in the methodology to evaluate the culture of sustainability at WPI will focus on asking questions that can help measure if awareness and participation in on-campus initiatives and events has increased.

2.2 AASHE Ratings

The Association for the Advancement of Sustainability in Higher Education (AASHE) is a non-profit organization that empowers higher education institutions to be leaders in sustainability and innovation. AASHE provides the Sustainability Tracking and Assessment

Rating System (STARS), a framework that allows institutions to evaluate their sustainability progress and goals (ASSHE, 2020). Institutions are evaluated in credits within five main categories (ASSHE, 2020):

1. Academics
2. Engagement
3. Operations
4. Planning
5. Administration

Institutions self-report their efforts in these categories and receive ratings and suggestions to improve based on that. The rating system has three tiers: bronze, silver and gold; with bronze being the lowest rating and gold the highest (ASSHE, 2020).

2.2.1 WPI STARS Ratings

WPI has self-submitted three times for evaluation through STARS since 2018. The institution has improved its STARS rating from a silver rating in 2015 to a gold rating in 2020. For the gold rating, WPI earned a total score of 72.46 across the five mentioned categories. Table 1 details WPI's scores in each of the 5 main categories.

Table 1
WPI STARS Scoring (AASHE, 2020).

Category	Score
Academics	49.27/58.00
Engagement	33.80/42.00
Operations	36.48/70.00
Planning & Administration	18.05/32.00
Innovation & Leadership	4.00/7.00
Total Score	72.46/209.00

Despite WPI earning the highest gold rating in STARS, there is much room for improvement with WPI losing 136.54 points across all the categories.

2.2.2 WPI STARS Campus Engagement Rating

Within the engagement category of STARS, there are two sub-categories that institutions can score in:

1. Campus Engagement
2. Public Engagement

In the sub-categories, there are different credits related to engagement that WPI can earn scores in based on the sustainability engagement programs and initiatives the institute reports. Table 2 details WPI's scores in the different credits of the campus engagement category.

Table 2
WPI STARS Campus Engagement Scoring (AASHE, 2020).

Campus Engagement	
Credit	**Score**
Student Educators Program	4.00/4.00
Student Orientation	2.00/2.00
Student Life	2.00/2.00
Outreach Materials and Publications	2.00/2.00
Outreach Campaign	4.00/4.00
Assessing Sustainability Culture	0.50/1.00
Employee Educators Program	3.00/3.00
Employee Orientation	1.00/1.00
Staff Professional Development	1.50/2.00
Total Score	20.00/21.00

In the campus engagement category, WPI lost one point towards its total score in the Assessing Sustainability Culture credit and the Staff Professional Development credit. The

Assessing Sustainability Culture credit is heavily correlated to the Objective C 1.2 of WPI's sustainability plan in assessing the impact of WPI community members' activities on sustainability, observe Figure 2 for more context. This credit scores institutions on their ability to assess the sustainability values, beliefs and behaviors of their campus community. Table 3 details the criteria for this credit.

Table 3

WPI Sustainability Culture Assessment Criteria (AASHE, 2020).

Attributes of the sustainability culture assessment (points awarded)	Points earned

An assessment of sustainability culture (i.e. values, behaviors and beliefs) is:
  • Administered to the entire campus community (students, staff and faculty), directly or by representative sample (0.5 points)
OR
  • Administered to a subset of the campus community or a sample that may not be representative of the entire community. (0.25 points)
	_____

• Administered longitudinally to measure change over time (i.e. with one or more follow-up assessments administered to the same cohort or representative samples of the same population).	x 2
Total points earned	**Up to 1**

WPI lost points on the first attribute of the criteria that requires the assessment to survey the entire campus or a sample representative to the campus demographics. The criteria detailed for this credit provided a framework for the survey created in this project's methodology. In order to properly evaluate the culture of sustainability at WPI, it must be ensured that the survey is distributed and taken by a representative of the campus demographics of students, staff and faculty.

2.3 UN Sustainability Goals

The Sustainable Development Goals (SDGs) are a collection of 17 interlinked objectives developed by the United Nations that serve as a blueprint to ensure a just and sustainable future for people and the planet, these objectives range across a variety of categories from education to energy (United Nations). The goals have provided a framework for WPI to focus its efforts and impact. The main ways in which WPI integrates SDGs into the institution is through academic programs, project work, faculty research and global partnerships (Worcester Polytechnic Institute, 2023). Ensuring that the WPI campus is aware and involved with initiatives that integrate SDGs will help the institution make more progress towards these objectives.

2.4 Previous Sustainability Engagement Research at WPI

This section will synthesize any findings and solutions from previous Interactive Qualifying Projects (IQPs) at WPI that focus on sustainability community engagement. This section will also describe aspects of community engagement that these project's failed to address.

2.4.1 Advancement of WPI's Sustainability Engagement and Education IQP

A previous IQP titled *Advancement of WPI's Sustainability Engagement and Education* by Megan Andresano and her colleagues investigated sustainability engagement methods at WPI. This IQP provided valuable preliminary information on the state of WPI's sustainability community engagement in 2018 and allowed the team to compare and evaluate if WPI has made progress towards the 5-year outcomes of tasks in the objectives.

The IQP utilized results from a survey sent to the WPI student body as well as a survey sent to other universities to evaluate the best engagement method for WPI students. Figure 4 below displays the results for the question "Which of the following limits your participation in sustainable active practices? (Check all that apply.)"

Which of the following limits your participation in sustainable active practices at WPI? (Check all that apply)
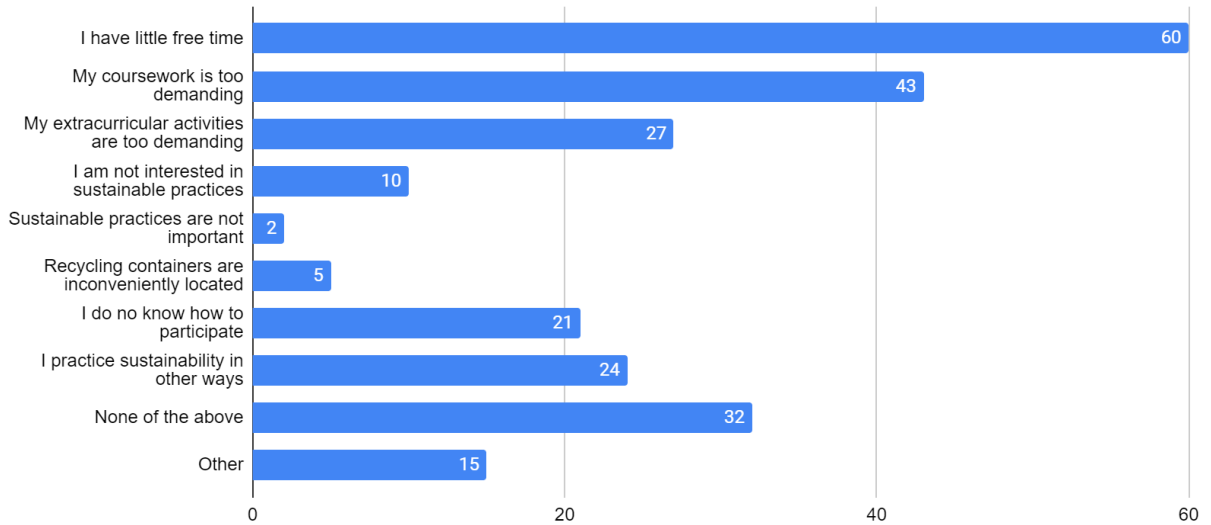
Figure 4: 2018 Data for Limitations for Participation in Sustainable Active Practices at WPI (Andresano et al., 2018). "Advancement of WPI's Sustainability Engagement and Education" by Megan Andresano, Kenuel Lopez Rivera, Tucker Martin, Sai Sett Paing, & Kyle Piette is licensed under CC BY 4.0 / A derivative from the original work

Andresano and others discovered that the most common limitation that prevents WPI students from engaging in sustainable active practices is a lack of free time and their coursework being too demanding. Figure 5 below displays the results for the question from the same IQP: "Are you interested in any of these options for sustainability at WPI?"

"Are you interested in any of these options for sustainability at WPI?"

Option	#
Sustaianbility Major	6
Sustaianbility Minor	28
Sustainability Concentration (in technical field)	24
More sustainability-related projects (IQPs, MQPs)	44
More sustainability-related electives	43
Sustaianbility knowledge assessments	19
Extra credit for sustaianble practices	46
None of the above	24
Other	3

# of respondents (103 in total)
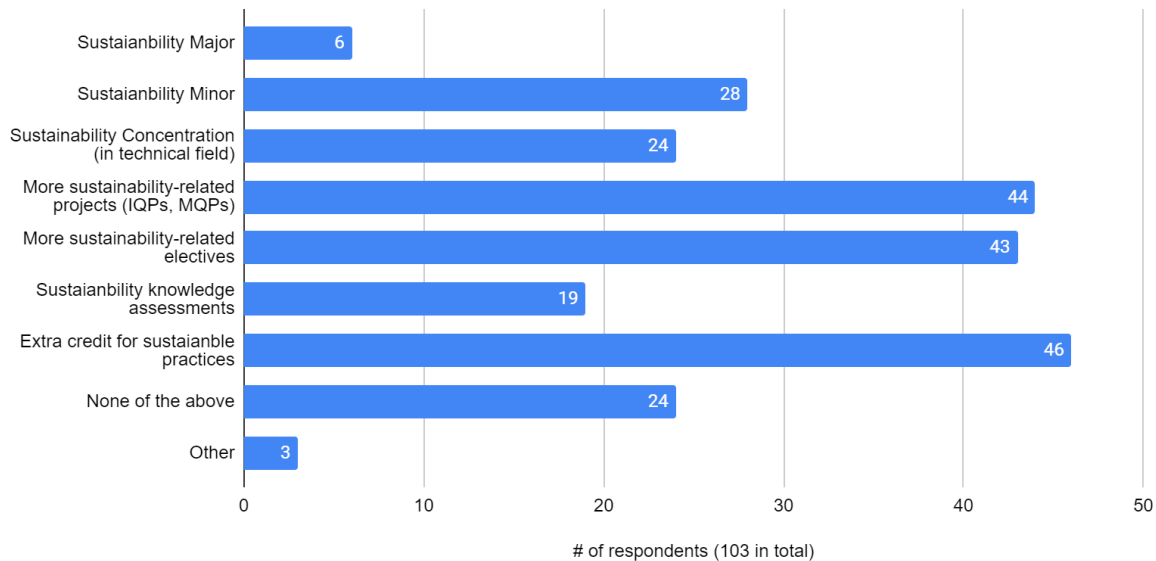
Figure 5: 2018 Data for Interest in Sustainable Opportunities (Andresano et al., 2018). "Advancement of WPI's Sustainability Engagement and Education" by Megan Andresano, Kenuel Lopez Rivera, Tucker Martin, Sai Sett Paing, & Kyle Piette is licensed under CC BY 4.0 / A derivative from the original work

The team deemed that WPI students were most interested in extra credit and more sustainability-related projects as ways to engage in sustainability.

Using the results captured, they proposed implementing more service-learning opportunities into courses at WPI as the best way to engage WPI students in sustainability. They deemed that service-learning addresses student needs to incorporate sustainability in academia by linking education to engagement. Service-learning opportunities also fit with WPI's sustainability and institutional goals of community engagement and education (Andresano et al., 2018).

This IQP focused its analysis and solutions on the WPI student body, neglecting the WPI community as a whole. With staff and faculty making up a large part of the campus population, it is integral to find ways to engage them in sustainability so that WPI can become a more sustainable campus throughout.

2.4.2 Monitoring and Presenting Energy Consumption to Increase WPI Sustainability Efforts IQP

A previous IQP titled *Monitoring and Presenting Energy Consumption to Increase WPI Sustainability Efforts* by Lucas Mancinelli and his colleagues investigated different methods to engage the WPI community in energy conservation. This IQP provided valuable preliminary information on the state of WPI's sustainability community engagement in 2018 and allowed the team to compare and evaluate if WPI has made progress towards the 5-year outcomes of tasks in the objectives.

The IQP utilized results from a survey sent to WPI students to evaluate the state of community engagement and participation in sustainability within the community. Figure 6 below displays the results for the question "Do you feel that you participate in any activities aimed at making WPI more sustainable."

Do you feel that you participate in any activities aimed at making WPI more sustainable?

Sample size = 96

Yes
44.0%

No
56.0%
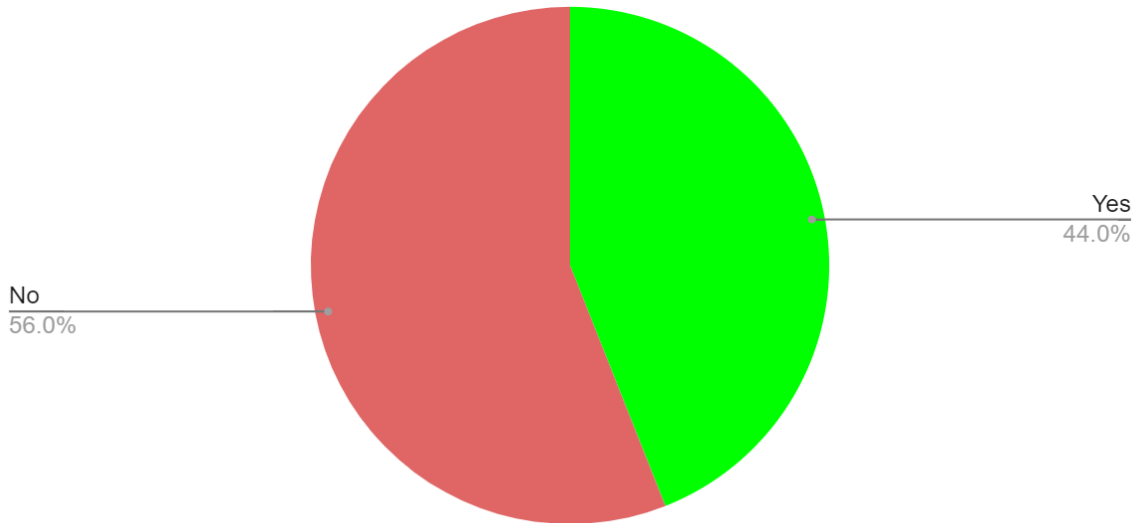
Figure 6: 2018 Data for Participation in Sustainable Activities (Mancinelli et al., 2018). "Monitoring and Presenting Energy Consumption to Increase WPI Sustainability Efforts" by Lucas Mancinelli, Daniel Vega, Nick Batchelder, & Paul Shingleton, Worcester Polytechnic Institute is licensed under CC BY 4.0 / A derivative from the original work

Mancienelli and his colleagues discovered that most students felt as if they didn't participate in any activities aimed at making WPI more sustainable, indicating the need for more or improved engagement methods to involve students. Figure 7 below displays the results for the question from the same IQP: "What initiatives would you like to see in order to help make WPI a more sustainable campus?"

What initiatives would you like to see in order to help make WPI a more sustainable campus?

N = 421

- 🔵 **Sustainability seminars**
- 🔴 **Dormitory based sustainability competitions**
- 🟠 **Physical Dashboard screens around campus displaying real time usage trends**
- 🟡 **Dashboard displaying real-time energy usage data on WPI web page**
- ⚫ **Other**
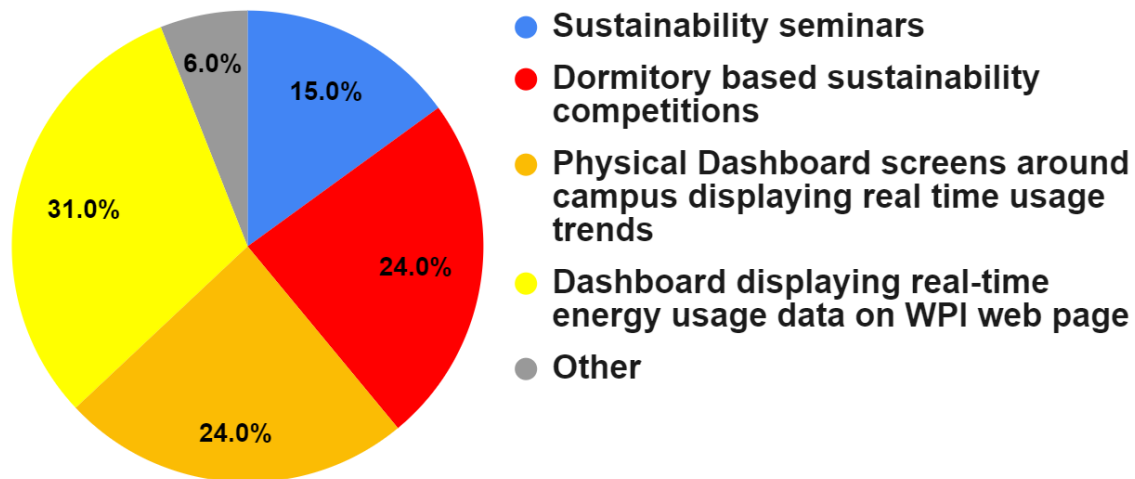
Figure 7: 2018 Data for Interest in Potential Sustainable Initiatives at WPI (Mancinelli et al., 2018). "Monitoring and Presenting Energy Consumption to Increase WPI Sustainability Efforts" by Lucas Mancinelli, Daniel Vega, Nick Batchelder, & Paul Shingleton, Worcester Polytechnic Institute is licensed under CC BY 4.0 / A derivative from the original work

Most respondents supported the idea of a dashboard displaying real-time energy usage data. The team deemed this solution as the most favored to engage the WPI community about energy conservation. The team proposed an energy usage dashboard and a plan for implementation that included dashboard design and placement on campus (Mancinelli et al., 2018).

This IQP focused its analysis and solutions on community engagement in energy conservation. As highlighted in a previously mentioned IQP titled *Advancement of WPI's Sustainability Engagement and Education*, the WPI community has weak community engagement in all aspects of sustainability. Finding methods to increase community engagement in all aspects sustainability is integral for meeting WPI's sustainability goals.

The IQP also surveyed only the WPI student body, again neglecting the WPI community as a whole. With staff and faculty making up a large part of the campus population, it is integral to find methods that best engage them in sustainability.

2.5 Sustainability Organizations at WPI

WPI has numerous on-campus organizations that members of the community can participate in to get involved with sustainability. The goals of these organizations range from focusing on poverty to climate action. Table 4 details all of the on-campus organizations at WPI along with what demographics can participate in it and a brief description of it.

Table 4

Sustainability Organizations at WPI

Organization	Groups Involved	Description
Green Team	Students	The Green Team is an organization that is dedicated to making WPI a more sustainable campus and educating the community about sustainability. The organization organizes and hosts numerous major events annually, including: E-Waste Drive, Free Thrift Store and more. The organization also manages Gompei's Gears Bike Share and organizes smaller events and programs as well.
Eco-Reps	Students	WPI's Eco-Rep program was started as a student initiative, where students taught their peers about sustainability. Soon after the program started, staff showed interest in the Eco-Reps, so the program expanded to include WPI staff. The goal was to have an Eco-Rep in every campus building, even in residential buildings, to help all WPI members develop more sustainable habits (Morin, 2014).
Office of Sustainability	Faculty, Staff, Students	The Office of Sustainability is a department that leads WPI's sustainability programs. This office is composed of the Director of Sustainability, the Energy and Sustainability Manager, student interns, and the Sustainability Advisory Committee. They publish annual sustainability reports detailing WPI's current sustainability efforts when it comes to greenhouse emissions, energy conservation, and campus engagement (Worcester Polytechnic Institute, 2023b).
Office of Sustainability Interns	Students	The Office of Sustainability has three student interns that aid the office in their sustainability efforts. These interns have many duties: they help prepare the annual WPI sustainability reports, update social media for the Office of Sustainability, help coordinate events, and gather data about WPI's sustainability performance (Worcester Polytechnic Institute, 2023b).
Sustainability Advisory Committee	Faculty, Staff, Students	WPI's Sustainability Advisory Committee, led by the Director of Sustainability, helps coordinate campus sustainability efforts, including energy and resource conservation, economic security, and social well-being. They also conduct research to minimize environmental impact. Students, faculty, and staff alike compose this group. This committee aims to have their work impact more than just the WPI campus (Worcester Polytechnic Institute, 2023b).
Sustainability Engagement Working Group	Faculty	A working employee group is being developed with the goal of engaging people and sharing announcements about sustainability. Although still growing, this group meets to discuss sustainability events with other events as well to update one another. This group is in its infancy and current members wish to have many others join.
Student Government Association	Students	The SGA addresses issues and concerns that undergraduate students have, provides financial help for WPI's clubs, and represents the voice of the student body. It is composed of an Executive Board that is elected annually, as well as Senate members. They post minutes of their Senate meetings, which are open to the public (WPI Student Government Association, n.d.). Sustainability is one of the many issues they tackle.

2.6 Sustainability Initiatives at WPI

This section describes large scale sustainability initiatives at WPI that have been implemented in recent years. These are initiatives and programs that members of the WPI community should have some awareness of for a healthy culture of sustainability.

2.6.1 Harrison Street

In January 2023, WPI solidified a long term public-private partnership with Chicago-based investment firm, Harrison Street. The 40-year partnership with Harrison Street will provide $45 million to reduce WPI's carbon footprint by advancing the university's strategic initiatives and campus infrastructure. (Worcester Polytechnic Institute, 2023a). Measures for advancing campus infrastructure include operating WPI's power plant, reforming the campus utility system and expanding energy conservation projects. Harrison Street will also provide WPI with the support to accelerate hands-on learning and collaborate with students and faculty on new research opportunities (Worcester Polytechnic Institute, 2023a).

2.6.2 Green Revolving Fund

In 2017, WPI initiated the Green Revolving Fund (GRF) with $1.5 million as initial allocation. The GRF supports and funds sustainability projects that generate financial returns for the institution. Financial returns and savings from these projects are circulated back into the fund to sustain it (Worcester Polytechnic Institute, n.d.).

Another component of the GRF is the GRF Community Initiative, which provides an opportunity for members of the WPI community to participate in the fund and make WPI a more sustainable campus. The initiative provides $10,000 annually to fund on-campus sustainability projects. These funds typically support 1 to 2 projects a year (Worcester Polytechnic Institute, n.d.).

2.6.3 Carbon Commitment with Next Nature

In April 2022, WPI announced a carbon commitment with Second Nature. Second Nature is an organization that is dedicated to accelerating climate action in higher education (Worcester Polytechnic Institute, 2022). Second Nature encourages higher education institutions to take action on climate commitments and innovate with campus initiatives and climate solutions (Worcester Polytechnic Institute, 2022). Through this commitment, WPI has pledged to reach carbon neutrality as soon as possible by creating a solid plan and submitting annual reports to show the institution's progress towards achieving this (Worcester Polytechnic Institute, 2022).

2.7 Psychology Behind Sustainability

A meta-analysis titled *Analysis and Synthesis of Research on Responsible Environmental Behavior* conducted by Jody Hines and her colleagues compiled factors that support or encourage people to participate in environmentally responsible behavior into five main categories: understanding challenges, procedural knowledge, prompts, social motives and material incentives (Hines et al., 1987). These factors are most efficient when used in combinations to have a lasting effect on people's behaviors (Hines et al., 1987).

2.7.1 Understanding Challenges

People are more likely to participate in environmentally responsible behavior if they are provided the knowledge to do so. The meta-analysis discovered several studies showing individuals are more likely to act in environmentally friendly ways when they understand environmental problems or their possible solutions (Hines et al., 1987). Hines and her colleagues also discovered the importance of providing both declarative and procedural knowledge to help people understand sustainability problems and take the proper actions to address it. Declarative knowledge is an awareness of facts that describe the issue at hand. Procedural knowledge is the information needed to perform a task or the steps needed to solve the issue described (Hines et al.. 1987).

2.7.2 Prompts

Prompts to remind people to participate in environmentally responsible habits is integral for sustaining those behaviors in the long run. A study by Katzev and Mishima found that paper recycling increased when signs reminding people about recycling were posted above waste bins in a university mail room (Katzev & Mishima, 1992). Similar tactics have been applied and proven to succeed for water and energy conservation. A study by Aronson and O'Leary found that people decreased water usage when signs about water conservation were posted in a communal shower room (Aronson & O'Leary, 1982-1983). Research also found that people were more encouraged to conserve energy when reminders were posted by light switches and computers (Levy & Marans, 2012).

2.7.3 Social Motives

Social motives in the form of stated commitments and perceived social norms can also encourage people to participate in environmentally responsible behavior in the long run. Evidence indicates that people are more likely to continuously act in sustainable ways when they pledge to it. In a meta-analysis by Hines, six studies found that there was a strong link between a person's written pledges to act environmentally and their actions (Hines et al., 1987). Both oral and written commitments have been proven to encourage behavior.

Fostering a community in which sustainability is the perceived norm can motivate individuals of a group to adopt environmentally responsible behavior. Humans are biologically programmed to internalize and exercise behaviors that are accepted by society. Unsustainable actions are generally considered a norm in society, but societal culture is constantly changing and can be shifted to prefer sustainable actions. According to a study on household energy and the factors that influence consumption by Schultz, out of the four types of informational messages, being environmental impact, money savings, how to instructions, and the amount neighbors are cutting back, the message regarding neighbors' behavior was the only message resulting in participants measurably reducing their own electricity use (Schultz, 2003). By giving

individuals of a community social proof that sustainable actions are the norm and accepted, they will aspire to change their habits to fit that norm.

To foster a culture in which sustainability is the perceived norm, increasing normative information, support, opportunities, and examples of sustainability in practice is necessary. By framing information and statistics in a way that communicates that sustainable behaviors are the norm and done by a large group of people, individuals are more likely to imitate those behaviors. Providing support through positive social cues to peers in a community can reassure them that they should continue doing sustainable behaviors. This support can also be provided in the form of a network with related or like-minded individuals. Staats conducted a study on groups of 6 to 10 friends/neighbors called EcoTeams who encouraged each other to increase sustainability of their households. According to the results of the study, social influence by the EcoTeam interactions aided others to change their household habits and maintain or increase the change for at least two years after this program finished (Staats et al., 2004). When people are a part of a network, they are more likely to adopt values or actions associated with the group identity of it.

2.7.4 Material Motives

Material incentives in the form of cash and gifts can be motivators of sustainable behaviors. Use of material incentives should be cautioned as they are oftentimes short-term compared to the other mentioned factors. A study by Katzev and Pardini found that households routinely recycled when rewarded with a material incentive but their recycling frequency reduced when the incentive was removed (Katzev & Pardini, 1987). Material incentives can be powerful to ignite behavior change when paired with other incentives to ensure that the change is properly sustained in the long run.

CHAPTER 3. METHODOLOGY

The goal of this project was to evaluate current and future initiatives related to increasing engagement with sustainability in the WPI community and suggest recommendations for improved strategies. This project goal was accomplished by completing the following project objectives:

1. **Objective 1:** Synthesize literature and resources about how WPI and other organizations address and implement sustainability engagement issues and efforts.
2. **Objective 2:** Understand the sustainable habits and the opinions of the WPI community surrounding current and existing sustainability engagement initiatives at WPI.
3. **Objective 3:** Evaluate the community impact and implementation of sustainability engagement initiatives at other universities.
4. **Objective 4:** Identify improvements to current or future engagement initiatives that WPI can adopt that will lead to improved sustainable habits of the WPI community.

3.1 Context for Methodology

This section will briefly reiterate the key findings that were found during background research. WPI's 2020-2025 Sustainability Plan outlines its four main sustainability goals, the last goal being community engagement. One objective of this last goal is to create a "culture of sustainability" at WPI, where "all WPI community members are engaged in activities that embrace and advance sustainability; and in which WPI recognizes and communicates sustainability impacts across all organizational, community, and academic activities" (Worcester Polytechnic Institute, 2020, p. 41). This objective includes ensuring that all WPI members are aware of campus sustainability initiatives, properly assessing the impact of these initiatives, and ensuring equity in sustainability efforts. The methods in this chapter outline the steps taken to assess the current state of WPI's community engagement sustainability goal.

The Association for the Advancement of Sustainability in Higher Education (AASHE) is an organization that provides the Sustainability Tracking and Assessment Rating System

(STARS), a framework that allows institutions to evaluate their sustainability progress and goals (ASSHE, 2020). They rank universities based on their sustainability efforts in five areas: academics, engagement, operations, planning, and administration. WPI scored 72.46 points out of 209, losing many of these points from a lack of sustainability operations or planning and administration, so there is much room for improvement.

The project team researched previous IQPs that also wished to improve sustainability engagement at WPI. Main findings were how many students felt that they lacked the time to practice sustainable acts due to demanding courses and extracurriculars in a 2016 survey (Andresano et al., 2018), while 56% of respondents in a 2018 survey stated they do not participate in sustainable activities at WPI (Mancinelli et al., 2018).

WPI is home to many sustainability organizations hoping to engage their campus through initiatives and events, such as the Green Team, the Office of Sustainability, and the Sustainability Advisory Committee. Larger sustainability initiatives include the $45 million partnership between WPI and Harrison Street, where this company will help reduce WPI's carbon footprint by advancing the university's strategic initiatives and campus infrastructure. (Worcester Polytechnic Institute, 2023a). WPI also has a Green Revolving Fund, which supports and funds sustainability projects that generate financial returns for the institution.

For some key takeaways behind the psychology and motivators of sustainability, people are more likely to practice sustainability when they understand environmental problems and possible solutions (Hines et al., 1987). Prompts are useful to remind people to participate in sustainability. There is also evidence suggesting that if people pledge to act sustainable, then they are more likely to act sustainable (Hines et al., 1987). Creating communities where sustainability is seen as the norm can also motivate people to become more sustainable. Material incentives can also motivate people, but are often just short-term solutions.

3.2 Project Shift

The goal stated at the beginning of this chapter is not the original goal of this project. Although this project currently focuses on all aspects of sustainability engagement, the original

purpose was to learn more about engagement practices specifically related to energy conservation. Below is the previous goal statement of this project:

"The goal of this project is to evaluate current and future engagement initiatives related to improving energy conservation/consumption habits of the WPI community and suggest recommendations for improved strategies."

The reason this project shifted from energy engagement to broader sustainability engagement is due to the findings made while researching. When conducting interviews and synthesizing literature in an attempt to learn more about engaging campuses about energy conservation, most information found related less to specifically energy engagement, and rather all aspects of sustainability. There were much more literary resources about overall sustainability engagement, and interviewees had much more to say about broader engagement even when asked questions about energy conservation. Thus, instead of focusing on just energy engagement, the current goal of this project is to understand and improve all aspects of sustainability engagement on campus.

3.3 Synthesizing Literature and Resources

The first objective was to help organize and focus all of our literature, resources and research materials. Through this we learned what we currently know about sustainability engagement efforts on WPI's campus and what we need to learn in later objectives. The results of this section can be found in chapter 2, the background section.

The first objective aimed to answer the following research questions:

1. *How does WPI engage its community about sustainability?*
2. *How do other organizations engage their communities about sustainability?*
3. *What motivates people to take sustainable actions?*

To complete this objective, literary resources were found through several methods. To understand how WPI engages its community about sustainability, previous IQPs about sustainability were studied, many of which were also focused on the engagement aspect. These were accessed through WPI's electronic projects database. Many IQPs used surveys as a way to

learn more about what WPI knows about sustainability, and included data that was then included in the background of this paper. IQPs often discussed where they left off, and what they would have liked to learn more about; these sections were great reads and helped guide this project to learn more about what previous students wished to learn.

WPI's Office of Sustainability also releases many resources about sustainability, the main one being WPI's Sustainability Plan for 2020-2025. This plan outlined the sustainability goals WPI wishes to accomplish, and was an integral starting guide as this project aimed to evaluate the current state of WPI's sustainability goals. Many WPI websites were also used to learn more about sustainability efforts on campus, as groups such as the Green Team have websites talking about their sustainability initiatives and events.

To better understand sustainability engagement at other universities, sustainability literature from other colleges was studied, and was found through their websites. The psychology of surveys was also studied to learn how to properly word and present a survey to obtain quality unbiased results.

3.4 Understand Sustainability Engagement in the WPI Community

The second objective was to help understand the sustainable habits and behaviors of the WPI community and also how WPI engages its community about this topic. By understanding how WPI engages its members and seeing any efforts that do not work well, any suggested initiatives can be ensured to target those pain points. To achieve this, the project team designed an online survey to be sent out to the target demographics of the WPI community (students, faculty, and staff). The team also designed and conducted interviews with implementers of sustainability related initiatives on WPI's campus.

The second objective aimed to answer the following research questions:

1. *How does WPI engage members about sustainability?*
2. *What are the sustainable habits of the WPI community?*
3. *What do WPI students, staff, and faculty know about campus sustainability? What initiatives does WPI currently have?*

4. *What initiatives does WPI plan to have?*

5. *How well are these initiatives working to improve sustainability engagement?*

6. *How can the effectiveness of these initiatives be measured?*

7. *What are some issues/barriers in implementing and running these initiatives?*

3.4.1 Survey Design

The survey featured a few questions used in surveys distributed by IQP teams in the project center. By including the same questions, outdated data on sustainability related behavior of the WPI community captured by previous surveys could be updated. By comparing the results of the questions from the previous IQP surveys with the results from the same questions in this survey, the project team could evaluate the impact of sustainability related initiatives on the WPI community that have been implemented in recent years. A full list of survey questions can be found in the appendix. Below are a few questions that were included in the survey.

A. *Which of the following limits your participation in sustainable practices at WPI?*

B. *Are you a part of any sustainability-focused groups on-campus?*

C. *Do you consider yourself environmentally conscious?*

D. *What encourages you to participate in sustainable practices at WPI?*

The survey was designed to understand the behavior of the WPI community surrounding both energy conservation and general sustainability engagement, as the survey was created while the focus of the project was about energy. The project team utilized research on the motivating factors behind sustainable actions to formulate survey questions and determine the best motivator for the WPI community. For example, one question of the survey asked "What would motivate you to participate in sustainable behavior?" The question then provided multiple options that were either material incentives (Goat Bucks, WPI merchandise, etc.) or social incentives (recognition).

The first section of the survey asked the respondent's role at WPI, with the options being staff, student, or faculty. After that, there were three different sets of questions for each of these groups. For example, a question asked only to WPI faculty was "Do you integrate sustainability

into the curriculums of the classes you teach?" Some options were also changed if all three groups were being asked the same question. When asked "Which of the following limits your participation in sustainable practices at WPI? Check all that apply." "Classes" was an option for students, which was replaced with "work" for faculty and staff.

The survey was also designed to educate on sustainability initiatives that haven't been as publicized while evaluating declarative and procedural knowledge of the WPI community. For example, one question gave a brief description about the $45 million partnership between Harrison Street and WPI before asking respondents if they have heard of this. A similar question with a brief description was asked if respondents knew about the Green Revolving Fund.

As much research was done about the psychology of surveys and how to properly design them, much care went into creating the Qualtrics survey, which includes how each question was worded, and the ordering of all the questions. Questions were worded in a way where they did not lead the respondents and sound rhetorical to ensure more honest answers. Questions were grouped accordingly, with demographics questions being asked first, then a section about general sustainability, then questions regarding energy conservation habits. Where applicable, questions included an "other" option, and also had a textbox with this option to explain their answer in case respondents had a different answer than any of the given options.

3.4.2 Interview Design for WPI Interviewees

When developing interview questions for WPI members, it was important to first ask a simple question about the interviewees' work at WPI relating to sustainability. People are often excited to talk about their own work, so this question acts as an icebreaker to get them to start talking and hopefully feel comfortable sharing their answers to our questions. For example, the president of WPI's Green Team was asked during his interview "Can you tell us about what the Green Team does and what the group's goals are?" The WPI interviewees were familiar with IQP projects and knew why they were being interviewed, so not many introductory questions were needed to get the interviewees talking. After asking these warm up questions, the project team then began asking questions relating to the project. One of the main objectives was to understand

how WPI currently engages its community on sustainability, so questions were asked about how these interviewees attempt to engage people. Questions were also asked about what could motivate people to be more sustainable. The project team also asked about any issues regarding sustainability engagement that the interviewees wish they could fix.

Three interviews were held with WPI members; one with the president of WPI's Green Team, one with the Director of Sustainability, and one with the Energy and Sustainability Manager.

The project team conducted an in-person interview with the President of the WPI Green Team, Gabriel Espinosa. The purpose of this interview was to understand how the Green Team engages with the WPI community to promote sustainable behavior and learn about any initiatives or events they manage. The interview questions probed for pain points and issues that the Green Team has with engaging the WPI community with sustainable behaviors. A full set of questions can be found in the Appendix. Below are a few questions asked in the interview:

A. What would you say is the biggest problem when trying to educate WPI about sustainability?

B. What do you think would motivate WPI students on practicing better sustainable habits?

C. What events/initiatives does the Green Team run that receive the most community engagement or turn-out? Why do you think those events/initiatives receive the most community engagement?

The team conducted an in-person interview with the WPI Director of Sustainability, as well as a separate Zoom interview with WPI's Energy and Sustainability Manager, Nicole Luiz. Both the Director of Sustainability and Nicole work together in WPI's Office of Sustainability. The purpose of these interviews was to understand the key problems that the Office of Sustainability faces, and their best methods to engage WPI on sustainability. As with the interview with Gabriel, these interview questions asked about engaging the WPI community with sustainable behaviors. A full set of questions can be found in the Appendix. Below are a few questions asked in the interview:

A. Can you tell us about any prior WPI projects which focused on educating WPI members about sustainable practices?
B. What do you think would be good ways to motivate the WPI community to want to become more sustainable?
C. How have WPI's sustainability policies changed over the years?

3.4.3 Survey Advertising

Many strategies were used to distribute the Qualtrics survey to WPI members. The survey was first distributed to the WPI reddit, a social news website that many WPI members frequent. The survey was also distributed via email thanks to Professor LePage. As having primarily student responses was a major concern, being able to reach many faculty members through this method was very useful. Another method was using eye-catching and colorful flyers with a QR code taking people to the survey. At the top of it was the potential gift card prize for taking the survey. This flyer was distributed around the WPI campus:
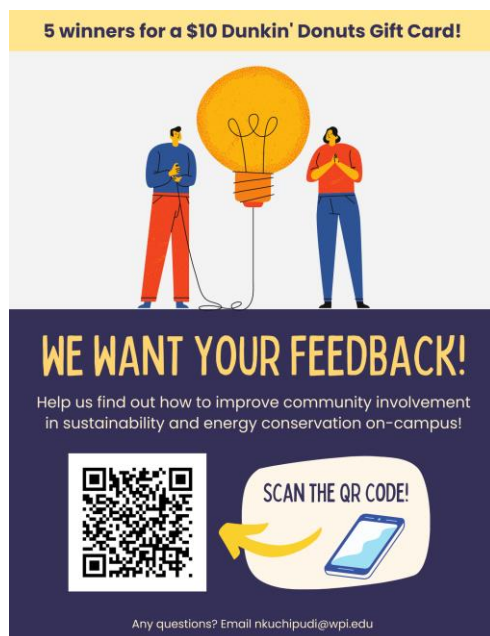

Figure 8: 2023 Survey Advertisement Flyer

Table sitting was also a successful method, which is when a table was reserved in the WPI campus center to advertise the survey. Many groups also reserve the other tables to advertise their own projects or groups, so attracting people to our table was crucial. A large poster detailing the sustainability project with eye-catching drawings was attached to the front of the table, as well as free candy for anyone that came up to the table. The above flyer was propped up on the table so that anyone that came could easily scan the QR code with their phone and take the survey.

3.4.4 IRB Approval

The project team completed CITI training modules relating to human research to learn how to ethically gather data from people. The team then received IRB approval for the survey questions to be distributed to the three target groups (students, faculty, staff). The project team also received IRB approval for the interview questions. Survey takers were ensured anonymity and given context to how survey data would be used or distributed through a preamble at the start of the survey. Interviews were recorded but with the consent of the interviewee at the start of the interview. Only audio was recorded for in-person interviews, and Zoom interviews had both video and audio recorded.

3.5 Evaluate Sustainability Engagement Initiatives of Other Universities

The third objective was to see what other universities are doing to help their community be engaged with sustainability. Through this, the project group could find useful strategies that could be implemented at WPI. The project group could also learn from any mistakes that other universities have made. To achieve this, the project team designed and conducted interviews with implementers of sustainability related initiatives on other university campuses (UMass Amherst, Holy Cross).

The third objective aimed to answer the following research questions:

1. *What initiatives does the university have?*
2. *What initiatives does the university plan to have?*

3. *How do their demographics compare to WPI's?*

4. *How do other organizations at other universities implement similar initiatives to the initiatives at WPI?*

5. *How well are these initiatives working to improve sustainable habits of their community?*

6. *How do other organizations at other universities measure the effectiveness of their initiatives?*

7. *What are some issues/barriers in implementing and running these initiatives?*

3.5.1 Developing a list of similar universities

Before conducting interviews, the project team developed a list of universities with similar campus makeups or demographics to WPI. Similar universities were determined based on a set of criteria:

1. Currently have or implementing an energy conservation plan
2. Have similar demographics to WPI's community
3. Has expressed willingness to participate in these interviews

These three criterias are critical in order to learn the most applicable information that will help the campus move forward in WPI's sustainability goals. These potential campuses must have a current or currently implementing an energy conservation plan in order for their participation to be relevant to our research. Secondly, they must have similar demographics and campus makeup to WPI since they will allow for better compatibility of campuses and plans. Thirdly, they need to express a willingness to participate in order to even start an interview.

By interviewing colleges that fit that criteria, the project team could ensure that any initiatives or strategies questioned about in interviews have the possibility of working for WPI's community.

3.5.2 Holy Cross

Holy Cross is a small liberal arts college located in Worcester, Massachusetts. The college has been included in Princeton Review's "Guide to Green Colleges" for 12 consecutive years for its efforts and initiatives in sustainability (College of the Holy Cross, 2023). Holy Cross has many sustainability-focused groups and community initiatives that students, staff and faculty can get involved with. For faculty and staff, the institution has an employee affinity group focused on sustainability that connects people around campus and creates dialogue about sustainability issues and initiatives. Students can join student-based sustainability organizations like Eco-Action or include sustainability into their studies and research through classes or summer programs. The institution emphasizes project-based sustainable action through a Green Fund that all demographics on campus can get involved in. Through the Green Fund, students, staff and faculty can propose projects that support sustainability on-campus to receive funding (College of the Holy Cross, 2023).

3.5.3 UMass Amherst

UMass Amherst is one of the largest public research universities in New England, located in Amherst, Massachusetts. The institution has been recognized for its outstanding sustainability efforts and initiatives in the Princeton Review, ranked #28 in the "Top 50 Green Colleges List" out of 455 universities (UMass Amherst, 2023). UMass Amherst has many avenues for students, staff and faculty to get engaged with sustainability. Students can join any of the ten student organizations focused on a wide range of sustainability concerns, from climate change to permaculture. The university also provides sustainability-focused academic and research opportunities through coursework and their research centers. For staff and faculty, the university has an advisory committee and Green Office Program to encourage sustainable practices in their roles (UMass Amherst, 2023).

3.5.4 Interview Design

The interview design process for other universities was similar to designing interviews for WPI members. When developing interview questions for people from other universities, it

was important to first ask a simple question about the interviewees' work at their college relating to sustainability. It was important to ask many of these types of questions, as the interviewee is a stranger from another university that is not aware of an IQP project. It was very important to give context as to why these people were being interviewed. After asking these warm up questions, the project team then began asking questions relating to the project. One of the main objectives was to understand how WPI currently engages its community on sustainability, so questions were asked about how these interviewees attempt to engage people. Questions were also asked about what could motivate people to be more sustainable. The project team also asked about any issues regarding sustainability engagement that the interviewees wish they could fix. Interviews were conducted with members from Holy Cross and UMass Amherst.

A Zoom interview with the Director of Sustainability at Holy Cross was conducted. The goal of this interview was to gain insight on engagement practices at another university, including what practices work best and what engagement methods that fail. At this point, this project was focused around energy-conservation engagement rather than just broader engagement. A full set of questions can be found in Appendix C. Below are a few questions asked in the interview:

A. *How do Holy Cross members get information about sustainability news?*
B. *Are there efforts or programs being made at Holy Cross to spread awareness about campus energy conservation?*
C. *What do you think would motivate Holy Cross members to practice better sustainable habits?*

A Zoom interview was conducted with the Campus Sustainability Manager at UMass Amherst, Ezra Small. The goal of this interview was also to gain insight on engagement practices at another university, including what practices work best and what engagement methods that fail. A full set of questions can be found in the Appendix . Below are a few questions asked in the interview:

A. *Are there courses at Amherst that teach students about sustainability?*

B. Are there efforts or programs being made at Amherst to spread awareness about campus sustainability?

C. What do you think would motivate Amherst members to practice better sustainable habits?

3.6 Identify Improvements to Current or Future Initiatives at WPI

Based on the previous objectives, the project group sought to suggest changes to initiatives based on community input and advice from other universities. These suggestions will help maximize community participation in any initiatives and ensure that WPI is taking the best strategy to change people's consumption habits.

The fourth objective aimed to answer the following research questions:

1. *How might these initiatives be improved?*
2. *Who will best implement the proposed changes to the initiatives?*
3. *How feasible are the changes to the initiatives?*
4. *What are some issues/barriers in implementing these changes?*

Once the data from the Qualtrics data was collected and the interviews were conducted, the project team began to use their findings to develop potential methods to better engage WPI on sustainability. Many possible solutions were brainstormed at first, and these ideas were proposed to other WPI members. After most of the data for this project was collected, the project team created a poster detailing the goal of this project and what was found so far. Possible solutions to the problems regarding how WPI engages people on sustainability were also outlined on the poster. The poster can be found in the appendix. This poster was presented to WPI's 2023 Climate Fair, and the project was presented to any passerbys in the campus center. The solutions were pitched to anyone that came up to the poster, and they gave feedback on if they think they could work.

CHAPTER 4. Results

This chapter will explore data gathered from the survey and explain the implications of the data on the progress of objectives and tasks in WPI's Sustainability Plan.

4.1 Survey Logistics

The Qualtrics survey obtained a total of 153 respondents; 87 students, 42 staff members, and 24 faculty members. The breakdown of students, staff and faculty respondents in Figure 9 indicates that the sample surveyed is relatively representative of the demographics on WPI's campus. WPI has approximately 7,320 undergraduate and graduate students making up 67% of the campus population, 481 faculty members making up 0.04% of the campus population, and 2,990 staff members making up 27% of the campus population. To be exactly representative, the survey would need more student respondents and less faculty respondents.
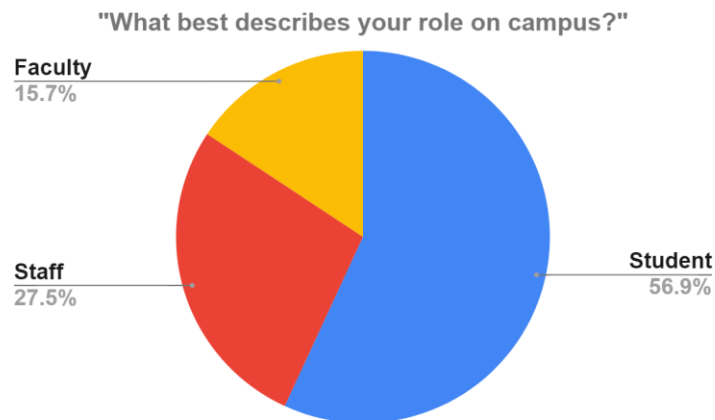
Figure 9: 2023 Data for Survey Demographics

Regarding the different ways the survey was advertised, our survey asked the following question: "How did you learn about this survey?" According to Figure 10, table sitting and email were very effective methods in advertising the survey, and many people also found the flyers

around campus. Regarding the "other" category, almost all of the written entries for "other" were about finding the survey through Reddit.

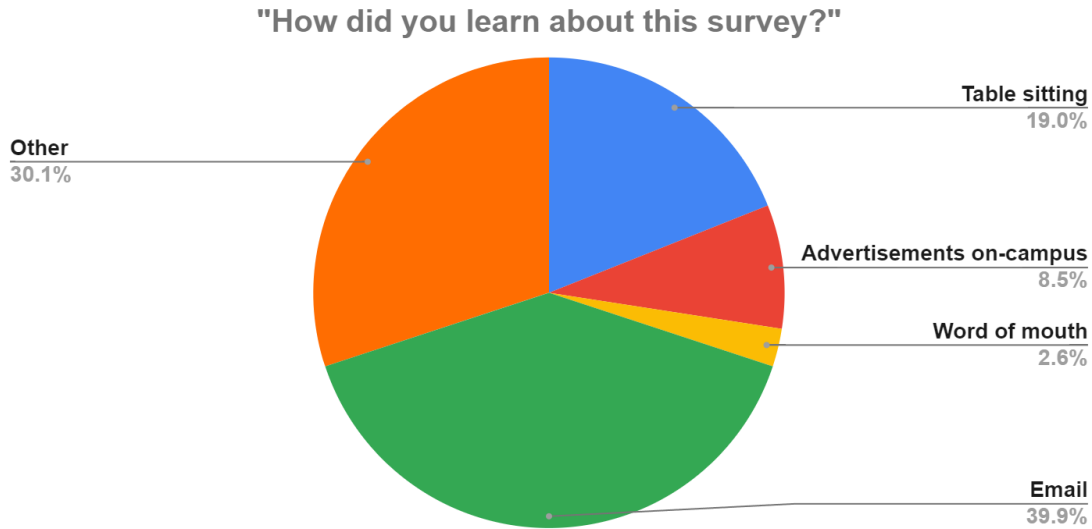"How did you learn about this survey?"

Figure 10: 2023 Data for Survey Advertisement Methods

4.2 Current State of Objective C1.1

The team utilized and compared the survey results gathered in 2023 and previous years with the 5-year outcomes in the 2020-25 WPI Sustainability Plan to evaluate the progress of tasks of Objective C1.1. Objective C1.1 aims for "all members of the WPI community are aware of sustainability challenges, opportunities for positive action, and how to integrate sustainability goals and values into their roles in relation to WPI." A full description of this objective and its tasks can be viewed in Figure 1 in Section 2.1.2.

4.2.1 WPI community reported not being aware of sustainability initiatives and events

Task 1 of Objective C1.1 claims that "WPI will engage and inform WPI stakeholders through a variety of communication venues (e.g., events, websites, social media, pitch competitions, resource fairs, conversations, etc.)". A full description of this task can be viewed in Figure 1 in Section 2.1.2.

As indicated in Figure 11 below, 32.62% of the WPI community reported not being aware of any sustainability events on campus.

"Which of the following on-campus sustainability initiatives/resources have you used or participated in? Check all that apply."
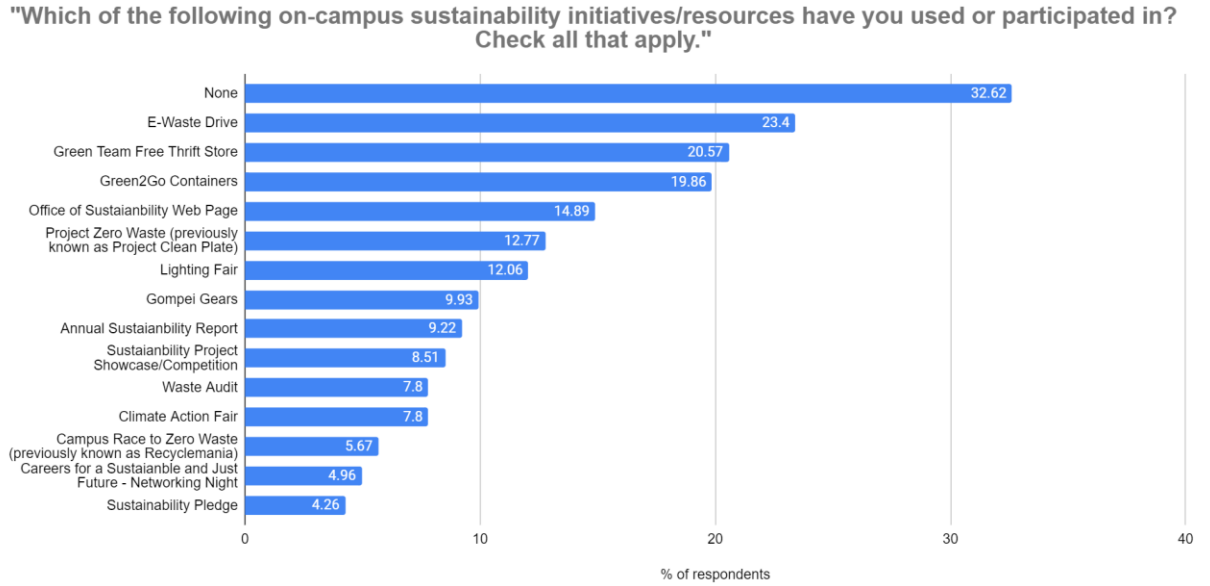
Figure 11: 2023 Data for Awareness of On-Campus Sustainability Events/Initiatives

The survey evaluated the communication of sustainability events by asking the following question: "Where did you hear about the mentioned on-campus sustainability events/initiatives?". According to Figure 11, the WPI community hears and learns about on-campus sustainability initiatives/resources primarily through social media, email, advertisements and word of mouth. WPI seems to be lacking awareness through other communication venues like the WPI website and TechSync.

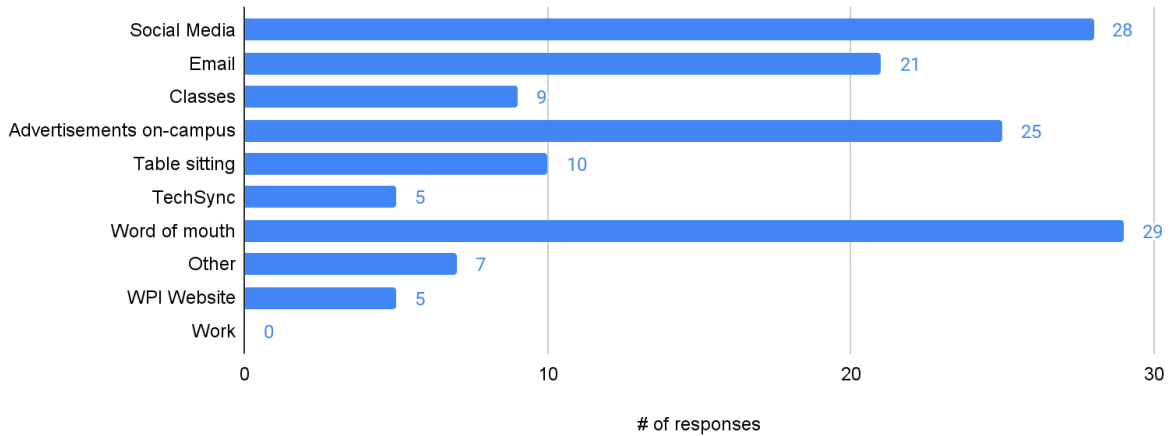## "Where did you hear about those on-campus sustainability initiatives/resources? Check all that apply."

Category	# of responses
Social Media	28
Email	21
Classes	9
Advertisements on-campus	25
Table sitting	10
TechSync	5
Word of mouth	29
Other	7
WPI Website	5
Work	0

Figure 12: 2023 Data for Communication Venues for On-Campus Sustainability
Events/Initiatives

The survey also asked respondents to rank where they get information about events and
initiatives happening on-campus. Based on Figure 12, the most popular platforms for the WPI
community to get information about on-campus initiatives and events are through email, social
media and word of mouth. In order for WPI to spread awareness about sustainability initiatives
and events, the institute should either increase communications through their lesser used venues
and platforms or increase communications through the platforms that the WPI community
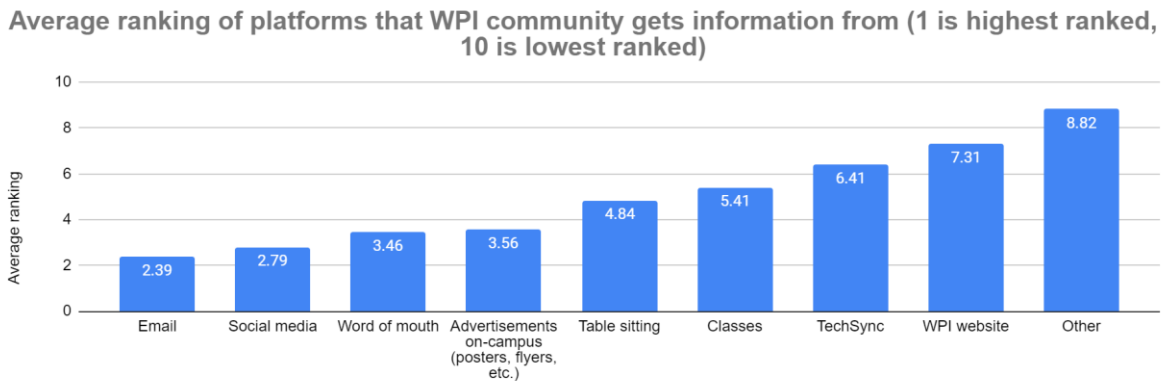already uses the most for information.

Figure 13: 2023 Data for Most Used Communication Venues for On-campus
Events/Initiatives

Task 2 of Objective C1.1 claims that "WPI will increase the level of awareness of
sustainability events, activities, and opportunities at WPI to ensure that all stakeholders are
reached." A full description of this task can be viewed in Figure 1 in Section 2.1.2.

The team wanted to evaluate if the WPI community is actually aware of sustainability
events and initiatives, the survey asked the following question: "Which of the following on-
campus sustainability initiatives/resources have you used or participated in? Check all that
apply." According to Figure 11, 32.62% of respondents of the WPI community have not heard of
any of the sustainability events listed. The results indicate a lack of awareness of sustainability
events and opportunities.

The survey also asked the following questions about larger-scale sustainability initiatives
on campus: "Have you heard of the Harrison Street partnership?" and "Have you heard of the
Green Revolving Fund." In Figure 14, 70.1% of the WPI community is unaware of the Harrison
Street Partnership. In Figure 15, 84.6% of the WPI community is unaware of the Green
Revolving Fund. Figure 13, 14, and 15 indicate that the WPI community is unaware of
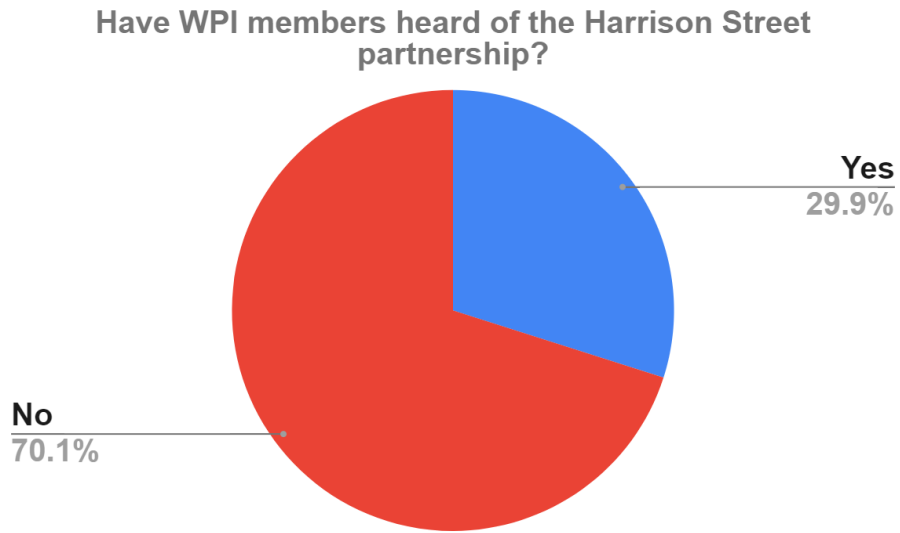sustainability initiatives and resources available to them.

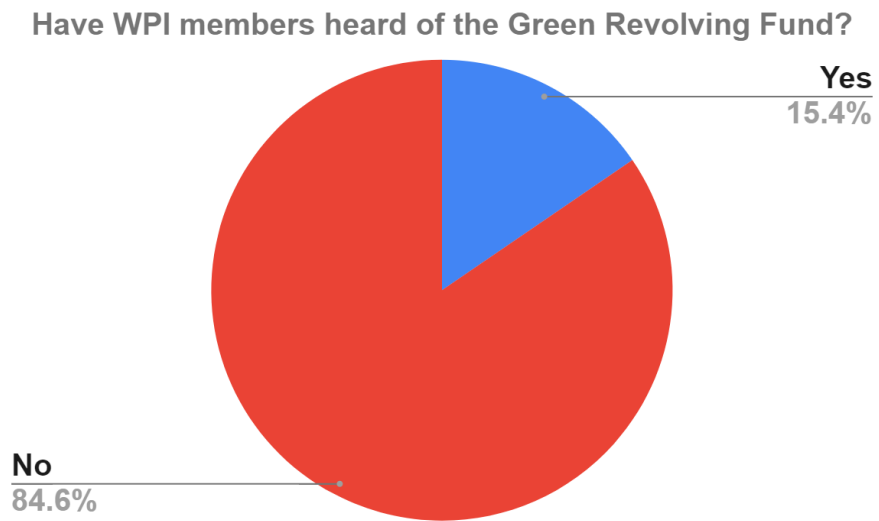Figure 14: 2023 Data for Awareness of Harrison Street Partnership

Figure 15: 2023 Data for Awareness of Green Revolving Fund

### 4.2.2 WPI community reported a minimal increase in participation in sustainability activities

Task 2 of Objective C1.1 claims that "WPI will increase the level of awareness of

sustainability events, activities, and opportunities at WPI to ensure that all stakeholders are reached." The expected 5-year outcome of this task is a "25% increase in participation in sustainability events, activities and opportunities." A full description of this task can be viewed in Figure 1 in Section 2.1.2.

To evaluate Task 2 and an increase in participation in sustainability engagement, results from a previous survey were compared with the results from a survey in 2023. In a 2018 IQP titled *Monitoring and Presenting Energy Consumption to Increase WPI Sustainability Efforts,* Lucas Mancinelli and his colleagues conducted a survey on the WPI community to evaluate WPI's energy conservation engagement. In the survey, Mancinelli and his colleagues asked the following question: "Do you feel that you participate in any activities aimed at making WPI more sustainable?". This same question was asked in our 2023 survey. Figure 16 displays a side-by-side comparison of the results for the question in 2018 and 2023. In 2018, 44.0% of respondents claimed that they felt they participated in activities aimed at making WPI more sustainable. In 2023, 53.15% of respondents claimed that they felt they participated in activities aimed at making WPI more sustainable. The results indicate there has been a 20.79% increase in members of the WPI community that feel they participate in activities aimed at making WPI more sustainable. These results do not meet the desired outcome of this task claiming a 25% increase in participation in sustainability events, activities and opportunities at WPI. The results indicate that despite there being a significant increase in participation in sustainability engagement, there is still area for improvement to reach the desired 5-year outcome.

Do you feel that you participate in any activities aimed at making WPI more sustainable? (2018)

Sample size = 96

Yes
44.0%

No
56.0%
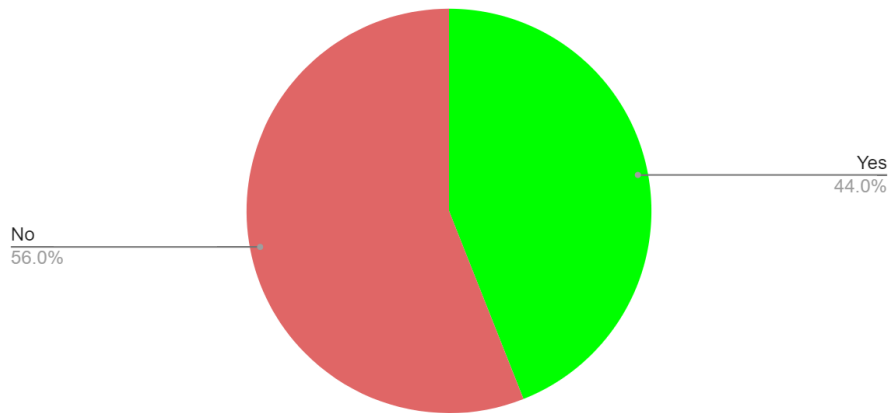
Do you feel that you participate in any activities aimed at making WPI more sustainable? (2023)
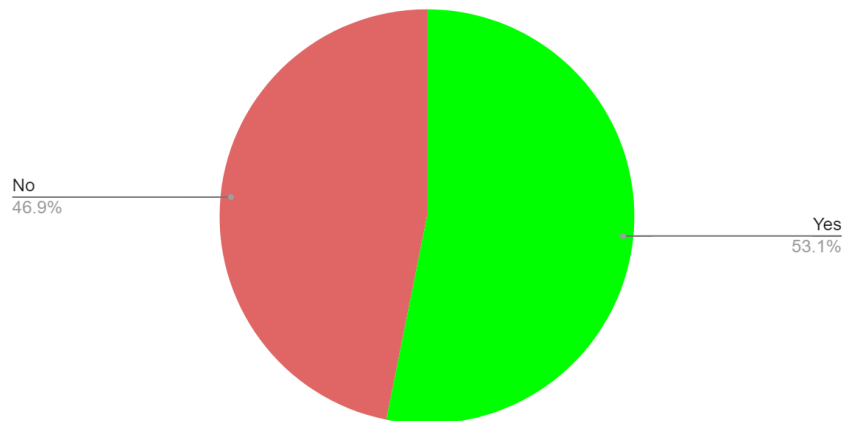

No
46.9%

Yes
53.1%

Figure 16: 2018 and 2023 Data for Participation in Sustainable Activities at WPI. 2018 pie chart data from: "Monitoring and Presenting Energy Consumption to Increase WPI Sustainability Efforts" by Lucas Mancinelli, Daniel Vega, Nick Batchelder, & Paul Shingleton, Worcester Polytechnic Institute is licensed under CC BY 4.0 / A derivative from the original work

4.3 Current State of Objective C1.2

The team utilized and compared the survey results gathered in 2023 and previous years with the 5-year outcomes in the 2020-25 WPI Sustainability Plan to evaluate the progress of

tasks of Objective C1.2. Objective C1.2 aims that "the impact of WPI community members' activities on sustainability is demonstrated through assessment and encouraged through recognition." A full description of this objective and its tasks can be viewed in Figure 2 in Section 2.1.2.

4.3.1 WPI community reported not being active in the culture of sustainability

Task 2 of Objective C1.2 claims that "WPI will assess progress toward adopting a culture of sustainability at WPI (e.g., awareness, values, beliefs)." A full description of this task can be viewed in Figure 2 in Section 2.1.2.

To evaluate if the WPI community is changing its beliefs and values and adopting a culture of sustainability, results from a previous survey were compared with the results from our 2023 survey. In a 2016 IQP titled *Advancement of WPI's Sustainability Engagement and Education*, Megan Adresano and her colleagues conducted a survey on the WPI community to evaluate WPI's sustainability engagement. In the survey, Adresano and her colleagues asked the following question: "Which of the following limits your participation in sustainable practices at WPI". This same question was asked in the 2023 survey. Based on Figure 17, the amount of respondents that feel as if "little free time" is a limit to their participation in sustainable practices increased by 7.2%. The percentage of respondents who feel as if coursework and extracurriculars are limits to their participation in sustainable practices increased by 4.3% and 7.1% respectively.

Which of the following limits your participation in sustainable practices at WPI?
Check all that apply. (Student responses)

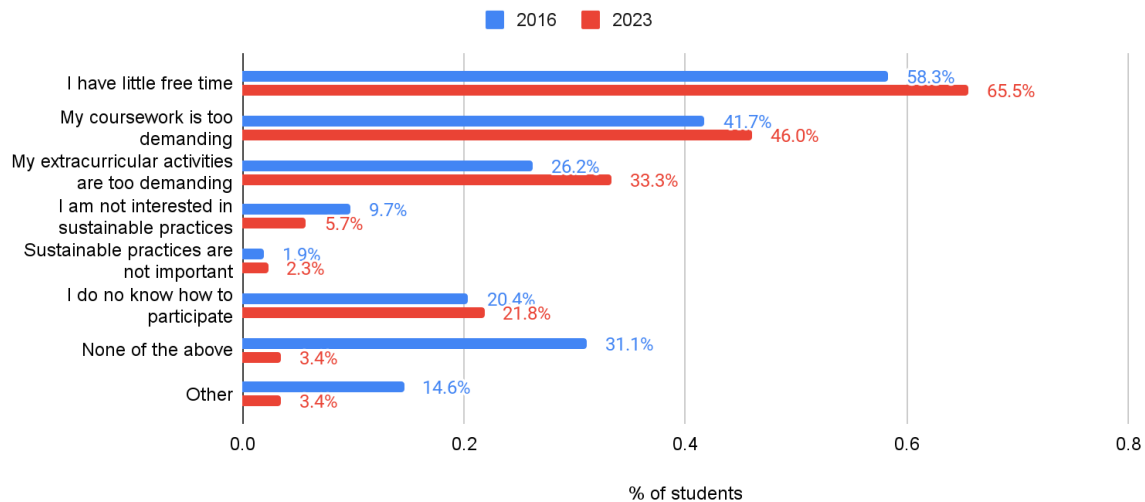*# of respondents: 103 in 2016, 87 in 2023*

■ 2016   ■ 2023

Figure 17: 2018 and 2023 Data for Student Limitations in Sustainable Practices at WPI (Andresano et al., 2018). 2016 data taken from: "Advancement of WPI's Sustainability Engagement and Education" by Megan Andresano, Kenuel Lopez Rivera, Tucker Martin, Sai Sett Paing, & Kyle Piette is licensed under CC BY 4.0 / A derivative from the original work

Members of the WPI community have too many priorities and don't realize that sustainable practices can be done despite little time. The WPI Director of Sustainability emphasizes that he would like the community to be aware that even with little time there are still ways to integrate sustainability into their role at WPI. In the survey, the following question was asked: "Which of the following on-campus sustainability initiatives/resources have used or participated in? Check all that apply." According to Figure 13 in Section 4.2.2, the most popular resources/initiatives used by WPI students are the Green Team Free Thrift Store, E-Waste Drive and Green2Go Containers. These resources are sustainable practices that are easy to participate in or expedite an activity that WPI students are already doing (in this situation; thrifting, getting rid of electronics, taking food out of the dining hall). President of the WPI Green Team, Gabriel Espinosa, supports this idea in an interview stating that WPI students will participate in sustainability if it's

convenient to them. Espinosa also states that the WPI Green Team prefers to implement initiatives that take minimal extra time and effort.

It is evident that members of the WPI community aren't very active in sustainability and lack the resources to know how to integrate sustainability into their role at the institution, indicating weak awareness, values and beliefs related to a culture of sustainability.

4.4 Current State of Objective C1.3

The team utilized and compared the survey results gathered in 2023 and previous years with the 5-year outcomes in the 2020-25 WPI Sustainability Plan to evaluate the progress of tasks of Objective C1.3. Objective C1.3 states that "WPI advances social justice initiatives and ensures that all sustainability-related programs promote diversity, equity, and inclusion." A full description of this objective and its tasks can be viewed in Figure 3 in Section 2.1.2.

4.4.1 Staff reported that sustainability initiatives and resources at WPI aren't inclusive

Task 2 of Objective C1.3 claims that "WPI will assess and advance diversity, equity, and inclusion in sustainability education and activities." The 5-year outcome of this task is that "DEI is incorporated into all activities." A full description of this task can be viewed in Table 3.

Survey results were utilized to evaluate if sustainability activities are inclusive of all demographics on campus. A 2023 survey asked the following question to staff respondents: "Are you a part of any sustainability focused groups on-campus?". According to Figure 18, 90% of staff respondents in the WPI community aren't a part of any sustainability focused groups on-campus.
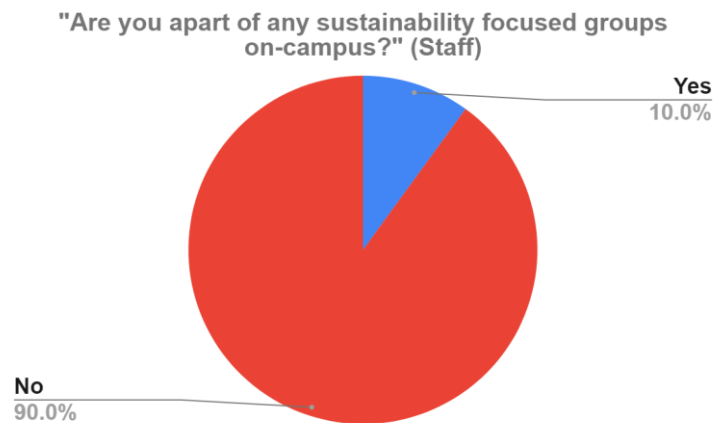
Figure 18: 2023 Data for Staff Involved with Sustainability Groups On-campus

The survey also asked the following questions: "Which if the following limits your participation in sustainable practices at WPI? Check all that apply." and "Are you a part of any sustainability-focused groups off-campus?". According to Figure 19 and Figure 20, the most common limitations to participating in sustainable practices at WPI for staff respondents is that they have little free time or do not know how to participate. The lack of free time may limit them from participating in sustainability-focused groups off campus, indicated by Figure 20 which reports that 86.7% of staff respondents aren't a part of any sustainability focused groups off-campus.

"Which of the following limits your participation in sustainable practices at WPI? Check all that apply. "(Staff)
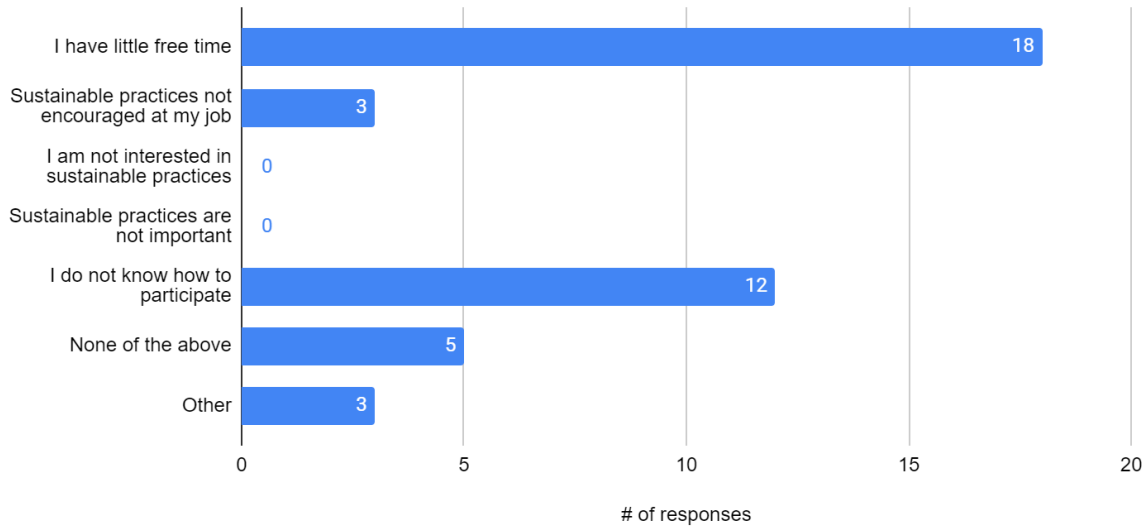
Figure 19: 2023 Data for Staff Limitations in Sustainable Practices at WPI

"Are you apart of any sustainability focused groups off-campus?" (Staff)
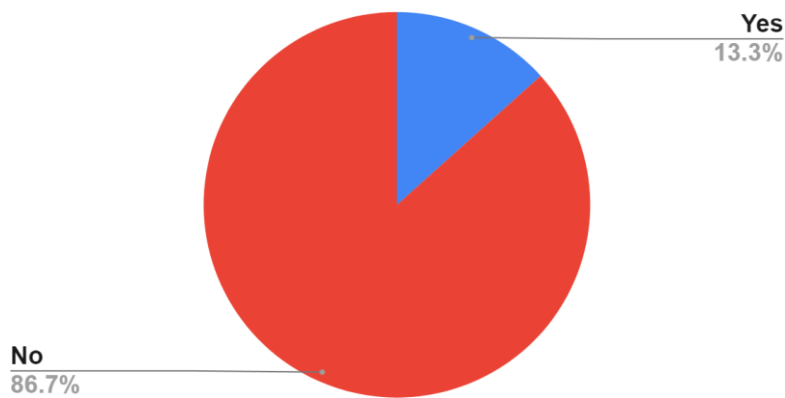
Figure 20: 2023 Data for Staff Involved with Sustainability Groups Off-campus

According to interviews with the WPI Director of Sustainability and Energy and Sustainability Manager, there are no required onboarding training modules to educate staff on sustainable practices for their job. Table 4 in Section 2.4.2 also indicates that there are limited clubs and on-campus group efforts focused on the staff demographic. Staff at WPI lack the

resources to integrate sustainability into their role, indicating that sustainability resources and initiatives at WPI aren't inclusive of this demographic.

4.5 Errors and Limitations

Collecting data is a difficult process, and any mistakes in the collection process can lead to skewed data and biases. Many problems were faced when both collecting survey responses and analyzing them. This section will detail any limitations that could have caused error in the survey data, and what changes would be made if this survey could be sent out again.

One possible problem is that the Qualtrics survey may have been too long, which can lead to people quitting the survey after starting it. Although the estimated time to take the survey was put at the very beginning (the beginning preamble stated the survey would take an estimated 10-15 minutes), many people would have been disinterested if they thought the survey was too lengthy. A shorter survey with the most important questions would likely generate more total complete responses.

There were also some technical issues with Qualtrics. When the survey was first sent out, most questions were not required to complete, as it was expected that respondents would not skip any questions. After seeing that people skipped some questions after some responses came in, every single question then became required to answer. Also, there were originally two questions asking if respondents wanted to type their email for updates about the Harrison Street partnership and the Green Revolving Fund. The intent was for these emails to be anonymously separated from their survey responses, but this was not the case. Thus, those questions were scrapped.

Wording questions was also difficult, and poor wording could have affected the survey responses. For example: before the two questions asking if respondents wanted to give their email for updates on Harrison Street and the GRF were these questions: "Would you like to hear updates and information about this partnership?" and "Would you like to get news and updates about the WPI GRF?" Since the part where respondents would enter their email to get updates was removed, it would be unclear what this question was asking. Most people likely interpreted it as asking if they wanted email updates about these initiatives. As many WPI members

complain about having cluttered email inboxes, it explains why many people responded "no." If the question was instead worded as "Would you like to learn more about this partnership?" then perhaps more people would have responded with "yes."

Since respondents had a chance of winning a prize for completing the survey, it is possible that many people rushed through the survey and did not give honest answers. Some of the questions in the survey are a text box where respondents can type anything to answer the question, but some responses were just gibberish and random letters. As all questions were required in order to move on, respondents likely put gibberish for these questions if they did not have a good answer to text-box questions and wanted to go to the next question.

Survey bias may also be prevalent in the responses. The Qualtrics survey was advertised as a sustainability survey, so many people that took the survey were likely already interested in sustainable practices. And if people that already participate in WPI's sustainability mostly answered the survey, then the data would be extremely skewed.

CHAPTER 5. Solutions

This chapter will recommend solutions that WPI can implement to foster their culture of sustainability and address the findings in Chapter 4.

5.1 Reimplement the World Cafe

Based on the results of Section 4.1 through Section 4.3, we recommend that administration works toward reimplementing the World Cafe at WPI. World Cafe's would provide an inclusive approach to create dialogue and awareness of sustainability issues and initiatives amongst all demographics on campus; students, faculty and staff.

World Cafe meetings, also known as "brown bag lunches," were a discontinued event where WPI members would come together and discuss a topic over lunch. According to an interview with the Sustainability Manager at the WPI Office of Sustainability, these events occurred once a term. Sustainability was a common topic in these events, and provided a valuable venue for the WPI community to learn and voice their opinions on sustainability issues and initiatives.

WPI's Director of Sustainability and the Energy and Sustainability Manager mentioned that the main issues for hosting and sustaining World Cafe meetings at WPI were finding meeting times where staff, faculty and students weren't busy. Another issue was finding capability in the Office of Sustainability to host the event.

In an interview with Holy Cross, the Director of Sustainability stated that they host a similar event for faculty at Holy Cross through an employee affinity group called BITE. In this event, people enjoy lunch with guest speakers, and talk about how people are being sustainable. This event is open to anyone that is employed by Holy Cross. BITE is also informal, which allows for people to feel more comfortable with sharing information. People join this group mainly by free will, but they try to encourage people to join with snacks. BITE often has multiple sessions since some people are unable to join due to their schedules, so if someone cannot go to one of these meetings then they can just go to the next. Reimplementing the World

Cafe with a similar structure to BITE would aid in helping staff, faculty and students attend if they have busy schedules.

5.2 Increase Communication of Sustainability Events

WPI sends out several weekly newsletters through email, such as the Career Development Center Newsletter and the Tech Newsletter. Such newsletters are emailed to all students, faculty, and staff. WPI's Student Government Association releases a weekly events newsletter, detailing what events will be hosted by WPI groups on each day of the upcoming week. Both new events and recurring events are described in these newsletters. These events include: mental health events such as Wellness Wednesday's; game events like Trivia Tuesday or bowling; and events to help students academically such as IQP guidance events.

One possible solution to increase engagement at WPI would be to ensure sustainability-focused events and information are featured in weekly newsletters. Sustainability-focused events such as the Climate Fair appear in the SGA's newsletters, but initiatives such as the $45 million partnership with Harrison Street do not appear. Including important announcements informing WPI members about sustainability efforts like this partnership would be very beneficial.

A newsletter focused only on sustainability could also be introduced. Although the SGA weekly newsletter does mention sustainability-focused events, each newsletter is very long and includes a lot of events, so sustainability events do not stand out. Also, each event in the newsletter has only a brief description, and does not give all the important details. Thus, a solution to this could be creating a new WPI email newsletter that features only sustainability news. This idea was told at the Climate Fair to people that came up to our poster. One attendee stated that this idea may or may not work, saying WPI members already receive a lot of emails, and would likely ignore another mass email. He stated that ensuring that sustainability-focused events are featured in already-existing newsletters could be more effective. According to interviews with Office of Sustainability members, email is a reliable way to reach staff and

faculty members. Unfortunately, they also stated that students are not as attentive to their emails, making this solution effective mostly for faculty and staff members.

Social media can also be an effective medium to spread news about sustainability at WPI. In an interview with the director of sustainability at Holy Cross, they mentioned that their institution has an Instagram account named Purple Goes Green, which is mainly used for announcements for events related to sustainability at Holy Cross, as well as infographics. They also mentioned that Instagram users sharing the posts from Purple Goes Green on their personal "stories" can be very effective. WPI's Green Team also uses social media to spread news, so increasing the usage of social media to advertise sustainability efforts would be effective. WPI's Director of Sustainability mentioned that there is a shift towards using Instagram, and also stated that Facebook would be a good way to reach WPI's older members. Since email is mostly useful to reach staff and faculty members, social media would be a good way to reach students and inform them about sustainability events at WPI.

5.3 Implement Onboarding Training for New Students, Staff, & Faculty

Interviews with Office of Sustainability members mentioned how there are currently no orientation requirements for staff members related to sustainability. A Climate Fair attendee who is a WPI staff member came to see our poster and affirmed that she did not learn about sustainability at work. Survey data also indicated that many faculty members do not learn about sustainable practices at their jobs. Survey respondents also indicated that although they are willing to change their sustainable habits, they do not know how to.

With this said, another method to increase engagement would be to teach new WPI members about sustainability during New Student Orientation (NSO) and employee onboarding. Survey respondents stated that they do not know how to practice sustainability, so it would be very beneficial to inform them how they can participate during orientation. NSO or employee training could teach new WPI members sustainable practices, such as how to properly conserve energy, how and where to dispose of any trash, what they should do with food waste, etc. They could also be informed about sustainability groups at WPI, such as the Green Team. This would

be especially beneficial for staff members in particular, as the vast majority of WPI staff reported not being a part of any on-campus sustainability groups in the Qualtrics survey.

Survey data also indicated that a lack of free time is a major reason why campus members are not practicing sustainability. Yet, interviews with the Office of Sustainability mentioned that there are ways to be sustainable with little free time and that sustainability should be a part of campus life. Thus, teaching proper sustainable practices when WPI members first arrive could help them build good habits over time, and hopefully sustainability would be a part of their daily routines even when faced with little free time.

One problem with this solution is finding the necessary time to teach new WPI members about sustainability during orientation. In an interview with the Campus Sustainability Manager at UMass Amherst, he stated that he would love to do more employee training relating to sustainability. Unfortunately, he stated that it is difficult to find enough time to introduce more sustainability training. Even after initially teaching WPI new members about sustainability, it is important to continue updating people about sustainability news. The Campus Sustainability Manager mentioned how certain staff members at UMass Amherst are kept up to date with the latest news about sustainability efforts and policies on campus. So even after learning about how to be sustainable during NSO and employee onboarding training, WPI members should be constantly updated on new sustainability policies and news.

APPENDIX A:

The following is a transcript of the 2023 online Qualtrics survey given to the WPI community. Note that some questions only show up depending on answers chosen for previous questions. There were also separate questions for each of the faculty, staff, and students.

"The Sustaining WPI On-Campus Project Center is developing suggestions to improve campus-wide energy conservation and consumption habits, and they would appreciate input from the WPI community to inform the process.

This survey will take an estimated 10-15 minutes.

Survey results and data will be anonymized. Results and proposed suggestions will be used and shared within the project center.

Survey participants have the opportunity to be entered in a raffle to win a $10 Dunkins gift card. There will be 5 winners.

Please take some time to fill it out completely and thank you!"

1. What best describes your role on campus?
   a. Faculty
   b. Staff
   c. Student
2. How did you learn about this survey?
   a. Table sitting
   b. Advertisements on-campus (posters, flyers, etc.)
   c. Word of mouth

     d. Email

     e. Other: _____

3. Where do you reside during the school year?

     a. On-campus housing

     b. Off-campus housing (walking distance to campus)

     c. Commuter

4. What type of on-campus housing do you reside in?

     a. Apartment

     b. Dorm

     c. Other: _____

5. Rank where you mainly get information about events or initiatives happening on-campus. (Most used at the top, least used at the bottom)

     a. Social media

     b. Email

     c. Classes

     d. Work

     e. Advertisements on-campus (posters, flyers, etc.)

     f. Table sitting

     g. TechSync

     h. Word of mouth

     i. WPI website

     j. Other

6. Do you consider yourself environmentally conscious?

     a. Yes

     b. No

7. Do you believe that your actions alone can make a difference for WPI's campus sustainability?

     a. Yes

b. No

8. Do you believe that group efforts can make a difference for WPI's campus sustainability?
   a. Yes
   b. No

9. Do you feel that you participate in any activities aimed at making WPI's campus more sustainable?
   a. Yes
   b. No

10. Which of the following on-campus sustainability initiatives/resources have you used or participated in? Check all that apply.
    a. Office of Sustainability Web Page
    b. Gompei Gears
    c. Climate Action Fair
    d. Green2Go Containers
    e. Annual Sustainability Report
    f. Green Team Free Thrift Store
    g. Waste Audit
    h. Sustainability Project Showcase/Competition
    i. Campus Race to Zero Waste (previously known as Recyclemania)
    j. Careers for a Sustainable and Just Future - Networking Night
    k. E-Waste Drive
    l. Sustainability Pledge
    m. Project Zero Waste (previously known as Project Clean Plate)
    n. Lighting Fair
    o. None. If so, why haven't you participated in any of the above?:

    _____

11. Where did you hear about those on-campus sustainability initiatives/resources? Check all that apply.
    a. Social Media
    b. Email
    c. Classes
    d. Work
    e. Advertisements on-campus (posters, flyers, etc.)
    f. Table sitting
    g. TechSync
    h. Word of mouth
    i. WPI Website
    j. Other: _____

12. If none, why haven't you participated in any of the above?

13. Did you find these events/resources useful for advancing your knowledge in sustainability?
    a. Yes. If so, why did you find them useful?:

    _____

    b. No. If so, why didn't you find them useful?:

    _____

14. What is your expected graduation year?
    a. 2023
    b. 2024
    c. 2025
    d. 2026
    e. Other:

15. Are you a part of any on-campus organizations? Check all that apply.
    a. Greek Life
    b. Clubs

c. Student government

d. Other: _____

e. None of the above

16. Which of the following on-campus sustainability-focused groups are you part of? Check all that apply.

    a. WPI Green Team

    b. Greenhouse Club

    c. Habitat for Humanity

    d. Vegetarian/Vegan Club

    e. American Academy for Environmental Engineers and Scientists

    f. Other: _____

    g. None. If so, why aren't you a part of any sustainability-focused groups?:

       _____

17. Which of the following limits your participation in sustainable practices at WPI? Check all that apply.

    a. I have little free time

    b. My coursework is too demanding

    c. My extracurricular activities are too demanding

    d. I am not interested in sustainable practices

    e. Sustainable practices are not important

    f. I do not know how to participate

    g. Other: _____

    h. None of the above

18. Where do you mainly learn information about sustainability or sustainable practices? Check all that apply.

    a. Social Media

    b. Classes

    c. On-campus events

d. Off-campus events

e. Clubs

f. Word of mouth

g. Other: _____

19. What encourages you to participate in sustainable practices at WPI?:

_____

20. What would motivate you to adopt energy conservation practices at WPI? Check all that apply.

a. Gift cards

b. Goat Bucks

c. WPI merchandise

d. Recognition

e. Academic credits

f. Other: _____

g. None of the above

21. Describe any tasks at your WPI job that consume energy.

_____

22. What have you learned about energy conservation in relation to those tasks at your job?

_____

23. What would motivate you to adopt energy conservation practices at WPI? Check all that apply.

a. Gift cards

b. Recognition

c. Salary bonuses

d. Other: _____

24. Are you a part of any sustainability-focused groups on-campus.?

a. Yes. If so which ones?:

_____

b. No. If so, why aren't you a part of any on-campus sustainability-focused groups?:

_____

25. Are you a part of any sustainability-focused groups off-campus?

    a. Yes. If so which ones?

    b. No. If so, why aren't you a part of any off-campus sustainability-focused groups?

26. Which of the following limits your participation in sustainable practices at WPI? Check all that apply.

    a. I have little free time

    b. Sustainable practices are not encouraged at my job

    c. I am not interested in sustainable practices

    d. Sustainable practices are not important

    e. I do not know how to participate

    f. Other: _____

    g. None of the above

27. Which of the following sustainability-focused groups are you a member of or advise? Check all that apply.

    a. Sustainability Advisory Committee

    b. WPI Green Team

    c. Greenhouse Club

    d. Habitat for Humanity

    e. Vegetarian/Vegan Club

    f. American Academy for Environmental Engineers and Scientists

    g. WPI Office of Sustainability

    h. Other: _____

    i. None. If so, why aren't you a part of any sustainability-focused groups?:

_____

28. Are you a part of any sustainability-focused groups off-campus?

    a. Yes. If so which ones?:

       _____

    b. No. If so, why aren't you a part of any off-campus sustainability-focused groups?:

       _____

29. Are you a part of or advise any research related to sustainability or energy conservation?

    a. Yes. If so, explain your role in the research:

       _____

    b. No

30. Do you integrate sustainability into the curriculums of the classes you teach?

    a. Yes. If so, explain how you do:

       _____

    b. No. If so, why don't you?:

       _____

31. Which of the following limits your participation in sustainable practices at WPI? Check all that apply.

    a. I have little free time

    b. There is no way to implement sustainable practices into the curriculum

    c. I am not interested in sustainable practices

    d. Sustainable practices are not important

    e. I do not know how to participate

    f. Other: _____

    g. None of the above

32. What would motivate you to adopt energy conservation practices at WPI? Check all that apply.

    a. Gift cards

    b. Recognition

    c. Salary bonuses

    d. Other: _____

33. WPI has formed a 40-year partnership with Chicago-based investment management firm Harrison Street that will provide $45 million for the university's strategic initiatives and will accelerate work to reduce WPI's carbon footprint by expanding energy-conservation measures, improving WPI's power plant, and developing sustainable energy technologies for the WPI campus. As part of the partnership, Harrison Street will provide WPI with support to accelerate hands-on learning and collaborate with students and faculty on new research opportunities. Have you heard of this partnership?

    a. Yes

    b. No

34. Where did you hear and get information about the Harrison Street partnership? Check all that apply.

    a. Social Media

    b. WPI website

    c. Email

    d. Classes

    e. Advertisements on-campus (posters, flyers, etc.)

    f. Table sitting

    g. TechSync

    h. Word of mouth

    i. Other: _____

35. What information do you want to know about the partnership:

_____

36. What are your opinions on the partnership?

_____

37. Do you want the ability to voice your opinion on this partnership?

    a. Yes

b. No

38. How would you like to be able to voice your opinion on the partnership? Check all that apply.
    a. Town halls
    b. Panel
    c. Online feedback forms
    d. Other: _____

39. Would you like to hear updates and information about this partnership?
    a. Yes (1)
    b. No (2)

40. The WPI Green Revolving Fund (GRF) is a fund dedicated to sustainability projects that generate financial returns in which cost savings received from the GRF projects are returned to the fund. The most common types of projects that are funded are energy efficiency projects such as lighting upgrades, building control optimization, and HVAC system recommissioning. Have you heard of the WPI Green Revolving Fund?
    a. Yes
    b. No

41. Where did you hear and get information about the WPI Green Revolving Fund? Check all that apply.
    a. Social media
    b. WPI website
    c. Email
    d. Classes
    e. Advertisements on-campus (posters, flyers, etc.)
    f. Table sitting
    g. TechSync
    h. Word of mouth
    i. Other: _____

42. What sort of updates or information would you like to know about these GRF projects?:

_____

43. Would you like to get news and updates about the WPI GRF?
    a. Yes
    b. No
44. Do you do any of the following energy conservation habits on campus? Check all that apply.
    a. Turning off lights in rooms on campus when leaving
    b. Turn off campus appliances when not in use when possible
    c. Turn off campus computer lab screens when not in use
    d. Unplug devices that aren't being used on campus
    e. Close sash of fume hood after use in campus labs
    f. Closing the blinds in classrooms during hot days to reduce heat gain
    g. Don't set temperatures too high/low in on campus rooms when possible
    h. Other: _____
    i. None. If so, why don't you do any of the mentioned energy conservation habits?:

        _____
45. How many days a week do you do those energy conservation habits?
    a. 0-1 days a week
    b. 2-3 days a week
    c. 4-5 days a week
    d. 6-7 days a week
46. Do you believe that you alone doing the mentioned energy conservation habits can make a difference towards WPI's campus sustainability?
    a. Yes
    b. No

47. Do you believe that a group collectively doing the mentioned energy conservation habits can make a difference towards WPI's campus sustainability?

    a. Yes

    b. No

48. How willing would you be to change your daily habits to conserve energy better?

    a. Very willing

    b. Somewhat willing

    c. Not very willing

    d. Not willing at all

APPENDIX B:

Below is a research poster for our IQP project presented at the WPI Climate Fair on April 19th, 2023.

APPENDIX C:

Below is a transcript of questions asked during an interview with a sustainability coordinator at Holy Cross.

1. Tell us about campus sustainability projects at Holy Cross focused on energy conservation.
2. What sustainability clubs or organizations exist at Holy Cross?
3. Are there courses at Holy Cross that teach students about sustainability?
4. How do Holy Cross members get information about sustainability news?
5. What do you think is the biggest problem regarding energy conservation at Holy Cross?
6. Are there efforts or programs being made at Holy Cross to spread awareness about campus energy conservation?
    a. What efforts are particularly effective to spread awareness and why?
    b. Do you have any advice to better educate the WPI community about sustainability?
7. Why do you think a Holy Cross member would not attempt to change their energy conservation habits?
8. What do you think would motivate Holy Cross members to practice better sustainable habits?
9. Is there data about Holy Cross's energy usage?
    a. If so, is it easily accessible to anyone?
10. How do sustainability policies at Holy Cross get passed or approved?
    a. Who has a say in these policies?

APPENDIX D:

Below is a transcript of questions asked during an interview with the Campus Sustainability Manager at UMass Amherst.

1. Tell us about campus sustainability projects at Amherst focused on energy conservation.
2. What sustainability clubs or organizations exist at Amherst?
3. Are there courses at Amherst that teach students about sustainability?
4. How do Amherst members get information about sustainability news?
5. What do you think is the biggest problem regarding energy conservation at Amherst?
6. Are there efforts or programs being made at Amherst to spread awareness about campus energy conservation?
    a. What efforts are particularly effective to spread awareness and why?
    b. Do you have any advice to better educate the WPI community about sustainability?
7. Why do you think an Amherst member would not attempt to change their energy conservation habits?
8. What do you think would motivate Amherst members to practice better sustainable habits?
9. Is there data about Amherst's energy usage?
    a. If so, is it easily accessible to anyone?
10. How do sustainability policies at Amherst get passed or approved?
    a. Who has a say in these policies?
11. You are a WPI alum, and were an active Sustainability Intern at WPI. I was wondering if anything major has changed regarding WPI's management or policies now compared to your time as a student.

APPENDIX E:

Below is a transcript of questions asked during interviews with sustainability coordinators at WPI.

1. Please tell us about your work at WPI.
2. Can you tell us about any prior WPI projects which focused on educating WPI members about sustainable practices? It can be about energy conservation or just sustainable practices in general.
    a. What do you think was successful about these projects?
    b. Did these projects implement changes or programs that still exist?
3. According to previous IQP survey data, one of the biggest reasons why WPI students say they don't do sustainable acts is due to a lack of free time. Do you think that there are any ways to be sustainable even when one has little free time?
4. What do you think would be good ways to motivate the WPI community to want to become more sustainable?
5. How do sustainability policies at WPI get passed or approved?
    a. Who has the power to make these changes?
    b. Do students have much of a say in these policies?
6. How have WPI's sustainability policies changed over the years?
    a. What caused them to change?
7. What has been the outcome of previous IQPs that aimed to change WPI's sustainable habits? Were they mostly successful?
8. Can you tell us about the efforts being made to create a WPI energy dashboard?
9. What are your opinions on the partnership between WPI and Harrison Street?

APPENDIX F:

Below is a summarized write-up of an interview with the President of the Worcester Polytechnic Institute Green Team, Gabriel Espinosa.

One major issue that Gabriel continuously highlighted is that the WPI student body is generally lazy when practicing sustainability. Gabriel expressed that the WPI student body is less involved in environmental politics compared to other universities he has corresponded with. He stated that WPI students don't participate in "environmental discourse" like rallies and protests, and he hopes that interest in that will increase with time. Convincing people to participate in sustainable actions that typically require more effort is a pain point when motivating people. To target this problem, the Green Team focuses on implementing initiatives and solutions that require minimal extra effort for students to participate in. Gabriel emphasizes that infrastructure changes are more effective towards energy conservation than changing people's habits as people don't want to change their routines or make an effort to be sustainable.

Gabriel stated that to educate the community, presenting statistics and declarative knowledge that magnifies the problem is impactful. Presenting the problem through visualizations or comparisons can be powerful and can help people conceptualize the impact of the problem. The Green Team utilizes this tactic in their Project Zero Waste initiative, in which they display how much food is being wasted in a clear container for people to see.

Gabriel also mentioned that material incentives can be a motivator for environmentally responsible behavior. The Green Team's most popular event is the Free Thrift Store in which members of the WPI community can donate and buy second-hand clothing. People favor this event as they get something "materialistic" out of it while making a sustainable choice by buying second-hand.

Another factor that contributes towards the success of the Free Thrift Store event is how it is advertised. The Green Team not only used social media to spread word, but also word of mouth by partnering with Greek Life organizations on campus. By involving large organizations,

they are able to create a social incentive that shows that making the sustainable choice of buying second hand is a norm on WPI's campus.

APPENDIX G:

Below is a summarized write-up of the interview with WPI's Energy and Sustainability Manager, Nicole Luiz.

Nicole mentioned how collaborating with groups rather than by yourself is a more effective way to reach people. She remarked that staff and faculty are always on their computers at their jobs, making it much easier to reach them via email. She also believes that students do not check their emails as regularly as faculty or staff. Nicole emphasized that because staff and faculty know where to check for important information since they have generally been at WPI longer than students.

Nicole talked about the World Cafe. Sustainability topics were common, and the World Cafe was a great way to discuss sustainability issues and possible solutions. Nicole mentioned how it was difficult to find meeting times when staff or faculty weren't busy and when students weren't in class.

Nicole said that it is very difficult to make people care about sustainability if they already don't care. She believes that one way to overcome this is for WPI to show that it truly cares about sustainability, and this interest would "trickle down" to WPI's members. Many people feel like they shouldn't bother getting involved in something if others aren't.

Nicole said that there are currently no orientation or requirements for staff related to sustainability, and that any suggestions would be welcome. She also stated that even if students have little free time, they should not feel like they need to join groups like the Green Team or attend every sustainability event to feel like they're being sustainable.

When the survey for this project was discussed with Nicole, she mentioned how it would be very difficult to get an unbiased result. Many people that the survey targeted were already interested in sustainability, which could lead to survey bias. She also believes that it is difficult for students to take surveys; if a survey goes out to the entire WPI community, it gets lots of staff and faculty respondents, although WPI is mostly students.

When asked what they want WPI members to know about the Office of Sustainability's work, Nicole mentioned the carbon commitment initiative signed with Second Nature. Nicole also mentioned that the Office of Sustainability is mostly just her and the Director of Sustainability running the department, and that much help is needed, which would hopefully include hiring more people into their department.

APPENDIX H:

Below is a summarized write-up of an interview with the Campus Sustainability Manager at UMass Amherst, Ezra Small.

When asked about the biggest sustainability issues that UMass Amherst currently focuses on, Ezra mentioned the ongoing UMass Carbon Zero initiative. He stated that the whole campus is involved in different aspects of this campaign, whether it be working with engineers to design a new energy system on campus, looking at new learning opportunities, or finding funding opportunities. Ezra stated that it is very difficult to engage students on this project due to the large scope of it, and also hard to give students something they can do to help that is "tangible to work on."

Regarding popular ways for Amhert students to get involved with sustainability, Ezra mentioned their Eco-Rep Program. This is a class that was peer based, where students were teaching other students. It was more action oriented originally but evolved into a seminar-based course. He also noted that the COVID-19 pandemic had negatively impacted many sustainability initiatives such as the Eco-Rep Program, but that they are slowly moving back on track.

Ezra stated that UMass Amherst is home to many student sustainability groups, one of which is the sustainability team in their Student Government Association that he partners with often. Ezra says that they are also relaunching their sustainability fund, and students help review applications and paperwork for this fund, and these students can even give recommendations. Ezra called this an "engagement fund." UMass Amherst is also home to 90 sustainability focused courses according to Ezra.

When asked about how to engage staff on sustainability, Ezra talked about the Green Office Program. Before it was canceled due to the pandemic, there were around 100 different offices around campus that participated in this program. Students would be trained as sustainability consultants and worked with a designated staff member in their office, called an "eco leader." They ran through checklists of what can be done in their office, such as energy conservation or paper reduction. Amherst does get in touch with custodian staff at the end of the

year to discuss their sustainability plans and programs to make sure they're on the same page. Ezra wishes that Amherst did more employee training related to sustainability with custodians, but lack of time and capacity is a huge reason why more training has not been done.

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