Journal of Sustainability Education
Vol. 28, March 2023
ISSN: 2151-7452

Value-action gaps between sustainability behaviors, knowledge, attitudes and engagement in campus and curricular activities within a cohort of Gen Z university students

Ashlyn M. Teather, University of Minnesota Duluth
Julie R. Etterson, University of Minnesota Duluth

Abstract: Sustainability is a core value of Gen Z and is increasingly a focus of campus strategic plans. Undergraduate survey data can inform campus programming by increasing our understanding of student sustainability behaviors, knowledge, attitudes, and how these relate to student participation in curricular and cocurricular activities. Repeated surveys can track change over time in general and among underserved demographic segments of the student population. Here we evaluate the first in a series of biennial sustainability surveys that will guide planning at a mid-sized midwestern university in the USA. Our survey, modeled after existing surveys, was distributed to undergraduate students at the University of Minnesota Duluth (348 respondents) and collected demographic information including: college affiliation, year in school, gender, race/ethnicity, and campus residence. Our study showed that student knowledge scores were comparable to similar surveys at other institutions (66%) and the average attitude score was very high (88%). However, scores related to sustainability action were strikingly lower, indicating a gap between students' understanding and acceptance of sustainability concepts and their willingness to engage, which we refer to as value-action gaps. When significant differences were detected between demographic groups, students who self-identified as female were more likely to have a higher sustainability score than students who identified as male and students who lived off campus were more likely to have a higher score than students who lived on campus. Other demographic results were mixed or not significant. We also noted a trend for students to score lower on questions related to business or economic sustainability and, similarly, for business students to score lower on sustainability questions overall than students in other colleges. Based on these baseline results, we provide recommendations to improve sustainability education and address the value-action gaps identified in this survey.

Keywords: Sustainability, University, Behaviors, Knowledge, Attitude, Gen Z

Ashlyn Teather *graduated from University of Minnesota Duluth in 2020 with a Masters in Environmental Education. She most recently worked at Duke University on projects related to environmental education. She can be reached at ashlynteather@gmail.com.*

Julie Etterson *is Department Head and Professor in the Biology Department at University of Minnesota Duluth. Her research focuses on evolution in native plant populations in response to anthropogenic factors, such as climate change and habitat restoration using the toolkit of ecological genetics. Additionally, she supports many sustainability efforts on campus. She can be reached at jetterso@d.umn.edu.*

INTRODUCTION

Global issues such as climate change, social justice, biodiversity losses, food quality and security -- in other words, sustainability issues (United Nations, 2015) -- are at the forefront of students' minds as they contemplate the world they will inherit. The current generation of college students, Gen Z, is characterized by confidence that they will change the world in these realms and have a track record of success that has been driven by the power of social media and a non-negotiable attitude toward racial, gender, and LGBTQ equity (Swartz et al., 2017). Gen Z's concern toward environmental issues, such as climate change, are considered a given. Moreover, Gen Z students prioritize careers where they can have social impacts. Based on these emerging generational attributes, it is important for institutions of higher education to provide opportunities for students to learn about emerging sustainability issues and engage in developing solutions (Barth et al., 2014; Eberhardt, 2017; Fromm & Read, 2018).

Traditional higher educational approaches may not be adequate to help students grapple with the "wicked problems" of contemporary society given their complexity and the necessity to be able to think critically at the interface of environmental, economic, and social systems (Head, 2008; McCune et al., 2021). Students rarely have an opportunity to cross disciplinary boundaries once they track into the curriculum for their major (Dawe et al., 2005; Desha et al., 2009; Tilbury et al., 2005). Traditional approaches can limit students to classroom-based learning and lack engagement, while experiential approaches can increase interaction between students and their community, enhance students' critical reflection, and build their sense of agency (Domask, 2007; Favaloro et al., 2019). Thus, it is incumbent upon university administrators and faculty to intentionally craft pedagogical approaches, in both curricular and cocurricular activities, that engage students and cultivate skills that will equip them to tackle the societal challenges of the future in their personal lives and as a component of their careers. University instructors ought to impart their discipline specific knowledge to their students *and* create curricula that facilitate deep learning opportunities that allow students to formulate their own solutions for sustainable development (Warburton, 2003).

To this end, a university campus itself can serve as a model system for students to learn about and engage in sustainability practices. Campuses have many parallels to small cities (Alshuwaikhat & Abubakar, 2008). Like a municipal government, campus administrators can promote energy efficiency, water conservation, campus greening, life-cycle analysis of consumer products, food security, public health, social justice reforms, and an awareness of the relationship between local and global issues. At the curricular level, faculty can pique student interest in sustainability issues by tailoring their curriculum to respond to shifts in national and global economic, social, and environmental realities (Assadourian, 2017; Wals & Jickling, 2002). A thoughtful sustainability programming framework creates opportunities for students to engage in problem solving on contemporary issues that are relevant to their lives and encourages interdisciplinary interaction, higher order thinking, diverse project partners perspectives, self-determination, and creativity. In sum, administrators should develop a clear vision of a campus sustainability framework that integrates coursework, research, co-curricular activities, campus

facility operations, and outreach into the community to maximize student engagement, intellectual growth, and self-actualization (Wals & Jickling, 2002).

Universities implement sustainability surveys for diverse reasons including gaining insight into the state of sustainability issues with respect to governance, operations, education, research, and outreach (Yarime & Tanaka, 2012). The Association for the Advancement of Sustainability in Higher Education (AASHE) Sustainability Tracking, Assessment and Rating System (STARS) is an example of a platform to aggregate institutional data. STARS provides a common set of benchmarks for tracking internal improvements over time and comparison across institutions. It was developed starting in the United States in 2006 by gathering feedback from AASHE workshop attendees (AASHE, 2021; Caeiro et al., 2020). An optional element of STARS is a sustainability literacy and campus culture assessment that provides a deeper analysis of strengths, weaknesses, and gaps in campus programming. The University of Minnesota Duluth (UMD) sustainability survey reported herein was initially developed to meet the STARS criteria and obtain a baseline understanding of our students' sustainability behaviors, knowledge, attitudes, and awareness of and participation in campus and community sustainability-related events.

Previous sustainability surveys at UMD showed that, although the campus community was concerned about sustainability, acknowledged their responsibility to contribute to a sustainable world, and understood social, economic, and environmental actions necessary to make progress toward sustainability goals, they were "rarely involved in activities that promote sustainability" (Gilbertson & LaCaille, 2016, p. 2). In other words, the campus community was aware of sustainability issues but stopped short of becoming engaged. Broadly in the literature, value-action gaps have been explained by the theory of planned behavior where action stems from behavioral intention which is affected by attitudes, social norms, and perceived behavioral control (Ajzen, 1991) and the value-belief-norm theory in which a chain of influence from personal values, to awareness of consequences and personal responsibility, to the development of personal norms leads to behaviors (Stern et al., 1999). Value-action gaps similar to UMD's have been previously reported with university students and have been attributed to a range of contributing factors including a lack of information, self-efficacy, and financial means as well as the attitudes of cohabitants and the displacement of responsibility to other people or entities (Chaplin & Wyton, 2014).

Survey results can be used to develop campus programming that targets the causes of value-action gaps. For example, a 2012 survey at UMD led to the adoption of a university-wide sustainability course designation and a one-course sustainability requirement for all undergraduates (Beery & Roatch, 2012). This survey was followed with participant interviews that showed that students value convenience and participate in sustainability behaviors with the fewest barriers (Beery, 2013). The data informed new campus policies such as a compostable plate and utensil requirement and the widespread availability of composting bins. In this way, the value-action gap was narrowed by university initiatives that changed sustainability norms and reduced barriers to action.

Here we report on a sustainability survey that builds on previous work in three ways. First, our survey was specifically designed to provide baseline information and to be repeated over time so that the impact of changes can be assessed. Second, the survey content was

expanded beyond environmental sustainability in accordance with the broader definition embraced by the United Nations (UN) Sustainable Development Goals (United Nations, 2022). Questions about economic sustainability and social justice were included to address the full meaning of sustainability. Finally, our survey also collected student demographic data to help understand which student populations were underserved by programming. Our survey goals were threefold: 1) to create a baseline data set of UMD undergraduate student sustainability behavior, knowledge, and attitudes, 2) to identify student groups that would benefit from targeted sustainability initiatives, and 3) to evaluate the value-action gaps among our students. This information will guide program development at UMD and assess its effectiveness over time.

METHODS

This survey was conducted at UMD, a medium-sized public university located in Duluth, Minnesota. Inspired by the work of the Ohio State University (Walpole et al., 2019), we developed a survey which included two reliable and validated tools (Zwickle & Jones, 2018) that permits us to track improvements over time and compare our campus to other institutions. This 51-question survey was largely modeled, with permission, after the Ohio State University's 2018 Campus Sustainability Survey (Walpole et al., 2019). Following their example, our survey had five sections that measured students: 1) behaviors, 2) knowledge, 3) attitudes, as well as awareness of and participation in 4) campus programming, and 5) curriculum in relation to sustainability.

Sections 1-3, Sustainability Behaviors, Knowledge, and Attitudes: The first three sections of the survey assessed student attributes. Section 1 (Q1-17) was designed to attain information on the frequency with which students engage in sustainability behaviors such as recycling and conscious water consumption (see supplemental Table S1 for a full list of survey questions). Frequency was measured on a 5-point Likert scale from "never" (1) to "always" (5). Section 2 (Q18-29) assessed sustainability knowledge employing the Assessing Sustainability Knowledge (ASK) instrument (Zwickle & Jones, 2018) that has 12 multiple choice questions that vary in difficulty. Validity tests show sustainability majors score higher than students from other disciplines, college seniors score higher than freshman, and high scores are significantly correlated with environmental attitudes. Section 3 (Q30-40) assessed sustainability attitudes using the Sustainability Attitude Scale (SAS; Zwickle & Jones, 2018). The validity SAS questions were assessed by comparison to the New Ecological Paradigm (NEP), an analysis that showed that SAS results had greater predictive power of sustainability behaviors and beliefs than the NEP (Zwickle & Jones, 2018). The SAS assessed sustainability attitudes on a 7-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (7).

Sections 4-5, Participation in Campus Programming and Curriculum: The final two sections evaluated the effectiveness of campus sustainability programming and curriculum as measured by student awareness of and engagement in these activities. Section 4 (Q41-45) measured students' attitudes towards campus sustainability co-curricular and curricular programming. The first question (Q41) measured the influence of campus sustainability programming on students' decision to attend UMD on a 5-point Likert scale with responses

ranging from “not at all” (1) to “a great deal” (5). The other five questions measured students’ awareness of campus sustainability activities using a 7-point Likert scale with responses ranging from “strongly disagree” (1) to “strongly agree” (7). Section 5 (Q46-51) measured student interest and awareness of the sustainability curriculum at UMD starting with an assessment of the number of sustainability courses students would prefer to take as a part of their major requirements (Q46). Responses ranged from “none” to “four or more.” Other questions related to the student’s perceived value of sustainability education and employed a 7-point Likert scale as above.

Data: With Institutional Review Board (IRB) approval, anonymized participant demographic information was obtained. Demographic data used in data analysis were: gender (male, female, or unidentified); academic college (Labovitz School of Business and Economics, Swenson College of Science and Engineering, College of Liberal Arts, College of Education and Human Service Professions, and School of Fine Arts; referred to hereafter as Bus/Econ, Sci/Eng, Lib Art, Ed/Health and Fine Art); residency (on or off campus); academic year (semester number 1-8); and race/ethnicity (White, American Indian, Hispanic, Asian, Black, Hawaiian, International, Not Specified). International students comprised <2% of respondents and were removed from data analysis due to small sample size. In April 2020, the survey was sent to 2,676 randomly sampled undergraduates which included full-time students over the age of 18 years.

Data analysis: Ordinal data (e.g., scores that ranged from 1-5 or 1-7) were analyzed with ordinal logistic models (JMP Pro version 14.0.0, SAS Institute, Inc. 2018). Five explanatory factors were included in each model: 1) self-identified gender (“gender,” hereafter), 2) academic college, 2) year in school (nested within academic college), 3) campus residence status (i.e., on or off campus), and 3) self-identified race/ethnic group. We report the Chi-square test statistics and their associated *p*-values from Maximum Likelihood analyses. For binary responses (i.e., correct/incorrect), we analyzed the data using a generalized linear model assuming a binomial distribution with a logit link. For factors with more than two possible outcomes (e.g., college), we used Tukey’s post-hoc tests to determine which level of the factor (e.g., which college) differed significantly from the others.

Gaps between students' values and their actions were identified in two ways. First, for all students combined, we calculated the Pearson’s correlation coefficients, *r*, between the average behavior score (Section 1) and average scores in the other survey sections: Section 2, Knowledge (percent correct); Section 3, Attitudes; Section 4, Campus engagement; Section 5, Curricular engagement. Second, to explore specific hypotheses, we calculated the same set of correlations as described above but for gender and campus residence data subsets.

RESULTS

Survey participants: The survey was partly or fully completed by 348 students (13% return). All students self-identified as either male or female. Females were almost twice as likely as males to complete the survey (Fig. 1a). Students from each of the five colleges were represented in the participant pool (Fig. 1b). Advanced students in their junior and senior years were 26% more likely to complete the survey compared to sophomores and freshmen (Fig. 1c).

Students who live off campus were 18% more likely to participate compared to those that live on campus (Fig. 1d). Of the respondents, 87% self-reported their ethnicity as White with 13% identifying with the other ethnic categories combined (Asian, Black, Hispanic, and American Indian) which is closely aligned with the demographics of UMD's student body (Fig. 1e). The percentage of questions for which demographic factors were significant included: gender (30%); campus residence (22%); academic college (37%); year in school within college (29%); and ethnicity (24%). Below, we present the survey results for each of the five thematic sections. For each section, we describe general patterns in the survey results and how they relate to the five pieces of demographic information that were included herein. Finally, we evaluate the value-action gaps across the data set.

Section 1. Behaviors: The extent to which students engaged in sustainability behaviors varied broadly (Fig. 2, Table 1 Section 1). The majority of students indicated that they "always" or "often" engaged in some behaviors such as turning off lights, (Q1, 96%), recycling (Q6, 94%), and printing on both sides of paper (Q4, 53%). A large percentage "never" or "rarely" engaged in other behaviors such as participating in student sustainability organizations (Q16, 74%), attending sustainability events on campus (Q14, 77%), participating in political action/activism related to the environment (Q15, 78%), and attending off-campus sustainability events (Q17, 83%).

At least one of the five demographic factors was significantly associated with student responses to the behavioral questions with three exceptions. Differences between female and male students were especially striking; gender was a significant factor for 41% of the Section 1 survey questions. Females were significantly more likely than males to engage sustainability behaviors with respect to the following: water bottle use (Fig. 3a), reduced meat consumption (Fig. 3b), recycling (Fig. 3c), using reusable bags (Fig. 3e), purchasing second-hand items (Fig. 3f), and attending on-campus sustainability events (Fig. 3g). Male students only had a higher sustainability ranking for one question related to powering down electronics (Fig. 3d).

Behavioral differences were also detected between on- and off-campus students for 35% of questions. Compared to on-campus residents, students who lived off campus were significantly more likely to eat organic or local food (Fig. 4a), conserve water (Fig. 4b), conserve home energy (Fig. 4c), engage in political action and/or activism (Fig. 4d), participate in organizations and volunteer (Fig. 4e), and attend off-campus sustainability-related events (Fig. 4f).

College affiliation was a significant explanatory variable for 35% of the sustainability behavior questions. Student responses were associated with their respective college for the following: reducing meat consumption (Q3), recycling (Q6), conserving water (Q10) and home energy (Q11), participating in organizations and volunteering (Q16), and attending off-campus events (Q17). However, there was no consistent pattern in the ranking of colleges (Fig. S1a-f). For 24% of the questions in this section, the students' year in school (within their college) also had a significant impact on their sustainability behaviors. Interestingly, in three of the four instances of statistical significance, earlier-term students had higher sustainability behavior scores than later-term students. For example, earlier-term Bus/Econ and Sci/Eng students had higher scores than later-term students with respect to local and/or organic food consumption (Q5). The only exception to the direction of this effect was in Fine Arts where later-term students

were more likely to recycle than earlier-term students (Q6). There was no overall relationship between year in school and the average sustainability behavior score, even in a simple regression analysis with no other demographic factors included ($F_{1,341}$=0.11; P = 0.74).

Despite the low ethnic diversity in our survey participant pool, we detected significant differences among ethnic/racial groups for 29% of questions in this section, including: home energy conservation (Fig. 5a), participation in on-campus (Fig. 5b) and off-campus events (Fig. 5d), and engagement in student organizations and/or volunteering (Fig. 5e). In general, American Indian, Asian, and Black students reported a higher likelihood of engaging in these sustainability behaviors, but there was also broad variance around the means as would be expected because of the small sample size. Hispanic and White students had lower scores that were sometimes significantly lower than the other ethnic/racial groups.

Section 2. Knowledge: On average, students provided the correct response to 66% of the sustainability knowledge questions (Fig. 2, Table 1, Section 2). Most students provided the correct answer for questions related to sustainable lifestyles (Q21, 100%), ozone protection (Q19, 90%), the largest carbon-emitting countries (Q26, 86%), and changes in wealth disparities in the USA (Q23, 85%). In contrast, very few students correctly answered questions about the causes of fish stock depletion (Q27, 25%) and the features of a sustainable economy (Q25, 39%).

Overall, demographic factors had less impact on student responses to knowledge-based questions than any other section in the survey. Nevertheless, there were a few significant results as follows. Male students were 27% more likely to understand the reason why US electricity costs are low compared to female students (Fig. 3h). On-campus residents were 18% more likely to recognize an issue related to environmental justice compared to off-campus residents (Fig. 4g). Student's knowledge differed depending upon college affiliation for questions related to the sources of carbon emissions (Fig. S1g) and the severity of environmental impacts (Fig. S1h). Again, there was no consistent pattern in average scores between students in different colleges. In terms of year in school, there were significant trends for three issues: sustainable forest management (Q20, Health/Ed freshman > seniors), the wealth gap in the US (Q23, Sci/Eng and Lib Arts seniors > freshman), and environmental justice (Q28, Sci/Eng and Lib Arts seniors > freshman). Ethnic/racial differences were evident for the average correct response rate (Fig. 5e) and for three specific questions: sustainable forest management (Fig. 5f), the wealth gap in the USA (Fig. 5g), and economic sustainability (Fig. 5h), but there was no general pattern across questions. Finally, a simple regression analysis of the overall average knowledge score in the section (Q18-29) and year in school showed that survey participants scored higher over time ($F_{1,322}$ = 7.08; P = 0.008). However, in the full analysis, this trend was not consistent for students in every college. Although later-term Sci/Eng students were more likely to provide the correct answer than earlier-term students, other colleges showed different trends.

Section 3. Attitudes: The average sustainability attitude score was high (6.18/7), indicating strong overall agreement with the sustainability attitude statements in this section (Fig. 2, Table 1, Section 3). Almost all students agreed or strongly agreed about the value of clean air (Q37, 96%) and clean water (Q33, 92%). In contrast, students were least likely to agree or strongly agree with statements suggesting that consumerism is not sustainable (Q32, 43%) and that an economy that values personal wealth functions at the cost of others (Q35, 69%).

Four of five demographic factors were significantly associated with student attitude scores for at least one question. Female and male sustainability attitudes differed significantly for four questions, and, in all cases, female students had higher scores than male students. Compared to males, females were more likely to agree that consumerism is not sustainable (Fig. 3i) and expressed willingness to reduce personal environmental impacts (Fig. 3j) and consumption of natural resources (Fig. 3k). They were also more likely to indicate that they were affected by the wellbeing of others compared to male students (Fig. 3l). Averaging across all questions in Section 3, female students had 4.9% higher attitude scores than male students (Fig. 3m). Campus residence only had a significant effect on one attitude question; respondents that lived off campus expressed greater agreement with the need to reduce personal environmental impacts (Fig. 4h).

College affiliation was significantly associated with student sustainability attitudes for five questions related to equal rights (Fig. S1i), community cooperation (Fig. S1j), the sustainability of consumerism (Fig. S1k), features of an unsustainable economy (Fig. S1l), and the value of biodiversity (Fig. S1m). Although the highest-ranking college differed between questions, students in the Bus/Eco were either the lowest scoring or tied for the lowest scoring for each of these questions. On average, students in Lib Art and Fine Art had the highest sustainability attitudes scores that were significantly higher than Bus/Econ which had the lowest (Fig. S1n). Neither year in school nor ethnicity had any significant impact on sustainability attitudes.

Section 4. Campus Programming: Most survey respondents agreed or strongly agreed that they knew how to dispose of waste, recyclables, and compost on campus (Q43, 82%) and thought that they could personally influence sustainability on campus (Q44, 67%, Fig. 2, Table 1, Section 4). Students were less confident that they were aware of sustainability initiatives on campus (Q45, 44%) or knew how to ride the public buses (Q42, 35%). Few students considered sustainability programming to be a factor in college selection (Q41, 16%).

Demographic factors had numerous significant effects on student responses to sustainability engagement questions. Gender was a significant factor for two campus programming questions. Compared to males, females were 16% more likely to consider sustainability opportunities when choosing a university (Fig. 2n) and were 10% more aware of campus sustainability initiatives (Fig. 1o). For residence status, students living off-campus were more confident using the city bus system compared to students living on campus (Fig. 4i).

Student survey responses also differed significantly according to college affiliation for four campus programming questions, including: awareness of campus waste disposal (Fig. S1o), confidence in personal ability to influence campus sustainability (Fig. S1p), awareness of sustainability initiatives (Fig. S1q), and ability to find additional information about campus sustainability initiatives (Fig. S15). Fine Art students were more aware of campus sustainability offerings than students in other colleges. Students' year in school also influenced survey responses for some academic colleges. For example, Sci/Eng freshmen were more likely to be influenced by sustainability programming (Q41), were more confident riding the bus (Q42) and were more aware of campus waste disposal initiatives (Q43) compared to seniors. Interestingly, Bus/Econ freshmen were more aware of campus sustainability initiatives (Q45) than seniors, but the opposite was true for Fine Arts students.

Students' self-reported race/ethnicity was also a significant factor in explaining student awareness of campus sustainability efforts, especially for confidence in riding the city bus (Fig. 5l), awareness of sustainability initiatives on campus (Fig. 5j), and ability to find information about sustainability-related events, programs, or student organization meetings (Fig. 5k). In all cases, Black students were more likely to be aware of campus sustainability efforts compared to Hispanic or White students, whereas other ethnic groups were not distinguishable.

Section 5. Curriculum: Sixty four percent of respondents agreed or strongly agreed that they could become involved in campus sustainability programming regardless of their major (Q48), but fewer were aware of sustainability educational offerings (Q50, 39%). Less than half of the students thought that employers were interested in hiring people with sustainability related knowledge and skills (Q49, 45%). Only 19% of the students indicated that they wanted to take three or more sustainability courses as a part of their undergraduate curriculum (Q47). Most students, 63%, were interested in taking one or two sustainability courses, and 18% preferred not to take any such courses.

The gender of respondents had no significant effect on any questions in this section. Campus residency, however, was significant for two questions. Students who lived off campus were significantly more interested in taking sustainability-related courses than those living on campus (Fig. 4j) and were more likely to think that future employers would value sustainability knowledge and skills (Fig. 4k). Students in Lib Arts were significantly more interested in taking sustainability courses compared to students in other colleges (Fig. S1s). Students' year in school also influenced student interest in sustainability and, in each case, earlier-term students gave more positive responses relative to later-term students. Specifically, compared to seniors, Health/Ed, Bus/Econ, and Sci/Eng freshman were interested in taking more sustainability courses (Q47), Health/Ed and Sci/Eng freshman were more likely to think students could be involved in sustainability regardless of their major (Q48), and Sci/Eng freshman were more likely to think future employers would be interested in sustainability knowledge and skills (Q49). Regarding ethnicity/race, Asian students were more likely than Hispanic students to think that sustainability knowledge and skills would be important to prospective employers (Q49). Other ethnic/racial groups were not distinguishable.

Value-action gaps: To determine which factors related to student sustainability behaviors, we examined the correlations between the average behavior score and the average scores in all other survey sections. Considering all students combined, there was no significant correlation between students' sustainability behavior and knowledge scores (Fig. 6). However, sustainability behaviors were weakly but statistically significantly correlated with the average attitude score ($r = 0.21$), and the average scores for campus ($r = 0.15$) and curricular ($r = 0.14$) engagement. When the data was broken down into gender and campus residence subsets, the most frequently significant demographic factors in previous analyses, there was still no significant relationship between the sustainability knowledge and behavior scores. However, correlations between sustainability attitudes and behavior differed among demographic groups and were stronger and significant for females living off campus ($r = 0.31$) and males living on campus ($r = 0.47$) but were not significant for other demographic groupings. The strongest relationship between the average sustainability behavior and the average score for any other survey section was for males who lived off campus who were actively engaged in campus

sustainability activity ($r = 0.47$). Aside from these three significant correlations, there were no other important relationships between the students' behavior scores and their sustainability knowledge, attitudes, and campus and/or curricular engagement.

DISCUSSION

This survey provided insight into a cohort of Gen Z students' understanding of and attitudes toward sustainability issues and the extent to which these translate into individual behaviors. The analysis of our survey data revealed three major patterns that will inform future strategies for sustainability program development. First, students have an uneven understanding of fundamental pillars of sustainability with a particular deficit in the economic realm. Second, some student demographic groups are not being reached by our programming, especially male students and those who live on campus. Finally, and perhaps most importantly, our study showed that this cohort of Gen Z students was knowledgeable about and had positive attitudes toward sustainability principals, but they were less likely to act on their values. Narrowing these gaps is important to meet the ambitious United Nations Sustainable Development Goals and train a generation of changemakers prepared to advance sustainability in both their personal and professional lives.

Knowledge gaps: Our survey revealed students did not understand or value sustainability issues in the realm of business and economics as thoroughly as other subject areas. On average, student participant scores were the lowest for both economic knowledge questions (< 40% correct) and economic-related attitude questions (Q32, 34, 35). In addition, Bus/Econ students themselves scored among the lowest tier of colleges for all questions survey-wide, although not always significantly lower. Collectively, these results suggest students' understanding of economic sustainability is weaker than in other domains. This may be due, in part, to a lack of relevant courses (Green, 2015). Although Bus/Econ majors account for >20% of the UMD student body, the college only offers 5% of the sustainability courses available on campus. Moreover, it is still an open question whether sustainability courses in other colleges integrate economic perspectives into their curriculum. Similarly, Barrella and Watson (2018) found economic sustainability to be the least emphasized element of sustainability in engineering curriculums, and the least understood and applied element of sustainability by engineering students. Given the pivotal role of business in a capitalist society and the critical role of financial considerations in daily decision making, it is incumbent upon universities to provide an understanding of the critical role of economics in building a sustainable society.

To address this issue, we recommend a thorough review of the sustainability curriculum in each college and especially for courses that satisfy the undergraduate sustainability liberal education requirement. A similar review was conducted by Western Michigan University by analyzing syllabi and interviewing instructors (Khan & Henderson, 2020). Results showed not all courses met the sustainability-focused course requirements and course instructors were often unaware their course was sustainability-focused. Feedback to instructors in all disciplines could emphasize the importance including economic perspectives in course material. Additionally, we recommend more opportunities for interdisciplinary learning so students improve their critical

thinking and can tackle complex sustainability issues (Howlett et al., 2016). Approaches could include collaboration between instructors with the help of a project coordinator; guest lecturers; final projects that encourage students to integrate knowledge; and creating curricula that builds on students' prior knowledge and encourages reflection (Annan-Diab & Molinari, 2017; Braßler & Sprenger, 2021; Pharo et al., 2012).

Demographic gaps: Across our dataset, female students tended to score higher than male students on questions related to sustainability behaviors, attitudes, and campus engagement. This is not a novel finding and has been reported in children, youth, and adults (Olsson & Gericke, 2017; Sahin et al., 2012; Zelezny et al., 2000). Another study on Gen Z showed females have stronger sustainability attitudes than males (Salas-Zapata & Cardona-Arias, 2020). Some authors have hypothesized that personality differences explain this disparity (Desrochers et al., 2019) and suggest females are inherently more conscientious than males, thus more likely to choose sustainable behaviors to protect the environment. Others have argued females tend to care deeply for and protect their environment because of strong emotional bonds with nature (Sahin et al., 2012). In any case, collectively these studies identify a gap in sustainability messaging and programming that warrant greater efforts to appeal to all students.

Another striking demographic finding was that off-campus residents consistently scored higher than on-campus residents across all parts of the survey. This is not simply a function of student age given that we statistically controlled for students' year-in-school in the analyses. Alternatively, living off campus may require greater financial independence and self-efficacy that empowers economic and value-based lifestyle decisions. For example, off-campus residents were more likely to buy organic/local food, conserve water, and attend off-campus events. Off-campus residents may also absorb sustainability attitudes and practices reflected in their community (Emanuel & Adams, 2011). UMD is embedded in the small city of Duluth, MN (USA), a community that embraces environmental protection, as illustrated by 11,000 acres of green space adjacent to Lake Superior, 129 parks, and over 200 miles of trails. The city has also enacted sustainability policies that enable the transition to renewable energy, promote energy conservation, and reduce plastic waste (Granley, 2020). It is likely that financial considerations, student self-reliance, and exposure to sustainability concepts on campus and in the community, each play an integral role enhancing sustainability action by off-campus residents.

To reach students across other demographic factors, such as gender and residence (and race/ethnicity though results varied in significance in this category) we recommend the sustainability office collaborate with other hubs on campus where students have already built close communities. Identity, and the associated ingroup norms, affect sustainability behavior, and conversely, behavior can be influenced through group interventions (Fielding et al., 2008; Fritsche et al., 2018). Gen Z is more racially and ethnically diverse than previous generations, meaning universities are filled with different cultures, and thus need to reimagine how to engage all students (Pew Research Center, 2018). For example, University of San Diego and UC Santa Cruz both better engaged students of color through offering continuous programming between their sustainability offices and multicultural centers (Fonseca, 2018; Lu et al., 2017). Sustainability programming could be integrated with other already existing communities to attract a wide audience, such as resident halls, sports teams, and cultural clubs.

Behavior gaps: Environmental knowledge is considered an essential component of developing ecological behavior, however, recent research has pointed to the other influences in this relationship, like intention, social norms, attitudes, and nature connectedness (Bamberg & Möser, 2007; Liu et al., 2020; Otto & Pensini, 2017). One of the most striking results of our study was the disjunction between students' sustainability knowledge and their sustainability actions. Although our students scored relatively well in the knowledge section (66% correct, comparatively California State University Northridge scored an average of 54% in a sample of 2,993 undergraduate students; Lundquist et al., 2018), there was no significant positive relationship between sustainability knowledge and behaviors across the full dataset, or within any demographic subset of student data. The absence of a direct knowledge-behavior relationship has previously been reported (Heeren et al., 2016; Li et al., 2019, Liobikienė & Poškus, 2019). This knowledge-behavior gap is important for sustainability leaders to note because it indicates that increasing understanding alone is not sufficient to elicit behavioral change. Theories in behavior change speculate perceived behavioral control, attitudes toward personal responsibility, and personal and societal norms may better explain behavior gaps (Ajzen, 1991; Stern et al., 1999).

We anticipated our students would have high sustainability attitude scores given the emerging consensus about Gen Z values that prioritize justice and creating a better world (Dabija et al., 2019). Indeed, this expectation was borne out. UMD sustainability attitude scores were high (6.19/7) and like those reported elsewhere (i.e., 6.09/7, Walpole et al., 2019). Based on previous studies, we anticipated positive environmental attitudes would mediate the relationship between environmental knowledge and behaviors (Liu et al., 2020). Yet, in our study, we found surprisingly weak, albeit statistically significant, relationships between students' attitude scores and their behavior scores ($r = 0.21$, $P = 0.0002$), campus engagement scores ($r = 0.15$, $P = 0.01$), and curricular engagement scores ($r = 0.14$, $P = 0.02$). This means, although sustainability behaviors may increase with attitudinal shifts, the amount of predicted change is modest. Moreover, it suggests other factors play an important role in inhibiting behavioral changes, such as cost (Rosentrater & Burke, 2017), attitudes of cohabitants, and displacement of responsibility to other people or entities (Chaplin & Wyton, 2014). Social norms, the unwritten rules of a society, are likely have a powerful influence on behavior (Legros & Cislaghi, 2020) and have been shown to affect energy conservation habits, eco-friendly consumer choices, sustainable food choices (Cialdini & Jacobson, 2021; Farrow et al., 2017), and recently, willingness to get the COVID vaccine (Graupensperger et al., 2021). It may be especially valuable to use the power of social norms to influence Gen Z given the rapid transmission of ideas that occurs over social media (Swartz et al., 2017). At present, however, our campus has not effectively used the power of social norms to increase sustainability behaviors, and thus we focused part of our recommendations on the possibilities for behavior change through this avenue.

Two strategies have been recommended in the literature to shift social norms (Sparkman et al., 2021). First, messaging can draw student attention by utilizing the dynamic nature of social norms. Recognition of social trends over time can elicit personal change even if it counters current normative behavior. This may be an especially useful strategy for communication via social media. A second approach is to present the issue as an invitation to work together to solve a problem. Gen Z students are determined, social activists, and one of the most politically active

generations (Swartz et al., 2017). To meet this enthusiasm for justice and a better world, university events should position sustainability as a cause beyond environmentalism and promote events as opportunities for students to work together.

Students perceived behavioral control over sustainability is also a factor at play in the value-action gap. Building self-efficacy, or confidence in our ability to affect change in our social environment (Bandura, 1977), positively affects sustainability behaviors (Schutte & Bhullar, 2017). Better yet, improving self-efficacy also benefits one's mental health and sense of purpose, though is negatively impacted by stress (Flynn & Chow, 2017; Gull, 2016). Additionally, higher self-efficacy in college students positively influences their sense of purpose in life and leads to higher retention rates in school (DeWitz et al., 2009). Gen Z is stressed about global climate issues; they report high levels of depression and anxiety, including climate anxiety (American Psychological Association, 2018; Hickman et al., 2021). Increasing self-efficacy, while increasing sustainability behaviors, can also lessen climate anxiety in young people as it helps them cope with their anxieties in a tangible way and provide hope (Clayton, 2020). While the main goal of sustainability education may be to develop students who take sustainable actions, we know that is impossible if students are mentally unwell. Nurturing self-efficacy in students can help address environmental and student health concerns and increase sustainability behaviors.

An individual's or a group's collective belief in their own capacity to act, or their self-efficacy or collective efficacy, respectively (Bandura, 1977, 2000) influences their pro-environmental behaviors (Bandura, 2000; Sawitri et al., 2015; Shafiei & Maleksaeidi, 2020). Jugert et al. (2016) found that enhancing collective efficacy increased self-efficacy, thus increased pro-environmental behaviors. Moreover, Chen (2015) found collective efficacy was a better predictor of pro-environmental behaviors than self-efficacy. Low self-efficacy and low collective efficacy, combined with a lack of sustainability norms on campus, could explain the value-action gap observed in our study.

To increase self-efficacy among our students, we recommend offering more service-learning opportunities. In service learning, students are paired with community partners to collectively solve a problem. Gen Z students in the United States are likely to resonate with this approach as they are characterized as being kind, open-ended, thoughtful, compassionate, and determined, and they desire logic-based and active learning in their classes (Seemiller et al., 2019). Molderez and Fonseca (2018) found service-learning projects gave their university students a sense of hope, and increased their sustainability competencies, such as systems thinking, creative thinking, and action competence. Civic engagement can also build social bonds and community support through the partnerships, increasing collective efficacy as well (Collins et al., 2014). While research shows low self-efficacy is a concern and has been reported among Gen Z students (World Economic Forum, 2021), our survey did not measure such and we would also recommend UMD and other universities assess this factor in future research. Additionally, assessing what the social norms of sustainability are on campus, such as through focus groups, could better unearth the role this factor plays in sustainability behavior.

Lastly, implementation of campus strategies to reduce the value-action gap among students is dependent upon faculty and staff who are willing to create relevant sustainability learning opportunities. To assess enthusiasm for this work, UMD conducted a faculty and staff

sustainability survey (N= 559, 2017) which showed that 91% of the respondents were either somewhat or very interested in sustainability efforts in their division. However, a lack of time and training were considered important barriers. This underscores the critical role of college administrators who need to set priorities and provide the necessary resources to promote progress. For example, since this 2017 study, the University of Minnesota system developed a new strategic plan that explicitly prioritizes sustainability. This has resulted in the development of a campus climate plan which will, hopefully, be followed with financial resources. We recommend another survey of similar nature to reassess faculty interest in and understanding of sustainability and education for sustainable development and use these results to further influence the campus administration and vision.

CONCLUSION

In the coming years, sustained commitment from campus leadership will be critical to achieving these sustainability goals and executing these recommendations (Lozano et al., 2015). We know this will not be easy, but we also know that it is necessary. While these recommendations aim to improve sustainability perspectives in students and faculty, the process of achieving them will do more than that. They will also build student confidence, new teaching competencies in faculty, and build community throughout the university. Faculty and staff at any university can champion many of our recommendations in this paper, though top-down support is still needed from campus administration to finance and encourage progress (Brinkhurst et al., 2011). Decision-makers need to heed our students' call for increased sustainability on campus. While we see progress being made in the University of Minnesota system through the most recent strategic plan, such as progress in combating hunger and recently hiring a systemwide chief sustainability officer (Office of the Executive Vice President and Provost, 2023), an updated survey of student sustainability knowledge, attitudes, and behaviors could help show the success of this vision. Lastly, we call on other universities to utilize STARS and other means of communication to share their research and lessons learned when it comes to progressing on the SDGs on campus so we may continue to learn from one another.

ACKNOWLEDGEMENTS

This work was supported by the Institute on the Environment at the University of Minnesota. We thank J. Korpi and M. Granley in the Office of Sustainability at the University of Minnesota Duluth for their important contributions to survey questions and recommendations.

LITERATURE CITED

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Alshuwaikhat, H., & Rimi Abubakar, I. (2008). An integrated approach to achieving campus sustainability: Assessment of the current campus environmental management practices. *Journal of Cleaner Production*, *16*, 1777–1785. https://doi.org/10.1016/j.jclepro.2007.12.002

American Psychological Association. (2018). Stress in America: Generation Z. Stress in America™ Survey.

Annan-Diab, F., & Molinari, C. (2017). Interdisciplinarity: Practical approach to advancing education for sustainability and for the Sustainable Development Goals. *The International Journal of Management Education*, *15*(2, Part B), 73–83. https://doi.org/10.1016/j.ijme.2017.03.006

Assadourian, E. (2017). EarthEd: Rethinking Education on a Changing Planet. Washington, DC: The Worldwatch Institute.

Association for the Advancement of Sustainability in Higher Education (AASHE). (2021). The Sustainability Tracking, Assessment & Ranking System. https://stars.aashe.org/

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, *27*(1), 14–25. https://doi.org/10.1016/j.jenvp.2006.12.002

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (2000). Exercise of Human Agency Through Collective Efficacy. *Current Directions in Psychological Science*, *9*(3), 75–78. https://doi.org/10.1111/1467-8721.00064

Barrella, E., & Watson, M. K. (2018, June 4). *Identifying Imbalances in Sustainable Design Curricula: A Spotlight on Economic Sustainability*. Engineering Education for Sustainable Development, Glassboro, New Jersey.

Barth, M., Adomßent, M., Fischer, D., Richter, S., & Rieckmann, M. (2014). Learning to change universities from within: A service-learning perspective on promoting sustainable consumption in higher education. *Journal of Cleaner Production*, *62*, 72–81. https://doi.org/10.1016/j.jclepro.2013.04.006

Beery, T. (2013). Making Sustainable Behaviors the Norm at the University of Minnesota Duluth. *The Journal of Sustainability Education, 5*.

Beery, T. & Roatch, J. (2012). Student Participation in Sustainability Survey Results Summary Draft. Retrieved on March 27, 2020 from https://docs.google.com/file/d/0B9ZyertIOSOidFNUN05KSEVkalk/edit

Braßler, M., & Sprenger, S. (2021). Fostering Sustainability Knowledge, Attitudes, and Behaviours through a Tutor-Supported Interdisciplinary Course in Education for Sustainable Development. *Sustainability*, *13*(6), Article 6. https://doi.org/10.3390/su13063494

Brinkhurst, M., Rose, P., Maurice, G., & Ackerman, J. D. (2011). Achieving campus sustainability: Top−down, bottom−up, or neither? *International Journal of Sustainability in Higher Education*, *12*(4), 338–354. https://doi.org/10.1108/14676371111168269

Caeiro, S., Sandoval Hamón, L. A., Martins, R., & Bayas Aldaz, C. E. (2020). Sustainability Assessment and Benchmarking in Higher Education Institutions—A Critical Reflection. *Sustainability*, *12*(2), 543. https://doi.org/10.3390/su12020543

Chaplin, G., & Wyton, P. (2014). Student engagement with sustainability: Understanding the value–action gap. *International Journal of Sustainability in Higher Education*, *15*(4), 404–417. https://doi.org/10.1108/IJSHE-04-2012-0029

Chen, M.-F. (2015). Self-efficacy or collective efficacy within the cognitive theory of stress model: Which more effectively explains people's self-reported proenvironmental behavior? *Journal of Environmental Psychology*, *42*, 66–75. https://doi.org/10.1016/j.jenvp.2015.02.002

Cialdini, R. B., & Jacobson, R. P. (2021). Influences of social norms on climate change-related behaviors. *Current Opinion in Behavioral Sciences*, *42*, 1–8. https://doi.org/10.1016/j.cobeha.2021.01.005

Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders*, *74*, 102263. https://doi.org/10.1016/j.janxdis.2020.102263

Collins, C. R., Neal, J. W., & Neal, Z. P. (2014). Transforming Individual Civic Engagement into Community Collective Efficacy: The Role of Bonding Social Capital. *American Journal of Community Psychology*, *54*(3), 328–336. https://doi.org/10.1007/s10464-014-9675-x

Dabija, D.C., Bejan, B., Dinu, V. (2019). How sustainability oriented is generation Z in retail? A literature review. *Transformations in Business & Economics, 18*(2), 140–155.

Dawe, G., Jucker, R., & Martin, S. (2005). *Sustainable Development in Higher Education: Current Practice and Future Developments*. York: The Higher Education Academy.

Desha, C. J., Hargroves, K., & Smith, M. H. (2009). Addressing the time lag dilemma in curriculum renewal towards engineering education for sustainable development. *International Journal of Sustainability in Higher Education*, *10*(2), 184–199. https://doi.org/10.1108/14676370910949356

Desrochers, J., Albert, G., Milfont, T., Kelly, B., & Arnocky, S. (2019). Does personality mediate the relationship between sex and environmentalism? *Personality and Individual Differences*, *147*, 204–213. https://doi.org/10.1016/j.paid.2019.04.026

DeWitz, S. J., Woolsey, M. L., & Walsh, W. B. (2009). College student retention: An exploration of the relationship between self-efficacy beliefs and purpose in life among college students. *Journal of College Student Development*, *50*(1), 19–34. https://doi.org/10.1353/csd.0.0049

Domask, J. J. (2007). Achieving goals in higher education: An experiential approach to sustainability studies. *International Journal of Sustainability in Higher Education*, *8*(1), 53–68. https://doi.org/10.1108/14676370710717599

Eberhardt, R. (2017). Generation Z Goes to College: An Opportunity to Reflect on Contemporary Traditional College Students. *Journal of College and Character*, *18*(3), 221–223. https://doi.org/10.1080/2194587X.2017.1338583

Emanuel, R., & Adams, J. N. (2011). College students' perceptions of campus sustainability. *International Journal of Sustainability in Higher Education*, *12*(1), 79–92. https://doi.org/10.1108/14676371111098320

Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social Norms and Pro-environmental Behavior: A Review of the Evidence. *Ecological Economics*, *140*, 1–13. https://doi.org/10.1016/j.ecolecon.2017.04.017

Favaloro, T., Ball, T., & Lipschutz, R. D. (2019). Mind the Gap! Developing the Campus as a Living Lab for Student Experiential Learning in Sustainability. In W. Leal Filho & U. Bardi (Eds.), *Sustainability on University Campuses: Learning, Skills Building and Best Practices* (pp. 91–113). Springer International Publishing. https://doi.org/10.1007/978-3-030-15864-4_7

Fielding, K. S., McDonald, R., & Louis, W. R. (2008). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology*, *28*(4), 318–326. https://doi.org/10.1016/j.jenvp.2008.03.003

Fritsche, I., Barth, M., Jugert, P., Masson, T., & Reese, G. (2018). A Social Identity Model of Pro-Environmental Action (SIMPEA). *Psychological Review*, *125*(2), 245–269. https://doi.org/10.1037/rev0000090

Flynn, D. M., & Chow, P. (2017). Self-Efficacy, Self-Worth and Stress. *Education*, *138*(1), 83–88.

Fonseca, J. (2018). *Underrepresented Student Involvement with the Office of Sustainability* [University of San Diego]. https://digital.sandiego.edu/cgi/viewcontent.cgi?article=1004&context=soles-mahel-action

Fromm, J., & Read, A. (2018). *Marketing to Gen Z: The Rules for Reaching this Vast and Very Different Generation of Influencers*. AMACOM.

Gilbertson, K. & LaCaille, L. (2016). Sustainability Survey Preliminary Results. Retrieved from https://drive.google.com/file/d/1mw_jySWOxK_-eri7WKO5LWfoyOTPP-qV/view

Graupensperger, S., Abdallah, D. A., & Lee, C. M. (2021). Social norms and vaccine uptake: College students' COVID vaccination intentions, attitudes, and estimated peer norms and comparisons with influenza vaccine. *Vaccine*, *39*(15), 2060–2067. https://doi.org/10.1016/j.vaccine.2021.03.018

Granley, M. (2020, December 1). *A Strong Start: Integrating Environmental Goals with Economic and Social Systems*. ICMA. https://icma.org/articles/pm-magazine/strong-start-integrating-environmental-goals-economic-and-social-systems

Green, T. L. (2015). Lecturers' perspectives on how introductory economic courses address sustainability. *International Journal of Sustainability in Higher Education*, *16*(1), 44–56. https://doi.org/10.1108/IJSHE-03-2013-0020

Gull, M. (2016). Self-efficacy and mental health among professional students: A correlational study. *International Journal of Modern Social Sciences*, *5*(1), 42–51.

Head, B. (2008). Wicked Problems in Public Policy. *Public Policy*, *3*(2), 101–118.
Heberlein, T. (2012). *Navigating environmental attitudes*. New York: Oxford University Press.

Heeren, A. J., Singh, A. S., Zwickle, A., Koontz, T. M., Slagle, K. M., & McCreery, A. C. (2016). Is sustainability knowledge half the battle? An examination of sustainability knowledge, attitudes, norms, and efficacy to understand sustainable behaviours. *International Journal of Sustainability in Higher Education*, *17*(5), 613–632. https://doi.org/10.1108/IJSHE-02-2015-0014

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet Planetary Health*, *5*(12), e863–e873. https://doi.org/10.1016/S2542-5196(21)00278-3

Howlett, C., Ferreira, J.-A., & Blomfield, J. (2016). Teaching sustainable development in higher education: Building critical, reflective thinkers through an interdisciplinary approach. *International Journal of Sustainability in Higher Education*, *17*(3), 305–321. https://doi.org/10.1108/IJSHE-07-2014-0102

Khan, S., & Henderson, C. (2020). How Western Michigan University is approaching its commitment to sustainability through sustainability-focused courses. *Journal of Cleaner Production*, 253, 119741. https://doi.org/10.1016/j.jclepro.2019.119741

Jugert, P., Greenaway, K. H., Barth, M., Büchner, R., Eisentraut, S., & Fritsche, I. (2016). Collective efficacy increases pro-environmental intentions through increasing self-efficacy. *Journal of Environmental Psychology*, *48*, 12–23. https://doi.org/10.1016/j.jenvp.2016.08.003

Legros, S., & Cislaghi, B. (2020). Mapping the Social-Norms Literature: An Overview of Reviews. *Perspectives on Psychological Science*, *15*(1), 62–80. https://doi.org/10.1177/1745691619866455

Li, D., Zhao, L., Ma, S., Shao, S., & Zhang, L. (2019). What influences an individual's pro-environmental behavior? A literature review. *Resources, Conservation and Recycling*, *146*, 28–34. https://doi.org/10.1016/j.resconrec.2019.03.024

Liobikienė, G., & Poškus, M. S. (2019). The Importance of Environmental Knowledge for Private and Public Sphere Pro-Environmental Behavior: Modifying the Value-Belief-Norm Theory. *Sustainability*, *11*(12), 3324. https://doi.org/10.3390/su11123324

Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. *Science of The Total Environment*, *728*, 138126. https://doi.org/10.1016/j.scitotenv.2020.138126

Lozano, R., Ceulemans, K., Alonso-Almeida, M., Huisingh, D., Lozano, F. J., Waas, T., Lambrechts, W., Lukman, R., & Hugé, J. (2015). A review of commitment and implementation of sustainable development in higher education: Results from a worldwide survey. *Journal of Cleaner Production*, *108*, 1–18. https://doi.org/10.1016/j.jclepro.2014.09.048

Lu, F., Rosser, R., Renteria, A., Kim, N., Erickson, E., Sher, A., & O'Connor, L. (2017). Inclusive Sustainability: Environmental Justice in Higher Education. In *Handbook of Sustainability and Social Science Research* (pp. 63–81). https://doi.org/10.1007/978-3-319-67122-2_4

Lundquist, L. L., Lucero, K., & Cox, H. (2018). Sustainability Knowledge Assessment at a Large, Regional, Minority-Serving Institution. *Journal of Sustainability Education*, *19*. http://

www.susted.com/wordpress/content/sustainability-knowledge-assessment-at-a-large-regional-minority-serving-institution_2018_12/

McCune, V., Tauritz, R., Boyd, S., Cross, A., Higgins, P., & Scoles, J. (2021). Teaching wicked problems in higher education: Ways of thinking and practising. *Teaching in Higher Education*, *0*(0), 1–16. https://doi.org/10.1080/13562517.2021.1911986

Molderez, I., & Fonseca, E. (2018). The efficacy of real-world experiences and service learning for fostering competencies for sustainable development in higher education. *Journal of Cleaner Production*, *172*, 4397–4410. https://doi.org/10.1016/j.jclepro.2017.04.062

Office of the Executive Vice President and Provost. (2023). University Performance and Accountability Report. Retrieved from the University of Minnesota Digital Conservancy. https://hdl.handle.net/11299/252460

Olsson, D., & Gericke, N. (2017). The effect of gender on students' sustainability consciousness: A nationwide Swedish study. *The Journal of Environmental Education*, *48*(5), 357–370. https://doi.org/10.1080/00958964.2017.1310083

Otto, S., & Pensini, P. (2017). Nature-based environmental education of children: Environmental knowledge and connectedness to nature, together, are related to ecological behaviour. *Global Environmental Change*, *47*, 88–94. https://doi.org/10.1016/j.gloenvcha.2017.09.009

Pew Research Center. (2018). *Early Benchmarks Show 'Post Millennials' on Track to Be Most Diverse, Best-Educated Generation Yet.*

Pharo, E. J., Davison, A., Warr, K., Nursey-Bray, M., Beswick, K., Wapstra, E., & Jones, C. (2012). Can teacher collaboration overcome barriers to interdisciplinary learning in a disciplinary university? A case study using climate change. *Teaching in Higher Education*, *17*(5), 497–507. https://doi.org/10.1080/13562517.2012.658560

Rosentrater, K. A., & Burke, B. R. (2017). University students and sustainability. Part 1: Attitudes, perceptions, and habits. *Journal of Sustainability Education, 16.* http://www.susted.com/wordpress/content/university-students-and-sustainability-part-1-attitudes-perceptions-and-habits_2018_01/

Sahin, E., Ertepinar, H., & Teksoz, G. (2012). University students' behaviors pertaining to sustainability: A structural equation model with sustainability-related attributes. *International Journal of Environmental and Science Education*, *7*, 459–478.

Salas-Zapata, W., & Cardona-Arias, J. A. (2020). Knowledge, attitudes and practices of resustainability in two university populations, Colombia. *Journal of Applied Research in Higher Education*, *13*(3), 914–924. https://doi.org/10.1108/JARHE-05-2020-0119

Sawitri, D. R., Hadiyanto, H., & Hadi, S. P. (2015). Pro-environmental Behavior from a SocialCognitive Theory Perspective. *Procedia Environmental Sciences*, *23*, 27–33. https://doi.org/10.1016/j.proenv.2015.01.005

Schutte, N. S., & Bhullar, N. (2017). Approaching Environmental Sustainability: Perceptions of Self-Efficacy and Changeability. *The Journal of Psychology*, *151*(3), 321–333. https://doi.org/10.1080/00223980.2017.1289144

Seemiller, C., Grace, M., Campagnolo, P. D. B., Alves, I. M. D. R., & Borba, G. S. D. (2019). How Generation Z College Students Prefer to Learn: A Comparison of U.S. and Brazil Students. *Journal of Educational Research and Practice*, *9*(1). https://doi.org/10.5590/JERAP.2019.09.1.25

Shafiei, A., & Maleksaeidi, H. (2020). Pro-environmental behavior of university students: Application of protection motivation theory. *Global Ecology and Conservation*, *22*, e00908. https://doi.org/10.1016/j.gecco.2020.e00908

Sparkman, G., Howe, L., & Walton, G. (2021). How social norms are often a barrier to addressing climate change but can be part of the solution. *Behavioural Public Policy*, *5*(4), 528–555. https://doi.org/10.1017/bpp.2020.42

Stern, P., Dietz, T., Abel, T. D., Guagnano, G., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism. *Human Ecology Review*, *6*(2), 81–97.

Swartz, L., Huff, S., & Harper, J. (2017). *Getting to Know Gen Z: How the Pivotal Generation is Different From Millenials.* Barkley, Inc. and FutureCast, LLC.

Tilbury, D., Crawley, C., & Berry, F. (2005). *Education About and For Sustainability in Australian Business Schools*. Australian Government Department of the Environment and Heritage; ARIES & Arup Sustainability.

United Nations. (2022). *Do you know all 17 SDGs?* https://sdgs.un.org/goals

United Nations. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development.* Retrieved March 14, 2022, from https://sustainabledevelopment.un.org/post2015/transformingourworld

Walpole, E.H., Herziger, A., & Wilson, R.S. (2019). 2018 Campus Sustainability Survey: Results and Trends. A Report by the Environmental and Social Sustainability Lab. The Ohio State University, School of Environment and Natural Resources

Wals, A. & Jickling, B. (2002). "Sustainability" in higher education: From doublethink and newspeak to critical thinking and meaningful learning. *International Journal of Sustainability in Higher Education*, *3*(3): 221-232. https://doi.org/10.1108/14676370210434688

Warburton, K. (2003). Deep learning and education for sustainability. *International Journal of Sustainability in Higher Education*, *4*(1), 44–56. https://doi.org/10.1108/14676370310455332

World Economic Forum. (2021). The Global Risks Report 2021. 16th Edition, World Economic Forum, Cologny.
http://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf

Yarime, M., & Tanaka, Y. (2012). The Issues and Methodologies in Sustainability Assessment Tools for Higher Education Institutions: A Review of Recent Trends and Future Challenges. *Journal of Education for Sustainable Development*, *6*, 63–77. https://doi.org/10.1177/097340821100600113

Zelezny, L. C., Chua, P.-P., & Aldrich, C. (2000). New Ways of Thinking about Environmentalism: Elaborating on Gender Differences in Environmentalism. *Journal of Social Issues*, *56*(3), 443–457. https://doi.org/10.1111/0022-4537.00177

Zwickle, A., & Jones, K. (2018). *Sustainability Knowledge and Attitudes—Assessing Latent Constructs* (pp. 435–451). https://doi.org/10.1007/978-3-319-67122-2_25

TABLE 1. Maximum likelihood text statistics from generalized linear models that show the relationship between student responses to 51 sustainability survey questions and explanatory demographic factors including: gender, campus residence, academic college, year in school nested with academic college, and ethnicity. Survey questions were divided into five sections including sustainability 1) Behaviors, 2) Knowledge, 3) Attitudes, 4) Campus engagement, and 5) Curricular engagement.

		Gender		Residence		College		Year (College)		Ethnicity	
Section	**Abbreviated question**	***X2***	***P***	***X2***	***P***	***X2***	***P***	***X2***	***P***	***X2***	***P***
1. Behaviors	Q1. Turn off lights	1.03	0.31	0.26	0.61	4.11	0.39	2.47	0.78	3.22	0.52
	Q2. Use a water bottle	5.73	**0.02**	1.87	0.17	2.45	0.65	4.98	0.42	1.07	0.90
	Q3. Eat less/no meat	17.00	**< 0.0001**	1.63	0.20	26.73	**<0.0001**	2.52	0.77	4.67	0.32
	Q4. Use both sides of paper	2.35	0.13	0.51	0.48	3.05	0.55	6.72	0.24	1.00	0.91
	Q5. Eat organic/local food	0.45	0.50	9.65	**0.002**	2.74	0.60	19.42	**0.002**	5.05	0.28
	Q6. Recycling	5.78	**0.02**	0.07	0.79	13.99	**0.007**	14.07	**0.02**	1.61	0.81
	Q7. Use alternative transportation	2.86	0.09	2.24	0.13	3.64	0.46	3.40	0.64	6.49	0.17
	Q8. Power-down electronics	3.96	**0.05**	0.75	0.39	9.13	0.06	9.13	0.10	9.02	0.06
	Q9. Use reusable bags	3.78	**0.05**	3.33	0.07	4.47	0.35	6.30	0.28	7.17	0.13
	Q10. Conserve water	1.51	0.22	16.70	**<0.0001**	12.64	**0.01**	12.04	**0.03**	4.87	0.30
	Q11. Conserve home energy	0.26	0.61	17.42	**<0.0001**	12.81	**0.01**	7.07	0.22	18.44	**0.001**
	Q12. Reduce consumption	0.48	0.49	0.27	0.61	6.43	0.17	8.92	0.11	3.21	0.52
	Q13. Purchase secondhand	4.30	**0.04**	1.28	0.26	8.38	0.08	11.14	**0.05**	7.02	0.13
	Q14. Attend in campus events	7.14	**0.01**	1.47	0.23	8.32	0.08	4.77	0.44	10.75	**0.03**
	Q15. Participate in political action/activism	2.95	0.09	4.10	**0.04**	5.35	0.25	4.72	0.45	7.15	0.13
	Q16. Participate in organizations/volunteering	0.93	0.34	3.72	**0.05**	9.96	**0.04**	2.65	0.75	13.82	**0.01**
	Q17. Attend off-campus events	0.64	0.42	5.95	**0.01**	11.13	**0.03**	4.23	0.52	12.25	**0.02**
2. Knowledge	Q18. Cause of stream/rive pollution	0.17	0.68	2.87	0.09	3.31	0.51	2.09	0.84	5.51	0.24
	Q19. Ozone protection	2.63	0.10	0.07	0.79	4.48	0.34	5.31	0.38	5.02	0.29
	Q20. Sustainable forest management	2.00	0.16	0.47	0.49	4.87	0.30	13.28	**0.02**	20.72	**0.0004**
	Q21. Environmentally sustainable living	0.17	0.68	1.93	0.16	1.26	0.87	6.15	0.29	7.49	0.11
	Q22. Sustainable development	0.01	0.92	0.07	0.79	2.79	0.59	5.55	0.35	14.53	**0.01**
	Q23. Wealth gap in the US	1.03	0.31	1.33	0.25	8.43	0.08	15.22	**0.01**	3.25	0.52
	Q24. Reason for low US electricity cost	8.20	**0.004**	1.85	0.17	2.44	0.66	7.73	0.17	5.56	0.23
	Q25. Economic sustainability	0.13	0.72	0.41	0.52	4.79	0.31	3.71	0.59	14.24	**0.01**
	Q26. Largest carbon dioxide emissons	0.28	0.60	3.65	0.06	13.35	**0.01**	10.67	0.06	3.64	0.46
	Q27. Cause of fish stock depletion	1.33	0.25	1.22	0.27	5.11	0.28	4.96	0.42	4.32	0.36
	Q28. Environmental justice	0.02	0.90	4.46	**0.03**	1.38	0.85	27.84	**<0.0001**	3.38	0.50
	Q29. Environmental impact	0.24	0.62	1.41	0.24	12.20	**0.02**	5.98	0.31	7.88	0.10
	Average knowledge score Q18-29	1.35	0.25	1.97	0.16	5.88	0.21	13.85	**0.02**	15.39	**0.004**
3. Attitudes	Q30. Equal rights	0.01	0.93	0.13	0.71	13.55	**0.01**	3.94	0.56	1.79	0.77
	Q31. Community cooperation	1.89	0.17	0.05	0.83	9.75	**0.04**	9.55	**0.04**	1.80	0.77
	Q32. Consumerism is not sustainable	7.60	**0.01**	0.02	0.88	23.05	**0.0001**	3.79	0.58	6.72	0.15
	Q33. Clean water is a human right	2.95	0.09	1.52	0.22	7.72	0.10	1.68	0.89	2.35	0.67
	Q34. Reduce my environmental impact	5.57	**0.02**	6.87	**0.01**	7.03	0.13	10.36	0.07	1.58	0.81
	Q35. An unsustainable economy	2.11	0.15	0.16	0.69	16.15	**0.003**	1.50	0.91	6.72	0.15
	Q36. Collaboration to solve global problems	1.22	0.27	0.19	0.67	1.55	0.82	0.98	0.96	2.87	0.58
	Q37. Clean air	0.27	0.60	0.29	0.59	6.00	0.20	5.27	0.38	0.98	0.91
	Q38. Consumption of natural resources	9.70	**0.002**	0.08	0.78	4.99	0.29	4.39	0.49	1.40	0.84
	Q39. Well-being of others	5.19	**0.02**	0.04	0.85	2.81	0.59	3.12	0.68	3.06	0.55
	Q40. Biological diversity	1.52	0.22	0.65	0.42	11.38	**0.02**	1.35	0.93	0.07	1.00
	Average attitude score Q30-40	6.26	**0.001**	0.15	0.07	21.21	**0.002**	1.33	0.93	4.36	0.36
4. Campus	Q41. Influence on college choice	9.20	**0.002**	2.91	0.09	5.76	0.22	12.11	**0.03**	5.70	0.22
	Q42. Confidence with bus system	2.25	0.13	6.12	**0.01**	4.46	0.35	1.77	0.88	9.80	**0.04**
	Q43. Dispose of waste properly	0.35	0.55	0.05	0.83	11.37	**0.02**	13.40	**0.02**	0.28	0.99
	Q44. Personal influence on sustainability	3.55	0.06	0.19	0.66	13.64	**0.01**	8.89	0.11	4.75	0.31
	Q45. Awareness of campus initiatives	4.90	**0.03**	1.69	0.19	14.58	**0.01**	21.54	**0.001**	13.71	**0.01**
	Q46. How to find additional information	1.25	0.26	1.32	0.25	13.17	**0.01**	5.75	0.33	25.02	**<0.0001**
6. Curriculum	Q47. Number of desired courses	0.08	0.77	12.26	**0.001**	25.18	**<0.0001**	21.29	**0.001**	3.32	0.51
	Q48. Involvement regardless of major	1.66	0.20	1.68	0.20	4.29	0.37	11.41	**0.04**	1.29	0.86
	Q49. Employer interest in knowledge/skills	2.71	0.10	7.35	**0.01**	8.82	0.07	17.23	**0.004**	11.48	**0.02**
	Q50. Informed about course options	0.03	0.86	0.10	0.75	7.22	0.12	7.14	0.21	8.78	0.07
	Q51. Project-based learning	0.21	0.64	3.37	0.07	6.84	0.14	7.72	0.17	7.13	0.13

FIGURE LEGENDS

FIGURE 1. Stacked bar chart showing percentages of student participants in five demographic factors with subcategories ordered from from largest (bottom) to smallest percentages (top): A. Gender (female, male), B. College (Sci/Eng, Health/Ed, Bus/Econ, Lib Art, Fine Art), C. Year (junior, senior, sophomore, freshman), D. Residence (off campus, on campus), E. Race/Ethnicity (White, Asian, American Indian, Hispanic, Black, no response).

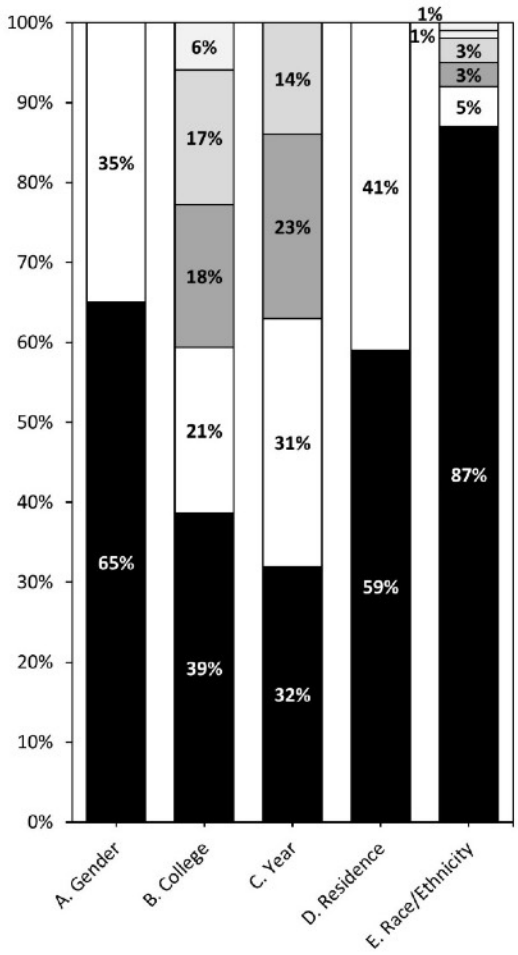
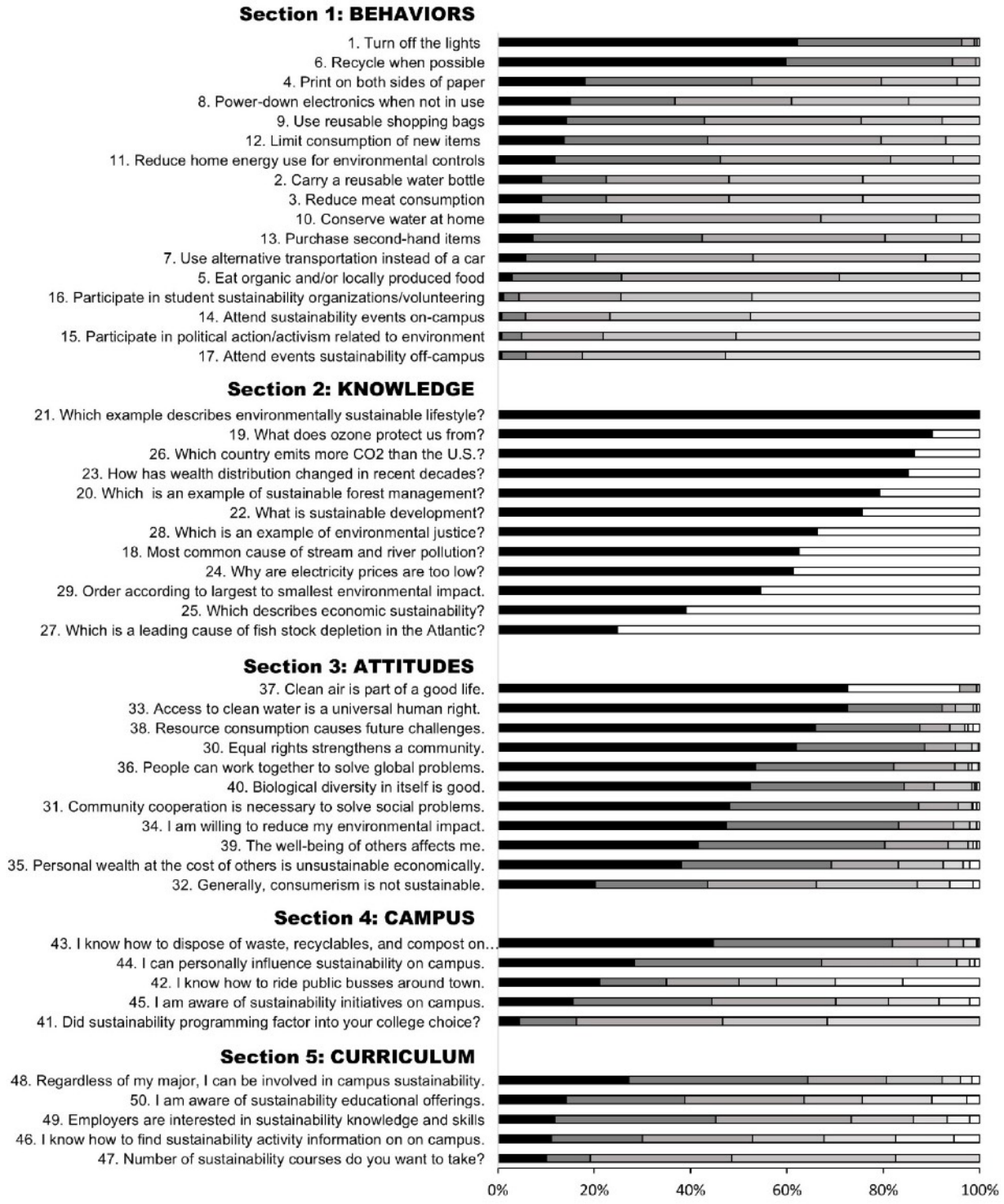


FIGURE 2. Horizontal stacked bar graphs showing the percentage of all possible answers for survey questions within the five sections. Section 1: Behaviors (Q1-17) ranged from "Always" (black) to "Never" (white). Section 2: Knowledge (Q18-29) responses are shown as correct (black) or incorrect (white). Section 3: Attitudes (Q30-40) ranged from "Strongly Agree" (black) to Strongly Disagree (white). Section 4: Participation in campus programming (Q41-45) and Section 5: Participation in curriculum (Q46-50) ranged from "Strongly Agree" (black) to

Strongly Disagree (white) with two exceptions. Q41 asked students how important sustainability was for their college choice, “A Great Deal” (black) to “Not At All” (white). Q47 asked students how many sustainability courses they would be interested in taking, “Four or more” (black) to “None” (white).



ISSN: 2151-7452

FIGURE 3. Bar graphs showing estimated means (SE) for all questions for which there were significant differences between female and male students for the five survey sustainability survey sections: 1) Behaviors, 2) Knowledge, 3) Attitudes, and 4) Campus Engagement (no significant results in Section 5) Curriculum Engagement.

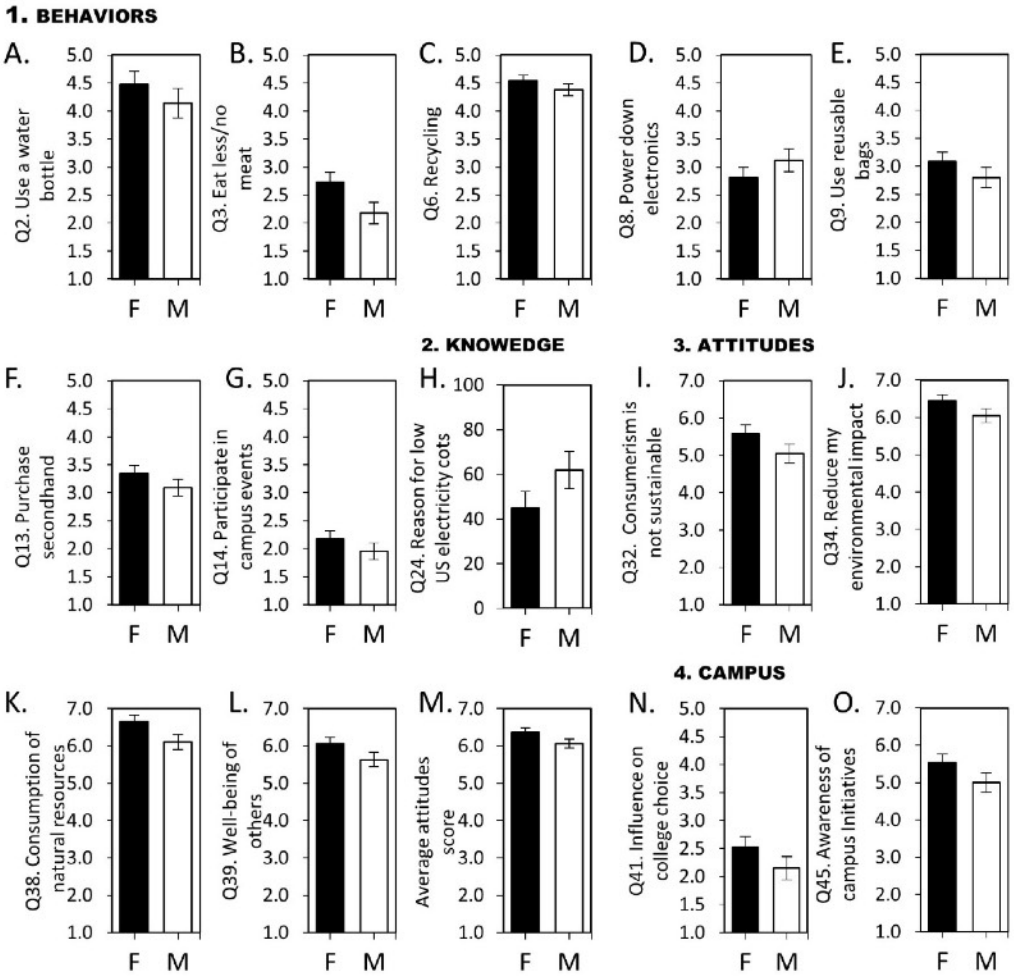
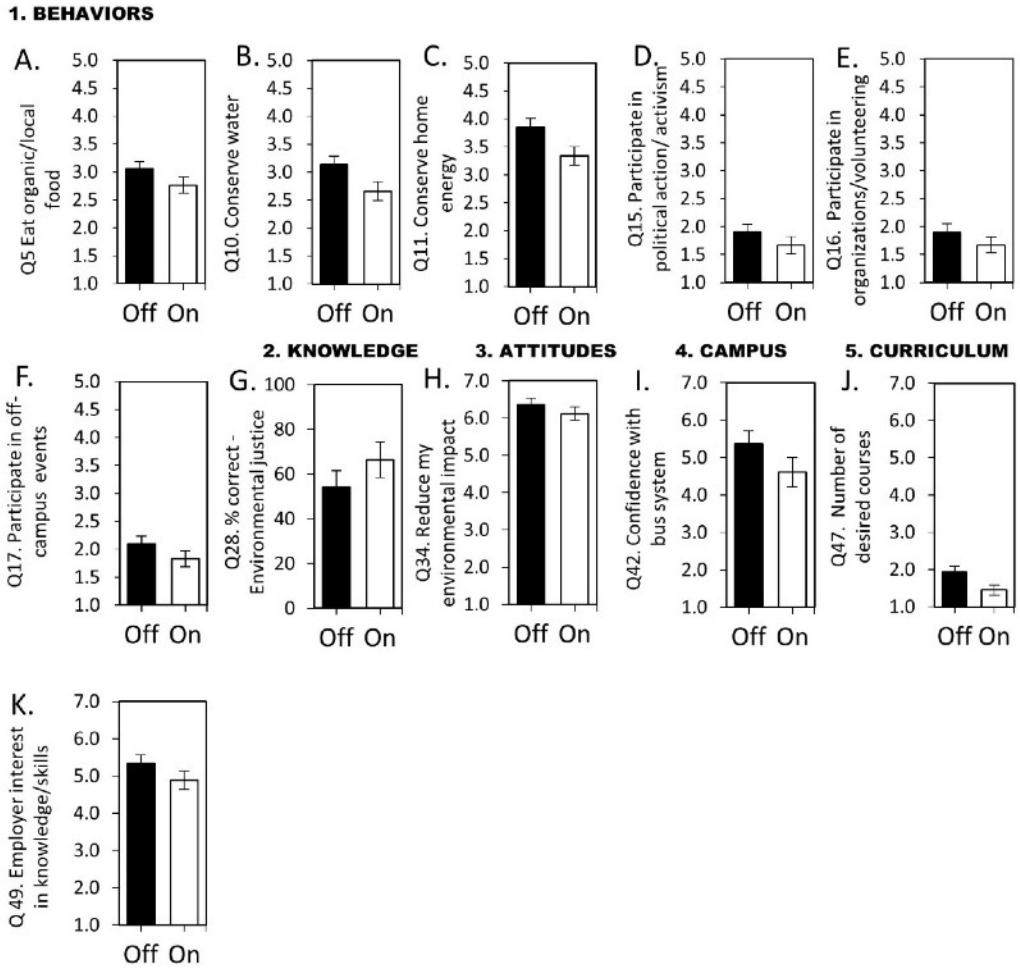


FIGURE 4. Bar graphs showing estimated means (SE) for all questions for which there were significant differences between on-campus and off-campus student residents for the five survey sustainability survey sections: 1) Behaviors, 2) Knowledge, 3) Attitudes, 4) Campus Engagement, and 5) Curriculum Engagement.



ISSN: 2151-7452

FIGURE 5. Bar graphs showing estimated means (SE) for all questions for which there were significant differences between ethnic/racial groups for the five sustainability survey sections: 1) Behaviors, 2) Knowledge, 3) Attitudes, 4) Campus Engagement, and 5) Curriculum Engagement.

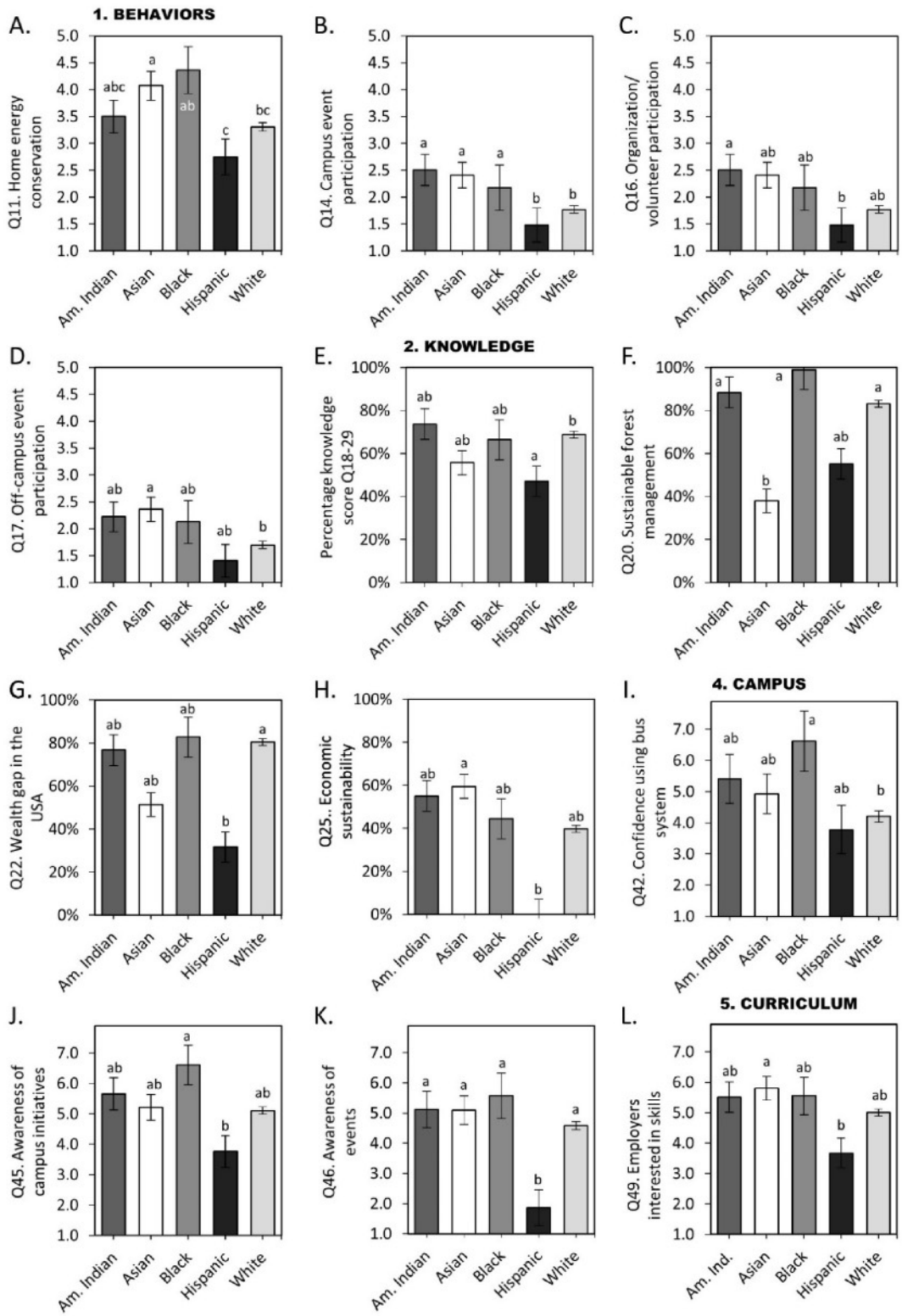
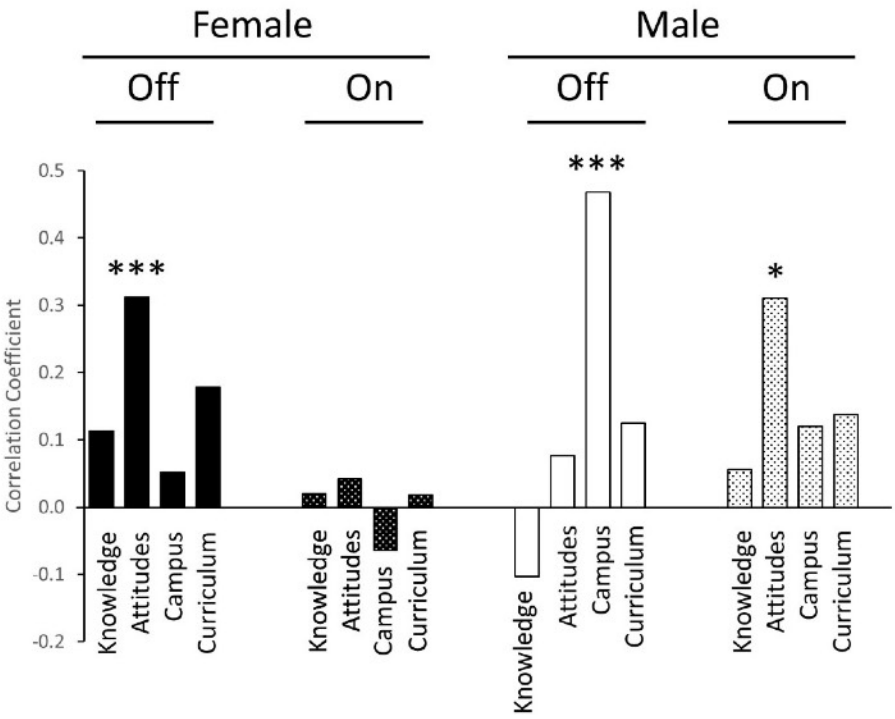
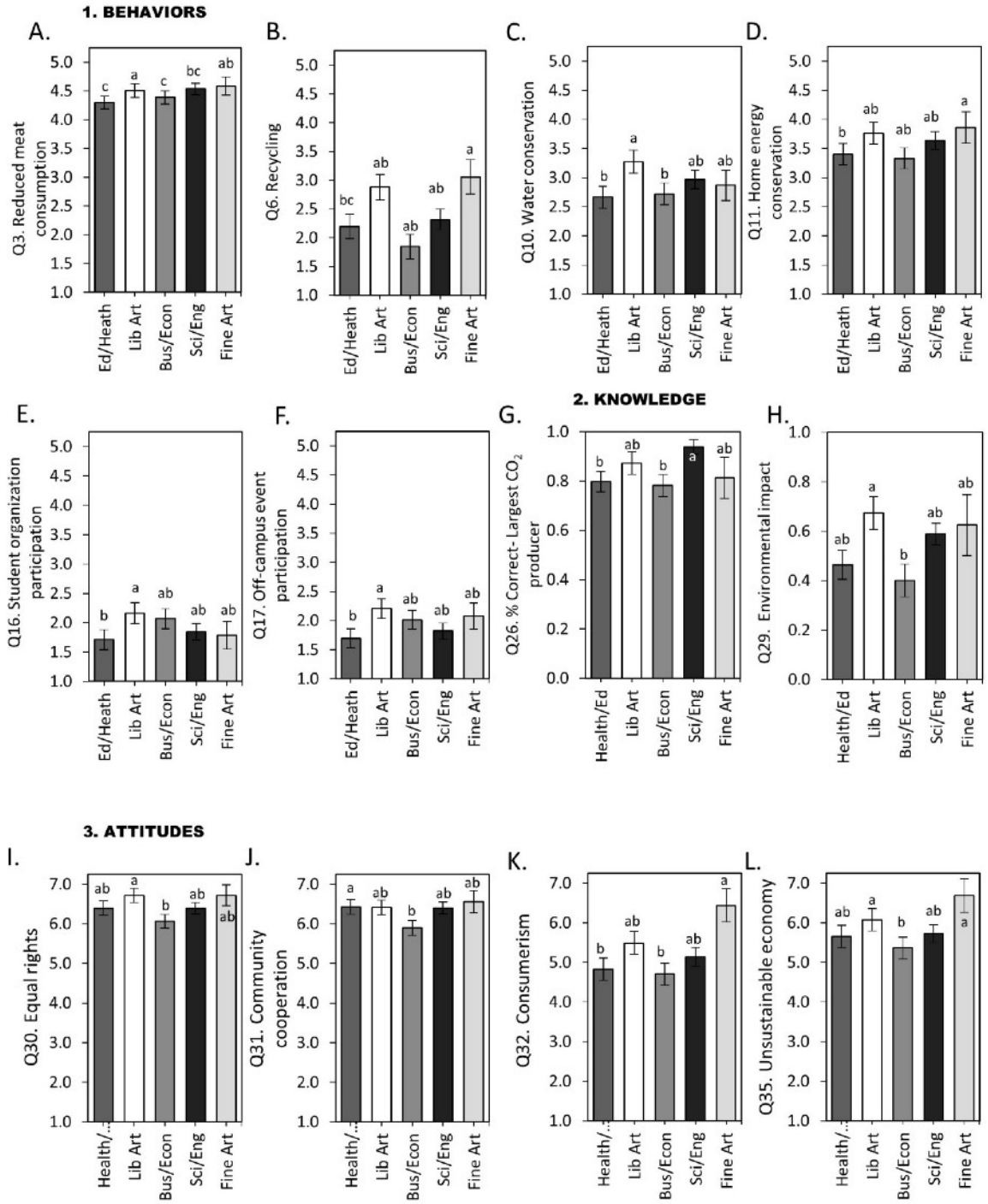


FIGURE 6. Pearson's correlation coefficients, *r*, between student's average behavior scores and their average scores in the knowledge, attitudes, and campus and curricular engagement sections. Correlations for all students are shown with black bars. Correlations for data subsets are

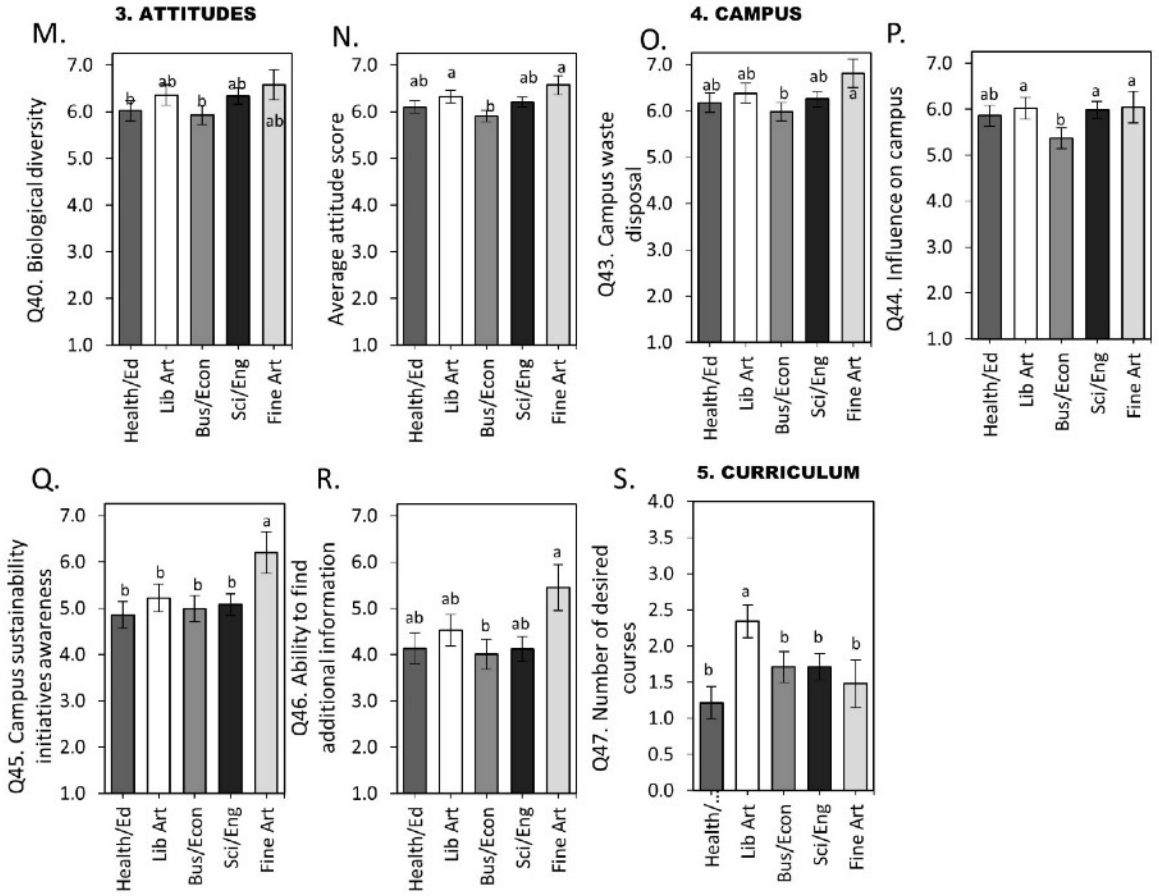
also shown for female students (off campus, gray bars; on campus, gray stippled bars) and male students (off campus, white bars; on campus, white stippled bars). * P < 0.05; ** P < 0.01; ***P < 0.001



SUPPLEMENTAL FIGURE S1. Bar graphs showing estimated means (SE) for all questions for which there were significant differences between colleges for the five survey sustainability survey sections: 1) Behaviors, 2) Knowledge, 3) Attitudes, 4) Campus engagement, and 5) Curriculum engagement.



ISSN: 2151-7452


3. ATTITUDES
4. CAMPUS
5. CURRICULUM
M.
N.
O.
P.
Q.
R.
S.
Q40. Biological diversity
Average attitude score
Q43. Campus waste disposal
Q44. Influence on campus
Q45. Campus sustainability initiatives awareness
Q46. Ability to find additional information
Q47. Number of desired courses
Health/Ed
Lib Art
Bus/Econ
Sci/Eng
Fine Art

Supplemental Table S1. Below is the full 2020 UMD Sustainability Survey that was adapted, with permission, from the Ohio State University 2018 report (Walpole et al., 2019). This survey was sent out using the Baseline survey system from Campus Labs, the usual survey system for UMD Student Life after obtaining IRB approval.

Section 1: Sustainability Behaviors (17 measures)

Below is a list of Behaviors you may or may not do. Please indicate how often you do these behaviors. 1 (Never), 2 (Rarely), 3 (Sometimes), 4 (Often), 5 (Always)

1. Turn off the lights in an empty room where you live
2. Carry a reusable water bottle
3. Choose to eat less meat or no meat in my diet
4. Print on both sides of the paper
5. Eat organic and/or locally produced food
6. Recycle when possible
7. Walk, bicycle, or take public transportation instead of taking a car
8. Turn your personal electronics off or into low-power mode when not in use
9. Use reusable bags when shopping
10. Act to conserve water when showering, cleaning clothes, dishes or other uses
11. Limit the energy used to heat or cool your living space
12. Limit your consumption of new items (e.g. electronics, clothes)
13. Purchase second-hand items instead of purchasing new items

When you have the opportunity, how often do you engage in the following out-of-classroom sustainability activities? 1 (Never), 2 (Rarely), 3 (Sometimes), 4 (Often), 5 (Always)

14. Attend sustainability-related events on-campus
15. Political action or activism related to protecting the environment
16. Participate in sustainability-related student organizations or volunteering
17. Attend sustainability-related events off-campus

Section 2: Sustainability Knowledge (12 questions)
Please choose one answer for each question.

18. What is the most common cause of pollution of streams and rivers?
    a. Dumping of garbage by cities
    b. Surface water running off yards, city streets, paved lots, and farm fields
    c. Litter near streams and rivers
    d. Waste dumped by factories
    e. Don't know
19. Ozone forms a protective layer in the earth's upper atmosphere. What does ozone protect us from?
    a. Acid rain
    b. Climate change

c. Sudden changes in temperature
d. Harmful UV rays
e. Don't know

20. Which of the following is an example of sustainable forest management?
    a. Setting aside forests to be off limits to the public
    b. Never harvesting more than what the forest produces in new growth
    c. Producing lumber for nearby communities to build affordable housing
    d. Putting the local communities in charge of forest resources
    e. Don’t know
21. Of the following, which would be considered living in the most environmentally sustainable way?
    a. Recycling all recyclable packaging
    b. Reducing consumption of all products
    c. Buying products labeled "eco" or "green"
    d. Buying the newest products available
    e. Don't know
22. Which of the following is the most commonly used definition of sustainable development?
    a. Creating a government welfare system that ensures universal access to education, health care, and social services
    b. Setting aside resources for preservation, never to be used
    c. Meeting the needs of the present without compromising the ability of future generations to meet their own needs
    d. Building a neighborhood that is both socio-demographically and economically diverse
    e. Don’t know
23. Over the past 3 decades, what has happened to the difference between the wealth of the richest and poorest Americans?
    a. The difference has increased
    b. The difference has stayed about the same
    c. The difference has decreased
    d. Don’t know
24. Many economists argue that electricity prices in the U.S. are too low because...
    a. They do not reflect the costs of pollution from generating the electricity
    b. Too many suppliers go out of business
    c. Electric companies have a monopoly in their service area
    d. Consumers spend only a small part of their income on energy
    e. Don’t know
25. Which of the following is the most commonly used definition of economic sustainability?
    a. Maximizing the share price of a company's stock
    b. Long term profitability
    c. When costs equal revenue

d. Continually expanding market share
e. Don't know

26. Which of the following countries passed the U.S. to become the largest emitter of the greenhouse gas carbon dioxide?
    a. China
    b. Sweden
    c. Brazil
    d. Japan
    e. Don't know
27. Which of the following is a leading cause of the depletion of fish stocks in the Atlantic Ocean?
    a. Fishermen seeking to maximize their catch
    b. Reduced fish fertility due to genetic hybridization
    c. Ocean pollution
    d. Global climate change
    e. Don't know
28. Which of the following is the best example of environmental justice?
    a. Urban citizens win a bill to have toxic wastes taken to rural communities
    b. The government dams a river, flooding Native American tribal lands to create hydro-power for large cities
    c. All stakeholders from an indigenous community are involved in setting a quota for the amount of wood they can take from a protected forest next to their village
    d. Multinational corporations build factories in developing countries where environmental laws are less strict
    e. Don't know
29. Put the following list in order of the activities with the largest environmental impact to those with the smallest environmental impact:
    A. Keeping a cell phone charger plugged into an electrical outlet for 12 hours
    B. Producing one McDonald's quarter-pound hamburger
    C. Producing one McDonald's chicken sandwich
    D. Flying in a commercial airplane from Washington D.C. to China

    a. A, C, B, D
    b. D, A, B, C
    c. D, C, B, A
    d. D, B, C, A
    e. Don't know

<u>Section 3: Sustainability Attitudes (11 measures)</u>
Please rate your response to each statement related to sustainability attitudes on a scale of 1 (Strongly Disagree) to 7 (Strongly Agree).

30. Equal rights for all people strengthens a community

ISSN: 2151-7452

31. Community cooperation is necessary to solve social problems
32. Generally speaking consumerism is not sustainable
33. Access to clean water is a universal human right
34. I am willing to put forth a little more effort in my daily life to reduce my environmental impact
35. An unsustainable economy values personal wealth at the cost of others
36. I believe that many people can work together to solve global problems
37. Clean air is part of a good life
38. Our present consumption of natural resources will result in serious environmental challenges for future generations
39. The well-being of others affects me
40. Biological diversity in itself is good

Section 4: Campus Sustainability (6 measures)

Please rate your response to the following question about sustainability programming on campus on a scale of 1 (Not At All) to 5 (A Great Deal).

41. When deciding to come to University of Minnesota-Duluth, were you influenced by the university's sustainability programming? *(For example: the Outdoor Program, on-campus recycling initiatives, sustainability-related student organizations, involvement in community and state environmental programs, funding and investment, or coursework)*

For the following questions related to sustainability initiatives on campus, please rate your response on a scale of 1 (Strongly Disagree) to 7 (Strongly Agree).

42. I feel confident riding the DTA buses and know how to use it to get to/from campus and around town.
43. I know how to properly dispose of my waste, recyclables, and compost on campus.
44. I can personally influence sustainability on campus (alternative transportation, conserve energy, reusable water bottle/coffee mug).
45. I am aware of various sustainability initiatives on campus (UMD Free Store, UPASS for riding DTA, UMD Land Lab, Waste Audits, Food Waste Awareness Day).
46. I know where to find information about sustainability-related events, programs, or student organization meetings.

Section 5: Sustainability Curriculum at UMD (5 measures)

Please answer the following question about your interest towards sustainability-related courses at UMD.

47. How many sustainability-related courses would you want to complete as a part of your undergraduate studies?
    a. None
    b. One
    c. Two

d. Three
e. Four or more

Please rate your response to the following statements about sustainability education on a scale of 1 (Strongly Disagree) to 7 (Strongly Agree).

48. Regardless of my major, I could become involved in sustainability-related programs, organizations, and other campus learning opportunities I liked.
49. I believe potential employers are interested in hiring students with sustainability-related knowledge and skills
50. I am well informed about my options to enroll or participate in sustainability courses, minors, majors, and other educational offerings at UMD
51. I have the opportunity to learn about sustainability through project-based or experiential learning.

PHOTOS

Ashlyn Teather

Julie Etterson

Article Image