



Furthering a Synergetic Sustainability Curriculum at The Ohio State University

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Executive Summary

This project contributes to a larger initiative by the Ohio State University (OSU) to further transdisciplinary environmental and sustainability education. The goal of our project was to assist OSU in developing a comprehensive framework. We provided benchmark information from 8 peer institutions, survey results, and a set of recommendations with which these groups could begin the development process. Specific research goals were as follows:

- Analyze sustainability curricular offerings at peer institutions (half are Big Ten schools, half are aspirational)
- Evaluate communication/marketing strategies for environmental and sustainability education programs at peer institutions
- Interpret current student preferences and interests regarding sustainability and environmental topics.

Our findings from benchmarking other universities showed that there are many sustainability dual-degree, major, minor, and graduate certificate programs that Ohio State does not offer. In regard to communication and marketing strategies, we found that other schools are utilizing sustainability advisors, high school outreach programs, and strong online search methods which allow students to find programs and courses that fit their interests.

Our survey was sent out to approximately 53,000 current, Ohio State undergraduate students and results came from roughly 3,900 responses through Qualtrics email services. Results generally showed a need for better communication strategies by Ohio State to make students aware of sustainability-related curricular offerings. Additionally, the majority of respondents noted that use of advisor communication may help students become interested and involved in the sustainability programs at Ohio State.

RECOMMENDATIONS:

- Establish a search by interest database for available programs, including by department, school, college, keyword, and rank.
- Establish or expand academic programs in clean energy, sustainable food systems, climate change and sustainable technology.
- Create a sustainability GE requirement for all undergraduate students.
- Engage students early on through presentations in their orientation classes or high school.
- Design training for student services staff and academic advisors in theme areas, or other disciplines.
- Incorporate student survey feedback into the language and communication of programs.

DISCLAIMERS:

- Students at peer institutions interviewed and surveyed at Ohio State were most likely highly engaged students and not reflective of the average university student
- Natural amenities could be an incentive for students interested in environmental programs to attend certain schools
- Language can affect choices and some question options were not randomized
- Survey data does not take into account enrollment in each area of study. This could make it seem like one area of study is less involved in sustainability education but may in fact just have less students

Introduction

This project is part of a larger initiative by The Ohio State University (OSU) to further multidisciplinary, environmental and sustainability education. Ohio State recognizes that sustainability-centered knowledge and skills will be highly useful in society and should draw

from multiple disciplines. Examples of these include the natural, social, medical, and engineering sciences, and the humanities.

Ohio State's sustainability goal for teaching and learning is to (1) deliver a curriculum that provides Ohio State students at all stages of instruction with opportunities to understand sustainability holistically, framed by the environment, science, technology, society, the economy, history, culture, and politics; and, (2) address the complexities of sustainability through a variety of learning formats, strategies, and occasions. In order to reach these goals, OSU established the sustainability education learning committee, (SELC), which include faculty leaders across disciplines and departments. This committee is working on a comprehensive framework to define a university-wide structure for delivering sustainability education. Our project contributed to this, although our scope only focused on two key goals of the larger framework:

- Better coordination and communication of existing educational content and programs related to sustainability, including those that focus on human-environment systems and foundational academic programs in environmental areas of study, and articulation of how they contribute to overall sustainability teaching and learning goals.
- Identification of curricular gaps in key sustainability areas. For example, Ohio State offers many courses in core sustainability areas, e.g., energy science and technology, resiliency planning, and environmental humanities, but does not have academic programs in these areas.

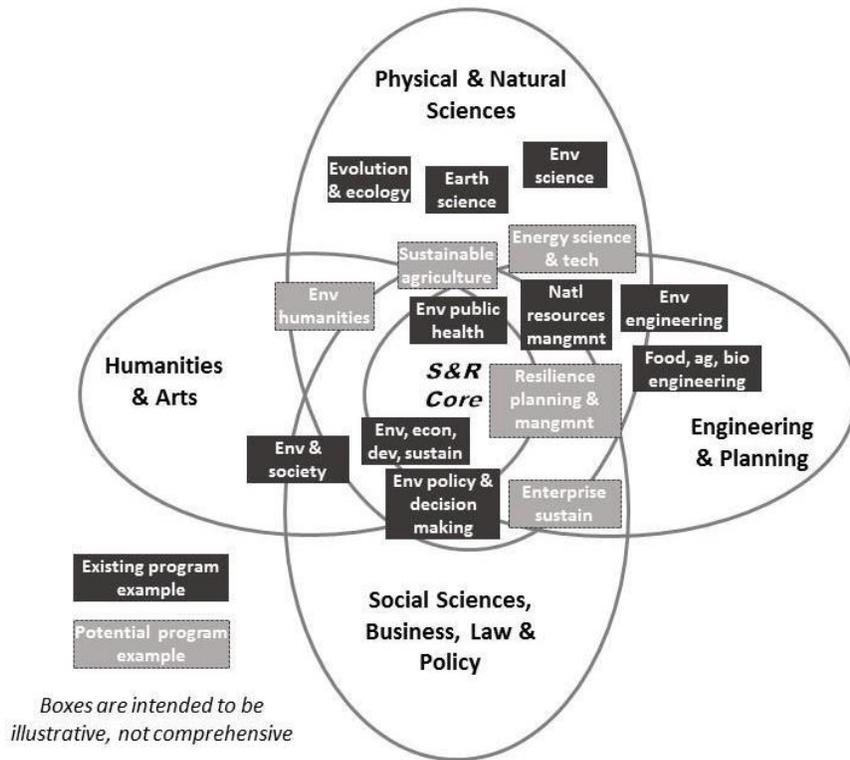


Figure 1: Conceptual Framework for Interdisciplinary Environmental (Env), and Sustainability (Sustain) Education

As shown in figure 1 above, disciplines can be intertwined in a variety of programs and majors. In our research, we explored the possibilities of combining fields and disciplines by collecting online information regarding curricular offerings at peer institutions, reaching out directly to administrators and students at peer institutions, and surveying current students at The Ohio State University to gauge prior knowledge and interest in sustainability-related topics.

The goal of this research project was to assist OSU in developing parts of its comprehensive framework, laid out above, for delivering sustainability education. Our research results are intended for use by the SELC as well as Ohio State’s Office of Academic Affairs (OAA), Office of Energy and Environment (OEE), and the Sustainable and Resilient Economy (SRE) and Initiative for Food and AgriCultural Transformation (InFACT) Discovery Theme programs.

I. Benchmarking Methods

In determining which peer institutions to examine, we focused on universities that share common characteristics with OSU to maintain a realistic scope. This benchmarking study focused solely on academic programs at other universities of comparable size, population, and reputation. Our findings include data from 8 peer institutions (9 including Ohio State), half of which are Big Ten schools, and half of which are aspirational. We define aspirational schools as those not included in the Big Ten franchise, but which still have a comparable scale and contain programs of interest. Information regarding programs at peer universities related to the environment, sustainability and resilience and their transdisciplinary programs was obtained by:

- Accessing appropriate program websites of peer institutions.
- Reaching out via phone and email to universities in order to obtain further information such as program management details, methods for measuring success, and further insight not included on their websites.
- Interviewing students at peer institutions (students were referred by program administrators) using the same survey questions asked of OSU students.

Benchmarking Results

Table 1 below shows an overview of our benchmarking results. It provides a direct comparison of each university's sustainability-oriented academic programs as well as their communication strategies. University of Colorado: Boulder is a clear leader, while Wisconsin lags behind the other institutions.

University	Category	Tot. Population	Intr. Grad	Intr. Majors	Intr. Minors	Intr. Certificate	Search by Interest	Institute/Office	Interesting Initiatives
Arizona State	Aspirational	71,900		X	X		X	X	
Illinois	Big Ten	33,900		X	X			X	X
Maryland	Big Ten	38,100			X			X	X
Michigan	Big Ten	46,000		X	X			X	X
Michigan State	Big Ten	39,000		X				X	
Penn State	Big Ten	46,600	X	X	X	X	X	X	
UC Boulder	Aspirational	33,200	X	X	X	X	X	X	X
Wisconsin	Big Ten	43,300		X			X	X	

Table 1. University comparison table showing all 8 universities and their ranking, population, and curricular sustainability offerings. In this table, “intr.” stands for “interdisciplinary”.

Michigan State University

Michigan State University (MSU) is a Big 10 school with a total enrollment of 39,000 in 2017. Within MSU, the College of Agriculture and Natural Resources and the College of Natural Science offer classes pertaining to sustainability. More specifically, the Department of Community Sustainability is the university’s center for co-curricular environmental programs and interdisciplinary sustainability study. One of the programs of interest within this department is the BS in Sustainable Parks, Recreation & Tourism (SPRT). This is an interdisciplinary program that combines the natural, social, management and behavioral sciences. Course requirement examples include: CSUS 310: History of Environmental Thought and Sustainability, as well as EEP 255: Ecological Economics.

In addition, MSU offers two graduate certificate programs that provide an interdisciplinary approach to environmental education. The first is the Forest Carbon Science, Policy and Management Certificate in the Department of Forestry. The program intertwines

forestry and natural resource management with climate science and aims to align forestry and climate change mitigation. The second is the Environmental and Social System Modeling Certificate, which introduces students to a variety of modeling systems including natural resource systems and social systems. The purpose of the program is to help address more complex global environmental changes, a problem that both policymakers and academic researchers struggle with.

University of Michigan

University of Michigan is a Big 10 school and had a total enrollment of 46,002 students in 2017. Planet Blue at UMich is their curricular and co-curricular sustainability organization. It encompasses all of the university's sustainability initiatives, including the School for Environment & Sustainability (SEAS) and the Graham Sustainability Institute. The University of Michigan's Program in the Environment (PitE) is a university-wide collaboration between the College of Literature, Science & the Arts (LSA) and the School for Environment & Sustainability. The program curriculum is interdisciplinary with course requirements in natural and social sciences as well as the humanities. Our contact at the University of Michigan for this report was Elizabeth LaPorte, the program manager for the Graham Sustainability Institute. She noted that courses with a sustainability-related focus or theme can be found within 10 UMich Schools, including Law; Public Policy; Architecture/Urban Planning; School for Environment and Sustainability; College of Engineering; School of Public Health; College of Literature, Science and the Arts (Program in the Environment); School of Information; Business; and Art and Design.

A noteworthy program at the University of Michigan that OSU does not have something similar to is their Energy Science & Policy Minor within the Program in the Environment. The

minor analyzes the sustainability of energy consumption, featuring courses such as EAS 501: Energy Justice, ENVIRON 412: Environmental Values in Public Policy, and NERS 211: Introduction to Nuclear Engineering.

Arizona State University

Arizona State University is what we consider an aspirational school. It had a total enrollment of about 71,900 students in 2016. ASU's Julie Ann Wrigley Global Institute of Sustainability was the first institute of its kind. It is the central core of the university's sustainability initiatives. In addition to Julie Ann Wrigley, ASU's School of Sustainability is the actual degree-granting entity. Our contact at ASU was Lisa Murphy, director of academic services at the School of Sustainability. She provided insight on their implementation of interdisciplinary programs, co-taught classes, and outreach efforts by the university.

Very few of the schools included in this study offer co-taught classes. Murphy noted that it is particularly difficult to design these courses due to a lack of faculty and problems with distributing pay. One of ASU's co-taught classes is SOS 111: Sustainable Cities. Murphy described the need for differing perspectives, which drove them to design a co-taught course. However, she noted that the instructors split the pay for the course, which makes it difficult to find willing faculty.

ASU was also one of the only schools benchmarked that offered dual-degree programs in the realm of sustainability study. For example, they offer a program in which students can receive a BA in Sustainability and a BS in Supply Chain Management in a 4 year span (taking classes during summer terms). The program course requirements include marketing and business, accounting, psychology, logistics management, as well as the Sustainable Cities class mentioned previously. The program is at the cutting edge of interdisciplinary sustainability

education and is designed to feature course overlap, which provides the student with a well-rounded schooling. According to Murphy, this program has been fairly popular in comparison to other similar programs at the university. However, she noted that a large portion of those enrolled were actually struggling with the variation of courses and their ability to focus their attention on multiple, very different, subjects. Because of the general difficulty of most of the sustainability programs at ASU, shortly after debuting the undergraduate majors, the academic board actually decided to decrease the acceptance rate and raise the standards for admission.

Another realm in which ASU is excelling is their communication and marketing strategies. Murphy detailed outreach efforts that include traveling to local high schools and delivering presentations to students in an attempt to introduce environmental and sustainability concepts prior to high school graduation. These outreach events were often successful in sparking interest and advertising the programs both at ASU and beyond.

University of Maryland: College Park

The University of Maryland: College Park (UMD) is a Big 10 school with a total enrollment of about 38,100 students. The school of public policy is where UMD houses their sustainability studies minor, according to Dr. Robert Sprinkle, one founder of the minor and professor in the policy school. He claims this minor is a great way to allocate revenue and integrate sustainability into any of their university's majors. This is the largest minor at the university since its creation, says Sprinkle. They do not currently have any sustainability majors.

UMD student Gannon Kese gave a great testimony to the university's sustainability efforts. He felt their sustainability presence was heavy on campus, and they marketed their relevant majors well through theme advisors and a search by interest database of available degrees. UMD offers advisors by theme, meaning students come into a Letters and Sciences

school similar to OSU's exploratory program, and they receive a general advisor to help them choose an area of study. Once the students narrow down their interests they get assigned more specific advisors. UMD's Sustainability Advisor program, which is different than the university's actual advisors, allow professors or student services staff to request students to present sustainability topics in first year or orientation courses. Next, College Park designed a sustainability teaching fellows program, which professors can attend and learn how to integrate sustainability topics into their courses. As a result of these workshops, college park boasts 185 participating faculty, 190 revised courses, and all 13 schools at the university now contain sustainability courses. The program is sponsored and managed by the University's Global Sustainability Institute and Office of Sustainability.

University of Colorado: Boulder

The University of Colorado: Boulder is an aspirational university. It has a total enrollment of about 33,200 students and is a branch campus of the University of Colorado.

Boulder boasts an environmental engineering program that is one of the largest of its kind with over 200 students. The program is multidisciplinary with faculty from Civil Engineering, Chemical Engineering, Mechanical Engineering, and Aerospace Engineering departments coming together in this one degree. Students also have the option of many minors and certificates within the college of engineering including Engineering Science and Society, Energy Engineering, and Renewable and Sustainable Energy (RSE), all of which are very interdisciplinary. Boulder's Leeds College of Business contains the Center for Education and Social Responsibility (CESR), which was ranked 6th in the nation for undergraduate sustainability programs. CESR houses two social responsibility certificates, and a master's program in sustainability. Outside of the EVEN Program, Boulder has two sustainability-

oriented majors: Environmental Studies and Environmental Design. Students in the Environmental Studies program receive a B.A. and are based out of Boulder's new Sustainability, Energy and Environment Complex (SEEC). This complex employs their own advisors, although the program itself is housed under the College of Arts and Sciences. The Environmental Design program functions as its own college, so they employ their own faculty, advisors, and staff. Students receive either a B.A. or B.S. in architecture or environmental design.

Lastly, UC Boulder offers one Masters of the Environment program. It is also housed under the College of Arts and Sciences. It allows for many specializations, which is where the degree gets its specific area of study. The multidisciplinary aspect comes from the variety of courses needed to satisfy the degree requirement. We were not able to speak directly with anyone at UC Boulder about their sustainability programs.

Penn State

Pennsylvania State University is a Big 10 school with a total enrollment of about 46,600 students at their University Park Campus. They house 24 branch campuses, however this analysis will focus on University Park, (outside of one notable mention), and not include their online World Campus.

One of the main things to note are the similarities between PSU's Community, Environment, and Development (CED) major and OSU's Environment, Economy, Development, and Sustainability (EEDS) major. OSU modeled EEDS after CED, although, Ohio State integrated their Fisher College of Business into the major. Penn State maintains a separate major in their Smeal College of Business that focuses more specifically on energy economics. Therefore, Penn State does not have an intercollege undergraduate major such as the EEDS

program at OSU. They offer a few intercollege graduate and minor options including: Civic and Community Engagement Science, Technology and Society, Sustainability Leadership, and Environmental Inquiry minors as well as Human Dimensions of Natural Resources and the Environment, and Ecology graduate programs. These programs are administered by an intercollege committee under the Office of the Vice President and Dean for Undergraduate Education. It is unclear whether or not an intercollege major will be created in the future at Penn State. Other notable programs include a supply chain major at their Harrisburg campus. Penn State also has a similar intercollege sustainability minor program to that of University of Maryland: College Park.

University of Wisconsin

The University of Wisconsin is a Big 10 school with a total enrollment of about 43,300 students. Also a branch campus system, this analysis will focus solely on UW-Madison, which is the main campus and therefore most comparable to OSU.

Similar to UC Boulder, UW Madison contains an Environmental Studies program which functions as its own college (Nelson Institute for Environmental Studies). It only contains one major, Environmental Studies, as well as two certificates: Environmental Studies and Sustainability. It also contains four graduate degrees: Environment and Resources, Environmental Conservation, Environmental Observation Informatics, and Water Resources Management, and two certificate programs: Culture, History, and Environment and Energy Analysis and Policy. Unlike UC Boulder's program, The Nelson Institute's faculty are housed in other departments such as engineering, geology, humanities, urban planning, etc. We could not contact UW-Madison for details on how this faculty allocation works. Wisconsin did not appear

to have any intercollege programs, according to its website. Notable strategies included a search by interest database for courses and programs.

University of Illinois

The University of Illinois is a Big 10 school and had a total enrollment of 47,826 in 2017. The Institute for Sustainability, Energy & Environment (iSEE) at Illinois is the university's center for sustainability research, campus initiatives, and education. The purpose of the institute is to bring interdisciplinary study themes to the school's curricular sustainability programs. Environmental sustainability courses can be found in Illinois' Department of Urban & Regional Planning, Department of Civil & Environmental Engineering, and Department of Natural Resources & Environmental Sciences.

Their programs are limited compared to other institutions, but Illinois contains a few of interest. Within iSEE, Illinois offers an interdisciplinary Certificate in Environmental Writing, which is a collaboration between the School for Earth, Society & the Environment and the English Department. The program is designed to introduce the interconnectedness of humans and nature, and then teach students how to communicate environmental research to the public.

II. Survey Methods

Our research team curated a survey to be distributed to approximately 53,000 current, OSU students through Qualtrics email services. The main objective was to ask students thoughtful questions in order to assess how they perceive Ohio State is administrating their sustainability curriculum. The survey was also designed to gauge students' interest in various sustainability related themes and courses so that the university could create or adjust current and future course offerings to reflect these interests. The final survey to be distributed to students

included a total of twenty two questions including multiple choice and extended response options to assess the diversity of respondents and account for potential bias in the results.

Given Ohio State's partnership with Qualtrics, an online surveying platform, we elected to design the survey using their services. Questions were drafted and then edited by various professors and university personnel. The survey then remained open from the 26th of March through the 2nd of April with one reminder email on the 28th of March. At the time of closing we had received 3,894 complete responses.

Data was analyzed using a breakout feature where data can be filtered by specific responses to a given question. We then created graphics and tables to understand our results and see trends clearly, which can be seen in the appendix. In doing this, we were able to see areas where students feel the university could improve, perhaps by comparing student interest in sustainability across various majors. We also utilized several features within excel. Throughout the next section we will reference charts and graphs which can be found in the appendix.

Survey Results/Analysis

Firstly, our survey asked respondents to select their rank, GPA, gender, and race/ethnicity. These questions were included as a way of determining potential biases in the data. We found there to be a very even distribution in respondents in regards to rank (Figure 18), but did not receive an even response rate based on current gender, GPA, or ethnicity (Figure 10, 19, 20). Final results could be slightly skewed as a result. There may be students who feel unable to participate in sustainability education at Ohio state if a student has a lower grade point average as they may feel disconnected from the university in general. Students may engage with themes involved around sustainability differently given gender and ethnicity. The uneven response rates

in these categories could have caused differing results in questions that ask about student interest in specific topics.

Based on the survey data, the student body is divided on whether or not the university has successfully integrated sustainability into coursework (Figure 15). However, it may be of concern that 54.3% of students do not feel as though Ohio State has prioritized sustainability education and 47.57% feel as though sustainability themes have not been incorporated into their courses. These results are especially relevant given that 85.52% of students believe that potential employers are interested in hiring students with sustainability related knowledge and skills (Figure 2).

In addition, only 7.06% of students have learned about sustainability in a course required for their major with 33.28% having responded that they have never learned about sustainability in any course at all (Table 6); 45% of those who responded said that they did not learn about sustainability in any course as a freshman. This may be an area of interest to the university so that they may develop programs geared towards educating freshman on sustainability in their first year.

Preference varied in regard to which sustainability-related course topics are of interest: 30.84% of students would willingly take a sustainability course as a general education requirement, a course offered through their major, or an elective (Figure 3); 24.96% of students would rather their experience with sustainability education come from a general elective (Figure 3). Students were least interested in taking a course offered through their major. This may be a perception that interesting sustainability topics are not associated with their major's core content. The university could encourage faculty to integrate these concepts into core class material.

Many students (44.55%) disagreed that they felt well informed about options to enroll or participate in sustainability programs at OSU and 6.45% of students *strongly* disagreed (Table 5). This result led us to believe that students feel they have not been exposed to sustainability studies because they were not aware that the courses were available. Given that 46.07% of students discovered their major online (Table 16), the university should seek to improve their online platforms so that these offerings are easier for students to find. This is even more important given that 47.79% (Table 18) of students from the sample decided their major before entering college and 76.84% (Table 18) of students responded they were unaware that OSU offered sustainability related majors and minors before beginning their course work at Ohio State. If information regarding sustainability programs is not well advertised on online platforms, students may not find out about them until they are well into a different program.

Along with online platforms, advisors inform students on their option to major in sustainability and other related majors, especially in the Explorers program; 35.15% of students choose their major after their first semester and 13.71% of students chose during their first semester (Table 18). This demonstrates that many students begin college unsure of what direction they would like to take with their studies. Advisors could help inform students about sustainability majors and minors when helping incoming freshman during orientation. This may help students find sustainability related majors before they begin taking classes in a different area of study that is of less interest to them.

The question that asked students how they discovered their major also had the option to select “Other” and then fill in a response. The majority of students who wrote in answers for this question answered that they discovered their major through a parent. It therefore may also be helpful to the university to reach out to prospective students’ parents to inform them of

sustainability majors, minors, and course offerings as the university continues to expand its curricular offerings.

We also found that many students have similar interests in both taking a course in a certain sustainability field as well as in the topic itself (Table 9). For example, when asked to select the topic or theme that interested them most, the highest response was “clean energy.” In conjunction with this when asked to select “which of the following classes would you be most interested in taking if offered by the university?” (Table 19) the most selected option was “The Future of Energy.” Based on the topics of interest indicated by students, we recommend the university consider adding more general education courses centered around this topic or possibly an entire discipline centered around the future of energy. Other areas of interest included climate change, sustainable food systems, and sustainable city planning. We also believe it is important that the University keep in mind the language being used when crafting these courses and or majors and minors. There was a high interest in sustainable food systems but a low interest in biodiversity and agriculture, which are all a part of a sustainable food system. This also re-emphasizes the idea of implementing classes that are cross disciplinary so that students understand the interlinkages between their studies and sustainability.

Lastly, we created a breakout report to analyze responses to the question “I believe I am well informed about my options to enroll or participate in sustainability courses, minors, majors, and other educational offerings at Ohio State University” based on students indicated majors and minors (Figure 23). We found that Engineering students were the number one responder for agree, disagree, and strongly disagree. Although there are many students enrolled in various engineering programs throughout the university this also demonstrates the importance of connecting this wide breadth of students to sustainability programming and course work. We also

want to acknowledge how this information could indicate gaps in students' knowledge of courses available to them. For example, the major with the second most responses in the strongly disagree category are psychology majors even though Ohio State offers courses such as "Psychology of Environmental Problems." Given that Ohio State has already made efforts to create cross disciplinary courses, the next step may be to advertise more heavily to students so that they are aware of the options available to them.

Challenges

Our main challenges were encouraging administrators from peer institutions to speak with us and marketing our survey to OSU students. The total survey responses may not be reflective of the entire campus population. We believe if the survey had been promoted more, we could have received additional feedback, which would allow us to see more obvious trends in how OSU's undergraduate students feel about integrating sustainability courses with their major.

Final Recommendations

Our final recommendations reflect both our benchmarking and survey results. Any interesting communication strategies, academic programs, or curriculum structures that could be directly supported by student preferences were compiled into a list of potential recommendations for bettering Ohio State's sustainability curriculum. These were then reviewed by the team's advisor, Gina Hnytka, and prioritized based on feasibility and relevance. Specific logistical barriers, such as funding, were disregarded for these particular recommendations:

- Establish a search by interest database for available programs, including by department, school, college, keyword, and rank.

- Establish or expand academic programs in clean energy, sustainable food systems, climate change and sustainable technology.
- Create a sustainability GE requirement for all undergraduate students.
- Engage students early on through presentations in their orientation classes or high school.
- Design training for student services staff and academic advisors in more theme areas, or other disciplines.
- Incorporate student survey feedback into the language and communication of programs.

Conclusion

Through our research we have found that no other universities are tackling sustainability using the four leaf clover sustainability framework. Universities are co-teaching and house courses which address each of the clover areas, but there are no full programs containing intercollege partnerships in all discipline areas. Ohio State has shown initiative by pursuing this path and could very well be a trailblazer for this model. OSU has done an excellent job crafting degree programs and courses geared toward sustainability, but many students feel unable to participate, or are unaware of, these programs. The university should work to better communicate with students through online research databases, outreach, and advertisements to students. Although we have found many students feel the university is already making strides towards introducing sustainability themes in both general education classes and in core major classes, we believe the university could still work to make courses more cross-disciplinary. It is clear through our results that other universities and Ohio State students perceive sustainability knowledge and skills as highly sought after in the job market. For these reasons, Ohio State should engage students of all backgrounds with sustainability. Creating a general education class will introduce students to topics that are of interest to them, but they may not select the class that

will teach them applicable sustainability related skills for their job of choice, so in addition to a GE, the university should work to integrate sustainability themes that students find interesting into all majors. We believe these efforts will have a positive response from both students and staff as well as among other collegiate institutions. By implementing cross disciplinary sustainability education, students will learn to think more innovatively so they may be leaders of a better world and proud legacies of The Ohio State University.

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- Debbie Lewis, Leader of Program Development and Evaluation, CFAES
- Dawn Wallace-Pascoe, Resource Planning Analyst, Office of Academic Affairs
- Kim Showaltar, Program Accountability Specialist, CFAES

APPENDIX A: METADATA

Dataset #1: ArizonaStateUniversity.docx

Source: Lisa Murphy, Director of Academic Services for Arizona State University. Phone: 480-965-7255 Email: Lisa.M.Murphy@asu.edu

Description: Notes from phone interview with Lisa Murphy regarding the Arizona State sustainability curricular offerings and challenges with implementation. Questions included:

- Do you have any sustainability or environmental undergrad majors, minors and dual degree programs?
- Do you have any sustainability or environmental graduate/masters programs?
- Do you have any sustainability or environmental degree enhancement certificate, transcript designation, or global options?
- Are any of these curricular sustainability/environment programs interdisciplinary?
- How are these sustainability or environmental programs administered? Where do the resources come from?
- Are faculty teaching (co-teaching) in joint disciplines on these topics? How?
- Is there an incentive for instructors to teach an interdisciplinary course? What is it?
- How did the university build their environment and sustainability programs and attract students?
- Do you have communication strategies or resources for sustainability/environmental programs such as centers or resources where students can go to learn about what to study or peak their interest?
- What are the benefits of working between departments to implement an interdisciplinary sustainability curriculum, how do you communicate between departments?
- What were the challenges to implementing an interdisciplinary sustainability/environment curriculum?
- How does the university gauge the success of an interdisciplinary sustainability/environment curriculum?
- Have employers given any feedback on what they think of these sustainability/environmental interdisciplinary programs?

Dataset #2: UofMichigan.docx

Source: Elizabeth LaPorte, Program Officer for University of Michigan. Phone: 734-647-6227 Email: elzblap@umich.edu

Description: Notes from phone interview with Lisa Murphy regarding the University of Michigan sustainability curricular offerings and challenges with implementation. Questions included:

- Do you have any sustainability or environmental undergrad majors, minors and dual degree programs?
- Do you have any sustainability or environmental graduate/masters programs?

- Do you have any sustainability or environmental degree enhancement certificate, transcript designation, or global options?
- Are any of these curricular sustainability/environment programs interdisciplinary?
- How are these sustainability or environmental programs administered ? Where do the resources come from?
- Are faculty teaching (co-teaching) in joint disciplines on these topics? How?
- Is there an incentive for instructors to teach an interdisciplinary course? What is it?
- How did the university build their environment and sustainability programs and attract students?
- Do you have communication strategies or resources for sustainability/environmental programs such as centers or resources where students can go to learn about what to study or peak their interest?
- What are the benefits of working between departments to implement an interdisciplinary sustainability curriculum, how do you communicate between departments?
- What were the challenges to implementing an interdisciplinary sustainability/environment curriculum?
- How does the university gauge the success of an interdisciplinary sustainability/environment curriculum?
- Have employers given any feedback on what they think of these sustainability/environmental interdisciplinary programs?

Dataset #3: UMD_Interview.docx

Source: Robert Hunt Sprinkle, Associate Professor Public Policy, University of Maryland: College Park. <sprinkle@umd.edu>

Description: Notes from phone interview with Robert Sprinkle on March 20th, 2018 regarding the University of Maryland sustainability curricular offerings and challenges.

Questions included:

- Can you talk about how the sustainability minor program at Maryland started?
- How did you recognize the demand for sustainability education? How did you know there was a demand?
- Are faculty teaching (co-teaching) in joint disciplines on these topics?
- Is there an incentive for instructors to teach an interdisciplinary course? What is it?
- How did the Sustainability Teaching Fellows Program start?

Dataset #4: UMDStudent_Interview.docx

Source: Gannon Kese, Junior studying Environmental Science Technology, University of Maryland: College Park. <Gkese@terpmail.umd.edu>

Description: Notes from phone interview on April 9th, 2018 with UMD student, Gannon Kese, regarding the University of Maryland sustainability curricular path and presence on campus.

Questions included:

- What is your current rank?
- Please share your major and minor
- What made you want to pursue your major, how did UMD help you find it?
- Do you know anything about Sustainability Advisors through UMD’s sustainability office?
- Specifically, does UMD have communication strategies or resources for sustainability/environmental programs such as centers or resources where students can go to learn about what to study or peak their interest?
- Does UMD have a sustainability GE?
- Were you aware that your school offered sustainability related majors and minors before you began your coursework there?
- I was able to learn about sustainability in: (mark all that apply)
- Were you familiar with how to schedule and participate in sustainability related courses right away or too late?
- How does the university make students WANT to learn about sustainability/ want to integrate it into their career?
- How “visible” is their university’s sustainability programming? Do other students know about it?
- What attracted you to your preferred sustainability program or course?
- Do you prefer interdisciplinary courses and programming? Why or why not?

Dataset #5: Survey Results

Source: Qualtrics.com & OSU undergraduate students

Description: After surveying around 3,900 students from Ohio State University, we were able to make conclusions from the received the results below.

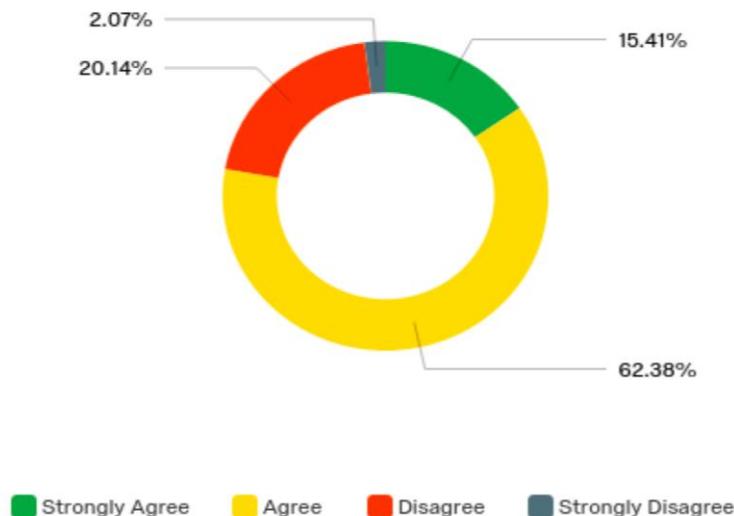


Figure 2. Results to “I believe potential employers are interested in hiring students with sustainability knowledge and skills.”

#	Answer	%	Count
1	Strongly Agree	15.41%	573
2	Agree	62.38%	2320
3	Disagree	20.14%	749
4	Strongly Disagree	2.07%	77
	Total	100%	3719

Table 2: Results to “I believe potential employers are interested in hiring students with sustainability knowledge and skills.”

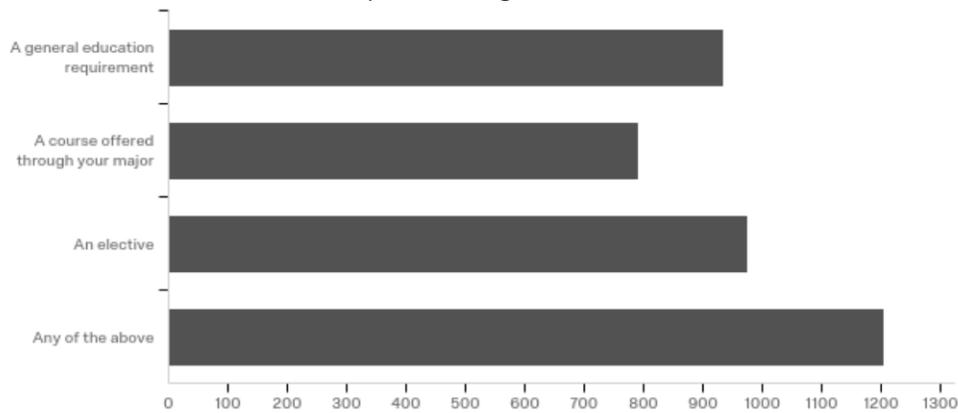


Figure 3. Results to “if I had the opportunity to take a sustainability course what would you like it to be?”

#	Answer	%	Count
1	A general education requirement	23.93%	935
2	A course offered through your major	20.27%	792
3	An elective	24.96%	975
4	Any of the above	30.84%	1205
	Total	100%	3907

Table 3. Results to “if I had the opportunity to take a sustainability course what would you like it to be?”

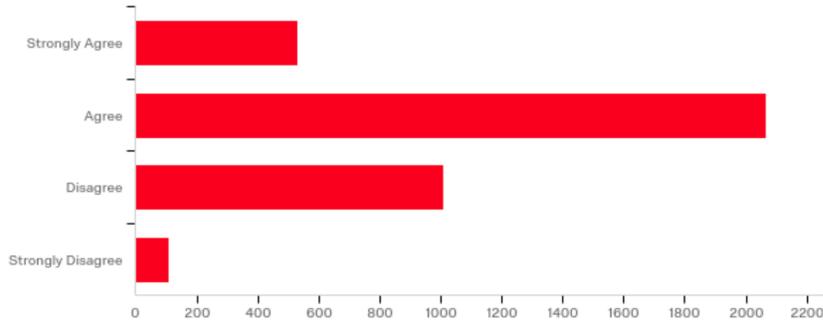


Figure 4. Results to “I am aware of and able to be involved in sustainability-related programs, organizations, and other campus learning opportunities regardless of my major.”

#	Answer	%	Count
1	Strongly Agree	14.30%	532
2	Agree	55.56%	2067
3	Disagree	27.18%	1011
4	Strongly Disagree	2.96%	110
	Total	100%	3720

Table 4. Results to “I am aware of and able to be involved in sustainability-related programs, organizations, and other campus learning opportunities regardless of my major.”

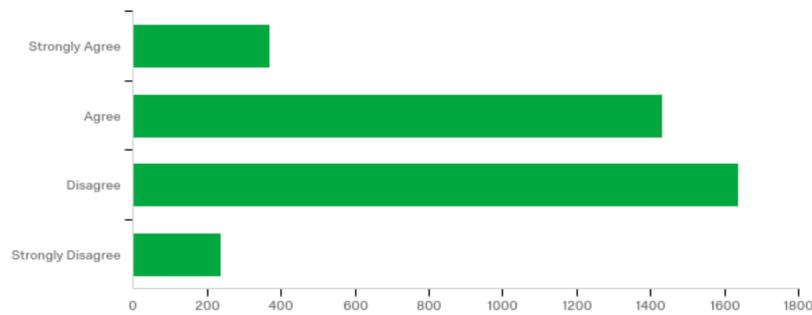


Figure 5. Results to “I believe I am well informed about my options to enroll or participate in sustainability courses, minors, majors, and other educational offerings at Ohio State University.”

#	Answer	%	Count
1	Strongly Agree	10.06%	370
2	Agree	38.94%	1432
3	Disagree	44.55%	1638
4	Strongly Disagree	6.45%	237
	Total	100%	3677

Table 5. Results to “I believe I am well informed about my options to enroll or participate in sustainability courses, minors, majors, and other educational offerings at Ohio State University.”

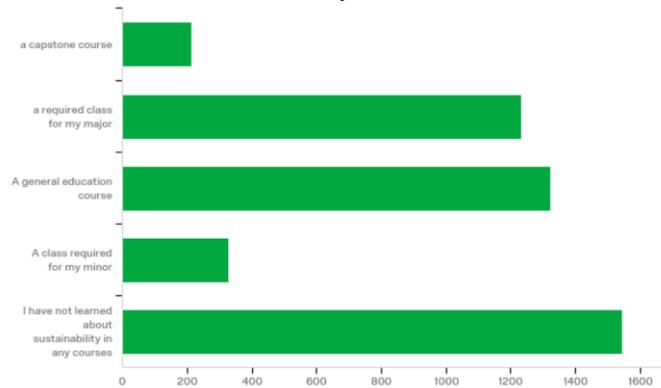


Figure 6. Results to “I was able to learn about sustainability in: (mark all that apply)”

#	Answer	%	Count
1	a capstone course	4.61%	214
2	a required class for my major	26.54%	1233
3	A general education course	28.52%	1325
4	A class required for my minor	7.06%	328
5	I have not learned about sustainability in any courses	33.28%	1546
	Total	100%	4646

Table 6. Results to “I was able to learn about sustainability in: (mark all that apply)”

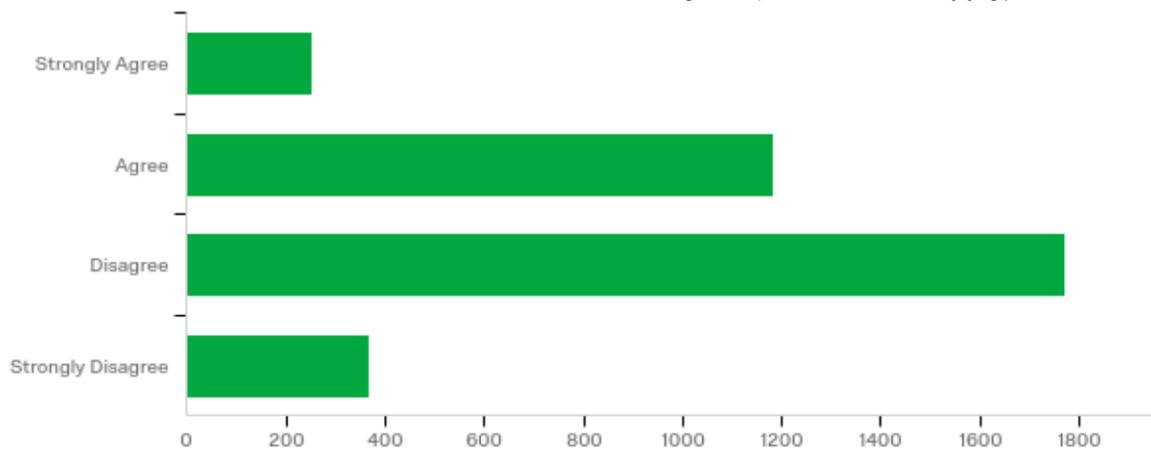


Figure 7. Results to “I have had the opportunity to learn about sustainability through project-based or experiential learning”

#	Answer	%	Count
1	Strongly Agree	7.02%	251
2	Agree	33.08%	1182
3	Disagree	49.59%	1772
4	Strongly Disagree	10.30%	368
	Total	100%	3573

Table 7. Results to “I have had the opportunity to learn about sustainability through project-based or experiential learning”

Theme/Topic	Responses
1) Clean Energy	1920
2) Sustainable Food Systems	1749
3) Climate Change	1732
4) Sustainable Technology & Innovations	1392
5) Sustainability in Business	1275
6) Water Quality	1204
7) Waste	1162
8) Clean Water Security	1152
9) Environmental Policy	1064
10) Transportation	1043
11) Sustainable Land Use	962
12) Biodiversity	877
13) Agriculture	699
14) Soil Health	293

Table 8. Results to “which of the following themes/topics would you like to know more about through classes, activities, and organizations?”

#	Answer	%	Count
1	Clean Energy	11.62%	1920
2	Sustainable Food Systems	10.58%	1749
3	Biodiversity	5.31%	877
4	Agriculture	4.23%	699

2) Orientation	570
3) Emails to accepted students	352
4) Advertising	218
5) Social Media	196
6) Required GE	82
7) Flyers and Posters	76

Table 10. Write in answers to “please share your recommendations for how Ohio State can better communicate about the breadth of academic programs relating to sustainability.”

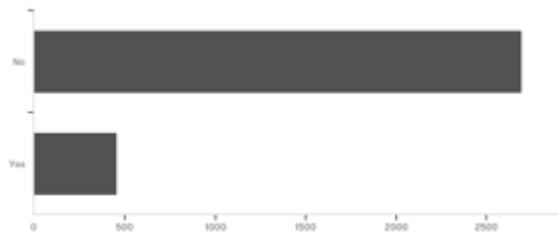


Figure 9. Results to “were you aware that OSU offered sustainability related majors and minors before you began your coursework at Ohio State?”

#	Answer	%	Count
1	No	76.84%	2691
2	Yes	13.05%	457
3	if yes which majors and minors were you aware of?	10.11%	354
	Total	100%	3502

Table 12. Results to “were you aware that OSU offered sustainability related majors and minors before you began your coursework at Ohio State?”

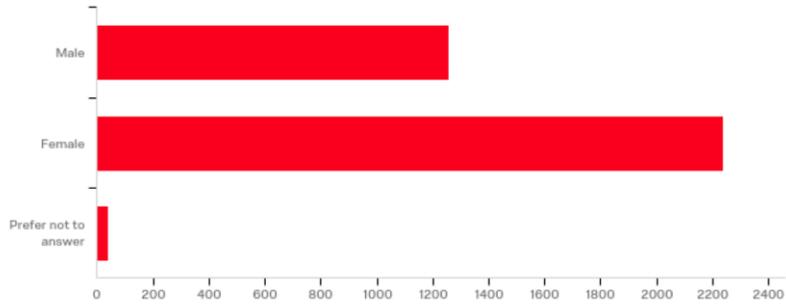


Figure 10. Gender of people who participated in the survey.

#	Answer	%	Count
1	Male	35.58%	1259
2	Female	63.29%	2240
3	Prefer not to answer	1.13%	40
	Total	100%	3539

Table 12. Gender of people who participated in the survey.

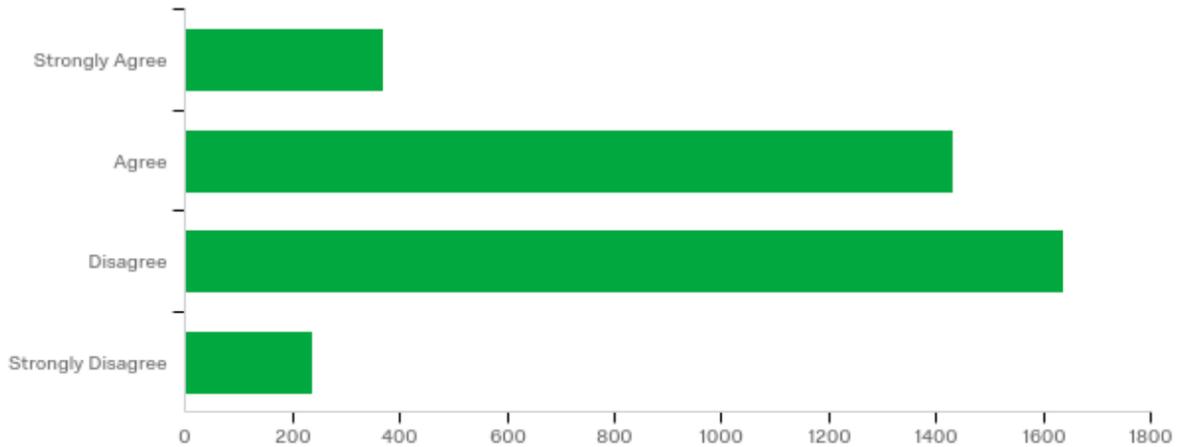


Figure 11. Results to “I believe I am well informed about my options to enroll or participate in sustainability courses, majors, and other educational offerings at Ohio State University.”

#	Answer	%	Count
1	Strongly Agree	10.06%	370
2	Agree	38.94%	1432
3	Disagree	44.55%	1638

4	<i>Strongly Disagree</i>	6.45%	237
	<i>Total</i>	100%	3677

Table 13. Results to “I believe I am well informed about my options to enroll or participate in sustainability courses, majors, and other educational offerings at Ohio State University.”

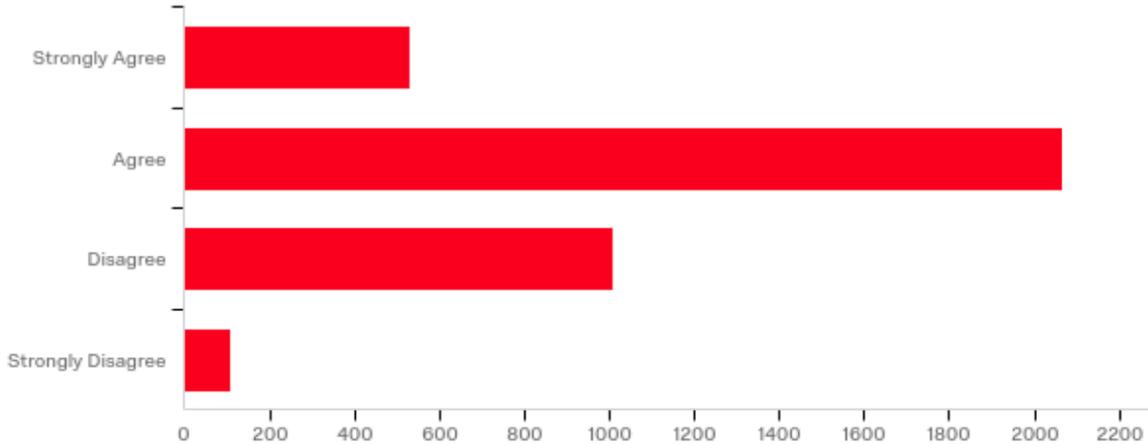


Figure 12. Results to “I am aware of and able to be involved in sustainability-related programs, organizations, and other campus learning opportunities regardless of my major.”

#	Answer	%	Count
1	<i>Strongly Agree</i>	14.30%	532
2	<i>Agree</i>	55.56%	2067
3	<i>Disagree</i>	27.18%	1011
4	<i>Strongly Disagree</i>	2.96%	110
	<i>Total</i>	100%	3720

Table 14. Results to “I am aware of and able to be involved in sustainability-related programs, organizations, and other campus learning opportunities regardless of my major.”

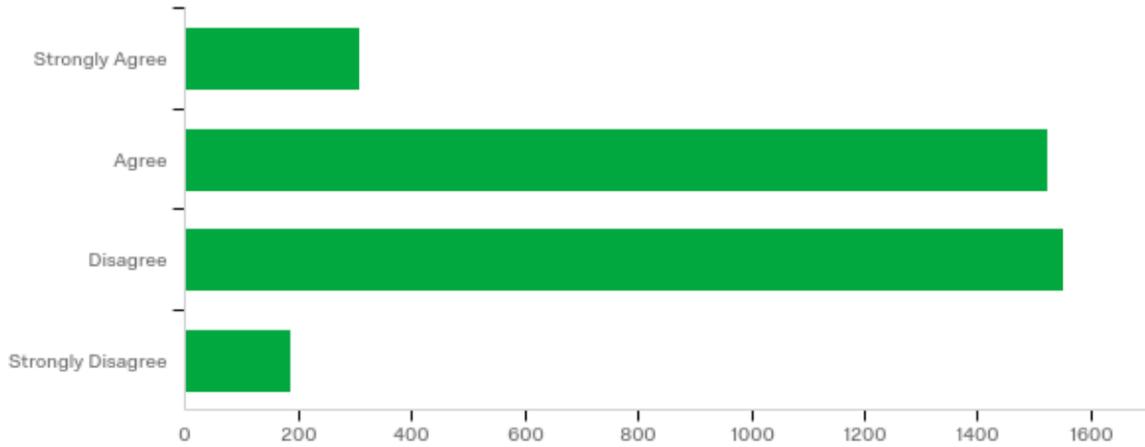


Figure 13. Results to “my interest in engaging with sustainability learning and education has increased due to the educational offerings and programs Ohio State provides.”

#	Answer	%	Count
1	Strongly Agree	8.65%	309
2	Agree	42.72%	1526
3	Disagree	43.45%	1552
4	Strongly Disagree	5.18%	185
	Total	100%	3572

Table 15. Results to “my interest in engaging with sustainability learning and education has increased due to the educational offerings and programs Ohio State provides.”

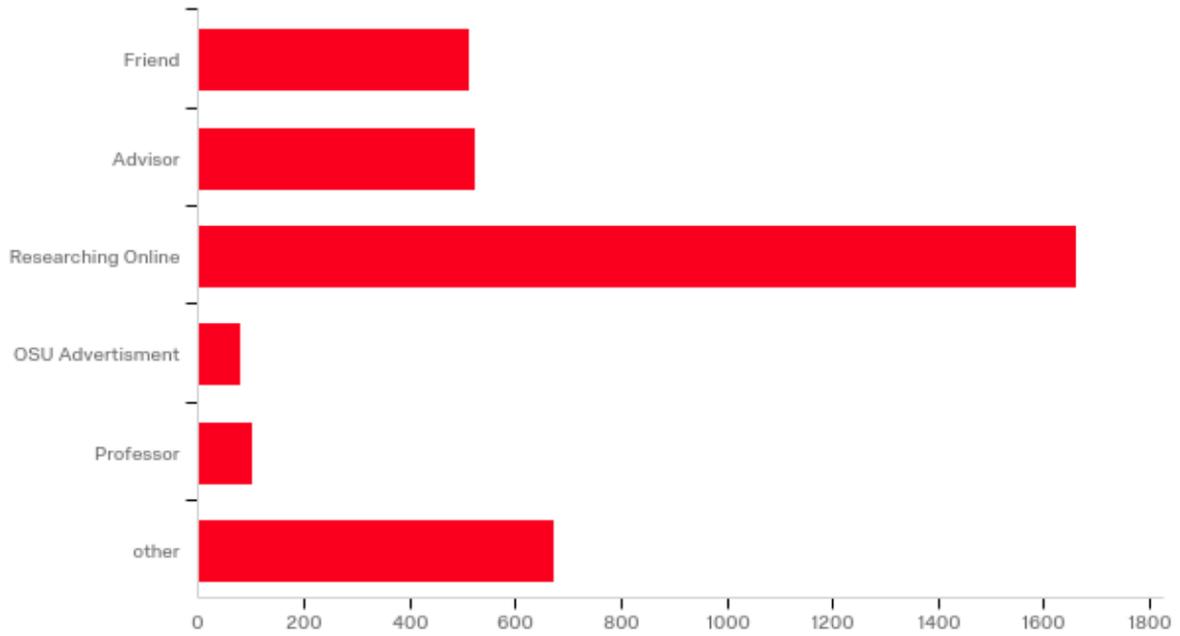


Figure 14. Results to “how did you find out about your major?”

#	Answer	%	Count
1	Friend	14.44%	514
2	Advisor	14.78%	526
3	Researching Online	46.70%	1662
4	OSU Advertisement	2.22%	79
5	Professor	2.92%	104
6	other	18.94%	674
	Total	100%	3559

Table 16. Results to “how did you find out about your major?”

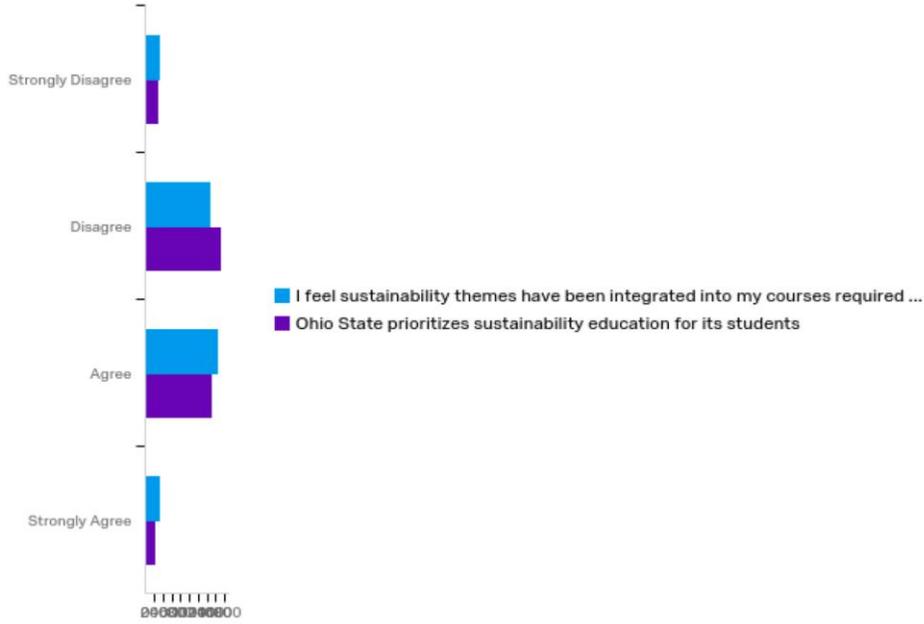


Figure 15. Results to “think about all the classes you have been required to take in order to graduate from Ohio State. Would you agree or disagree with the following statements?”

#	Question	Strongly Disagree		Disagree		Agree		Strongly Agree		Total
1	I feel sustainability themes have been integrated into my courses required for graduation	8.91%	337	38.66%	1463	43.58%	1649	8.85%	335	3784
2	Ohio State prioritizes sustainability education for its students	8.12%	306	46.18%	1741	40.08%	1511	5.62%	212	3770

Table 16. Results to “think about all the classes you have been required to take in order to graduate from Ohio State. Would you agree or disagree with the following statements?”

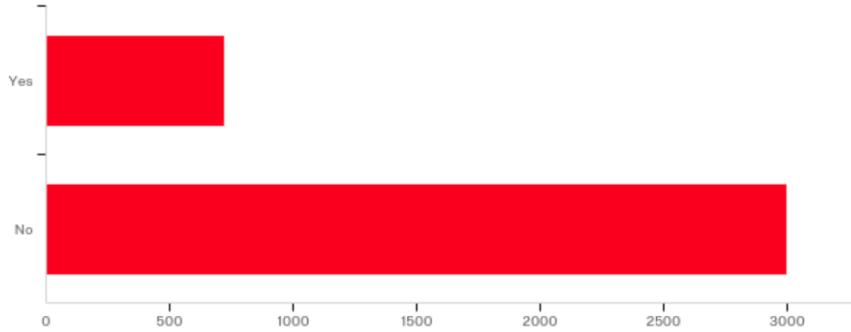


Figure 16. Results to “have you enrolled in any elective courses focused on sustainability topics outside of those courses required for you in your major or minor program?”

#	Answer	%	Count
1	Yes	19.39%	721
2	No	80.61%	2998
	Total	100%	3719

Table 17. Results to “have you enrolled in any elective courses focused on sustainability topics outside of those courses required for you in your major or minor program?”

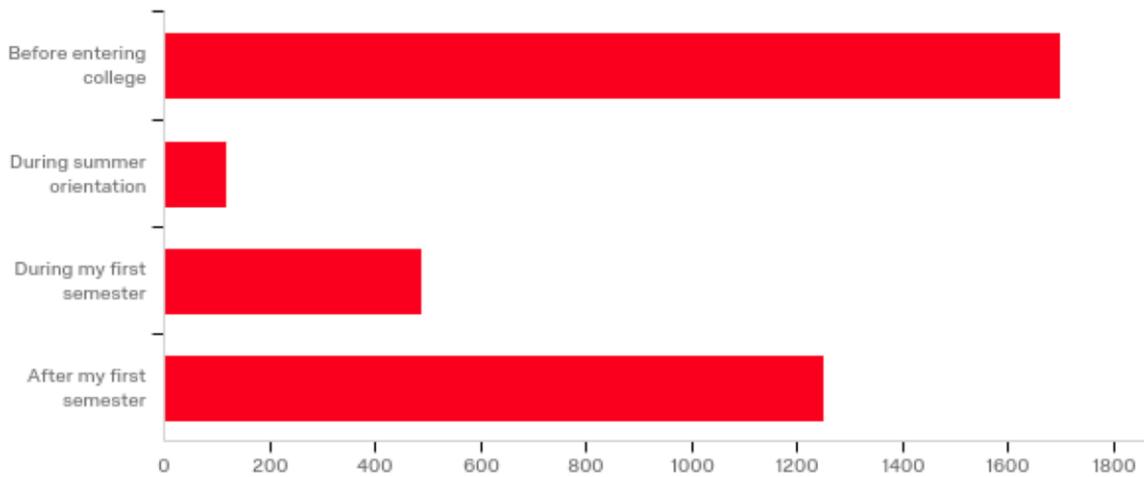


Figure 17. Results to “when did you decide your current major?”

#	Answer	%	Count
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1	<i>Before entering college</i>	47.79%	1701
2	<i>During summer orientation</i>	3.34%	119
3	<i>During my first semester</i>	13.71%	488
4	<i>After my first semester</i>	35.15%	1251
	<i>Total</i>	100%	3559

Table 18. Results to “when did you decide your current major?”

#	Answer	%	Count
1	<i>Greening the Economy: Sustainable Cities</i>	9.85%	1374
2	<i>Municipal Solid Waste Management in the USA and Developing Nations</i>	2.69%	375
3	<i>Intro to Environmental Law and Policy</i>	5.78%	806
4	<i>The Future of Energy</i>	12.39%	1728
5	<i>Ecosystem Services: A Method for Sustainable Development</i>	4.32%	603
6	<i>Intro to Sustainability</i>	8.11%	1131
7	<i>Electric Industry Operations and Markets</i>	2.32%	324
8	<i>Global Warming: The Science and Modeling of Climate Change</i>	7.97%	1112
9	<i>Climate Change and International Development</i>	6.44%	898
10	<i>Environmental Ethics</i>	6.81%	950
11	<i>Into to Public Health</i>	6.88%	960
12	<i>Smart Technologies - Applicable Programs for Careers in Sustainability</i>	6.54%	912
13	<i>Water Scarcity</i>	7.48%	1043
14	<i>Food Sovereignty and Environmental Justice</i>	6.36%	887
15	<i>Sustainability in Sports</i>	6.05%	844
	<i>Total</i>	100%	13947

Table 19. Results of “which of the following classes would you be most interested in taking if offered by the university? (choose up to 5)”

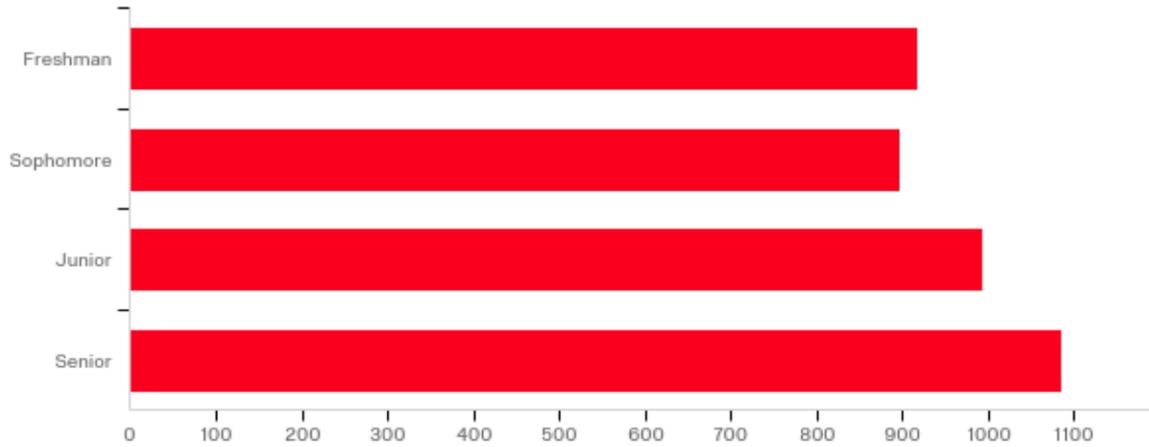


Figure 18. Results to “what is your current rank?”

#	Answer	%	Count
1	Freshman	23.55%	917
2	Sophomore	23.06%	898
3	Junior	25.50%	993
4	Senior	27.89%	1086
	Total	100%	3894

Table 20. Results to “what is your current rank?”

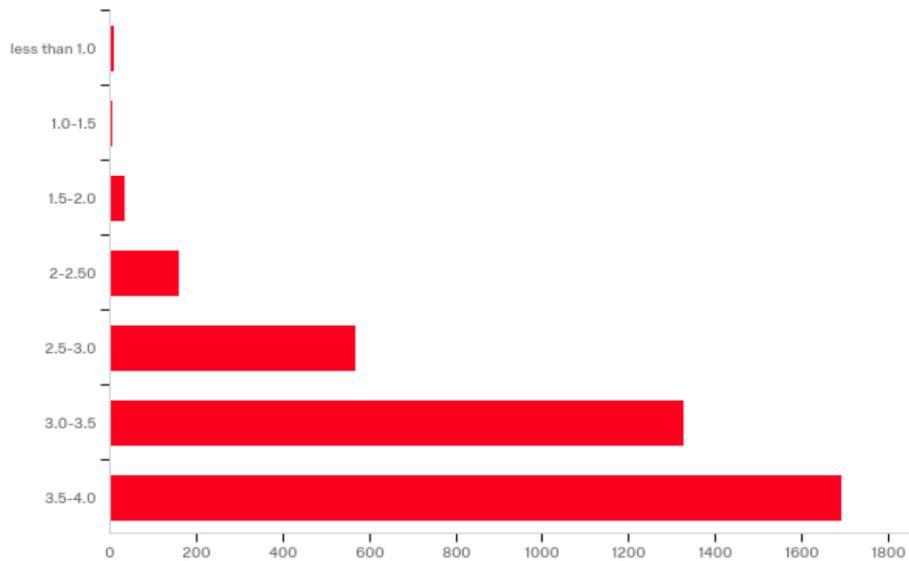


Figure 19. Results to “what is your current GPA?”

#	Answer	%	Count
1	less than 1.0	0.21%	8
2	1.0-1.5	0.16%	6
3	1.5-2.0	0.92%	35
4	2-2.50	4.21%	160
5	2.5-3.0	14.99%	570
6	3.0-3.5	34.93%	1328
7	3.5-4.0	44.58%	1695
	Total	100%	3802

Table 21. Results to “what is your current GPA?”

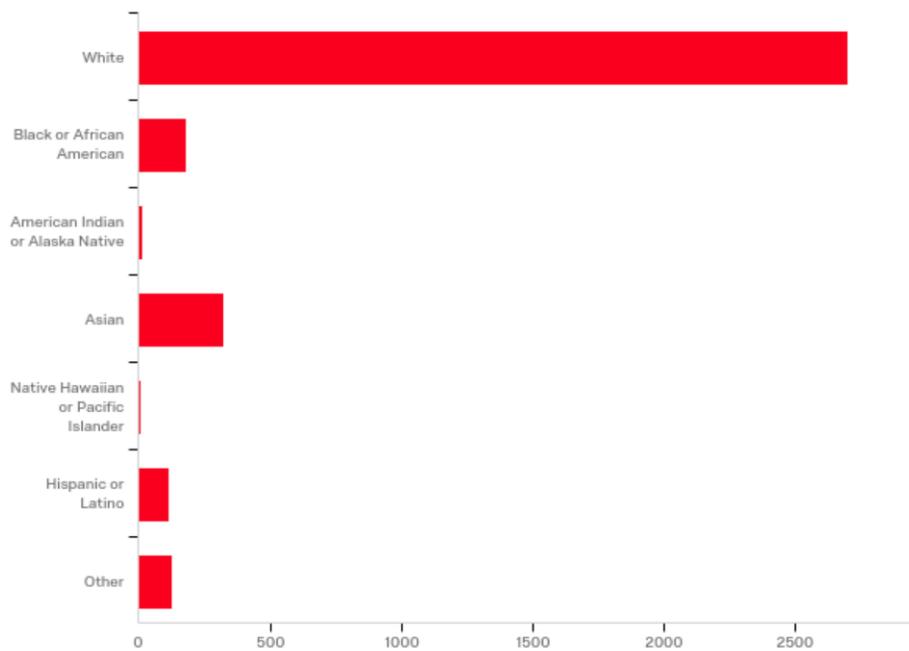


Figure 20. Results to “what is your race/ethnicity?”

#	Answer	%	Count
1	White	77.83%	2703
2	Black or African American	5.21%	181
3	American Indian or Alaska Native	0.35%	12
4	Asian	9.42%	327

5	<i>Native Hawaiian or Pacific Islander</i>	0.29%	10
6	<i>Hispanic or Latino</i>	3.31%	115
7	<i>Other</i>	3.60%	125
	<i>Total</i>	100%	3473

Table 22. Results to “what is your race/ethnicity?”

Strongly Agree		Agree		Disagree		Strongly Disagree	
Major	# of students	Major	# of students	Major	# of students	Major	# of students
EEDS	38	Engineering	167	Engineering	238	Engineering	37
Biology	23	Business	130	Biology	153	Psychology	19
Health Studies	20	Psychology	73	Business	115	Business	16
Economics	15	Foreign Language	72	Psychology	114	Biology	11
Public Affairs	15	Health Studies	58	Health Studies	111	Computer science	11

Table 23: Results to “I believe I am well informed about my options to enroll or participate in sustainability courses, minors, majors, and other educational offerings at Ohio State University.” broken down by students indicated major or minor