Should I Major in Sustainability?

Review of 100 institutions' websites from a student perspective

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Abstract

In the face of complex social and ecological crises, higher education institutions (HEIs) are under pressure to prepare ecologically literate graduates, skilled sustainability professionals, and effective and resilient change agents. In response to these demands, interdisciplinary environmental and sustainability programs have proliferated at colleges and universities over the past two decades. This report documents a website review of sustainability programs at 100 U.S. HEIs, purposely selected for institutional and regional diversity. The researchers, who were themselves student interns at the Global Council for Science and the Environment, examined sustainability and sustainability-related degrees and program offerings at each institution. The report provides insight into sustainability education and the needs and interests of various stakeholders, concluding with recommendations for further research and a more comprehensive program census.

Background

The Global Council for Science and the Environment

The Global Council for Science and the Environment (GCSE[1]) is a Washington, D.C.-based non-governmental organization which, since the 1990s, has had a mission to span boundaries of knowledge and decision-making to address environmental and sustainability challenges. The organization currently advances this line of work through the *Pathways toward Accreditation for Sustainability and Sustainability-Related Programs* initiative (P2A). The initiative, funded by the Cynthia and George Mitchell Foundation and in partnership with Arizona State University, has four components:

(1) Inclusive participation from high-level Advisory Council (SELAC), GCSE member Community of Practice, public roundtables, and an interactive GCSE website;
(2) Development of the Key Competencies in Sustainability Education framework;
(3) Professional development and capacity-building for program directors, faculty, and students;
(4) Exploring and developing accreditation standards for sustainability degree programs

The goal of the P2A initiative is to strengthen sustainability programs by establishing a shared reference framework for sustainability education, paired with best practices to guide quality, accessible, and context-sensitive teaching, learning, and assessment.

[1] The Global Council for Science and the Environment (GCSE) was formerly known as the National Council for Science and the Environment (NCSE)

Developing the Key Competencies in Sustainability Education framework (see Brundiers et al. 2021) requires preliminary research assessing the scope and scale of higher education sustainability programs. This research assists GCSE and the greater higher education community in examining the current state of sustainability education to assess convergence, divergence, and emergence across program outcomes.

About the Researchers

Harrison Freiman and Patrick Grady were students working at GCSE from January 2023 - June 2023 as a part of Northeastern University's cooperative education program. At Northeastern University, Harrison studies Political Science and Environmental Studies. While at GCSE, Harrison supported programs and research, working with Senior Advisor Krista Hiser with the Pathways to Accreditation initiative and senior fellow Amy Zimmer-Faust with the Department of Energy's Local Climate Action project. Outside of environmental and political research and reporting, Harrison enjoys philosophy and sustainable fashion.

Patrick Grady is majoring in Philosophy with a concentration in Law & Ethics and minoring in Information Ethics, International Affairs and Spanish. At GCSE, Patrick supported communications, membership, and events, including drafting content documents for GCSE's communications - *Pathways* and *The Connection*. Outside of work Patrick enjoys spending time with his dogs and listening to music.

As current students with interests in environmental and sustainability careers, the researchers' perspective provides a unique lens into how students navigate program websites and choose programs to meet their education and career goals.

I. Introduction

A 2017 report published by the National Council for Science and the Environment (NCSE)[2], *Scope of Interdisciplinary Environmental, Sustainability, and Energy Baccalaureate and Graduate Education in the United States,* outlines the rise in interdisciplinary environmental, sustainability, and energy (IESE) program adoption and implementation across US institutions. Data from similar NCSE reports in 2008, 2012, and 2016 illustrate rapidly expanding IESE education in higher education programs; simultaneously, sustainability "across the curriculum" is contextualizing other disciplines and professional studies.[3] Cumulatively, these reports emphasize the importance of developing IESE

[2] The National Council for Science and the Environment (NCSE) is now called the Global Council for Science and the Environment (GCSE).

[3] Vincent, S, S Rao, Q Fu, K Gu, X Huang, K Lindaman, E Mittleman, K Nguyen, R Rosenstein, and Y Suh. "Scope of Interdisciplinary Environmental, Sustainability, and Energy Baccalaureate and Graduate Education in the United States." Washington, D.C.: National Council for Science and the Environment, 2017.

education and recognizing the trajectory of current and future IESE program prominence in national education.
Since those historical reports, there has been an undeniable rise in demand for sustainability skills and experience as demonstrated by industry reports by Microsoft[4], LinkedIn[5], Deloitte[6], and the World Economic Forum. Employers spanning various sectors are realizing the importance of integrating sustainability into business/industry programs and strategic plans. For example, in their 2023 *Future of Jobs Report* the World Economic Forum describes sustainability specialists as one of the fastest growing job roles globally.[7] Thus, there is clear and growing demand for graduates with education and skills to fill these positions in the professional sphere.

In its 2020 report, *Strengthening Sustainability Programs and Curricula at the Undergraduate and Graduate Levels,* the National Academies of Science, Engineering, and Medicine (NASEM) outlined the origins of sustainability science as a discipline, sustainable development as a practice, and how these objects of study have been integrated into higher education. According to a 2013 report on *Interdisciplinary Environmental and Sustainability Education on the Nation's Campuses*[8], undergraduate programs cluster around three disciplinary areas– natural science, social science, and interdisciplinary sustainability solutions emphases, respectively – while graduate programs tend to cluster around two – natural systems and sustainability solutions.[9] Sustainability education programs in general promote common goals that correlate with initiatives to advance global engagement on the United Nations' Sustainable Development Goals (SDGs). However, inconsistencies in framing and focus of programs persists across higher education programs.

While there are no shared professional standards for sustainability degrees, many scholars have defined core sustainability competencies[10]. The Key Competencies in Sustainability, originally

[4] Microsoft. "Closing the Sustainability Skills Gap: Helping Businesses Move from Pledges to Progress," 2022. https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE5bhuF., p.11

[5] LinkedIn. "LinkedIn Global Green Skills Report." Sunnyvale, CA: LinkedIn, 2022.

[6] Philip, Pradeep, Claire Ibrahim, and Emily Hayward. "Work toward Net Zero | Deloitte Global." Deloitte, 2022. https://www.deloitte.com/global/en/issues/climate/work-toward-net-zero.html.

[7] World Economic Forum. "The Future of Jobs Report 2023." World Economic Forum, April 30, 2023. https://www.weforum.org/reports/the-future-of-jobs-report-2023/in-full/.

[8] Vincent, Shirley, Stevenson Bunn, and Lilah Sloane. "Interdisciplinary Environmental and Sustainability Education on the Nation's Campuses 2012: Curriculum Design." Washington, D.C.: National Council for Science and the Environment, 2013.

[9] National Academies of Sciences, Engineering, and Medicine. *Strengthening Sustainability Programs and Curricula at the Undergraduate and Graduate Levels*. Washington, D.C.: The National Academies Press, 2020. https://doi.org/10.17226/25821.

[10] E.g., Wiek, Arnim, Lauren Withycombe, and Charles L. Redman. "Key Competencies in Sustainability: A Reference Framework for Academic Program Development." Sustainability Science 6, no. 2 (July 1, 2011): 203–18. https://doi.org/10.1007/s11625-011-0132-6.; Bianchi, G. (2020). Sustainability Competences (JRC123624). Publications Office of the European Union. https://doi.org/10.2760/200956 ; Australian Council of Environmental Deans and Directors, 2015

defined by Wiek et al. (2011)[11] are among the most cited, and in recent years, they have been updated and refined by scholars and experts[12]. Implementing the Key Competencies in Sustainability into higher education involves a complementary shift in academic programs and also within those organizations and institutions that employ sustainability initiatives.

In this study, we continue the conversation from a) GCSE census reports on the prominence of interdisciplinary environmental and sustainability programs among US HEIs and b) the NASEM report surrounding the framing and focus of sustainability programs at US HEIs, from the viewpoint of a key stakeholder in this conversation: prospective students.

We take this approach for several reasons. Firstly, this is the stakeholder group with which the researchers, as current students, most closely identify. Second, students are essential investors and customers of the higher education system, and degrees in the United States are an increasingly expensive product. Therefore, students have substantial financial stakes in degree programs, as well as their post-graduate earning potentials. In addition, while Generation Z and younger generations are believed to have more concern, and anxiety, about climate change and sustainability than previous generations, it is unclear whether these feelings influence decisions on whether to attend college and which kinds of degrees to pursue[13]. All students entering higher education are concerned with credibility and accountability, and this applies especially to sustainability as an emergent discipline and area of professional preparation.

Research Questions

1. How common are sustainability programs across US HEIs at various institution types?
2. How are sustainability programs described on institutions' websites?
3. What are the similarities and differences between sustainability degree programs and degree programs in related disciplines?
4. What is the relationship between the presence of sustainability programs and campus sustainability commitments?

[11] Wiek, Arnim, Lauren Withycombe, and Charles L. Redman. "Key Competencies in Sustainability: A Reference Framework for Academic Program Development." *Sustainability Science* 6, no. 2 (July 1, 2011): 203–18. https://doi.org/10.1007/s11625-011-0132-6.

[12] Brundiers, Katja, Matthias Barth, Gisela Cebrián, Matthew Cohen, Liliana Diaz, Sonya Doucette, W. Dripps, et al. "Key Competencies in Sustainability in Higher Education—toward an Agreed-upon Reference Framework." *Sustainability Science* 4 (January 1, 2021): 213. https://doi.org/10.1007/s11625-020-00838-2.

[13] Roca-Barcelo, Aina, Allison M. Gaines, Annalisa Sheehan, Rhiannon Thompson, Rosemary C. Chamberlain, Brendan Bos, and Richard Neil Belcher. "Making Academia Environmentally Sustainable: A Student Perspective." The Lancet Planetary Health 5, no. 9 (September 1, 2021): e576–77. https://doi.org/10.1016/S2542-5196(21)00199-6.

II. Methodology

The purpose of the research was to gain a current understanding of what higher education institutions offer in terms of formal and informal sustainability education, including sustainability-focused degree programs. One hundred websites were examined in total, selected to represent different institutional types (including federally-designated minority serving institutions and tribal colleges), sizes, and regions, as well as institutions that do and do not participate with organizations such as Advancement of Sustainability in Higher Education (AASHE)'s Sustainability Tracking, Assessment, & Rating System (STARS), Times Higher Education Impact Rankings, and GCSE. The researchers were given the selected institutions in alphabetical order, not knowing what categories they represented.

Systematic Approach to Website Navigation and Categorization

The researchers approached the website analysis from the viewpoint of prospective undergraduate students (enhanced by their positionality as undergraduate students). Inspired by sustainability curriculum research by O'Byrne, Dripps, and Nicholas (2015)[14], the researchers established a standard protocol for navigating the university websites (details below). Establishing a structured approach to website and program analysis helped to minimize research bias and returned more precise depictions of sustainability content.

What follows are the categories examined and noted in researching our case list of schools.

I. *Institution Type*

To ensure variety, generalizability, and relevance, we aimed to represent Carnegie institution classification levels and institution types in our research. The basic classifications include: Associate's Colleges, Baccalaureate/Associate's Colleges, Baccalaureate Colleges, Master's Colleges & Universities, Doctoral Universities, Special Focus Two-Year, Special Focus Four-Year, and Tribal Colleges and Universities. All but the Two- and Four-Year Special Focus institutions were represented by the sample.

II. *Is/are there a Sustainability Degree Program/(s)? - Y/N*

One of the primary questions asked was whether the studied institution offered an *explicit* sustainability degree program. Qualifying whether a degree program was a sustainability degree program, specifically, involved looking at the titles of the degree programs, minors, certificates, and occasionally courses to determine the program's self-identification with sustainability as a professional field.

III. *(Closest) Program Titles*

Many academic programs overlap significantly with sustainability, so the researchers also collected data on "sustainability-related" program offerings within the sample. Selecting "related" programs involved analyzing both program titles and descriptions. Doing so

[14] O'Byrne, David, W. Dripps, and Kimberly Nicholas. "Teaching and Learning Sustainability: An Assessment of the Curriculum Content and Structure of Sustainability Degree Programs in Higher Education." *Sustainability Science* 10 (January 1, 2014): 43–59. https://doi.org/10.1007/s11625-014-0251-y.

allowed the researchers to assess convergence and divergence between such "sustainability-related" and "sustainability-focused" programs.

IV. *Keywords*

In order to represent the most important concepts and emphases within each program, researchers selected key words and phrases from the published program descriptions. Examples include "interdisciplinary," "conservation," and "culture."

V. *Commitment to campus sustainability*

The NASEM report, *Strengthening Sustainability Programs and Curricula at the Undergraduate and Graduate Levels,* notes that "campus commitments to sustainability are linked to the proliferation of sustainability and related degree programs nationwide" (p. 35). Thus, this study records evidence of campus commitment to sustainability at all sample institutions.

AASHE's Sustainability Tracking Assessment and Rating System (STARS) database is based on a self-reporting assessment framework that colleges and universities use to measure their campus sustainability performance. The framework involves both long-term sustainability goals and short-term entry points for evolving sustainability institutions and programs, and also includes the presence of academic programs, even while the bulk of points focus on campus operations[15]. On-campus commitment to sustainability is generally considered important to reinforce sustainability the "implicit" curriculum; so, we counted STARS participation as a proxy indicator of an on-campus commitment to sustainability.

However, there are instances where a school was not found on the AASHE STARS database. These institution's websites were still examined for the presence of on-campus sustainability initiatives. A commitment to sustainability was considered any public effort towards sustainability on campus, and towards providing students with an opportunity to engage with sustainability content outside of the classroom.

VI. *Other variables*

Researchers also collected data on the degree level, unit organization/department location, and the existence of any sustainability specializations, minors, or certificates for each program studied.

We broke down our sample according to the above variables and, when appropriate, looked for correlation between them. The culmination of our analysis speaks to two fundamental points: (1) the general landscape of sustainability-focused and sustainability-related programs in and among higher education institutions, and (2) what this landscape looks like from the perspective of potential students.

[15]AASHE. "Campus Sustainability Hub." hub.aashe.org, 2021. https://hub.aashe.org/browse/topics/curriculum/?topics=curriculum&gallery_view=list.

III. Results

Sample Description: Carnegie Classification

Of the 100 case schools examined, 46 were doctoral, 20 baccalaureate, 12 master's, 12 associate's, and 10 tribal institutions (Figure 1). 39 states and Washington, D.C. were represented by our sample, spanning all geographic regions of the continental United States, plus Alaska and Hawaii. Below, Figure 1 depicts the breakdown of the research sample, compared with the makeup of all US institutions with Carnegie Classifications.

Figure 1: Research Sample by Institution Type compared with all US institutions

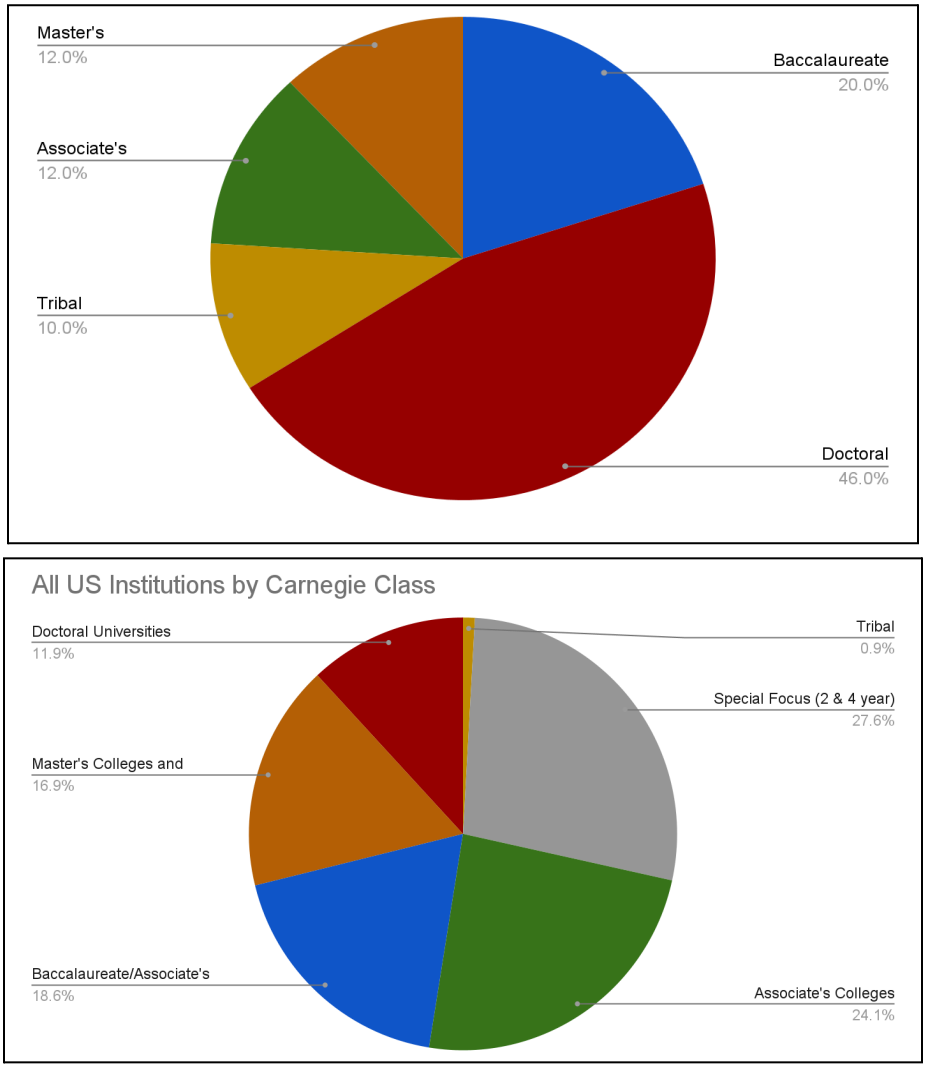


Figure 1: *The chart on the **top** depicts the breakdown of this study's sample by Carnegie classification. For reference, the chart on the **bottom** depicts the makeup of all US institutions by Carnegie classification*[16].

[16] *(The Carnegie Classification of Institutions of Higher Education. "2021 Update - Facts & Figures." Bloomington, IN: Center For Postsecondary Research Indiana University Bloomington School Of Education, 2021. https://carnegieclassifications.acenet.edu/wp-content/uploads/2023/03/CCIHE2021-FactsFigures.pdf.)*

Sustainability and sustainability-related degree offerings by institution type

Within the selected sample, 38/100 schools (38%) offered an explicitly-titled sustainability degree program, while the remaining 62 schools (62%) did not.

Among those institutions that **did** offer sustainability degree programs, we find that doctoral institutions (54% of the 46 doctoral institutions in the sample) and baccalaureate institutions (35% of 20 baccalaureate institutions in the sample) were most likely to offer sustainability degrees.

Table 1. ***Sustainability*** *Degree Program Presence by Institution Type*

% of Doctoral: 54% (25/46)
% of Baccalaureate: 35% (7/20)
% of Master's: 25% (3/12)
% of Associate's: 17% (2/12)
% of Tribal: 10% (1/10)

Table 1: *This table depicts the number and percentage of institutions within each institution type (e.g., doctoral, baccalaureate, etc.) that offer a sustainability degree program. The institution type with the highest percentage of institutions offering sustainability degrees were doctoral institutions.*

Degrees that were *not* explicitly focused on sustainability (indicated via either title or program content), but *did* contain interdisciplinary content related to sustainability, were reported as "sustainability-related" degrees. These included, for example, environmental studies/science degrees, resource management degrees, or earth/energy sciences degrees.

Within our sample, 91/100 institutions offered at least one sustainability or sustainability-related program. Of the 9 institutions that offered **neither** sustainability **nor** sustainability-related degrees, 4 are associate's colleges (out of 12 associate's colleges in the sample).

Sustainability and Sustainability-related Program Titles

Coding programs as "sustainability" versus "sustainability-related" was largely reliant on the exact wording of the program's full title. In total, across 100 institutions we recorded **230 program titles** that were considered "sustainability programs" or "sustainability-related programs." See **Table 2** for example program titles.

Full program titles also helped contextualize and provide more information on program content. The word clouds displayed in **Figure 2** illustrate the keywords found among the explicit sustainability degree program titles and the titles of sustainability-related degree programs. We found that, among the 230 total program titles observed, 57 were sustainability programs, 40 were earth and environmental science programs, and 28 were environmental studies programs. The other 105 sustainability-related programs reviewed (approximately half) varied widely from natural resource management to ecotourism to food systems.

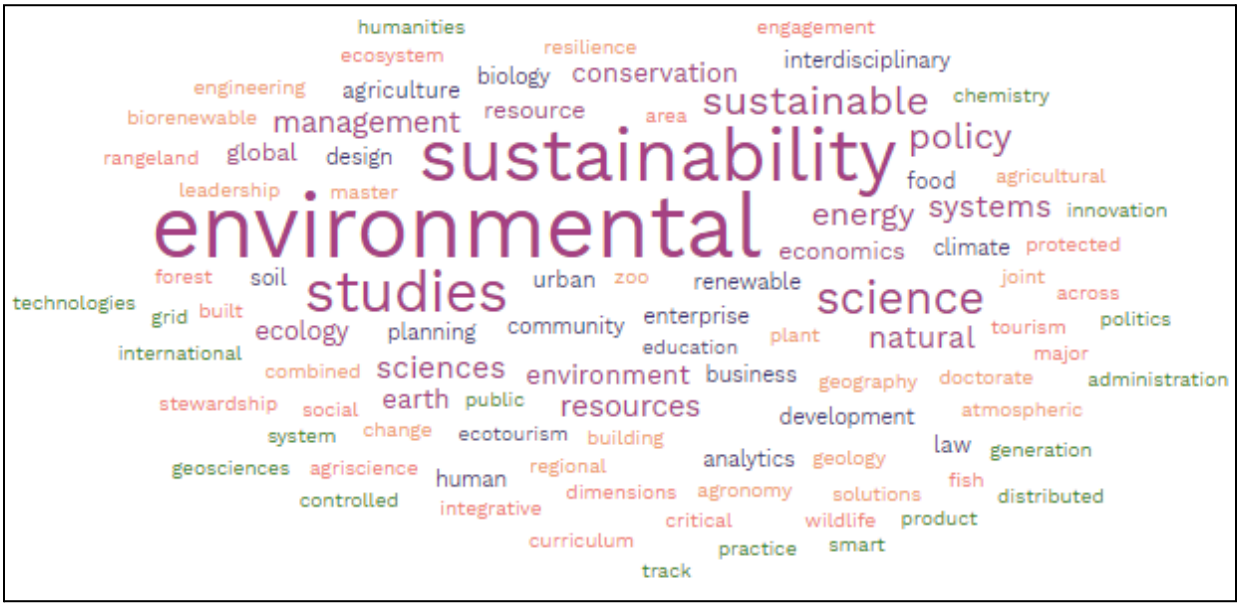
Table 2. *Examples of "Sustainability" and "Sustainability-Related" Program Titles*

Sustainability Program Titles	**Sustainability-Related Program Titles**
BA/BA Sustainability Studies MS Integrative Conservation and Sustainability BS Environment and Sustainability MA/MS Global Sustainability	MS Environmental Science PhD Earth and Environment MA Environmental Studies BA Environment and Human Culture

Frequency of program keywords in program titles corresponds with text size within each word cloud. For sustainability programs, "environmental," "sustainability" and "studies" were most frequent. For sustainability-related programs, "environmental," "science" and "studies" were most frequent.

Figure 2.

Word cloud: Keywords from (explicit) Sustainability Program Titles



Word cloud: Keywords from Sustainability-related Program Titles

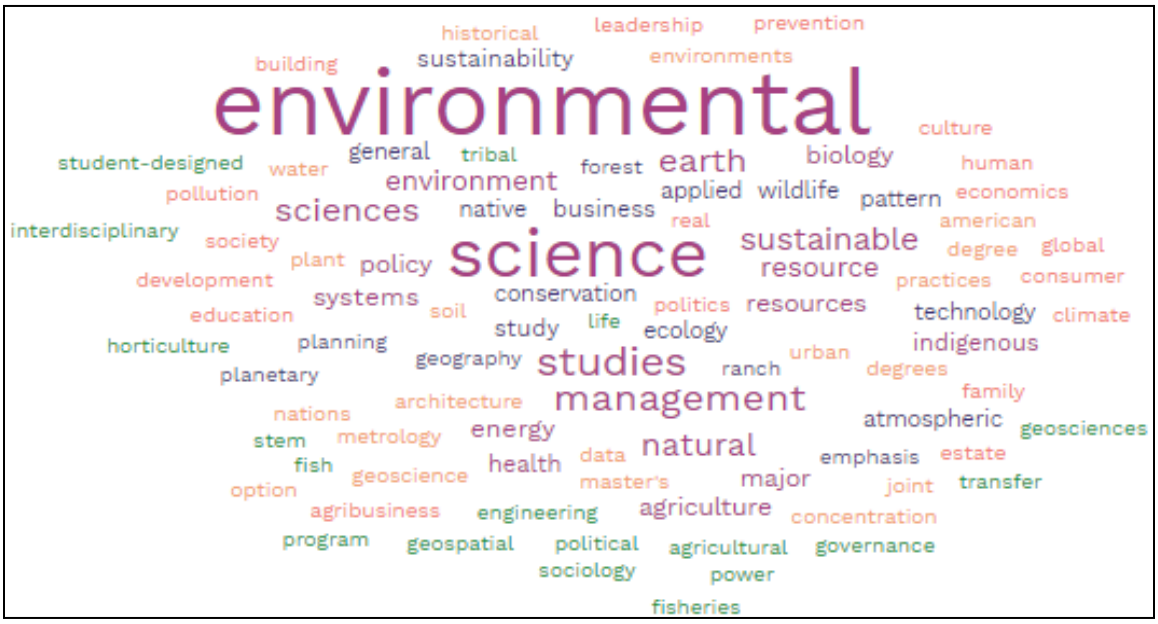


Figure 2: *These word clouds depict common words used in the titles of sustainability programs (top) and sustainability-related programs (bottom). Text size correlates with the frequency of the word's use.*

Sustainability and Sustainability-Related Program Descriptions

After program titles, **program descriptions** are the main source of information for prospective students to evaluate a program offering. In order to compare and contrast sustainability and sustainability-related program descriptions from our sample, the authors recorded keywords for each program in a database. That data was then used to generate the word clouds **in Figure 3**.

Across both word clouds, "natural resources," "climate change," "conservation" and "stewardship" are common descriptors. In sustainability program descriptions, the words "sustainability", "environmental justice," "systems thinking," "social science" and "understanding" are commonly used. In contrast, sustainability-related program descriptions were more likely to use keywords such as "environmental health," "energy," "chemistry" and "geology."

The researchers also note that sustainability program descriptions made more frequent use of the word "solutions" (e.g., "solutions," "sustainability solutions," "environmental solutions") than sustainability-related programs.

Figure 3.

Word cloud: Keywords from (explicit) Sustainability Program Descriptions

Word cloud: Keywords from Sustainability-related Program Descriptions

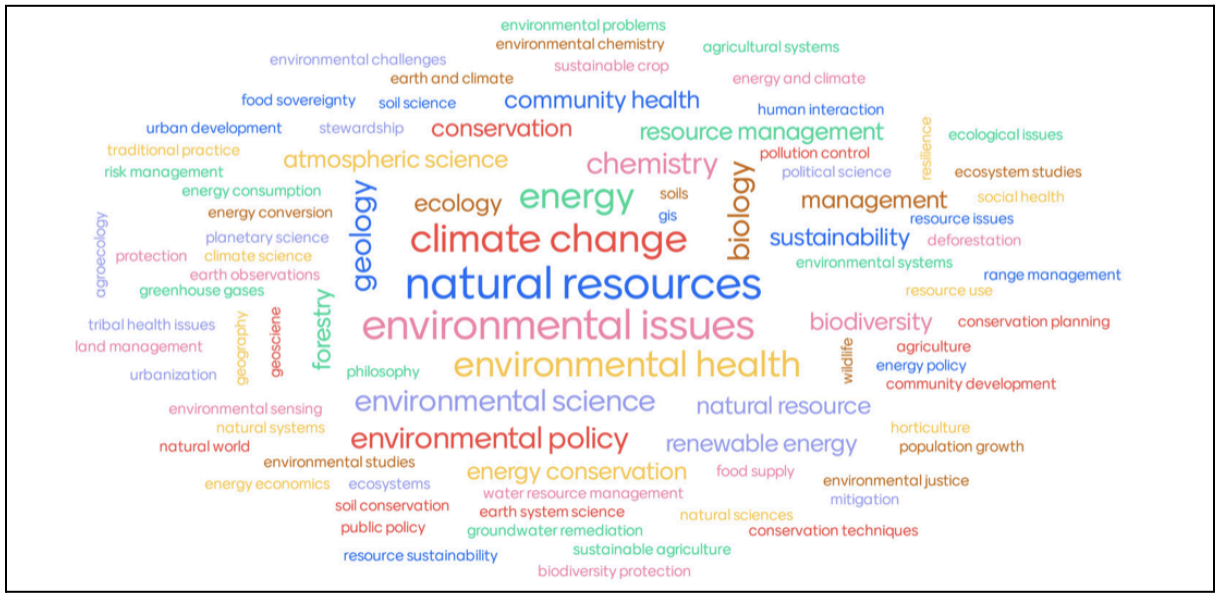


Figure 3*: These word clouds depict common words and two-word phrases used in the descriptions of sustainability programs (top) and sustainability-related programs (bottom). Text size correlates with the frequency of the word's use.*

Relationship between on-campus sustainability commitments and presence of sustainability degree

An additional factor examined for each institution type is whether each school had an explicit on-campus commitment to sustainability (e.g., campus as "living labs," experiential learning, community engagement). Of the 100 case schools examined, 68% have an explicit on-campus commitment to sustainability.

Table 3. *% Total Institution Type Represented With On-Campus Commitment to Sustainability*

% of Doctoral With: 89% (41/46)
% of Baccalaureate With: 65% (13/20)
% of Master's With: 58% (7/12)
% of Associate's With: 42% (5/12)
% of Tribal With: 20% (2/10)

Among the different institution types represented in the research, there is variation in the prominence of campus sustainability commitments on each institution's website, which may indicate more or less real-world sustainability efforts on campus. Doctoral institutions with high research activity tend to be more likely to highlight comprehensive and explicit sustainability commitments, followed by (in order): baccalaureate, master's, associates, and tribal institutions.

Of the 38 institutions that offer sustainability programs, 35 (92%) also offer on-campus commitments to sustainability.

Region
We used US institutional accreditation demarcations by region as boundaries to note the presence or absence of sustainability programs at each of the 100 examined case schools (see **Figure 4**).[17] We found no statistically significant relationship between region (RAO) and the presence or absence of sustainability degree program offerings in our sample.

V. Discussion

Sustainability and sustainability-related degree offerings

Overall, a majority of institutions in the sample (91%) offer sustainability **or** sustainability-related degrees. However, just 38 schools (38%) offer explicitly-titled sustainability degrees, indicating that opportunities to earn a degree in sustainability as a distinct discipline are less common than opportunities to earn a degree in closely related disciplines.

This variable was central to the study but also the most difficult to determine. First, determining what counts as a sustainability degree is a matter of interpreting context clues: program name, program description, course requirements, associated monitors, certificates, and concentrations,

[17] "Regional Accrediting Organizations | Council for Higher Education Accreditation." Accessed January 4, 2024. https://www.chea.org/regional-accrediting-organizations-accreditor-type.

etc. Second, we sought to differentiate between true "sustainability programs" and those which were "sustainability-related," i.e., programs that substantially overlapped with sustainability studies via required courses or program add-ons. In general these were interdisciplinary environmental and earth sciences or studies programs that incorporated *some elements* of sustainability.

Figure 4. *Regional Accrediting Organizations Map*

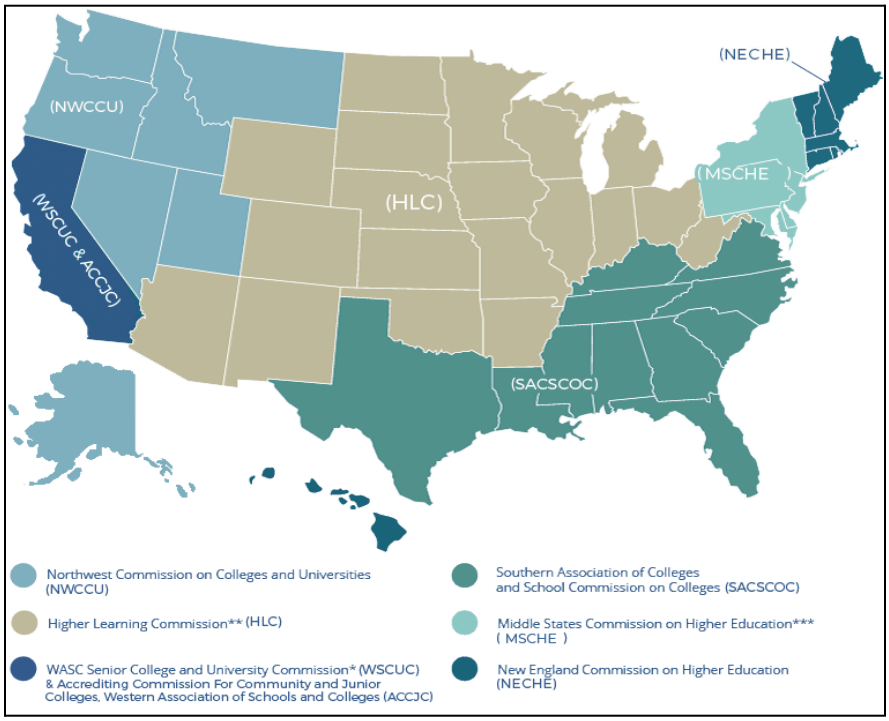


Figure 4: *This map is a reference for regional accrediting organizations across the U.S.*[18]

In addition to the keywords "sustainability" or "sustainable," we looked for any other indication of a program that is inter- or transdisciplinary; that deals holistically with environmental, social, and economic dimensions of sustainability; and/or purports to prepare sustainability professionals. Even then, translating these clues into a binary, "presence" or "absence" of a sustainability program proved extremely challenging.

Thus, our first key finding is that sustainability, as other authors have pointed out[19,20], is still a difficult discipline to bound and define. This finding is especially important considering the context

[18] National Survey of Student Engagement. "Accreditation Toolkits." Evidence-Based Improvement in Higher Education. Accessed February 13, 2024. https://nsse.indiana.edu//support-resources/data-results-guides/accreditation-toolkits/index.html.
[19] White, Mark A. "Sustainability: I Know It When I See It." *Ecological Economics*, Sustainable Urbanisation: A resilient future, 86 (February 1, 2013): 213–17. https://doi.org/10.1016/j.ecolecon.2012.12.020.
[20] Farley, Heather M., and Zachary A. Smith. *Sustainability: If It's Everything, Is It Nothing?* London: Routledge, 2013. https://doi.org/10.4324/978020.499062.

of this study, which intentionally adopted a prospective student's perspective while navigating program websites. Colleges and universities need to more coherently communicate what sustainability **is** and what a sustainability degree **offers**.

Next, we examined the relationship between institution type and availability of a sustainability degree. Doctoral institutions were the most likely to offer such degrees, followed by master's and baccalaureate institutions. Tribal colleges (1/12) (which were intentionally over-represented here to provide adequate sample size) and associate's colleges (2/12) were least likely to offer sustainability degrees. The researchers considered the extent to which financial and other resources may influence this trend.

Upon further review, we noted that 33% of associate's colleges in our sample offer neither a sustainability degree **nor** a sustainability-related degree. Community colleges are an important access point to higher education in the US, especially for lower-income and underserved populations. Indeed, there are the second-most abundant institution type in the US[21]. What mechanisms or interventions are needed to support sustainability and related programs for this institution type?

Sustainability and Sustainability-related Program Titles

Another important component of this study was to investigate the distinctions between sustainability and sustainability-related programs. Taking an inductive approach, the researchers analyzed similarities and differences in the program titles of sustainability and sustainability-related programs.

At first glance, program titles share a number of keywords in common, "environmental" and "sustainability" chief among them. Upon further investigation, however, differences emerge. Within sustainability program titles, we found more frequent pairing with disciplines outside of the natural sciences, such as "sustainable development," "community planning," "business," and "tourism." In contrast, sustainability-related programs tended to include more frequent references to the natural sciences and natural resource management, including words like, "biology," "fisheries," and "resource." Distinctions between sustainability and sustainability-related programs are further explored in program descriptions.

Sustainability and Sustainability-Related Program Descriptions

Similar to the trends emerging from program titles, comparisons of program descriptions also reveal meaningful similarities and differences between sustainability and sustainability-related programs.

Both sustainability and sustainability-related programs appear to be highly interdisciplinary, drawing from diverse disciplines and topics such as environmental policy, law, and health. Another notable similarity is a shared focus on climate change – a critical challenge for both environmental

[21] See note 14

and sustainability studies. The similarities between environmental and sustainability programs in this study are reflected in the Classification of Instructional Programs (CIP) codes utilized by the National Center for Education Statistics (NCES). The NCES definitions of each are as follows:

> **30.3001 Sustainability Studies**: "A program that focuses on the concept of sustainability from an interdisciplinary perspective. Includes instruction in sustainable development, environmental policies, ethics, ecology, landscape architecture, city and regional planning, economics, natural resources, sociology, and anthropology."[22]
>
> **03.0103 Environmental Studies**: "A program that focuses on environment-related issues using scientific, social scientific, or humanistic approaches or a combination. Includes instruction in the basic principles of ecology and environmental science and related subjects such as policy, politics, law, economics, social aspects, planning, pollution control, natural resources, and the interactions of human beings and nature."[23]

In the NCES listings, sustainability programs are nested under the "multi/interdisciplinary studies" category[24], whereas environmental studies programs are nested under the "natural resources and conservation" category[25].

The findings of this study reflect the NCES categorizations. Sustainability programs take an interdisciplinary lens, and incorporate more language on the *human dimensions* inherent in addressing environmental challenges, as indicated by the prominence of keywords like "environmental justice," "human-environment," and "social science." In contrast, sustainability-**related** programs tended to describe their programs more often with words like, "natural resources," "energy," and "environmental issues."

These results also echo the trends observed by Vincent, Bunn, and Sloane's 2013 report[26]. The report found that undergraduate programs clustered around three areas: natural science, social science, or sustainability solutions emphasis. Graduate programs clustered around natural systems or sustainability solutions emphasis. In this study, our analysis considered all program levels (undergraduate, graduate, etc.) together, but discovered a similar distinction between sustainability-related programs (which emphasize natural sciences) and sustainability programs (which emphasize solutions). Further research on the "solutions emphasis" in sustainability

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[22] National Center for Educational Statistics. "Classification of Instructional Programs: Sustainability Studies." Institute of Educational Statistics, 2010. https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=89257.

[23] National Center for Educational Statistics. "Classification of Instructional Programs: Environmental Studies." Institute of Educational Statistics, 2010. https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=87194.

[24] See note 17 above

[25] See note 18 above

[26] See note 7 above

programs at all levels is warranted.

Other keywords found often in sustainability program descriptions, and less-so in sustainability-related programs, are the words "understanding," "interactions," and "systems thinking." Together, the frequent use of this language implies program learning objectives that foster student understanding of the complex relationships between humans and the environment.

Relationship between on-campus sustainability commitments and presence of sustainability degree

Despite there being more schools in our sample *without* sustainability degree programs than *with*, there are far more schools promoting their on-campus commitments than not. A majority of the whole sample (68%) demonstrate on-campus commitments to sustainability.

The NASEM report suggests a link between the rise of sustainability programs in the US and the rise of campus commitments to sustainability[27]. In our analysis, we found that almost all institutions (92%) **with** sustainability degree programs also have on-campus commitments to sustainability, whereas 52% schools **without** sustainability degrees demonstrate on-campus commitments to sustainability. This pattern suggests a positive correlation between the sustainability degrees and campus sustainability commitments. However, the nature of that correlation, its directionality (e.g., which comes first, the sustainable campus or the sustainability degree program?), and mechanisms of cause and effect (e.g., resource availability), remain open to further research.

VI. Limitations

The study has four key limitations. Firstly, we recognize that, despite establishing shared criteria for coding a program as "sustainability" or "sustainability-related," making this determination can be a complex and ultimately subjective process. This is in part because of the highly varied and complex landscape of interdisciplinary sustainability and environmental education, and also because there is no real consensus around definitions or criteria for sustainability degrees.

Secondly, the study acknowledges the impact of limited time constraints and variability of interpretation. Website navigation varies by user, even when using a navigation protocol. We also note that, depending on an institution's size and available resources for activities like marketing and website development, information regarding sustainability programs and campus commitments to sustainability may be made more or less visible. Greenwashing is also a concern, to some extent.

Thirdly, while this study thoroughly examined 100 institutions, we emphasize the need for more extensive research to definitively address the questions posed in the report. The disparities among case institutions suggest a broader mismatch in US sustainability programs, and a larger sample could explore patterns within specific population groups, institution types, and degree levels, providing more nuanced results.

[27] See note 8 above

Lastly, the study recognizes that determining whether "sustainability" is or is not taught at an institution is subject to cultural bias, particularly in relation to minority-serving institutions and tribal colleges. In some cultures and institutions, sustainability can be *embedded* in course content, curricula, and even the campus ethos. Therefore, it is possible that this study under-represents sustainability learning at some institutions. Learning to recognize diverse perspectives and traditional knowledge systems in sustainability education is a key area for future research.

VII. Conclusion

Considering the gravity of sustainability challenges facing society and the planetary systems on which we depend, it is crucial to prepare graduates to address these challenges. Higher education has an essential role in this endeavor. This study provides valuable insights into the current landscape of sustainability and sustainability-related degree offerings in higher education institutions. We explored potential patterns among 230 sustainability and sustainability-related programs at 100 US higher education institutions, and how these programs are framed on institutions' websites. Our findings indicate that while a significant majority of institutions in the sample offer degrees related to sustainability, the explicit presence of sustainability-focused programs is less common than related disciplines like environmental studies.

This study also found differences between the availability of sustainability degrees at different institution types. Doctoral universities were most likely to offer sustainability degrees among all institution types, followed by baccalaureate and master's programs. Thus, there appears to be a positive relationship between resources and research capacity of an institution and sustainability program offerings. Additionally, we found that a third of associate's colleges in the sample did not offer sustainability-related degrees. Together these findings raise questions about the accessibility of sustainability degrees in tertiary education at different levels, and the implications this holds for equity in sustainability education.

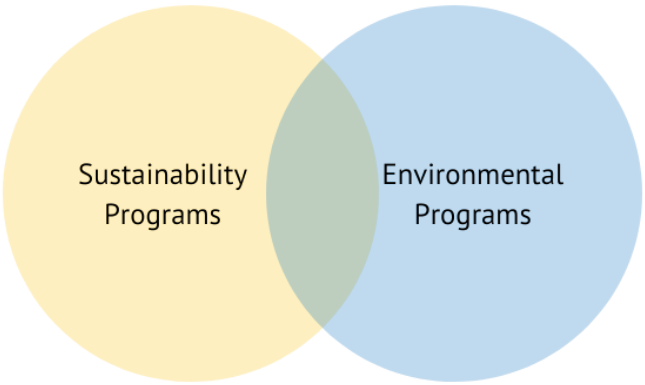
Another objective of this study was to explore the differences between sustainability and related disciplines as communicated by program titles and descriptions. Our results underscore the big-picture, interdisciplinary, and solutions-oriented nature of sustainability education. Sustainability programs tend to embrace a broader perspective, incorporating social, economic, and environmental dimensions, while sustainability-related programs often lean towards natural sciences and resource management.

Nevertheless, the similarities, differences, and overlap between "sustainability" and "environmental" programs remains "messy". Even the program CIP codes[28] have overlap and may not be consistently selected (making it harder to know how many programs there are). Are "sustainability" and "environment" growing together, growing apart, or are they parallel? From the perspective of a

[28] National Center for Educational Statistics. "CIP User Site." What is the CIP? Accessed January 5, 2024. https://nces.ed.gov/ipeds/cipcode/default.aspx?y=55.

prospective student, the different pathways are unclear without program-level guidance about the learning outcomes of each, and the career paths that they lead to.

Figure 5: Overlap of Sustainability and Environmental Programs



VIII. Recommendations for Future Research and Program Design

Overall, these findings highlight the inherent challenge in defining the value of sustainability degrees for various stakeholders including prospective students and their families, as well as employers and communities. In order to take preliminary steps to greater clarity and coherence across the US higher education sector, we recommend the following:

1. *Conduct a Comprehensive Census of Sustainability and Related Disciplines*
    a. A more precise understanding of the current state of interdisciplinary environmental and sustainability education in higher education is needed. A new and larger program census could better capture the landscape of interdisciplinary sustainability and environmental education across US institutions (and abroad).
        i. A program census could also more deeply examine curricular content of sustainability and related programs, including whether and how sustainability programs demonstrate an emphasis on solutions, topics, or themes.
        ii. In addition, further research should expand upon past research to compare sustainability curricula at associates, tribal, and doctoral institutions.
    b. Future research could also more closely examine the relationship between campus-level sustainability and environmental programs.

2. *Workforce Perspectives*
    a. Sustainability is not only an academic discipline, but a growing profession. Program designers must actively work to incorporate workforce readiness elements into sustainability programs. Specifically, sustainability programs have an influential role to play in communicating sustainability career and education pathways to diverse students at various degree levels. Because sustainability is a field that

over-represents individuals who are white and economically privileged[29,30], it is especially important that these pathways are communicated and nurtured at the community college level.

b. To support this endeavor, future research should continue to build the body of literature on green jobs, sustainability jobs, and how those differ from "environmental" jobs.

3. *Justice, Equity, Diversity, and Inclusion*
    a. Equity and access within sustainability programs also involves the thorough examination of diverse pedagogies and knowledge systems. Indigenous perspectives, for example, may represent sustainability programs very differently. Institutional cultures might be amended so as to nurture diversity, equity, and inclusion structurally.
    b. It is important that future research properly explores how to nourish and encourage those changes from a multicultural perspective inclusive of different worldviews.

[29] Data USA. "Sustainability Studies | Data USA," 2022. https://datausa.io/profile/cip/sustainability-studies.

[30] Mak, Heather. "The State of Equity, Diversity and Inclusion in Sustainability." Diversity in Sustainability, 2021. The State of Equity, Diversity and Inclusion in Sustainability.

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