

STUDENT PERCEPTIONS AND DEFINITIONS
OF SUSTAINABILITY

BY

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THESIS

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Abstract

The term *sustainability* encompasses a variety of concepts and therefore many disparities and misconceptions exist. As the University of Illinois and many other higher education institutions begin prioritizing sustainability, understanding student perceptions and attitudes can inform spending of limited resources on more effective sustainability initiatives. In this exploratory study, freshmen were surveyed via an online questionnaire to gather information on how they perceived and defined sustainability. I analyzed the open ended responses to learn about student understanding of the concept in light of its three components: environment, society, and economy. Quantitative data were analyzed within the context of the interconnectedness with nature scale (INS) as developed by Shultz (2002) and with a practical focus to assist in university sustainability planning. A majority of participants alluded to sustainability in terms of societal and environmental components. Most included reference to usage (e.g. maintain, conserve, improve) of resources and recognized a temporal aspect to that usage. However, complexity within individual responses was limited, with a focus on human needs as the most common element. Perceived importance levels of sustainability were moderately high, whereas knowledge and interest levels were moderately low. Students placed greatest importance on saving energy, developing renewable energy sources, and considering impacts on natural systems. Interest in personal education and development of green courses and sustainability initiatives was quite low.

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Student Perceptions and Definitions of Sustainability

Introduction

“Sustainability emerges on our campuses as a set of principles and examples, a work in progress that can be advanced only through participation and engagement in bringing those principles into the rhythm of day-to-day life in a way that enables and empowers all members of the community.” - Tom Kelly (2009)

Sustainability has been defined in many different ways. According to the Brundtland Report, which provides a commonly accepted definition, it is that which “meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development [WCED], 1987, p. 2). However, factions within the scientific community agree this definition is too basic (Oskamp, 2002). As the term evolved, three domains emerged as key to understanding and progress in sustainable practice: ecological, societal, and economic (Oskamp, 2002). In other words, one needs to consider environmental impact and functioning while factoring social justice and generational aspects, as well as economic feasibility. Others argue that some definitions are too anthropocentric, or assume human benefit should be the most central component (Freyfogle, 2006). As a result, much debate has occurred to pinpoint how sustainability should be defined and practiced.

Furthermore, sustainability is a broad term that is not instinctively or easily understood and communicated (Newport, Chesnes, & Linder, 2003). In a 2001 speech, Kofi Annan, former Secretary-General of the UN, stated that “our biggest challenge in this new century is to take an idea that seems abstract -- sustainable development -- and turn it, too, into a daily reality for all the world's people” (United Nations, 2001). Despite being a vague term, sustainability has been widely used not only in academia, but also in politics and with a wider audience (Kidd, 1992; Freyfogle, 2006). Freyfogle (2006) stated that the broadness of this term can be positive and

allow for those with differing viewpoints to find common ground. Yet, the ambiguity of sustainability can either lead to implementation problems when many people view the meaning differently (Kidd, 1992; Leal Filho, 2000; Shriberg, 2002; Freyfogle, 2006) or to frustration and apathy in light of the overwhelming expanse of the concept (Leal Filho, 1999; Dahle & Neumayer, 2001; Velazquez, Munguia, & Sanchez, 2005).

However, Kelly (2009) and Aber (2009) noted that in relation to higher education, sustainability is a useful term for a university when it is loosely defined. It allows users to develop a specific meaning within the diverse cultural, social, and ecological systems of the local context. Understanding the perceptions and attitudes university students hold towards sustainability can play an integral role in turning the broad concept into a usable reality.

In 2007, the University of Illinois at Urbana-Champaign (UIUC) developed an Office of Sustainability. The office worked with faculty, staff, and a few students to create a sustainability vision with a focus on integrating sustainability into the norms of campus life. At this writing, committees are developing and implementing action tasks to move forward with this vision in the areas of education, facilities, and outreach. Gathering information on the perceptions and attitudes that students hold towards sustainable practice will help shape a definition of sustainability for the university. This information can then serve as a tool to inform change and focus the limited resources the university has to direct toward sustainability.

Personal Statement

Development of the Project

In having worked and traveled to many places, as an environmentalist I began to see how in the practice of environmental work, many factors are involved beyond simply being able to

protect the environment. Sustainability became for me, the concept that was able to encompass what I saw at the right way to proceed. Therefore, I attended a sustainability workshop at the University of Illinois Urbana/Champaign in September 2009. The workshop involved faculty, students and staff in developing a vision and goals for sustainable practice at the university. They were moving into developing action plans for the areas of education, facilities, and outreach. In listening to the history of this process, it was revealed that very limited student involvement took place; something was missing.

I started brainstorming how students could be involved or what information would be useful to have from students for this process. What do students think about sustainability and how do they relate it to their campus? They need to be involved as they will be needed to make some changes and be on board for sustainability initiatives.

In conjunction, I began delving into the literature and came across the problem of defining sustainability. However, it was suggested that one could and should define sustainability within a specific context, such as a university, to understand what those involved wanted the definition to focus on to help move forward.

My broad research questions developed from there. At that point I became involved with the sustainability movement on campus and joined the Student Sustainability Committee (a committee that granted funds to campus sustainability projects) and the Sustainability Education Task Force (a group whose mission was to develop a set of learning outcomes for sustainability for the university). Through conversations with faculty and staff in these groups and others involved with sustainability, I learned about what others thought was needed from students to move the university forward. These conversations generated some of my specific questions for the survey. I also had discussions with undergraduate students in my Introduction to

Environmental Studies course to get baseline information on what they thought sustainability was, how familiar they were with it, and if it was important to them.

I participated in the University of Illinois' Office of Sustainability Prairie Project workshop, early in fall 2010. It was designed to help instructors incorporate sustainability into classroom learning whether it is a sustainability-themed course or not. There I met the co-instructors of the Liberal Arts and Sciences (LAS) 101 Introduction to the College of LAS course and determined to use them as my sample.

Personal View of Sustainability

I would like to think that I have been as objective as possible when working on this project, but I also know that it is very difficult to be purely objective. However, I took as many steps as possible to do so and would like to share those before I discuss my personal definition of sustainability. First, I took the time to have discussions with multiple faculty, students, and staff about my project. These included employees of the Office of Sustainability, professors involved with the Student Sustainability Committee and on the Education Task Force, and students within my courses. I feel that this gave me a broad view of sustainability from many angles.

I also read a wide selection of literature on sustainability, on sustainability in higher education, and on student involvement. This introduced me to many definitions of sustainability, the controversy with defining it, and the ways to move forward and mitigate barriers to it. In learning the difficulty of defining sustainability, I knew that data analysis of definitions would be tricky. How would I decide what was important, what students should or should not know, and how would I sift through the large number of possibilities? Therefore I decided that the best way would be to choose a generally accepted conceptual definition of sustainability and use that as a measurement for student definitions of sustainability. Analysis, to the best of my ability, was not

based on my personal definition of sustainability, but on a broad conceptual definition as supported by the literature. I developed coding category meanings congruent to that definition and attempted to look for consistencies with those meanings in the dataset.

In addition, I kept in mind other ideas from the literature such as anthropogenic based definitions, social justice, and cultural factors. The idea was not that any of these definitions were right or wrong, but that they are most generally accepted in the literature as basic conceptual ideas of sustainability. Are students recognizing one or more of these concepts? Are there other concepts they have related to sustainability? Are there any concepts that are recognized within the literature that are not addressed by the students?

That being said, performing completely unbiased analyses of qualitative data are quite difficult. One's views always provide a backdrop for one's thinking and conceptualization of ideas. Therefore, I now give a brief synopsis of my views of sustainability. To me, sustainability, at the most basic level, is all about balance, finding a balance between what the earth is able provide and what people and animals need to survive. However, I hold very strongly that we need to not simply take from the earth, but find a way to utilize resources in a way that is safe for ecosystem survival and ecosystem growth. This can come from technological advances, improved techniques, incorporation of many factors into planning and utilization beyond profit margins, and getting people involved in understanding and embracing these concepts. I am not a preservationist, I understand we need to use resources, but let us do it in a way that can promote longevity, equal rights and caring for all beings, considering values beyond monetary gain, and improving earth's conditions. However, on the other hand, I feel that humans need to consider their usage of resources and need to be involved in a new type of lifestyle that considers the previously mentioned factors as well.

In my discussion I hope to show, not what is right or wrong, but what students have said that is similar to the literature in terms of environmental, societal, and economical factors to sustainability and what students have missed when compared with what the literature suggests. Places where inconsistencies occur then appear to indicate areas where steps could be taken to improve student awareness or knowledge of that concept. However, it is up to educators and administrators to make judgment on whether that concept is applicable in their situation.

Literature

Defining Sustainability

According to Freyfogle (2006), the word ‘sustainable’ was first applied to forestry practices in Germany in the 1840s and was brought to the United States by Gifford Pinchot and others. As historically applied to natural resources, it meant consuming within certain rates and by certain techniques that allowed resources to endure. The term was then applied to agricultural practice and to describe an emerging paradigm of development in the 1980s. The most broadly cited definition appeared in the Brundtland Report, a 1987 report of the World Commission on Environment and Development (WCED, 1987). This report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (p. 8). Sustainability, as a term, evolved from the concept of sustainable development and the two are now considered interchangeable (Kelly, 2009).

As the term evolved, it included not only environmental aspects, but also economic and societal facets (Schmuck & Schultz, 2002; Newport et al., 2003). Environmentally sustainable solutions will not be practical if they do not have economic strength and consider human needs on many levels. Over the next twenty years, the concept moved through many phases; each one

emphasized a different one of these three main components (Kelly, 2009).

Some have argued that too much emphasis has been placed on environmental issues (Nixon, 2002; Oskamp, 2002). Others believe certain definitions are too anthropocentric (Schmuck & Schultz, 2002; Freyfogle, 2006). Thaman (2002) reasoned that a cultural element should be considered. She found that many definitions are based on western values and fail to incorporate the meanings and ways of knowing of indigenous or non-western peoples. Within traditional knowledge, a key difference is the idea of cyclical natural processes versus the western view of time as linear (Thaman, 2002). Definitions and their implications need to be inclusive and applicable for all, including those who may be on the forefront of sustainable nature resource extraction.

Kidd (1992) concluded that the concept of sustainability developed under too many different and incompatible trains of thought and therefore determining one set definition was futile and unnecessary. Leal Filho (2000) reported that because each person's individual experiences and political and environmental views play a role in their definition, consensus can be difficult. On the other hand, Freyfogle (2006) acknowledged the broadness of this term can allow for those with differing viewpoints to find common ground.

Although people are generally supportive of sustainability initiatives (Leal Filho, 2000), implementation can prove difficult when disparities in understanding of the concept occur (Leal Filho, 2000; Velazquez et al., 2005; Freyfogle, 2006). Sustainability is viewed by many as an ambiguous term, which includes a number of complexities when attempting to apply the concept (Kidd, 1992; Leal Filho, 2000; Shriberg, 2002; Freyfogle, 2006). Newport et al. (2003) stated that sustainability is too broad a term to be useful in public dialogue. These misconceptions, disparities, and complexities can be confusing, overwhelming, and leave many unsure and

uninterested in pursuing action (Leal Filho, 2000; Dahle & Neumayer, 2001).

However, Kidd (1992) and Leal Filho (2000) claimed that definition in a broader sense was unnecessary and suggested those using the term in a specific context simply define the term in relation to their usage. Kelly (2009) further argued that sustainability, as a term, should remain vague, a work in progress that needs to be informed and interpreted by the culture and situation in which it is being utilized.

So, if people using the term chose to try to define it within their context, how do they do that? On a larger scale, how does an entity, such as a university or a student body, attempt to define the term? When initiating sustainability programs at the university level, Aber (2009) concluded “there is a need to define sustainability in the campus context” (p.1); therefore, understanding how students at a university define sustainability seems to be a worthy goal.

Both Kelly (2009) and Aber (2009) noted that sustainability is a useful term for universities as it is loosely defined and allows the user to develop a specific meaning within the diverse cultural, social, and ecological systems in a local context. Leal Filho (2000) concluded that research in this area needs to address the specific themes and issues of sustainability to help universities increase the success of their sustainability programs.

Sustainability in Higher Education

In 1990, the Tallories Declaration was created by twenty-two top university officials to document actions that should be taken by higher education institutions to ensure a sustainable future. The officials determined that "universities educate most of the people who develop and manage society's institutions. For this reason, universities bear profound responsibilities to increase the awareness, knowledge, technologies, and tools to create an environmentally sustainable future" (Report and Declaration of the President's Conference, 1990, p.1).

Similar to Tallories, the Association of European Universities developed the University Charter for Sustainable Development in 1993 (Stalvant, 1996). The Brundtland Report's definition of sustainability was used to develop the charter's ten guiding principles that direct universities through implementation of sustainable practice throughout their operations, research, and education programs (Stalvant, 1996). Over 200 colleges and universities, including UIUC, have signed the document, committing to further develop sustainable practice at their institutions (Stalvant, 1996).

In addition, a number of other documents bolster the university's place within sustainability policy and research (Leal Filho, 2000). Many within the field have supported the connection between sustainability and higher education because universities, by greening themselves, can easily demonstrate and teach students about these practices (Leal Filho, MacDermott, & Padgham, 1996; Creighton, 1999; Evangelinos, Jones, & Panoriou, 2009; Wright, 2009).

Accordingly, for the last twenty years, universities have increasingly introduced sustainability concepts into their academic dialogue (Nixon, 2002; Shriberg, 2003; Aber, 2009). Student groups interested in sustainability topics have also emerged in greater numbers (Newport et al., 2003; Shriberg, 2003). Unfortunately progress is slow, as many barriers exist to implementing successful programs (Smith, 1993; Riera, 1996; Van Ginkel, 1996; Leal Filho, 2000; Shriberg, 2003; Corcoran & Wals, 2004; Velazquez et al., 2005; Lozano, 2006). These barriers include lack of awareness, logistics within university organization structures, limited funding, lack of top level support, time constraints, and lack of communication (Velazquez et al., 2005).

However, one of the main barriers to sustainability within higher education has been the

lack of a clear definition of sustainability (Leal Filho, 2000; Dahle & Neumayer, 2001; Velazquez et al., 2005). Misconceptions in a decentralized university organization can create significant challenges for cohesion and undermine the ability of a campus-wide vision to be successful. Dahle and Neumayer (2001) suggested more research is needed to determine best practices for incorporating sustainability into higher education.

Although a vast amount of literature on the development of sustainability in higher education exists, the focus has been on how institutions, administrators, staff, and stakeholders can be directed to ensure the success of sustainability initiatives. Velazquez et al. (2005) and Lozano (2006) noted that a major barrier to successful promotion of sustainability in higher education has been the lack of awareness, interest, and participation among students. Ruff and Olson (2009) surveyed a group of interior design students on their environmental views and their perceptions of sustainable products and design. The study revealed that student perceptions and understanding of sustainability did not always coincide with what reported actions indicated. The authors concluded that education about sustainability within the interior design program needed to move away from merely introducing sustainable products and designs, but instead needed to focus on developing a strong base for sustainable practice to ensure students' incorporation of sustainable products and design in the future.

Limited work has focused specifically on the role the student body plays in the success of sustainability initiatives. Velazquez et al. (2005) suggested that students do not fully understand their role in the future health of the planet leading to a lack of personal responsibility. Even fewer researchers have considered student perceptions and definitions of sustainability in a general sense or in a university context as a way to improve sustainability programs within higher education.

Conceptual and Theoretical Framework

Perceptions

As sustainability is a broad and complex term, one can hypothesize that students will entertain a wide variety of definitions. These definitions will be based on their perceptions of the term. However, before these definitions can be considered, one must examine the role perceptions play on the defining and understanding similar concepts. Brookfield (1969) claimed “decision makers operating in an environment base their decisions on the environment as they perceive it, not as it is”. One cannot understand someone’s decisions without understanding their thought processes. Although this theory was developed for use in geographical research, Brookfield concluded that understanding and interpretation in many fields needs to come from seeing through the eyes of those on the landscape and gaining a description of the categories used to describe those experiences.

Including analysis of perceptions within one’s methods has been viewed as a holistic approach; however, Brookfield noted the strength in using it in relation to smaller groups or regional areas. In his research, he determined that misconceptions developed and distorted through society as a whole, or on a smaller scale, can create decision making that opposes what science would suggest is the appropriate course of action. This has been supported in recent times through research on risk perception combined with understanding of environmental issues, mechanisms, and outcomes (Attari, DeKay, Davidson, & Bruine de Bruin, 2010).

Baird, Leslie and McCabe (2009) agreed that while outside factors influence decisions, perceptions act as the underlying cause for decisions and behaviors. They argued that research and policy that fails to incorporate information on perception, may change an environment, but fail to change behavior by not first changing perception. The focus of the current research

project is on developing an understanding of perceived sustainability; however, future data collected on behavior could allow links to be made between the environment, perception, and environmentally-friendly behavior, or termed another way, the consequences of one's perceptions. This information can be used to develop policy that is combined with knowledge of student attitudes and behavior on campus.

Human-Nature Relationship

Although the current research project is an exploratory study, the conceptual basis relies on the human-nature relationship. An increasing number of authors have argued that sustainability will only be achieved through a psychological connection with nature (Schultz, 2002). Dietz and Stern (1994) developed a values-based connection between humans and environmental attitudes. In their work, these connections could be egoistic with value placed on oneself, altruistic with values placed on others, or biospheric with value placed on nature. In each case, proenvironmental attitudes may occur, however the reason for those beliefs may differ. Schultz (2000) expanded on this work postulating that every person holds some egoistic reason for proenvironmental behavior, as caring for the environment will ultimately benefit humans. However, he recognized that the type of attitudes will be determined by level of perceived connection to nature.

Vining, Merrick, and Price (2008) concluded that although one can view humans as a part of nature, a dissonance occurs wherein most individuals consider humans, human intervention, and human-made objects as unnatural. Schultz (2002) postulated that the human-nature relationship is not a simple dichotomy, but that connectedness to nature is better represented as a continuum of overlap between nature and self. He created the Inclusion of Nature in Self (INS) scale to understand this phenomenon (see the scale within the questionnaire in Appendix A).

Schultz (2000) determined that there is a direct relationship between how connected someone feels with nature and their level of environmental concern. Furthermore, this feeling of connection to nature is directly related to environmental attitudes.

According to Lamb (1996), viewing oneself as a part of or separate from nature is influenced by one's perceived value of the environment. Schleicher (1996) argued it is these environmental values and their emotional weight that will most likely result in proenvironmental behavioral changes. The human-nature relationship will be related to participants' perceptions of sustainability as well as to several other factors that may or may not contribute in a significant way to that relationship.

In conclusion, sustainability is a concept that can be a difficult to define, understand, and relate to. This can cause conflict in defining the term and impede successful implementation of initiatives in a time when sustainability is moving into the forefront of global concerns. Understanding perceptions and definitions of sustainability will be useful in mitigating conflict and will help successfully transform sustainable practice into an everyday reality. In the context of a university, being aware of student perceptions and understandings of sustainability, when used in developing education initiatives and policy, could increase the likelihood of success for those initiatives in the face of tight fiscal times.

Research Questions

In this project, I explored the question, how do freshman students perceive and define sustainability? Understanding how those students not yet exposed to the university's practice of sustainability perceive this concept can help inform best practices for communicating and implementing that practice for those students. Furthermore, are there gaps where information

needs to be shared or misconceptions mitigated to help move the university forward on its vision of sustainability?

Although the main focus of this research was on qualitatively reported perceptions and definitions, quantitative information was collected on student opinions toward sustainability and its practice within the university. I wanted to explore the theoretical relationship between interconnectedness to nature and connection to sustainability as documented by Schultz (2002). I hypothesized that the greater one's connection to nature, the greater one's level of connection to sustainability. Furthermore, I wanted to explore different variables that may or may not have been salient to students in relation to sustainability with the university context.

1.) What levels of connection do students have with sustainability?

- a. Connection types included level of familiarity, awareness, knowledge, interest and importance
- b. Other questions addressed personal importance of learning, importance as a university issue, interest in environmental issues, and consideration of sustainability in day-to-day choices

2.) Are these connections different among different demographic groups?

- a. Gender
- b. Geographic location
- c. Size of population at the location

3.) What projects and impacts are students most interested in for campus sustainability?

I was interested in the types of correlations that may have existed between the variables including gender, geographic place of childhood, and the size of that place. Gender has been discussed within the literature as a variable that affects levels of environmental concern (Stern,

Dietz, & Kalok, 1993). I feel that limited previous work on the topic warranted exploration of various basic analyses to determine if anything common or unique emerged from the dataset.

Additionally, I was curious as to level of connection students had with sustainability. The hope was to shed light on strategies to effectively move forward with sustainability initiatives from a student standpoint, as student involvement with this has been minimal. Limited input from students can lead to ineffective policies, initiatives, and educational opportunities as student involvement is essential for success (Lozano, 2006).

Answering these questions can and should be a starting point for making decisions on implementation of sustainability within the university. This information provides a sense of student needs, wants, and expectations for courses that incorporate sustainability topics, as well as for green initiatives and policies on campus. It can help professors and administrators understand which topics already have strong student literacy and interest as well as areas that may need a different approach to be successful.

Methods

Study Design

This project included

- (a) qualitative data analyzed using the three pronged approach to sustainability that considers environment, society, and economics;
- (b) qualitative data analyzed with grounded theory to reveal emergent themes;
- (c) quantitative data analyzed within the interconnectedness to nature construct; and
- (d) quantitative data analyzed to reveal contextual levels of connection to sustainability for practical application at the university.

Consideration of generally recognized components of sustainability along with emergent themes was an effective approach because of the socially constructed meanings of sustainability that have developed through the vagueness and complexity of this term.

Data within this study were context dependent, which can limit generalization to other populations. However, the benefit of this limitation in this situation is that a rich time and context-dependent body of knowledge is needed to inform the developing sustainability culture of UIUC. As Kelly (2009) stated, sustainability is useful in context, and as a work in progress that is developed by those in that context.

Research Setting

The University of Illinois campus in Urbana-Champaign is a large partially state-funded, research-based university situated in central Illinois. The student body consists of about 40,000 students comprising 30,000 undergraduates and 10,000 graduate students.

In 2007, through the Office of Sustainability, the university initiated plans to begin addressing sustainability as a campus. A sustainability vision and goals were developed; committees formed to build on that vision and further determine the steps needed to move forward. A focus was placed on improving facilities, building outreach capacities, and developing courses reflecting sustainability themes.

Participants

I recruited research participants from the incoming Fall 2010 freshman class, which comprised about 7,500 students (UIUC Department of Management Information [DMI], 2010). Freshmen were chosen as a group of individuals who may have widely different levels of exposure to sustainability prior to attending college and as a group of individuals who will be directly influenced for the next four years by newly developed sustainability policies at the

university.

To approximate the freshman class, the sample population consisted of students in the College of Liberal Arts and Sciences' (LAS) required introductory freshmen course, LAS 101. LAS is the largest college at the university with about 11,500 students and includes the most diverse set of majors and students within the university (DMI, 2010). Self-selection for the students in this course was not a factor because it is required for all first-time freshmen.

According to Groves, Signer, and Corning (2000), authors of the leverage-salience theory, different kinds of appeals are needed to encourage all types of questionnaire recipients to participate. Dillman et al. (2009) further stressed the importance of making issues salient to potential participants to increase response rate. Therefore, linking the questionnaire to a course that would be covering sustainability topics (saliency) and receiving endorsement from course instructors (leverage) seemed to be a strong way to increase response rate.

Enrollment in the introductory course was 1,832 students, encompassing all first time freshmen in LAS. Assuming that 10% of incoming freshmen are under 18 and therefore unable to participate in the research (DMI, 2010), the sample population becomes 1,649. Of those students, 270 participated producing a response rate of 16.4%.

Materials

An online questionnaire, created through collaboration with many individuals involved in campus sustainability, was used to gather data (the questionnaire is in Appendix A). It began with a series of demographic questions followed by two scaled questions about level of familiarity with and awareness of sustainability. Thereafter, followed an open ended question that directed respondents to brainstorm keywords, ideas, and actions that came to mind when considering sustainability. This order was used to “warm-up” respondents with a few simple

questions and then to get them brainstorming about sustainability. This was used to attempt to decrease the effort of responding to the next question where participants were asked to write a definition of sustainability.

The remainder of the questionnaire contained scaled rating and multiple choice questions addressing knowledge, interest, importance of sustainability, personal involvement in sustainable practice, educational opportunities, and university sustainability initiatives. Additionally, students were asked about their attitude toward sustainability and to report their human-nature relationship through the Inclusion with Nature Scale (INS) (Schultz, 2002).

The questionnaire was developed using guidelines from Dillman et al. (2009) to reduce instrument and measurement error (further explanation is in Appendix B). The instrument was then critiqued by several university faculty experienced with questionnaire design and qualitative human dimensions research. It was also reviewed by a number of graduate students to ensure question clarity and functionality.

Procedure

Teaching assistants in the LAS 101 course were given a script that described the project, which was read to the students in each of 78 discussion sections (the script is in Appendix C). Students were encouraged by the course instructors to complete the questionnaire on a voluntary basis. The following day, each student received an e-mail with a link to the online questionnaire (the e-mail is in Appendix D). One week later, a pop-up announcement regarding the survey was posted on the course educational website (the pop-up announcement is in Appendix E) and a link to the questionnaire was provided on the regular course website. Instructions included with the questionnaire indicated completing the survey implied consent (refer to the instructions on the questionnaire in Appendix A).

Data collection procedures were developed according to the guidelines of Dillman et al. (2009) and Alreck and Settle (2003) in order to maximize response rate and reduce non-response bias (further explanation is in Appendix B). Additionally, the online survey interface did not allow students to complete the questionnaire more than once.

Data Analysis

Quantitative data were entered into SPSS. To report basic findings, I calculated frequencies and descriptive statistics. Scaled variables were compared to each other via correlation analysis and to the human-nature relationship and other demographic variables via ANOVA.

Data from the three open ended questions regarding keywords, definitions, and attitudes were entered into QSR N6. Within the keyword dataset, I used content analysis to identify the ideas and phrases that appeared most often. This information was used to develop a coding hierarchy. I then coded those elements within the keyword dataset to determine overall frequency of response (the coding hierarchy and frequencies appear in Table 1). The unit of analysis consisted of the response to the questions. Codes could be used multiple times for the same response if key words or phrases within the same category appeared in that response more than once.

For the definition and attitudes data, content analysis was performed by two independent researchers. In content analysis, central themes and ideas within the datasets were extracted to determine common as well as unique perceptions, attitudes, and definitions of sustainability. Analyses were based on grounded theory with themes that emerged from the data. The content analyses from the two researchers were then considered and combined to develop a coding hierarchy for the definition dataset (coding categories and frequencies can be found in Table 2)

and a coding hierarchy the attitudes dataset (found in Table 3). Additionally, definitions were categorized as environmental, societal, and/or economical, considering the three component approach to sustainability as developed by Oskamp (2002). I performed the coding for both the definition and the attitudes datasets.

Open Ended Questions Results and Discussion

Keywords

Participants were first asked to brainstorm keywords, ideas, or thoughts generated when considering sustainability. Within the dataset, I used content analysis to identify the ideas and phrases that appeared most often. This information was used to develop a coding hierarchy. Codes were used multiple times for the same response if key words or phrases within the same category appeared in that response more than once. This dataset was used to gain a general understanding of the ideas and actions respondents were linking to sustainability. The frequencies for the coding hierarchy are reported in Table 1. Definitions of the coding categories are found in Appendix G.

Table 1: Keyword Coding Hierarchy and Frequencies

Temporal		68	Humanistic Aspects		56
Future	39		Standard of Living	8	
Present	10		Survival	6	
Generations	19		Needs of People	8	
			Innovation	12	
Environments/Resources		83	Population	10	
Environment	36		World	6	
Resources	31		Education	3	
Ecosystems	7		Materialism	3	
Nature	4				
Earth	2		Action		146
Other Env.	11		Maintain	45	
			Reduce	30	

Table 1 (cont.)

Environmental Issues		249		Renew	20
Energy	103	12		Conserve	18
Alternative Energy		11		Preserve	10
Wind		8		Reuse	10
Renewable Energy		7		Efficiency	7
Biofuels		6		Overuse	6
Green Energy		4			
Nuclear		3		Other	
Other		4		Green	27
				Environmentalism	19
Fossil Fuel/Carbon		42		Government	14
Carbon			24	Responsibility	10
Emissions					
Footprint					
Oil			7	Complexity	
Fossil Fuels			6	Process	11
Gas			5	Impact	11
Recycling	38				
Global Warming	25			Economics	14
Environmental Health	20				
Water	18				
Food	11				
Transportation	7				
Other Env Issues	27				

In a general sense, respondents most often mentioned a specific environmental issue such as global warming, pollution, or fossil fuel usage. Other highly mentioned general categories included some type of action connected to sustainability, a reference to some aspect of the physical environment, as well as the existence of a temporal factor within sustainability.

Within environmental issues, the most mentioned categories included energy, fossil fuels, recycling, and global warming. The most common action suggested was sustaining/maintaining, whereas others included reducing, renewing, and conserving. The most common temporal category was mention of the future.

Human-related factors mentioned within the keywords dataset included standard of living, population, human needs, as well as innovation and education. Fewer respondents mentioned environmentalism, being green, and responsibility. Even fewer mentioned larger conceptual elements such as processes and impacts.

Definitions

Directly following the keyword section, participants were directed to attempt a definition of sustainability. Content analysis was performed by two independent researchers. Central themes and ideas were identified to determine common as well as unique definitions of sustainability. Analyses were based on grounded theory with themes that emerged from the data. Additionally, definitions were categorized as environmental, societal, and/or economical, considering the three component approach to sustainability as stated by Oskamp (2002). Definitions were taken verbatim and I coded them according to the resulting hierarchy. Category frequencies can be found in Table 2. Category definitions and examples can be found in Appendix H.

Table 2: Definition Coding Hierarchy and Frequencies (N=270)

<u>Free Nodes</u>		<u>Tree Nodes</u>	
Environmental	112	Environmental	155
Egoistic	32	Resources	89
Biospheric	59	Ecosystem/Envir.	27
Other	22	Environmental Examples	22
		Environmental Health	17
Economic	5	Societal	168
		Generations/Children	80
		Changes/Responsibility	40
Societal	116	Standard of Living	31
Altruistic	9	Temporal	145
(intragenerational)			

Table 2 (cont.)

		Future	109
		Present	36
Temporal (only)	11		
		Usage	160
		Maintain	36
Limited Definition	81	Conserve	27
		Preserve/Protect	21
Literal Definition	31	Care For/Upkeep	18
		Provide/Support	17
		Efficient/Effective	14
		Balance	11
		Improve/Make Better	8
		Fix/Repair	3
		Development	14

Environmental, Social, and Economic Factors with the Definitions. To identify the definitions (N=270) based on the three components of sustainability, I gave each response an overall code to indicate whether it mentioned environmental, societal, and/or economic factors. Definitions of these factors were taken from Oskamp (2002). Environmental definitions (n=112) comprised 42% of the responses. They were those that referred to resources, ecosystems, the Earth/environment, or a specific example of environmental issues including energy, global warming or recycling. A few examples of such definitions follow.

“Sustainability is keeping the earth healthy and in good condition so we can continue to use its resources responsibly and maintain humanity for years to come.”

“Sustainability is the ability to keep the environment and resource levels the way they are now for the future generations.”

I further divided the environmental category into definitions that appeared to address

resources or the environment as a means to support humans (egoistic) and those that included a reference to the environment beyond human-centered reasoning (biospheric). These categories were developed from Stern and Dietz (1994). Examples that alluded to the environment as a means to support humans (n=32) included mention of human needs, generational needs, and keeping resources available for people. Furthermore, language did not indicate an intrinsic value to conserving or protecting the environment. Verbiage was disconnected from such generally recognized environmentally supported wording such as preservation and conservation versus maintaining and satisfying.

“Sustainability is to efficiently use resources to satisfy the requirement of every generation.”

“Sustainability is the idea that the earth’s natural resources must be maintained and kept available for the next several generations.”

Examples referring to the environment beyond human-centered reasoning (n=59) used language that revealed a level of support or caring for the environment and its resources. Respondents used language in support of the environment such as making it a better place, or protecting it from types of harm such as global warming.

“Sustainability is supporting our environment to keep vital resources, such as water, from being depleted by being green and using renewable resources so that future generations will live in a better place.”

“Sustainability should be a kind of development with minimum environment cost and a healthy life with low carbon, which can slow the pace of global warming and other destructive results.”

Societal definitions composed the most frequently coded category (n=116) at 43% of

respondents. This category included any mention of people, humans, or elements related to people such as generations, or lifestyles.

“Developing ways to meet the needs of the present without compromising the needs of future generations.”

“The goal of sustainability is to provide us with the lifestyle we desire and to be able to comfortably provide that lifestyle indefinitely.”

Within the societal factors that contribute to a definition of sustainability, are the ideas of social justice and equity between all people (Oskamp, 2002). This would translate to an altruistic values approach, placing value on others, within the work of Stern and Dietz (1994). Although, note in this case that I am specifically referring to others as those that are intragenerational versus intergenerational, meaning the social justice between all people that are currently living versus those who will come in the future. This concept was mentioned by nine respondents.

“Sustainability is the ability of Earth's inhabitants to put forth collective efforts to make the world a better place for all to live in. That being our single cohesive vision, we can all maintain a standard of living befitting the entire human race.”

Additionally, the third component of sustainability, economics, was referred to by only five respondents. This category included mention of economics, markets, money, or similar elements. Oskamp (2002), among others, includes economics into sustainability, as sustainable practice needs to be financially viable and generate profit for it to be workable. However, this concept seemed to be lost to most students. No business students were in the sample population; had they been, maybe the results would have been different.

Definitions were categorized if they had been coded for both environmental and social

elements. This area of overlap included 66 definitions; 25% respondents included both a social and environmental element.

“Sustainability is the action involved in maintaining a livable environment for humans and other animals and the responsibility of thinking proactively.”

“Sustainability is the act of living in harmony with the earth and using its resources in a way that can support both the planet and its population without destroying it either.”

A conceptual definition that emerged from the data was one that included only a temporal aspect to sustainability, with neither a particular mention of the environment nor a mention of humans. In these definitions, it seemed beyond my capacity to deduce an anthropogenic or environmental slant from the respondent. I categorized these examples as temporal (n=11).

“Sustainability is an attempt to prevent the present from overpowering the future.”

“Current progress without injuring future prospects.”

Emergent Themes within the Definitions. In addition to categorizing each definition by the larger conceptual categories of sustainability, I also considered individual word choice within definitions. The most frequently mentioned concepts were in reference to the future, generations, and resources. Nearly equal frequencies of environmental, societal, and temporal concepts occurred within the data set.

Another frequent element of the definitions, similar to the keywords, was inclusion of a verb indicating a type of action for performing sustainability. The most common verb I coded was that of sustaining or maintaining (n=35). Others included conserving (n=27), preserving (n=21), and taking care of (n=18).

Noteworthy was the number of respondents who made specific reference to energy within their definitions (n=17). This was the environmental issue that received the most specific

reference. Furthermore, a small number of respondents portrayed it as the main or only focus when defining sustainability (n=13).

“Using our energy supplies in a conscientious way while at the same time coming up with new and better ways to get energy supplies for the future that will keep up with the fast-growing population.”

“Sustainability is the concept that we can use new ideas and methods to create green energy so future generations will not suffer.”

While this number is small, it could indicate a possible avenue of misconception about sustainability within the study population, in that it refers only to issues of energy. Or it could stem from the current importance of energy issues within politics and the media. Students may be exposed to energy issues more often than other issues making them more salient and readily available in their minds. However, with either explanation, it bears considering that information on other environmental issues related to sustainability could need increased exposure.

A reference to lifestyle or standard of living was mentioned by 31 respondents. In considering the category further, a distinction appeared between the types of lifestyles respondents described. Fourteen participants indicated that sustainable practice would allow continuation of current standards of living into the future.

“The goal of sustainability is to provide us with the lifestyle we desire and to be able to comfortably provide that lifestyle indefinitely.”

“Sustainability is the ability for civilization to continue using the same habits without running out of the resources necessary to accomplish these habits.”

Some respondents suggested that lifestyles needed to change to conserve resources into the future and create equitable living standards for all (n=7).

“Sustainability is the ability of Earth’s inhabitants to put forth collective efforts to make the world a better place for all to live in. That being our single cohesive vision, we can all maintain a standard of living befitting the entire human race.”

“Sustainability is the awareness of surroundings and consciously un-selfish effort towards the conservation of health, comfort, and happiness of the world, environment, and living beings in the environment.”

Further Discussion of Keyword and Definition Data. When I consider the definition and keyword datasets, it appears that the respondents are working to grasp the difficult concept of sustainability in light of environmental and societal factors. As was shown above, environmental and societal elements were mentioned that would coincide with those of definitions within the literature. Respondents identified the temporal aspect of sustainability as well. The focus was most strongly placed on humanistic factors, whether that was to provide for people in the present or for future generations. However, most references did not consider the social justice elements that have been associated with sustainability. This appears to be an area of inconsistency with student perceptions and a recognized conceptual foundation for sustainability. Instruction is needed to move definitions and perceptions beyond a limited view of the lifestyles and “needs” of those in developed countries.

In the keyword dataset, most respondents referred to one or many environmental issues as related to sustainability, as well as to the physical elements of the natural environment that play a role. Additionally, in the definition section, many identified natural resources and the natural environment as a context for sustainability. Some participants recognized the need to maintain or conserve resources, or mentioned protecting the environment, a biospheric viewpoint. For some, an egoistic viewpoint emerged in their definitions. In these cases, sustainable practice was

viewed to produce these outcomes for the pure benefit of humans.

The mention of economic factors was minimal within the data set. Reference to other elements, as suggested by the literature, such as politics and culture, was also limited. These findings suggest the potential avenues where students could be educated beyond the societal and environmental factors to broaden their understanding of sustainability.

Attitudes

For this question, content analysis was limited to broad categories of attitudes that strongly emerged from the data. Again, content analysis was performed by two independent researchers. Analyses were based on grounded theory with themes that emerged from the data. The content analyses from the two researchers were considered and combined to develop a coding hierarchy. I performed the coding and frequencies can be found in Table 3 with definitions of categories and examples in Appendix I.

Table 3: Attitudes Coding Hierarchy and Frequencies (N=230)

Support Level	191		
Enthusiastic support	38	16.5%	
Support	128	55.6%	
Neutral	17	7.4%	
Do not support	7	3.0%	
Enthusiastic do not support	1	.004%	
I try/do small things	25		
I wish I did more	8		
Rationale	136	59%	
I am only one person	8		
More important problems/priorities	11		
I don't know enough	16		
Inconvenient/sacrifice	20		
Too distant from me	10		
Overemphasized/annoyed	11		

Table 3 (cont.)

Government/regulation	9
It is too hard	20
Do not care/not interested	11
Attributions to others	46
Responsibility to environment	10
Responsibility to future generations	19

The goal was to gain a general sense of the attitudes respondents held toward sustainability, versus examining specific wording or reaction. Within the coding hierarchy, responses ($N=230$) were coded into one of five categories based on their level of support for sustainability. These categories ranged from enthusiastically do not support to enthusiastically support. Seventy-two percent of respondents ($n=166$) either supported or enthusiastically supported sustainability. Within those who supported sustainability, different levels of importance were revealed with descriptors such as interested, aware, needed, important, extremely important, and most urgent. Examples of responses included,

“I think sustainability is very important, and I always do my best to do my part in conserving resources for the future.”

“It is something we need to consider if we want humanity to prosper in the future.”

Twenty-five respondents, about 10%, used language indicating they were either neutral or did not support sustainability. Examples included:

“I am not motivated enough to do something substantial about it.”

“I know that in my lifetime I will not see the worst consequences of our current lifestyle.”

Additional coding was given to responses that stated “I try” ($n=25$). The responses indicated that the respondent was trying to become more sustainable and/or was performing

small or easy activities such as recycling, not littering, and conserving water.

“I try to make positive choices day to day, but I do not always.”

“I will do easy things such as use a metal water bottle, recycle the plastic and paper I use, not waste water, and other small things like that even if it is a little bit inconvenient.”

Other respondents revealed they would like to do more (n=8).

“I think it is extremely important; I wish I could say I live more sustainably. One thing I always do is recycle paper, plastics, and metal.”

In addition to reporting a level of support, a large number of respondents included a reason or rationale as to why sustainability was not occurring, either by them or in general.

Some participants pointed out the inconvenience of certain actions (n=20) or that it was hard to do or remember (n=20).

“I am all for it but I am not going to go out of my way to do it.”

“The most challenging aspect is to make sustainable choices habitual.”

Some thought they were not knowledgeable enough to participate (n=16).

“I agree with the concept, but don't always know what I can do personally in order to make a difference.”

A few respondents indicated that too much emphasis on sustainability had turned them off to it (n=11).

“I feel that sustainability itself is very important, but the concept has been shoved down my throat so many times that I become resentful towards people who will not shut up about it.”

Others said that sustainability and its consequences were too distant from them (n=10) or they

had other priorities (n=11).

“It’s generally not going to affect my generation, so I’m not making a huge attempt to make drastic measures to affect it.”

“I don’t think about it that much, it seems more like a background issue to me when there are more immediate problems like homework and classes.”

A few concluded that an individual cannot make a difference (n=8) or that the government or regulations need to take care of the problem (n=9).

“I feel that it is hard for the individual to make impacts on the views of society.”

“I think that sustainability issues that concern society as a whole, like energy and resource management, are influenced much more by the government and the commercial sector than they are by individuals.”

However, the most commonly reported response was attributing the problem to others (n=46), claiming that people needed to become aware of sustainability and take action.

“I feel like many people don’t care or just don’t do enough to help the earth.”

“Sustainability is worthwhile and a good thing to engage in everyday activities, but I feel that most people in today’s society tend to ignore it or simply not think about it in the middle of their daily activities.”

In a broad sense, three general attitudes towards sustainability emerged from the data, one of support for the concept, one of support but with a rationale or defense mechanism for not personally performing, and one of limited support. From those who supported sustainability, about 60% of responses also indicated there was some reason they were not performing sustainable actions. Reasons were justified with rationales, mostly in the form of defense mechanisms. Examples are as follows:

Thought suppression - *“I feel we need to take more actions for sustainability, but it is easy to forget to do that.”*

Rationalization - *“I think it is important, but I don’t know how to begin solving the problem.”*

Denial – *“It is a nice idea but there is not enough evidence to support it.”*

When asked what their general attitudes toward sustainability were, students revealed answers I had not anticipated. As was mentioned, 60% included a rationale or justification for why they or others were not more involved in sustainability. This reveals a certain level of guilt involved within this concept (Vining & Ebreo, 2002).

Quantitative Results and Discussion

Demographics

Two hundred and seventy students completed the online questionnaire, yielding a response rate of 16.4%. Demographics appear in Table 4. Of those students, 60% were female and 40% were male. Sixty-five percent identified as being from the Chicago metropolitan and suburban area and 23% were from other locations in Illinois, for a total of 88% who were considered residents of Illinois. Three percent were from other areas in the U.S. and 9% were international. Furthermore, 58% identified as being from suburbs, 22% from a large metropolitan area, 5% from a stand-alone city, and 15% from a small town or rural area.

Table 4: Comparison of Sample and Population Demographic Data

	<u>Sample</u>		<u>Population (Freshman class)</u>
<i>Geographic Place</i>	Freq.	%	%
Chicago/Chicago Suburbs	174	64.4%	61%
Other Illinois Locations	63	23.3	21
Outside Illinois	8	3.0	7

Table 4 (cont.)

Outside the US	25	9.3	10
<i>Locality</i>			
Urban/Large Metropolis	60	22.2%	unavailable
Suburban	157	58.1	
Stand Alone City	13	4.8	
Rural/Small Town	40	14.8	
<i>Gender</i>			
Female	163	60.4%	47%
Male	107	39.6	52

I compared the demographic data of the sample to demographic data from the 2009 UIUC freshman class as those were the newest data available. Demographics between the sample and the population were similar and the comparisons are reported in Table 4. This indicates that the sample reflected the population in most respects and inspires confidence in the data even though the response rate was low.

Scaled Questions

Students were asked to rate their level of familiarity, awareness, knowledge, interest, and perceived importance of sustainability. Responses were recorded on a scale ranging from one (not at all) to five (extremely). Table 5 reports the mean responses for the scaled questions. Participants reported that sustainability in general was somewhat important with a mean rating of 3.81. Next were familiarity at 3.24, awareness at 2.95, interest at 2.90, and knowledge at 2.67. With the other scaled questions, importance of sustainability as a university issue was rated highest with a mean of 3.33, importance of sustainability in one's own education was 3.00, interest in environmental issues was 2.85, considering sustainability in day-to-day choices was

2.84, and interest in taking sustainability courses was 2.41.

Table 5 also reports the skew statistic for the distributions of each question. Most skew values were near zero revealing limited skewness in the distributions. I also inspected the frequency distributions and none were bimodal or heavily skewed.

Table 5: Mean Ratings of Scaled Questions

	Mean	SD	Skew		Mean	SD	Skew
Importance	3.81	(1.01)	-.458	Uni. Importance	3.33	(.998)	-.256
Familiarity	3.24	(.924)	.235	Learning Importance	3.00	(1.17)	1.12
Awareness	2.95	(.937)	.205	Env. Issue Interest	2.85	(1.09)	.228
Interest	2.90	(1.09)	.218	Daily Choices	2.84	(1.03)	-.013
Knowledge	2.67	(.882)	.426	Green Courses	2.41	(1.14)	.644

(1-Not at all, 5-Extremely)

In considering the mean ratings of familiarity, awareness, knowledge, interest, and importance were rated highest overall, with familiarity and awareness following, respectively. This could indicate that although students may not be as familiar or aware of the complexities and specifics of sustainability, they seem to think it is an important issue. Additionally, low levels of interest and knowledge occurred despite the reported importance of sustainability. The moderate importance of sustainability to students was further supported by participants' responses to the two of the other scaled questions that addressed importance. Importance of sustainability as a university issue and importance of sustainability in one's personal learning were ranked moderately important with means of 3.33 and 3.00, respectively.

Respondents rated their knowledge level of sustainability as just below average. This appears to be a place where students feel the most lacking toward sustainability. It indicates an area where the university could most efficiently turn funding into a positive increase in sustainability on campus. However, one must keep in mind that respondent interest in taking

sustainability courses was rated the lowest. This may signify a need to consider either broad, effective marketing of such courses or a variety of pedagogical methods within courses to spark student awareness and interest.

To explore the data further, I compared the scaled questions using bivariate correlation to determine the types of relationships that existed between the variables. Table 6 is the resulting correlation matrix with Pearson's r values listed. In every comparison of scaled questions, a statistically significant positive correlation occurred. For example, as knowledge level increased, so did level of interest or level of perceived importance. Some pairs were moderately associated, others showed stronger correlations where about half of the variance was accounted within those variables. Moderately strong correlations existed between familiarity and awareness ($r = .709$, $r\text{-squared} = .503$), familiarity and knowledge ($r = .695$, $r\text{-squared} = .483$), awareness and knowledge ($r = .741$, $r\text{-squared} = .549$), and also interest and importance ($r = .710$, $r\text{-squared} = .504$).

However, these particular data appear to show a disconnection between some of the levels of connection to sustainability. Familiarity, awareness, and knowledge are strongly correlated with each other as one group. Importance and interest are strongly correlated as another group. Yet there are no strong correlations across the variables within these two groups. While statistical analyses do show significant correlations between all of these variables, conceptually in terms of interest, for example, importance accounts for 50% of the variance within interest level, whereas knowledge, awareness, or familiarity would only account for 20%. It is interesting to ponder how one might further bridge the gap between being familiar, knowledgeable, or aware of something and to actually being interested in or recognizing its importance.

Table 6: Correlation Matrix for the Scaled Variables including the Human-Nature Relationship

	Human Nature Relationship	Familiarity	Awareness	Knowledge	Interest	Importance	Day-to-Day Choice	Learning Importance	Green Courses	University Importance	Environmental Issues
Human Nature Relationship	1	.332 .000	.273 .000	.297 .000	.427 .000	.357 .000	.373 .000	.237 .000	.335 .000	.370 .000	.408 .000
Familiarity		1	.709 .000	.695 .000	.472 .000	.350 .000	.403 .000	.320 .000	.356 .000	.310 .000	.423 .000
Awareness			1	.741 .000	.455 .000	.305 .000	.396 .000	.286 .000	.352 .000	.260 .000	.407 .000
Knowledge				1	.485 .000	.322 .000	.443 .000	.284 .000	.328 .000	.314 .000	.409 .000
Interest					1	.710 .000	.557 .000	.549 .000	.721 .000	.575 .000	.780 .000
Importance						1	.543 .000	.517 .000	.555 .000	.618 .000	.622 .000
Day-to-Day Choice							1	.426 .000	.446 .000	.412 .000	.472 .000
Learning Importance								1	.615 .000	.451 .000	.568 .000
Green Courses									1	.510 .000	.720 .000
University Importance										1	.565 .000
Environmental Issues											1

Sustainability on Campus

Students were asked to consider which sustainability projects they would most like to see implemented on campus. Respondents were allowed to choose up to three answers resulting in percentages totaling more than 100%. The percentage of respondents choosing each project is reported in Table 7. The greatest number of students, at 64%, supported development of renewable energy sources for campus. Improving the energy efficiency of campus buildings followed at 60%. Forty percent of students indicated the desire for more recycling containers on campus. Least important was increasing and improving courses integrating sustainability themes at 5.5%.

Table 7: Sustainability Projects Students Would Most Like to See on Campus

Project	% of students
Development of renewable energy sources for the campus	63.7%
Improving energy efficiency of campus buildings	60
More containers for recycling	42
Increasing sustainability of dining hall food and policies	32.5
Upgrade of bike and bus transportation options	29.2
Increasing university purchasing of green products	24
Native landscaping and reduced pesticide usage	20.3
Increased sustainability activities and incentive programs	18.5
Increase/improve courses integrating sustainability themes	5.5

Note. Students could choose up to three answers resulting in percentages that total more than 100%

In similar fashion, participants were asked which factors should be most important when the university considers funding sustainability projects. The results are reported in Table 8. Eighty percent of respondents indicated the amount of energy saved was most important. Sixty percent would like impact on natural systems considered, 45% chose amount of money saved, and carbon emissions avoided was reported at 42%. Thirty-five percent thought impacts on

students should be considered, 18% factored in potential for educational value, and 17% chose visibility to students.

Table 8: Most Important Factors the University should Consider when Choosing to Fund Sustainability-Based Projects?

Factor	% of students
Amount of energy saved	80%
Impact on natural systems	60
Amount of money saved	45
Carbon emissions avoided	42
Impact on students	35
Potential for educational value	18.5
Visibility to students	17

Note. Students could choose up to three answers resulting in percentages that total more than 100%

Overall, students were most interested in university projects that developed renewable energy and improved the energy efficiency. Although the rationale for their choice is not apparent, this finding is interesting when considering that in the past people have generally misinterpreted the environmental benefits of proenvironmental behaviors (Attari et al., 2010). For example, people have overestimated the impact individual recycling has for the environment, and underestimated the impact of purchasing new and energy efficient appliances. However, in this case students have selected the two choices that would most likely make the biggest impact for the university. Recycling activities follow close behind, which reveals the importance that is still placed on recycling as a major proenvironmental behavior, but at a 40% response, possibly the perceived importance of this activity may be decreasing.

Similarly, when asked which factors should be considered when funding sustainability projects, 80% of students chose the amount of energy saved. Impact on natural systems was also considered important at 60%. Support for these factors reveals a biospheric values system

towards sustainability where importance is placed on the environment. In comparison, the factors based on personal benefits to students, such as impact on students, visibility to students, and educational value, were ranked quite low. This is a positive finding in that previous work of Stern and Dietz (1994) and Schultz (2000) has recognized egoistic rationales, focused on one's self, are generally highly salient for many people in relation to environmental issues. However in this case, those types of rationales were rated lowest.

In relation to knowledge and education, students reaffirmed their lack of interest in sustainability education. Improving courses and increasing sustainability initiatives were ranked quite low, as well as educational value as a factor to be considered in funding projects. Again, this may indicate a strong need to market sustainability courses in an explicit or unique way to generate student interest and increase perceived saliency. Another approach would be to use sustainability as a backdrop for examples and activities within seemingly unrelated courses as a way to increase awareness.

Gender Comparisons

In terms of gender, it has been generally recognized that females are more concerned with environmental issues than males (see Stern, et al. 1994 for an overview). I compared the mean values for the scaled questions to determine if significant differences were present between males and females; the results are included in Table 9. Three categories showed significant differences between male and female responses. In these cases, males reported higher levels of familiarity, awareness, and knowledge of sustainability than females. Although not statistically significant in any other case, females reported higher mean values for every other scaled question.

Table 9: Mean Gender Comparison of Scaled Questions

	Male	Female	F(268)	p-value
Familiarity	3.43 (.88)	3.12 (.93)	2.70	.007**
Awareness	3.13 (.92)	2.83 (.93)	2.56	.011*
Knowledge	2.92 (.92)	2.52 (.82)	3.73	.000**
Interest	2.85 (1.1)	2.93 (1.1)	.606	.545
Importance	3.68 (1.1)	3.89 (.96)	1.65	.099
Daily Choices	2.79 (1.1)	2.88 (1.0)	.646	.519
Learning Importance	2.98 (1.2)	3.02 (1.1)	.253	.801
Green Courses	2.36 (1.2)	2.44 (1.1)	.499	.618
Uni. Importance	3.23 (1.0)	3.40 (.98)	1.33	.184
Env. Issue Interest	2.81 (1.2)	2.88 (1.0)	.472	.637
Human-Nat. Relate	3.84 (1.5)	3.96 (1.6)	.601	.549

* p<.05 **p<.01

In this dataset there was no statistically significant difference in the reported interest or importance levels of sustainability between males and females, nor were there differences in the level of interest in environmental issues between males and females. This is contrary to some preceding research. Additionally, there was no difference in the human-nature relationship between males and females.

Geographic and Locality Comparisons

Differences based on the geographic area of childhood, as reported in Table 10, were not statistically significant at the .05 level, except in one case. International students reported a

significantly higher connection to nature than domestic students. This will be discussed in a subsequent section. Additionally, differences based on the size of locality, as reported in Table 11, were not statistically significant in any case.

Table 10: Mean Geographic Comparison of Scaled Questions

Scaled Variable	Chicago/ Suburbs	Other IL Locations	Outside Illinois	Outside the US	F(3)	p-value
Familiarity	3.26 (.93)	3.25 (.89)	3.13 (1.1)	3.16 (.94)	.129	.943
Awareness	2.94 (.96)	2.90 (.84)	3.00 (1.2)	3.12 (.93)	.331	.803
Knowledge	2.70 (.89)	2.57 (.87)	2.75 (.71)	2.72 (.89)	.379	.768
Interest	2.90 (1.1)	2.84 (1.1)	2.75 (1.3)	3.12 (.93)	.451	.717
Importance	3.82 (1.0)	3.71 (1.0)	3.63 (1.4)	4.04 (.73)	.711	.546
Daily Choices	2.80 (1.0)	2.78 (.99)	2.75 (1.0)	3.36 (1.1)	2.34	.073
Learning Importance	3.01 (1.2)	2.89 (1.0)	2.63 (1.2)	3.40 (.86)	1.42	.235
Green Courses	2.37 (1.1)	2.33 (1.2)	2.25 (1.2)	2.92 (1.1)	1.90	.129
University Importance	3.36 (.98)	3.21 (1.0)	3.00 (1.3)	3.60 (.86)	1.26	.286
Env. Issue Interest	2.86 (1.1)	2.71 (1.0)	2.75 (1.1)	3.16 (1.0)	1.03	.381
Human-Nature Relate	3.79 (1.5)	3.95 (1.3)	3.50 (1.4)	4.76 (1.9)	3.11	.027*

Table 11: Mean Locality Comparison of Scaled Questions

Scaled Variable	Urban/Metro	Suburban	Stand Alone City	Rural/ Small Town	F(3)	p-value
Familiarity	3.08 (1.0)	3.30 (.90)	3.31 (.95)	3.25 (.84)	.811	.489
Awareness	2.90 (.99)	2.97 (.94)	3.23 (1.2)	2.88 (.79)	.548	.650
Knowledge	2.65 (.84)	2.71 (.89)	2.85 (1.1)	2.53 (.85)	.631	.596
Interest	3.02 (1.0)	2.87 (1.1)	2.77 (1.1)	2.88 (1.1)	.330	.803
Importance	3.92 (.85)	3.83 (1.0)	3.69 (.75)	3.60 (1.1)	.875	.455
Daily Choices	2.95 (1.1)	2.83 (1.0)	2.85 (.80)	2.75 (1.0)	.333	.802
Learning Importance	3.23 (.99)	2.97 (1.2)	2.92 (1.0)	2.80 (1.2)	1.21	.305
Green Courses	2.65 (1.1)	2.34 (1.1)	2.00 (.57)	2.45 (1.3)	1.68	.172
Uni. Importance	3.57 (.91)	3.29 (1.0)	3.38 (.96)	3.13 (1.1)	1.78	.150
Env. Issue Interest	3.05 (1.1)	2.83 (1.1)	2.69 (.63)	2.68 (1.1)	1.12	.342
Human-Nat. Relate	4.30 (1.7)	3.75 (1.5)	3.62 (1.0)	4.05 (1.4)	2.10	.100

Human-Nature Relationship

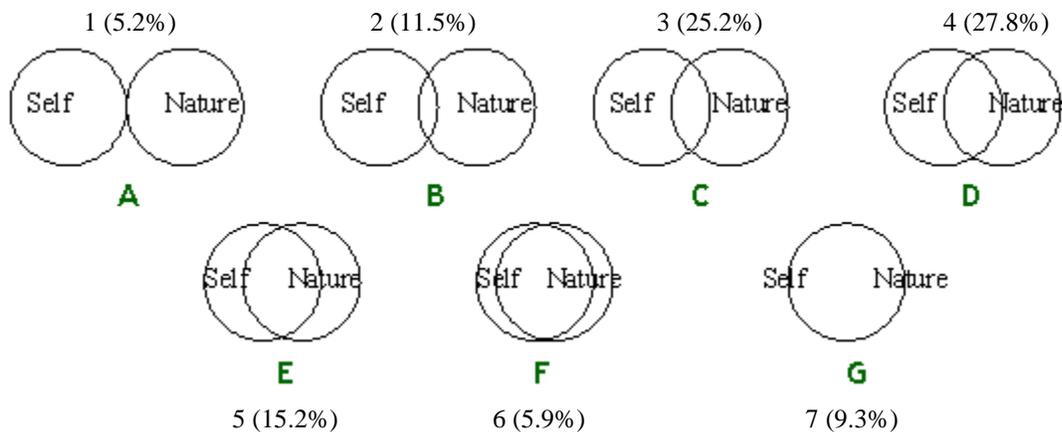
Participants indicated their position on a continuum (Inclusion of Nature with Self Scale

by Schultz 2002) by considering Venn diagrams that contained two circles with increasing levels of overlap between nature and people scaled from one to seven. As is indicated by Figure 1, the mean rating was 3.91. A 50% overlap of nature and humans occurred at that level, indicating that on average, respondents viewed themselves as approximately 50% connected to nature. Five percent of students indicated there was no connection between themselves and nature, 9% indicated there was 100% overlap.

There was no statistically significant difference between the reported human-nature relationship of females and males. However, international students felt significantly more connected to nature than domestic students. It is interesting to note that international students viewed themselves as significantly more connected to nature. When considered with data that report no significant differences in awareness, knowledge, or interest levels between domestic and international students, one could postulate that cultural differences are at work. As Thaman (2002) noted, differences in culture and ways of knowing have profound effects on how one would view and practice sustainability. However, data were not collected on ethnicity, race, or other cultural factors, making further analysis of these differences difficult.

Figure 1: Interconnectedness with Nature Scale (INS)

Mean 3.91 (1.55)



I compared the scaled questions to the INS scale with bivariate correlation and the results are reported in Table 6 (see page 37). There was a statistically significant positive correlation between the human-nature relationship and every scaled variable. In other words, as the reported connection to nature increased, so did ratings levels of every other scaled question. For example, those with a stronger relationship to nature were more likely to have higher levels of knowledge, to report higher perceived importance of sustainability, and were more likely to consider sustainability in day-to-day choices. These findings support Shultz (2002) and others who have concluded that an interconnectedness to nature is necessary for the successful implementation of sustainability. However, these correlations were all moderate to low, with r-squared values between .05 - .18, indicating that the relationship only accounts for a small amount of variation within the variables.

Furthermore, these data do not allow causal linkages to be made. One cannot assume that interconnectedness to nature caused respondents to be more interested in or more knowledgeable about sustainability. One could also conclude that increased awareness, knowledge, and interest levels in sustainable principles and practice could build a person's relationship with the natural world.

Overall Discussion

In considering cross-over from the entire dataset, four areas of interest emerged. First, there was a wide variety of actions and activities involved within sustainability. Also, energy emerged as a significant factor for respondents. Thirdly, a dissonance with respect to education appeared in that the importance of education was recognized but interest in sustainability in participants' own education was minimal. Finally, similar to documented relationships between

attitudes towards environmental issues and subsequent behavior, sustainability's importance is recognized, however behavior does not always follow.

Usage/Action

The usage of resources, actions, or achievements of sustainability seemed to vary widely within the dataset. Within the keywords and definitions, sustainability, as one might expect, was reported most often as resulting in sustaining or maintaining resources. Yet some viewed sustainability as preserving, conserving, or developing efficient use of resources. Others felt sustainability should fix problems and improve existing conditions. Similarly, within the literature, disparities exist on the actions and outcomes of sustainability. It is important to identify and then define the elements on which agreement exists when implementing sustainability (Davey, Earl, & Clift, 2000). Sustainability within the university would benefit from a discussion on the types of actions students, faculty, and administrators are considering most important as well as the way those concepts are being defined.

Energy

One noteworthy keyword that appeared across the open ended responses was energy. This materialized as anything from fossil fuels and oil to alternative and green energy. Even though energy is certainly one area where sustainable principles have been applied with increasing regularity, a handful of definitions touted energy as seemingly the only issue sustainability was meant to address. Additionally, within the quantitative dataset, 80% of respondents reported amount of energy saved as the most important factor in considering sustainability projects, and 64 and 60 percent of students, respectively, requested development of renewable energy sources and improvement of building energy efficiency. Combining the frequency of "energy" within the open ended responses and the quantitative data, the perceived

importance of energy issues seems significant. Does a misconception exist drawing too much focus on energy, possibly because of its current status in the media, its connection to foreign wars, and the increasingly high prices of gasoline, or are students beginning to understand the increasing role energy plays in creating a sustainable world? More research would be needed to answer this question.

Education

Participants' self-assessments of their knowledge levels regarding sustainability were quite low. Yet interest in taking courses with sustainability themes was also rated low. When asked which projects the university should pursue, building and improving courses with sustainability content as well as developing increased activities and initiatives, held little importance for the participants. Visibility to students and educational value, as factors important to funding sustainability programs, received little attention. Overall, respondents did not appear to place a high value on or interest in sustainability education, whether it was formal or informal. Still, students seemed to place at least moderate value on incorporating sustainability into their own learning. Additionally, a number of students within the attitudes data indicated other people need to learn or be educated about sustainability. A dissonance within expectations for education seems to emerge. There is a level of importance placed on education, yet actual practice of education by respondents has not occurred or is not valued.

Although education does not necessarily lead to a change in behavior, the university as an institution of higher education could possibly benefit from increasing its focus on providing exciting and innovative sustainability programming. Behavior change could be an outcome of increasing educational efforts; however, making sustainability (or any topic) salient and accessible to students should be the goal of any university. Low perceived knowledge level and

value placed on educational aspects of sustainability could indicate an area where money could be efficiently spent to make the largest difference. However, an increase solely in educational opportunities would not suffice. Strong campus-wide and area-specific promotion and marketing would be necessary to create interest and salience for education on this topic. Or perhaps a completely different approach might be necessary; sustainability themes and concepts could be incorporated throughout the material of already existing courses. In this case, students would be exposed to these ideas without specifically choosing to take a course on sustainability.

Attitudes: Importance versus Behavior

We see a dissonance between attitudes and behavior not only within educational aspects of sustainability, but also overall in relation to sustainability. The mean rating of importance of sustainability and interest in sustainability are significantly different. Importance rating and consideration of sustainability in day-to-day choices were not rated equally. In addition, within the attitudes dataset, sixty percent of respondents, although supportive of sustainability, included a reason or rationalization for lack of behavior. This phenomenon, which has been well documented within the environmental attitudes literature, appears to cross over into sustainability.

Human-Nature Relationship

The human-nature relationship was considered in relation to the quantitative dataset. As was hypothesized, higher levels of interconnectedness to nature did result in higher levels of connection to sustainability, be it with familiarity, awareness, knowledge, interest, or importance. Still, correlations were moderate at best indicating other factors contribute to one's relationship to sustainability. Additionally, interconnectedness was not significantly different for gender or locality. However, there was a statistically significant difference between the human-

nature relationship of domestic and international students. International students felt a stronger interconnectedness with nature. Data collected within this study does not allow for added inferences to be made, but future research on this difference could possibly further pinpoint what characteristics and variables contribute significantly to this relationship.

Limitations

The demographic data of the sample aligned well with the demographics of the population. However, one might speculate that participants within the 16.4% response rate generally had an affinity for sustainability. As is the case with many voluntary online surveys, those who respond are more likely to have a stake in the topic (Groves, Presser, & Dipko, 2004; Duda & Nobile, 2010). The LAS 101 course instructor would not allow a follow-up email to be sent to students, which could have increased response rate and decreased possible response bias. Furthermore, as incentives were not offered, response bias may have further shifted towards those with personal interest in the topic (Dillman et al., 2009). Non-respondents were not contacted, so it is hard to know if systematic biases existed in the data. However, respondents showed little interest in sustainability or in learning more about it, which could indicate there were not strong biases within the respondents. Coupled with the demographic similarities of the respondents with the population, this makes a good case for the validity of the findings.

Although demographic data between the sample and the population were consistent, and the most diverse college within the university was sampled, the sample was not random within the population of freshmen. Students within other colleges, such as agriculture or engineering, may have fundamentally different views of sustainability. For example, business students may have been more likely to recognize the economic aspects of sustainability. However, this sample

population was chosen as a trade-off for achieving an increased response rate. Dillman et al. (2009) stressed the importance of making issues salient to the respondents; linking the questionnaire to a course that would cover sustainability topics and receiving the endorsement of the course instructors seemed a strong way to do this. Nonetheless, this could make generalizability of the findings limited.

Questionnaires tend to be reactive measures (Wysor, 1983). Can a questionnaire truly reveal what a person really thinks about or is it more or less what a person is able to think about and give an opinion of when asked? In other words, questionnaires are limited in their ability to assess perceptions within a real world setting, which may invoke different participant responses (Wysor, 1983; Attari et al., 2010). In addition, it may have been difficult for respondents to capture and organize their true thoughts on a concept as complex as sustainability. However, in the context of developing university initiatives and programs aimed at building support and capacity for sustainability, knowing what students are able to think about can be a useful place to start.

Conclusions

Awareness, interest, and knowledge levels regarding sustainability within the sample population were quite low. As mentioned previously, the university would like to create a culture of sustainability. These are areas where the university could focus efforts to further incorporated sustainability into the norms of campus. Examples of options include providing more exposure for sustainability projects on campus, increasing course offerings that contain sustainability components and developing engaging and exciting sustainability initiatives for dorms, clubs, or Greek society to get involved with. Additionally, this information could be used as a baseline level with which the university could measure changes towards sustainability over

time. If we assume respondents were generally more interested in sustainability than non-respondents, awareness, interest, and knowledge levels within the population may be even lower.

Definitions appeared to contain high levels of anthropogenic elements. A high level of respondents focused on providing for human needs now and in the future, as well as maintaining lifestyles and protecting the environment as a way to ensure those lifestyles. Environmental elements were considered as well, but may have been linked closer to human needs than to protecting the environment. Other factors, including economic, political, social justice, or cultural, were limited within the dataset. In this case, the university may need to take specific action to expand its portrayal of sustainability to include components outside of the humanistic.

In the context of a university, it behooves administrators and faculty to be aware of student perceptions and understandings of sustainability. This work has revealed inconsistencies within student perceptions and definitions in relation to the literature. In considering the three elements of sustainability, environment, society, and economy, some students recognized environmental and societal components, but very few recognized a combination of these elements. In making this comparison, it allows better policy and implementation to occur that will be salient and practical for the students in this time and place. In general, this awareness for any university, when used in developing education initiatives and policy, will increase likelihood of success for those initiatives in the face of tight fiscal times.

References

- Aber, J. (2009). Editor's Preface in J. Aber, T. Kelly, & B. Mallory (Eds.), *The sustainable learning community: One university's journey to the future*: Lebanon, NH: University of New Hampshire Press.
- Alreck, P. & Settle, R. (2003). *The survey research handbook*. Irwin, CA: McGraw-Hill.
- Attari, S.Z., DeKay, M.L., Davidson, C.I., & Bruine de Bruin, W. (2010). Public perceptions of energy consumption and savings. *Proceedings of the National Academy of Sciences*, 107, 16054-16059.
- Baird, T.D., Leslie, P.W. & McCabe, J.T. (2009). The effect of wildlife conservation on local perceptions of risk and behavioral response. *Human Ecology*, 37, 463-474.
- Brookfield, H.C. (1969). On the environment as perceived. *Progress in Geography*, 1, 51-80.
- Corcoran, P. B. & Wals, A. (2004). The problematic of sustainability in higher education; a synthesis. In P. B. Corcoran & A. Wals (Eds.), *Higher education and the challenge of sustainability: Problematics, promise, and practice*. Dordrecht, The Netherlands: Kluwer Academic.
- Creighton, S. H. (1999). *Greening the ivory tower, improving the environmental track record of universities, colleges, and other institutions*. Cambridge, MA: MIT Press.
- Dahle, M., & Neumayer, E. (2001). Overcoming barriers to campus greening: A survey among higher educational institutions in London, UK. *International Journal of Sustainability in Higher Education*, 2(2), 139-160.
- Davey, A., Earl, G., & Clift, R. (2000). Driving environmental strategy with stakeholder preferences: A case study of the University of Surrey. In W. Leal Filho (Ed.), *Sustainability and university life* (pp. 47-66). Frankfurt, Germany: Peter Lang.
- Dillman, D., Smyth, J. & Christian, L.M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). Hoboken, NJ: John Wiley & Sons.
- Duda, M.D., & Nobile, J.L. (2010). The fallacy of online surveys: No data are better than bad data. *Human Dimensions of Wildlife*, 15, 55-64.
- Evangelinos, K.I., Jones, N., & Panoriou, E.M. (2009). Challenges and opportunities for

sustainability in regional universities: a case study in Mytilene, Greece. *Journal of Cleaner Production*, 17, 1154-1161.

Freyfogle, E.T. (2006). *Why conservation is failing and how it can regain ground*. N.p.: Eric T. Freyfogle.

Groves, R.M., Presser, S., & Dipko, S. (2004). The role of topic interest in survey participation decisions. *Public Opinion Quarterly*, 68(1), 2-31.

Groves, R.M., Singer, A., & Corning, A. (2000). Leverage-salience theory of survey participation: Description and an Illustration. *Public Opinion Quarterly*, 64, 299-308.

Henderson, K., Powell, G. & Scanlin, M. (2005). Observing outcomes in youth development: An analysis of mixed methods. *Journal of Park and Recreation Administration*, 23(4), 58-77.

Kelly, T. (2009). Sustainability as an organizing principle for higher education. In J. Aber, T. Kelly, & B. Mallory (Eds.), *The sustainable learning community: One university's journey to the future* (pp. 1-53). Lebanon, NH: University of New Hampshire Press.

Kidd, C. (1992). Evolution of sustainability. *Journal of Agricultural and Environmental Ethics*, 5(1), 1-26.

Lamb, K.L. (1996). The problem of defining nature first: A philosophical critique of environmental ethics. *Social Science Journal*, 3, 475-486.

Leal Filho, W. (1999). Recognizing and addressing misconceptions on the concept of sustainability at the university level. In W. van de Bor, W. Leal Filho, P. Holen, & A. Wals (Eds.), *Integrating concepts of sustainability into education for agriculture and rural development* (pp.185-198). Frankfurt, Germany: Peter Lang.

Leal Filho, W. (2000). Dealing with the misconception on the concept of sustainability. *International Journal of Sustainability in Higher Education*, 1(1), 9-19.

Leal Filho, W., MacDermott, F. & Padgham, J. (Eds.). (1996). *Implementing sustainable development at university level: A manual of good practice*. European Research and Training Centre on Environmental Education: University of Michigan.

Lozano, R. (2006). Incorporation and institutionalization of SD into universities: Breaking through barriers to change. *Journal of Cleaner Production*, 14, 787-796.

Newport, D., Chesnes, T., & Lindner, A. (2003). The "environmental sustainability" problem: Ensuring that sustainability stands on three legs. *International Journal of Sustainability in Higher Education*, 4(4), 357-363.

Nixon, A. (2002). *Campus sustainability assessment and related literature: An annotated bibliography and resource guide*. Western Michigan University, Kalamazoo, MI. available at: www.ulsf.org/pdf/NixonbiblioFinal.pdf

Oskamp, S. (2002). Summarizing sustainability issues and research approaches. In P. Schmuck & W.P. Schultz (Eds.), *Psychology of sustainable development* (pp. 301-324). Kluwer Academic: Boston.

Ruff, C., & Olson, M. (2009). The attitudes of interior design students towards sustainability. *International Journal of Technology and Design Education*, 19, 67-77.

Schleicher, K. (1996). Environmental ethics. In W. Leal Filho, F. MacDermott, & J. Padgham (Eds.), *Implementing sustainable development at university level: A manual of good practice*. University of Bradford: Bradford, England.

Schultz, P.W. (2000). Empathizing with nature: The effects of perspective taking concern for environmental issues. *Journal of Social Issues*, 56, 391-406.

Schultz, P.W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & W.P. Schultz (Eds.), *Psychology of sustainable development* (pp. 61-78). Kluwer Academic: Boston.

Schmuck, P., & Schultz, P.W. (2002). Sustainable development as a challenge for psychology. In P. Schmuck & W.P. Schultz (Eds.), *Psychology of sustainable development* (pp. 3-18). Kluwer Academic: Boston.

Shriberg, M. (2002). Institutional assessment tools for sustainability in higher education: Strengths, weaknesses, and implications for practice and theory. *Higher Education Policy*, 15(2), 153-167.

Shriberg, M. (2003). Is the "maize-and-blue" turning green? Sustainability at the University of Michigan. *International Journal of Sustainability in Higher Education*, 4(3), 263-276.

Smith, A.A. (1993). *Campus ecology - A guide to assessing environmental quality and creating strategies for change*. Living Planet Press: Los Angeles, CA.

- Stalvant, C. (1996). Workshop report and summary. In W. Leal Filho, F. MacDermott, & J. Padgham (Eds.), *Implementing sustainable development at university level: A manual of good practice*. University of Bradford: Bradford, England.
- Stern, P.C. & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 50, 65-84.
- Stern, P.C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior*, 25, 322-348.
- Thaman, K.H. (2002). Shifting sights: the cultural challenge of sustainability. *Higher Education Policy*, 15, 133-142.
- UIUC Department of Information Management. (2009). On-Campus Fall 2009 New Freshmen Profile. Retrieved January 20, 2011, from http://www.dmi.illinois.edu/stuenr/abstracts/fa09Freshman_ten.htm
- United Nations Press Release: SC/SM/7739. (2001, March 15). Secretary-General calls for break in political stalemate over environmental issues. Retrieved September 14, 2009.
- VanGinkel, H. (1996). Implementing sustainable development: A case study. In W. Leal Filho, F. MacDermott, & J. Padgham (Eds.), *Implementing sustainable development at university level: A manual of good practice*. University of Bradford: Bradford, England.
- Velazquez, L., Munguia, N., & Sanchez, M. (2005). Deterring sustainability in higher education institutions: An appraisal of the factors which influence sustainability in higher education institutions. *International Journal of Sustainability in Higher Education*, 6(4), 383-391.
- Vining, J. & Ebreo, A. (2002). Emerging theoretical and methodological perspectives on conservation behavior. In R. Bechtel & A. Churchman (Eds.), *The New Handbook of Environmental Psychology*. New York: John Wiley, 541-558.
- Vining, J., Merrick, M. & Price, E. (2008). The distinction between humans and nature: Human perceptions of connectedness to nature and elements of the natural and unnatural. *Human Ecology Review*, 15(1), 1-11.
- World Commission on Environment and Development (1987). *Our Common Future*. Oxford University Press: Oxford.
- Wright, T. (2009). Sustainability, Internationalization, and Higher Education. *New Directions for Teaching and Learning*, no.118. Online: Wiley Periodicals. DOI: 10.1002/tl.357

Wysor, M.S. (1983). Comparing college students' environmental perceptions and attitudes: A methodological investigation. *Environment and Behavior*, 15(5), 615-645.

7. Consider the term sustainability. Please list below any keywords, concepts, ideas, or actions that come to mind when you think about **Sustainability** - *Please spend a few minutes brainstorming ideas and list whatever comes to mind (minimum 5 items), do not worry about spelling or grammar.*

8. Using the ideas you generated above, attempt to define sustainability to the best of your ability. *Please feel free to write whatever comes to mind and don't worry about grammar, complete sentences, spelling, etc...*

9. How would you rate your level of **knowledge** about issues of sustainability?

Not at all knowledgeable < - - - - - > Very knowledgeable

1 2 3 4 5

10. How would you rate your level of **interest** towards issues of sustainability?

Not at all interested < - - - - - > Very interested

1 2 3 4 5

11. How important do you think it is to be aware of sustainability issues?

Not at all important < - - - - - > Very important Don't know

1 2 3 4 5 9

12. How often do you consider sustainability when making day to day choices?

Never < - - - - - > Always

1 2 3 4 5

13. Describe your general attitudes toward sustainability:

14. How important do you think it is to incorporate sustainability concepts into your learning here at the university?

Not at all important < - - - - - > Very important Don't know

1 2 3 4 5 9

15. How interested would you be in taking a course that included sustainability topics?

Not at all interested < - - - - - > Very interested Don't know

1 2 3 4 5 9

16. What **THREE** sustainability projects would you most like to see **on campus**?

*Check only **THREE** answers*

- Improving energy efficiency of campus buildings
- Increasing university purchasing of green products
- Development of renewable energy sources for the campus
- Increase/improve courses integrating sustainability themes
- Upgrade of bike and bus transportation options
- More containers for recycling
- Increased sustainability activities and incentive programs

- Native landscaping and reduced pesticide usage
- Increasing sustainability of dining hall food and policies

17. Which are the most important factors the University should consider when choosing to fund sustainability-based projects. *Check only **THREE** answers.*

- Amount of energy saved
- Amount of money saved
- Visibility to students
- Potential for educational value
- Impact on natural systems
- Impact on students
- Carbon emissions avoided

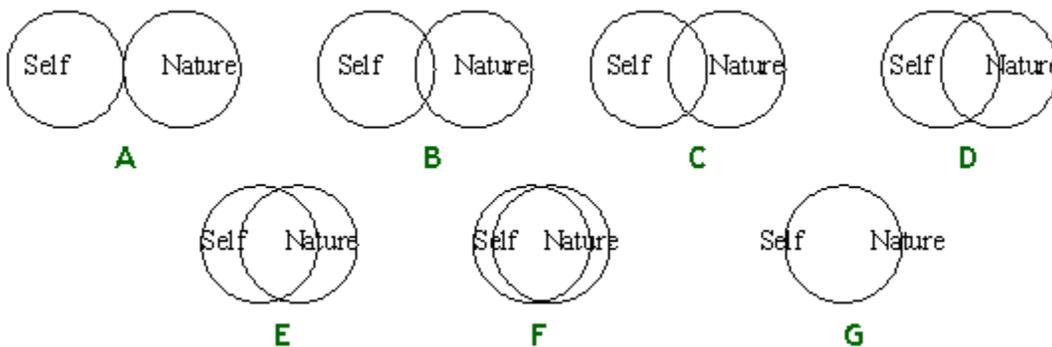
18. When considering all the responsibilities of a university, how important do you feel sustainability should be as a university issue?

Not at all important <-----> -----> Very important Don't know
 1 2 3 4 5 9

19. What is your level of interest in Environmental Issues?

Not at all interested <-----> -----> Very interested
 1 2 3 4 5

20. How interconnected are you with nature? Please indicate which of the pictures below best describes your relationship with the natural environment. *Circle ONE letter.*



Are there any additional comments you would like to make regarding sustainability on campus?

Thank you for your participation!

Appendix B: Rationale for Methodology

In the tailored design strategy, “solutions are tailored to most effectively and efficiently deal with the contingencies of different populations and survey situations” (Dillman, et al., 2009, p.12). As with this questionnaire, particular time and effort were taken to ensure the instrument and the data collection methods would maximize response rate and create reliable data.

Instrument

The questionnaire included open ended and quantitative data-generating responses. As concluded by Henderson, Powell and Scanlin (2005), using a mixed methods approach can enhance the understanding of a phenomenon and increase the validity and reliability of the research. While Henderson et al. (2005) noted there are criticisms when linking qualitative and quantitative approaches, they argued that recognizing the underlying theory of the qualitative and quantitative methods being utilized, when interpreting the data, can lead to useful exploration of a topic.

Various university departments and individuals involved with campus sustainability were contacted to assist with question generation. This was done to make questions applicable and salient within the context of the university. Consultation of the literature was also used for question development.

As suggested by Dillman et al. (2009), question types were varied and limited to reduce response cost. Simple scaled and multiple choice questions were used to further reduce response cost. The survey was housed on the universities online toolbox which standardized viewing of the questionnaire for all respondents. This also ensured that respondents could only complete the survey once. Questions were tested by a group of graduate students to ensure that they were clear and generated the responses they were designed for.

Procedures

Both Dillman et al. (2009) and Alreck and Settle (2003) cited non-response error as the major form of error associated with an online survey method. However, Dillman et al. (2009) also suggested utilizing the methods that will best connect with your target population. The target population was mostly 18-19 years of age, and because Dillman et al. (2009) documents the 18 to 30 year-old group as the most difficult to reach, an online questionnaire was used despite the higher level of non-response. Freshmen students are familiar with and comfortable receiving a request via campus email and using this form of survey will therefore establish trust with the students. This method also decreased the cost of participation for busy college students by making it convenient to respond.

Students at UIUC all have and frequently use email as a main form of communication. Most students are now familiar with and capable of filling out online surveys. Therefore, using an online questionnaire did not systematically eliminate participants from the sample pool because of lack of access or abilities, reducing coverage bias.

As discussed in the main text, sampling was not random. However, it was decided that to increase response rate, steps need to be taken to increase saliency and leverage in accordance with the saliency-leverage theory of Groves et al. (2000). However, efforts were also made to ensure that within the chosen sample respondent diversity was high. I attempted to create a balanced trade-off with these methodologies to generate the most representative dataset as was possible with limited resources.

Limited coercion was generated by choosing students that the researchers had no contact with. Students were informed of the voluntary nature of the questionnaire, with the encouragement of helping another student, and the request of the professors as a reason for

participating. A formal in-class announcement was made to inform the students of the project before an email was sent. This announcement gave students prior knowledge of the email and the project in an attempt to make the request more salient to the students, thus potentially increasing the response rate as compared to a “cold-call” type email received at random. These efforts were all taken to give all students ample and equal opportunity and motivation to complete the questionnaire as suggested by Dillman et al. (2009).

Appendix C: Classroom Script

The University of Illinois is in the process of developing sustainability practices and initiatives on this campus. Additionally, sustainability will be a central theme of this course. A graduate student, Corrin Behm, is doing her Master's Thesis work on student perceptions of sustainability, basically trying to understand what you, the students, think about sustainability. She has asked if students in this class would be willing to fill out a short online questionnaire to gather her data. This information will be anonymous to you who participate, but the overall information will be used to direct the university in its future sustainability endeavors. Although choosing to or to not participate in the survey will not affect your grade in this class, we encourage you to help Corrin and the university as they work to improve the sustainability of campus. An email will from Corrin, that should be arriving in your inbox this week will direct you to the survey link. It will also include her contact information should you have further questions.

Appendix D: Solicitation E-mail

Dear LAS 101 Student,

My name is Corrin Behm, and I am hoping you will participate in a sustainability survey for my master's thesis. I plan to share my research results with university officials and faculty who are working to help improve sustainability on this campus. As you may recall from this past week, I have received permission from the LAS 101 course directors to request your participation in this survey.

If you are willing, please take a few minutes to fill out the online questionnaire at the following link: <https://illinois.edu/sb/sec/3643581>. I would like to encourage you to complete the survey even if you feel you do not know about or have no interest in sustainability. The online questionnaire will lead you through a series of questions to help determine your perceptions about sustainability.

By completing the questionnaire, you consent that you are 18 years of age or older and that you voluntarily agree to participate in the study.

My sincerest thanks,

Corrin Behm, Master's Student
Department of Natural Resources and Environmental Sciences
behm1@illinois.edu
217-333-4737

Appendix E: Follow-up Pop-up Message

A second notice about the Sustainability Survey

September 21, 2010 10:39 PM

Dear LAS 101 Student,

My name is Corrin Behm, and I am hoping you will participate in a sustainability survey for my master's thesis. I plan to share my research results with university officials and faculty who are working to help improve sustainability on this campus. As you may recall from this past week, I have received permission from the LAS 101 course directors to request your participation in this survey.

If you are willing, please take a few minutes to fill out the online questionnaire at the following link: <https://illinois.edu/sb/sec/3643581>

I would like to encourage you to complete the survey even if you feel you do not know about or have no interest in sustainability. The online questionnaire will lead you through a series of questions to help determine your perceptions about sustainability.

By completing the questionnaire, you consent that you are 18 years of age or older and that you voluntarily agree to participate in the study.

My sincerest thanks,

Corrin Behm, Master's Student

Department of Natural Resources and Environmental Sciences

behm1@illinois.edu

217-333-473

Appendix F: Keyword Coding Descriptions

<u>Category</u>	<u>Description or List of Keywords included in the Category</u>
Temporal	This group contains words that indicate the passage of time as relevant to the concept of sustainability.
Future	Future, Long-term, Lasting
Present	Present, Short-term, Meet Our Needs, Today, Now
Generations	Generations, Children, Intergenerational
Environments/ Resources	This group contains words that refer to aspects of the physical environment, most often as elements of the natural environment.
Environment	Environment
Resources	Resources, Natural Resources, Renewable Resources
Ecosystems	Ecosystems
Nature	Nature, Natural
Earth	Earth, Planet
Other Env.	Trees, Plants, Animals, Habitat
Environmental Issues	This group contains words/problems that fall within generally recognized current environmental issues.
Energy	Categories included types of renewable energy sources. Alternative Energy, Wind, Renewable Energy, Biofuels, Green Energy, Nuclear, Solar, Ethanol, Green Roofs, Hydrogen
	Categories also included fossil fuel and carbon based energy sources. Fossil Fuels, Carbon, Carbon Emissions, Carbon Footprint, Oil, Gas
Recycling	Recycle, Recycling
Global Warming	Global Warning, Climate Change, Greenhouse Effect
Env. Health	Health, Clean, Healing, Not Polluting
Water	Water, Water Conservation, Acid Rain, Ocean Levels, Drinking
Food	Food, Farming, Herbicides, Farm Management, Vegetarianism
Transportation	Hybrid Cars, Electric Cars, Bike, Walk
Other Env. Issues	Pollution, Deforestation, Landfills, Waste, Overexploitation, Extinction
Humanistic Aspects	This group contains words and ideas that represent a focus on humans, their needs, and their role within sustainability.
Standard of Living	Current Living, Maintaining Lifestyle, Comfortable Living

Survival	Survival, Subsistence
Needs of People	Needs, Necessities, Support of
Innovation	Ingenuity, Forward Thinking, Improving, Change, Technology
Population	Population, Overpopulation, Growth, Carrying Capacity
World	World, Global
Education	Education, Learning
Materialism	Materialism, Consumerism

Usage This category represents action words or verbs most specifically referring to how resources could be handled within sustainability.

Maintain	Maintain, Sustain, Lasting, Durable, Keeping, Consistent
Reduce	Reduce, Use Less, Save, Control, Moderation
Renew	Renew, Renewable
Conserve	Conserve, Conservation
Preserve	Preserve, Preservation
Reuse	Reuse
Efficient	Efficiency, Efficient
Overuse	Overuse, Exploitation

Other

Green	Green, Going Green, Green Energy, Green Thinking
Environmentalism	Environmentalism, Eco-Friendly, Stewardship, Tree-Hugger
Government	Government, Politics, Regulations, Acts
Responsibility	Responsibility, Citizenship, Awareness

Complexity These two categories moved beyond basic lists of ideas or actions related to sustainability and discussed more in depth issues related to sustainability.

Process	Planning, Action, Effort, Research
Impact	Impact, Living within Means, No Affect

Economics This group contains any mention of factors that pertain to capital generating (or not generating) capabilities in relation to sustainability. Economy, Money, Capitalism, Poverty, Financial Security

Appendix G: Definition Coding Descriptions and Examples

Free Nodes – Based on overall conceptual ideas within the definition.

Environmental	Refers to definitions that included an aspect of the physical environment and/or its systems. <i>“Sustainability is keeping the earth healthy and in good condition so we can continue to use its resources responsibly and maintain humanity for years to come.”</i> <i>“Sustainability is the ability to keep the environment and resource levels the way they are now for the future generations.”</i>
Egoistic	Definitions that appeared to address resources or the environment as simply a means to support humans through wording choice. <i>“Sustainability is to efficiently use resources to satisfy the requirement of every generation.”</i> <i>“Sustainability is the idea that the earth’s natural resources must be maintained and kept available for the next several generations.”</i>
Biospheric	Definitions that included a reference to the environment beyond human-centered reasoning through wording and language choice. <i>“Sustainability is supporting our environment to keep vital resources, such as water, from being depleted by being green and using renewable resources so that future generations will live in a better place.”</i>
Other	Definitions did not have language or meaning that fell into either previous category. <i>“Sustainability is the preservation of anything. It's mostly used when talking about the environment though.”</i>
Economic	Refers to definitions that mention factors pertaining to capital generating (or not generating) capabilities in relation to sustainability. <i>“Develop our economy and enjoy our life now in a way that our future generation won't sacrifice their right to develop and enjoy their lives.”</i>
Societal	Definitions that made reference to humans or human interactions within sustainability.
Egoistic	Definitions that appeared to address resources or the environment as simply a means to support humans through wording choice. <i>“The ability of our generation to use the resources from our environment to produce efficient energy and future lasting usage for generations to come.”</i>
Altruistic	Definitions that addressed providing for the needs of others with specific reference to social justice aspects.

“Sustainability is the ability of Earth's inhabitants to put forth collective efforts to make the world a better place for all to live in. That being our single cohesive vision, we can all maintain a standard of living befitting the entire human race.”

Temporal Definitions that included only a temporal aspect to sustainability, with neither a particular mention of the environment nor a mention of humans.

“Sustainability is an attempt to prevent the present from overpowering the future.”
“Current progress without injuring future prospects.”

Limited Definition Definitions were lacking in the basic environmental, societal, economic, or temporal aspects of sustainability. Or definitions referred to ideas or objects not generally defined within sustainability.

“How efficient you are in consumption.”
“The way we maintain life.”
“To be able to provide for.”

Literal Definition Definitions were recognized as those that did not address any environmental, economic, social, or human factors within the definition. Definitions would similar to those one might find in the dictionary.

“Being able to maintain an amount of matter on a workable level without using all of the matter in one time.”
“Sustainability is the ability of a place or thing to remain in a constant state indefinitely.”

Tree Nodes – Based on word choice within definitions

Environmental This group contains words that refer to aspects of the physical environment, most often as elements of the natural environment.

Resources Refers to mention of resources and natural resources.

“Sustainability is using the resources today, but also ensuring that there are resources for the future.”

Ecosystem/Envir. Refers to mention of the ecosystem, the environment, nature, Earth, etc...

“Sustainability is our efforts to maintain and preserve our environment for the future generations to come.”

Env. Examples Refers to mention of a specific environmental element, issue, or solution.

“Sustainability to me means keeping the environment in a healthy state by reducing,

reusing, and recycling. It is saving resources that are rare to the earth and stopping pollution.”

Env. Health Refers to mention of health aspects of the environment including health, cleanliness, proper functioning.
“Taking measures to ensure that the future is just as healthy, good or even better than it is right now.”

Societal This group contains words that make reference to humans or human interactions within sustainability.

Generations Refers to mention of generations, children, successors.
“Sustainability is making sure that the Earth will still be able to be lived upon by our children and grandchildren.”

Change/Responsibility Refers to mention of the ability of people to change, innovate, or take responsibility for environmental problems and sustainability.
“It is making sure that we conserve resources to make them last as long as possible, we adapt to changes, and we promote diversity.”

Standard of Living Refers to a standard of living, lifestyle choices, be it seen as comfortable or equitable for all.
“Being able to live well without jeopardizing the welfare of the Earth.”

Temporal This group contains words that indicate the passage of time as relevant to the concept of sustainability.

Future Refers to mention of the future, long-term, or lasting.
“Sustainability is a long term development that allows you to get long-run benefits.”

Present Refers to mention of current times, now, today, the present.
“Sustainability is making sure that there are enough resources for all of the generations around the world now, and to come.”

Usage This category represents usage types or actions most specifically referring to how resources could or should be handled within sustainability.

Maintain Refers to maintaining, sustaining, endurance, lasting, and consistent usage.
“Sustainability refers to something that can be maintained at a certain level for long periods of time without compromising future generations.”

- Conserve Conserving, or wise usage of resources.
“Trying to conserve the world's energy and resources in order to make life last longer.”
- Preserve/Protect Preserving or protecting resources.
“Keeping the environment in a manner that will preserve it for future generations.”
- Care for/Upkeep Refers to up keeping or caring for resources or the environment.
“Being able to take care of our economy and environment without severely damaging our future society.”
- Provide/Support Refers to resources as need for providing and supporting something else.
“Sustainability is a process that requires a team effort to provide and maintain resources necessary for survival.”
- Efficient/Effective Efficient and/or effective usage of resources.
“Sustainability is to efficiently use resources to satisfy the requirement of every generation.”
- Balance Refers to trying to balance usage of resources.
“Sustainability is the effort of a group of people/community to balance their consumption/action with the rate of replenishing said source.”
- Improve/make better Refers to intention to improve current state of the resources or conditions.
“Sustainability is a way of living today that better our present world but also better the world for future generations.”
- Fix/repair Repairing or fixing damage that was done to resources.
“Sustainability is the efforts humanity needs to take to fix the problems arising in the environment causes by ourselves and past generations.”
- Development** The category refers to development or progress as an aspect of sustainability.
“It is a kind of development that uses resources effectively so that it will not harm the next several generations.”

Appendix H: Attitudes Coding Descriptions and Examples

Support Level	This category breaks down the support levels that respondents indicated toward sustainability.
Enthusiastic support	Wording choice indicates a higher level of support. <i>“I think sustainability is very important, and I always do my part in conserving resources for the future.”</i>
Support	Wording choice indicates a moderate level of support. Resources are being <i>“I believe it is necessary as the world comes to terms with the fact that resources are being depleted faster than they’re being invented or discovered.”</i>
Neutral	Wording choice indicates the respondent does not feel one way or another. <i>“I don’t think about it that much, it seems like a background issue to me when there are more immediate problems.”</i>
Do not support	Wording choice indicates a lack of support for sustainability. <i>“I am aware it exists but I don’t actively try to be green.”</i>
Enthusiastically does not support	Wording choice indicates feelings of disdain for sustainability. <i>“I think it is a waste of time and really couldn’t care less.”</i>
I try/ do small things	Respondents mention that they try to be sustainable and/or do the things they think are small or easy in relation to sustainability. <i>“I try to make positive choices day to day, but do not always.”</i> <i>“I recycle when I can, and don’t litter.”</i>
I wish I did more	Respondents indicated they wished or would like to more activities that are considered sustainable. <i>“It is something I wish I lived by more.”</i>
Rationale	Respondents included a reason or rationale for why they or society are not performing sustainable acts.
I am only one person	A feeling that an individual cannot make a difference. <i>“I think it is very important but difficult to make drastic changes on your own.”</i>

More important problems/priorities	Considering other issues as more salient to their time. <i>"I try to help, but it is not my first priority."</i>
I don't know enough	Respondent indicated a lack of knowledge on the topic. <i>"I think it is important but I don't know how to begin solving the issue."</i>
Inconvenient/sacrifice	Actions are an inconvenience or a personal sacrifice.
Too distant from me	Sustainability and/or consequences of lack of action are too far in the future or are not visible within my own personal day-to-day life. <i>"I know in my lifetime I will not see the worst consequences of our current lifestyle."</i>
Overemphasized/annoyed	The overemphasis or extreme tactics of some have turned off the respondents towards sustainability. <i>"I feel that sustainability is very important, but concept has been shoved down my throat so many times that I become resentful towards people who will not shut up about it."</i>
Government/regulation	Respondents indicated that the government needs to address sustainability or regulations need to be made to create action. <i>"I feel that what I do individually doesn't really make a difference regarding sustainability, and that some sort of law that forces one to be sustainable should be enacted."</i>
It is too hard	Actions are too hard to do, remember, habitualize, etc... <i>"While I believe the idea is extremely important, it is hard to put into practice since it has not been pushed early in school."</i>
Do not care/not interested	Respondents do not have a feeling or connection or caring to sustainable practice or actions. <i>"We need to know and make right choices, but I don't know well enough and don't care much enough."</i>
Attributions to others	It is other people that need to take action or become educated on the topic. <i>"Sustainability is an important issue. However, many people are often lazy, or reluctant to change to confront this issue. Others are simply not aware."</i> <i>"Self-centered individuals and organizations promote mindlessness and are the antithesis of sustainability efforts."</i>

Responsibility to environment

Respondents indicated a particular feeling of responsibility to try and be sustainability for the sake of the environment.

“I normally associate sustainability with the environment and the importance of society’s role to protect and preserve it. I feel it is and will be a constant responsibility that needs to be a priority to society.”

Responsibility to future

Respondents indicated a particular feeling of responsibility to try and be sustainable for the sake of future generations.

“I believe that sustainability is very important to take into account because what we do today will affect the lives of the generations to come.”