Higher Education's Impact on Changing the Sustainable Behaviors of Students

A DISSERTATION
SUBMITTED TO THE FACULTY OF
UNIVERSITY OF MINNESOTA
BY

Wendy Rae Stary

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

Tom Stertz, Ed. D., and James Brown, Ph. D., Advisors

May 2013

Acknowledgements

There are several people to whom I owe a great deal of gratitude for their contributions towards the completion of my dissertation. The list needs to start with my advisors, Drs. James Brown and Tom Stertz. I sincerely thank them for always being positive role models and going out of their way to be supportive of my mission, especially in light of the timing I needed to meet. I will always remember how well they treated me and I will indeed "pay it forward!"

I would like to thank my committee members for their time and efforts evaluating my work at all stages leading up to the completed dissertation. In particular, I thank my chair, Dr. Sasha Ardichvili, for always providing sound advice and for pushing me to a higher level of research. And to Dr. Susan Staggs, I am especially grateful for the assistance with the behavioral model used in my study and for guidance on conducting focus groups.

I would like to extend my sincere appreciation to the faculty, staff and students at the University of Wisconsin-Stout who helped me in one way or another during the collection of data for my study. Whether it was by providing data directly or through student recruitment efforts I could not have been successful without each and every contribution. An extra special thank you goes to Leann Faye for sharing her data and qualitative analysis talents, without which I would have struggled immensely to hit my targeted completion date.

I would like to thank my family, friends, and colleagues for helping to keep me sane throughout this process. Whether it was covering a lecture, proof-reading a paper,

helping me navigate the Ph. D. process, providing words of encouragement, or watching my kids while I worked, each and every act was helpful and much appreciated. I would not be where I am today without these significant contributions!

Finally, I end this list with the three people in my life with whom I am the closest and who sacrificed greatly in order for me to fulfill my dream of teaching. For my husband, Jer, I greatly appreciate that he tried so hard to understand what I was going through and I am also very humbled by his belief in me when I didn't always believe in myself. And last but certainly not least, I thank my two young sons, Tucker and Max. It was their unconditional love and hugs that sustained me during the most trying moments of this process.

Abstract

The purpose of this research study was to establish understanding of the capability of universities to change the behaviors of students towards pro-sustainability behaviors. In particular, the University of Wisconsin-Stout was studied due to the nature of pro-sustainability initiatives already implemented on the campus and the ease with which the researcher could gain access to the necessary documentation and student participants.

The Robert Yin methodology of a positivistic case study was used for this research study and Paul Stern's Value-Belief-Norm Theory of Environmentalism became the theoretical framework upon which a model for influencing pro-sustainability behavior in students attending universities was built. Review of the literature related to pro-sustainability behavior change and higher education allowed for enhancement of the theoretical model to include specific contextual and personal capability factors. Seven theoretical propositions were derived from the factors of the model and served to help refine the data collection process, as well as guide the data analysis.

The results of the study showed that all seven theoretical propositions were supported to some degree. Additional findings of interest were related to feedback mechanisms, perceived limits and a temporal component to self-efficacy development, and the effects of prior experiences with pro-sustainability behavior.

Table of Contents

Page

List of Tables

Page

List of Figures

Page

CHAPTER ONE

INTRODUCTION

It is well known that humans and other living creatures have certain basic needs in order to survive. The planet earth is relied on by these creatures to provide resources and natural processes, the likes of which are often referred to as ecological capital (Gardner & Stern, 2002). Over the years the actions of human beings have jeopardized the ability of the earth to adequately regenerate ecological capital. Three of the biggest consequences stemming from destruction of ecological capital include increases in average temperatures globally, depletion of the ozone layer, and losses to tropical forests and genetic diversity.

It has been predicted that irreversible climate change will occur if the average global temperature rises more than 2°C (Foster & Clark, 2012). This may not seem like much, but factor in the effects caused by changes in wind, rainfall and sea levels, as well as temperature distributions globally and it becomes a much bigger issue (Gardner & Stern, 2002). These have been known to cause tremendous negative impacts to agricultural yields, fish and shellfish populations, and day-to-day living in low-lying regions prone to flooding. These are effects that people living today are already dealing with to some degree and they are only predicted to worsen for future generations.

Similarly, the effects of ozone depletion are believed to be contributing to increased occurrences of diseases including various forms of cancer (Gardner & Stern, 2002). Many of the drugs used to treat these cancers are being derived from plant species that only thrive in tropical forests, but these forests are being cleared for various purposes

such as agricultural and building construction needs. This in turn has caused the complete loss of entire species as well as other detrimental effects such as decreases of rainfall, erosion of topsoil and severe flooding. Furthermore, the detrimental effects listed have been directly attributed to human behaviors related to the development of current societies and economies.

The World Commission on Environment and Development, better known as the Brundtland Commission, wrote an extensive report around the concept of sustainable development including three major sections (1987). The first laid out concerns related to the current state of the environment, society and economy, the second focused on the challenges surrounding confrontation of these concerns, and the third necessary endeavors towards overcoming the presented challenges. One specific direction coming out of this report clearly dictated the need to tie sustainable development to the field of Work and Human Resource Education by stating, "Human resource development is a crucial requirement not only to build up technical knowledge and capabilities, but also to create new values to help individuals and nations to cope with rapidly changing social, environmental, and development realities" (p. 27). One needs to consider the role of universities and other higher education institutions with respect to human resource development, in particular the education and training of the future workforce.

General Context of Sustainability in Higher Education

In 1990 upper-level administrators at colleges and universities world-wide met in Talloires, France, with the intent of formalizing their commitment to education for sustainability (ULSF, n.d.). Part of their urgent message was that "environmentally

literate specialists" are needed in strategic areas such as engineering, economics, and social sciences, to name a few. The role of universities was explicitly presented as being central to achieving this goal:

> 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. . . . Universities must play a strong role in the education, research, policy development, information exchange, and community outreach to help create an equitable and sustainable future. (Role of Universities, para. 1)

The United Kingdom's strategic planning document titled, "Securing the future: delivering UK sustainable development strategy" also promotes 'sustainability literacy' as a core competency within schools, higher education institutions including professional graduates, and in businesses and other places of work (2005). "Sustainable development principles must lie at the core of the education system, such that schools, colleges and universities become showcases of sustainable development among the communities they serve," (p. 37). This was described as requiring much more than information sharing; rather modeling of good sustainable behavior within all levels of the educational institutions is critical.

In January of 2008, the United States Congress amended the Higher Education Act of 1965 (U.S. Congress, 2008). Part of this amendment included the addition of provisions for sustainability programs within universities and the authorization of grants for funding sustainability planning initiatives. Essentially, this amendment allocated

funds to be budgeted for grants that institutions of higher education, or other non-profit groups working in collaboration with these institutions, could apply for to use towards development of sustainability programs for areas such as emissions reductions, transportation, green building, and waste management, to name just a few. A key aspect of this grant program is that the goal was to integrate these aspects of campus operation with the academic programs in a way that was multidisciplinary.

History of Sustainability Initiatives at the UW-Stout

It is unlikely that a major shift in behavior towards pro-sustainability will be achieved in institutions of higher education unless the desired behavior is exemplified at all levels (HM Government, 2005). Educators and administrators must truly live by the principles they teach if their pupils are to fully embrace the ideals that are the heart of sustainability.

In the fall of 2007, the UW-Stout took a vitally significant step to kick off their journey towards a sustainable campus with the chancellor's signing of the American College & University Presidents Climate Commitment (Hoel et al., 2011). This commitment came to fruition upon the urging of dedicated students desiring to see their campus do something meaningful with respect to sustainability. This in turn led to the creation of a sustainability coordinator position and the new Environmental Sustainability Steering Committee (ESSC). The ESSC was immediately charged with: developing a plan of action to make the operations of the campus more sustainable, promoting the infusion of sustainability concepts into curriculum across all disciplines, and ultimately gaining participatory support for the plan campus-wide.

Moving forward with their newly developing commitment to sustainability, during a summer strategic planning session in 2008, dubbed FOCUS 2015, sustainability became one of four university priorities (Hoel et al., 2011). It called for the demonstration of sustainability leadership, development of campus policy, and collaboration with other initiatives regionally. As a means of determining priorities for an action plan, in the spring of 2009, the UW-Stout Applied Research Center held eight focus groups. Data generated from six of these pointed to a need for improved knowledge generation / dissemination. Three sub-themes were most prevalent and became part of the proposed action plan. They are summarized as:

1. Necessity to increase both knowledge and awareness through education for sustainability
2. Emphasize the sustainability priority to infuse sustainability concepts across all current courses
3. Create degree programs and courses dedicated to sustainability

Later that summer a small group of faculty and instructional staff was provided funding through the Provost's Office and attended the Midwest Regional Collaborative for Sustainability Education (MRCSE) workshop cultivating best practices for initiating the integration of sustainability into all curriculums across the university (Hoel et al., 2011). Following the workshop two of the faculty applied for and were awarded an MRCSE seed grant. The result of these efforts (and some leg-work by graduate students to present to departments across campus,) was the organization of the Sustainability

Across the Curriculum Network (SACN) of which there were more than 60 charter members of faculty and staff.

Over the course of the next year and a half faculty and staff alike continued their on-going pursuit of promoting the infusion of sustainability into the curriculum (Hoel et al., 2011). Additional conferences and workshops were attended by founding members of the SACN and a World Café event was held in January 2010, with a goal of collecting input on general strategies for implementing the concepts of sustainability into the curriculum at UW-Stout, more specific accounts of how individual faculty and staff proposed implementation into their own courses, and a list of sustainability related skills and knowledge every graduate of the UW-Stout should take with them when they graduate. With the assistance of the UW-Stout Outreach Services a two day Sustainability Across the Curriculum summer workshop was held on the UW-Stout campus with attendance of several faculty and staff from institutions throughout the region. The SACN membership met monthly to continue the discussions from the World Cafe and put together a proposed budget that was partially funded by the provost early in the fall 2010 semester. Part of this funding went towards hiring of a graduate assistant to conduct a literature review on the sustainability-related practices of other regional and peer institutions.

In the spring of 2011, the Environmental Sustainability Coordinator for the campus presented the ESSC and SACN's action plan for sustainability in the curriculum along with a proposed list of classroom projects to the Chancellor's Cabinet (Hoel et al., 2011). The action plan, along with voluntary use of the proposed projects, both received

their full support. Upon the urging of the provost, a small group of founding SACN members then presented on a proposed definition and plan for implementing sustainability across the curriculum at the UW-Stout to the Dean's Issues Council, Student Support Services, Administrative and Student Life Services, Senate of Academic Staff, the College of Management, and Student Life Services Directors. In April, the Senate of Academic Staff voted unanimously to pass a proposed resolution put forth by the ESSC providing for the definition of sustainability in the curriculum. This was a key step in creating a common understanding across campus. Later that year the process of beginning to track progress toward sustainability began with the help of the Advancement of Sustainability in Higher Education's Sustainability Tracking Assessment and Rating System (STARS®). With the help of the Associate Vice Chancellor, the SACN members also began to propose and revise courses with sustainability concepts integrated into them.

Informally, the author is aware that there were also pockets of effort on the part of other faculty and staff to develop courses and minor programs, separate from any of the efforts described above.

Evaluating the Capability of Higher Education Institutions

Over approximately the past two and a half decades, these examples show how governments, other high-level officials, and universities have united around a common goal of sustainability. More specifically, to infuse sustainability concepts into higher education through multiple initiatives all geared towards impacting a vast audience of future leaders. A looming question then is whether or not these institutions are capable of

such an endeavor.

In conducting the research described herein, it was critical to develop an understanding of general behavior change theory while also investigating current beliefs in higher education regarding the teaching and learning strategies deemed most beneficial to changing student behavior to be more pro-sustainability. These two paths had to converge in such a way as to yield a theoretical model for pro-sustainability behavior change that could then be compared to case studies as a means of determining whether or not they are capable of effecting change in the students they serve.

Significance of the Problem

A great many educational institutions are committed to action toward becoming models of sustainable behavior. In the United States this can be witnessed through the multitudes that have signed the American College & University President's Climate Commitment (ACUPCC, n.d.). Signing of this document includes a commitment to create a plan to bring the institution to climate neutrality. A large part of this effort is in the reduction of greenhouse gases through actions such as use of public transportation, installation of energy efficient appliances, and waste minimization initiatives. As many of these institutions move towards this goal, they have begun to document and measure their successes via rating systems that allow them to see how they compare to others and how they improve from one year to the next (aashe, n.d.).

On the surface it seems that these initiatives, based on knowledge of what is believed to be good for the environment, society and the economy, would be worthwhile endeavors. Yet in higher education it is difficult to know whether or not institutions are

capable of doing this in a way that truly changes the attitudes and behaviors of students. Without this knowledge it is difficult to keep the initiative strong and moving forward.

Background Information

Efforts on the part of educational institutions show evidence of a belief in the need for increasing resolve towards sustainability. Yet, much needs to be better understood regarding the effects these efforts have on their graduates. Myers and Beringer (2010) studied the psychological aspects related to sustainability concepts in higher education to show that during the college years important aspects of identity formation occur. This identity is both a product of the beliefs one holds as well as a motivational force towards action (Rosenberg, 1979). With the appropriate stimulus these young adults may become change agents towards a more sustainable environment (Myers & Beringer, 2010). Due to the complex, misinformed nature of many issues related to sustainability, students need a weaving of "intellectual, motivational, volitive, affective, social, and practical-technical competencies" (p. 53) within their transformed identity if this is to truly happen. Thus, implementation into teaching and learning practices has proven to be a great challenge (Timmerman, 2009) and educators find it quite difficult to define in a manner that students can readily grasp during their short tenure with an educational institution (Walshe, 2008). The challenges of implementation make it all the more important to understand whether or not higher education institutions are capable of such efforts.

Statement of the Problem

The capability of universities to fully implement programs which foster pro-sustainability behavior among students needs to be better understood. This involves understanding of both the factors that affect behavioral change as well as factors specific to promotion of sustainability concepts in higher education. It is hypothesized that review of this information can lead to theory about what it truly takes to make higher educational institutions capable of promoting such behavioral change. This theory will need to be tested within the context of higher education in order to evaluate the level of support it generates and make possible alterations. Without this knowledge it will be impossible to make informed decisions about the next steps for sustainability initiatives in higher education, especially as the next wave of high priority topics emerges.

Applying a definition to sustainability within the context of this paper requires that it entail three facets: living within limits, understanding of the interconnectedness of the economy, society, and environment, and providing for equitable sharing of opportunities and resources (Sustainable Measures, n.d.). Often times it is used to describe something relatively specific such as sustainable communities, development, or manufacturing. An internationally accepted definition of sustainable development was created by the Brundtland Commission which defined it as meeting the needs of the current generation without negatively impacting future generations' abilities to meet their needs (1987).

Design Rationale

In order to conduct research around the capability of higher education institutions to implement initiatives to effect change in student behavior to be more pro-sustainability, a site had to be chosen in which commitment to this initiative had already been made and implementation was well under way. The University of Wisconsin-Stout (UW-Stout) was a prime location in that this commitment had been made along with implementation of multiple initiatives at all levels of the institution. It was also a perfect venue for this research as the author already had access to the records and people that would be vital to carrying out the study, a critical aspect of selecting the case(s) for a case study (Yin, 2009). The case study methodology was chosen over other methods (quantitative in particular) as it provided the opportunity for deeper inquiry and theory development and testing, as opposed to the descriptive data a quantitative study would have provided. The rationale used for a single case was that of a unique case. The UW-Stout is a polytechnic institution, a designation carried by very few higher education institutions in the United States (UW-Stout, n.d.b). As a polytechnic institution, the mission at UW-Stout is to, "use applied learning, scientific theory and research to solve real-world problems, grow the state economy and serve society" ("Wisconsin's Polytechnic University", para.1). The university is known for its wide use of hands-on learning and applied research projects that often come about through collaboration with business and industry.

CHAPTER II

LITERATURE REVIEW

Using the definition of sustainability provided in chapter one as a guide, the specific disciplines within research most directly influencing the study of sustainability include: economics, environmental science, and social and behavioral science. Here in the literature review, each discipline will be discussed with respect to the relationship that exists between it and pro-sustainability behavior. This will lead to a discussion of what it means to achieve pro-sustainability behavioral change including those factors deemed most beneficial to this cause within the context of higher education. The literature review will also provide the framework for the development of a theory around how best to effect this behavioral change in students at higher education institutions. Finally a review of the methodology selected for this study is covered.

Economics and Sustainability

The science of economics is that which deals with the production, distribution, and consumption of products or services (economics, n.d.). In an ideal world the focus here would be not on monetary gain but on life preservation (Sumner, 2003). Unfortunately, at this point in time the societies of this world are not functioning anywhere near ideal conditions. Over a period of time, "Americans allowed market forces and market relations to banish all kinds of emotional attachments, customary rights, familial considerations, class and gender privileges that once had cushioned (or clouded?) their material interactions" (Larson, 2005, p. 4). This period of time is referred to as 'the market revolution' and is characterized by the displacement of more cultural or

traditional controls over the production, distribution, and exchange of goods by economic factors including those of supply, demand, and price. Following the market revolution it no longer mattered who or what a person was, or where he or she was located as money became the soul factor in mobilizing products and people.

The mobilizing effects of money can be witnessed today as businesses and entrepreneurs jump at the opportunity to become part of the "Green Business Revolution" (Koester, 2011). Marketed to consumers as doing their part to protect the environment and valuable natural resources, these companies are often after the monetary savings as well as increased profits that accompany increased sales of products. The concept of increasing sales is truly an oxy-moron within the essence of sustainability and contributes to the dark looming cloud that hangs over the United States economy, stagflation, which is, "stagnant economic growth occurring simultaneously with runaway inflation" (Jones, 2008, p. 1). In a market driven economy this is likely the most undesirable outcome because of the ever-widening disparity between jobs lost and rising prices. A complete overhaul of the economy, including the way people think about it is necessary as the economic models, business practices, and accounting tools used today are based on a time when it was believed the resources nature provided would always be plentiful and cheap. Economic changes alone will not magically create a sustainable world, rather it will require a balance amongst social, environmental, and economic systems through individual awareness and action (Perdan, Azapagic, & Clift, 2000). Yet, with the appropriate driving forces, economic models may be created that do indeed create this balance through the creation of jobs that are equally inclusive to people from all walks of

life while creating new sources of energy and preserving natural resources (Jones, 2008). The first step towards building this new economy is to drastically cut energy costs by eliminating the need for fossil fuels. No one has said this is an easy task, yet by taking on the challenge a multitude of jobs would be created. Combine that with the reduction in energy costs and stagflation begins to recede and a new, stronger economy emerges.

Environmental Sciences

A steady increase in human population is a catalyst to increased material consumption and consequently a decrease in both the quantity and quality of precious natural resources (Vlek & Steg, 2007). Unfortunately, the impact is greater in some parts of the world than others and at a relatively slow rate whereas people can become desensitized to the actual outcomes. The study of environmental science seeks to change this by making quantitative measurement of environmental devastation a reality (Pardieck, 2005). It is vital to research for sustainability as its essence lies in the interactions between the living / non-living environment and the people who inhabit it. Heavily researched topics within environmental science include the depletion / preservation of natural resources, environmental degradation, and climate change.

Many of the environmental issues studied are caused by human activity at different stages throughout the entire life of the multitude of different products people use to simplify their own lives (SAIC, 2006). This human activity involves the use of raw materials and often non-renewable energy sources to create products (or services) which in turn, through their production and use produce atmospheric emissions and solid and waterborne wastes, all of which impact the environment. These impacts are really

negative consequences towards future availability of natural resources, plants and animals, or the health and wellbeing of humans, all of which occur on global, regional, and even local levels. On a global level the earth is experiencing increased amounts of ultraviolet radiation, depletion of resources, longer seasons, loss of soil moisture, and changes to forestation, as well as wind, and ocean patterns. On a regional level buildings are corroding and vegetation and soil are adversely affected by acidification, while humans experience decreased visibility, eye irritation, and respiratory tract and lung irritations caused by photochemical smog. Finally, on a local level eutrophication in lakes and streams is causing excessive levels of plant growth and oxygen depletion in some areas while aquatic toxicity is causing decreased amounts of aquatic plant and insect production and biodiversity, as well as decreases in commercial or recreational fishing. Also locally, wildlife suffers the effects of terrestrial toxicity and loss of habitat due to human land use while loss of available water and increases in disease and death rates affect the human population.

There is a general consensus amongst many scientists today that understanding climate change including its causes and effects is central to repairing or even reversing environmental degradation (EPA, 2010). Over a significant period of time scientists have been collecting and interpreting data for the state of particular environmental conditions in various parts of the world in order to gain increased understanding of the changes occurring to the climate. This data has been compiled into several indicators that can be used in the identification of climate trends, factors of influence, and the long-term effects. Five categories, possessing a total of 24 climate change indicators have been well

documented and serve as a useful tool towards making a connection between environmental devastation and the human behavior contributing to, or even causing it. The five categories of indicators include: greenhouse gases, weather and climate, oceans, snow and ice, and society and ecosystems. The way these indicators have been presented shows a full circle of causes and effects. Essentially, human activities cause the emissions of greenhouse gases. At elevated levels these gases cause long term changes in weather and oceanic patterns as well as snow and ice cover. These changes can have devastating effects on the natural ecosystems of plants, animals, and microorganisms which provide various services including clean water and food to the humans whose behavior is contributing to their demise.

Social and Behavioral Sciences

In their strategic planning document, "Securing the Future," the United Kingdom (UK) (2005), stressed that creating a sustainable world would require significant behavioral change on the part of all people to stop environmental degradation and resource depletion. This involves getting people to make more informed decisions that are good for the environment, society, and economy, locally and abroad. A plan was laid out for how they would strive to achieve this behavioral change through sharing of knowledge, positive and negative incentives, and modeling of appropriate behavior by all levels of officials. However, sustainability of the planet is far from being reached and ongoing research into social and behavioral factors is critical (Vlek & Steg, 2007). Many key questions are still lingering in the areas of theory, methodology and policy-making around behavioral change. This is where the field of applied social psychology comes in

as it contributes to understanding of social problems and the creation of intervention strategies toward improving the behavior of people, on an individual or group level, with respect to the problem (Schneider, Gruman, & Coutts, 2005). Applied social psychology is a branch of social psychology which is science that investigates human interaction, in particular how they, "think about, feel about, relate to, and influence one another" (p. 2). In applied social psychology the human interaction is first explored as part of the understanding phase. This understanding can be expanded to include the following:

- Description: identification of details and nature surrounding phenomenon
- Prediction: determination of factors that are systematically related to phenomenon
- Causality: determination of causal relationships between factors
- Explanation: establishment of why relationships between factors occur

In some cases the understanding of a phenomenon has already been studied and an applied social psychologist can move directly into the intervention piece. This is what distinguishes them from other social psychologists. Creating interventions is really about establishing control, or the ability to manipulate situations such that they will lead to desired changes in a phenomenon. It is believed that two categories of influence exist relative to these changes in behavior, situational and personality trait (Leary & Hoyle, 2009). Often these two areas are studied relatively independently of each other despite the fact that both have been proven to affect how people will respond or behave to a given situation. It has also been shown that a person's potential to be engaged versus alienated within a particular scenario is directly related to the social conditions in which they are functioning (Ryan & Deci, 2000). Furthermore, the university setting is prime

for shaping the identity, moral, and intellectual development of the young adults, roughly 17 to 21 years of age, who attend these institutions (Myers and Beringer, 2010).

Defining Pro-sustainability Behavioral Change in Young Adults

Before delving into specific initiatives being used in higher education to promote behavioral change it must be understood what is meant by it. In general, it has been shown that the choices people make in life, relative to the actions they will take, have the potential to significantly affect the environment, economy, and society (Swim, Clayton, and Howard, 2011). The idea of behavioral change involves an understanding of what the desirable action or behavior is and influencing people to engage in it more often and perhaps at an increased intensity, when applicable.

Often it is easier to first identify the negative behavior as a means to start flushing out the positive. Research has found three categories of human behavior to be linked to causing the greatest negative impact relative to sustainability; overpopulation, overconsumption and under conservation (Oskamp, 2000). There is some inter-relatedness within these behavior categories as increases in the human population have significant potential to increase both overconsumption and under-conservation. Desirable behavior change then requires replacing these negative behaviors with the more pro-sustainability behaviors. These positive behaviors can be categorized into four types: activism (direct involvement in major initiatives), non-activism within the public-sphere (supporting public policies or initiatives from the sidelines), private-sphere (cognoscente when making household purchases, travel arrangements, etc.), and organizational (influencing others within private organizations, businesses or industry) (Stern, 2000).

The level to which one exhibits these behaviors may change over time based on exposure to varying factors of influence.

Behavior Change Theory

The study of behavior change has been around for a very long time and a great many theories exist around what causes one to behave the way he or she does. In a quest to determine more specifically what causes individuals to behave in a friendlier manner towards the environment, society, and the economy, a select few continually come up in the literature. Four of these will be briefly summarized and compared here followed by a more in-depth look at the Value-Belief-Norm theory (Stern, Dietz, Abel, Guagnano, & Kalof, 1999), that became the framework on which the theory for this research study was developed.

Theory of Planned Behavior

The theory of planned behavior (TPB) "provides a useful conceptual framework for dealing with the complexities of human social behavior" (Ajzen, 1991, p. 206). It depicts the predictive ability of influential factors including a person's attitude (personal behavioral evaluation) about a behavior, subjective / social norms (socially accepted behavior), and one's perceived ability to control (self-efficacy) or act out a specific behavior, in determining one's intention to behave in a certain way. The TPB has also been used to show that perceived ability to control or perform a specific action along with intention to do so account for much of the variance in actually acting out the behavior. Further, the TPB brings in personal / moral norms to show some effect on behavior and recognizes that all of these factors connect in some way to a foundational belief structure

regarding each specific behavior. Deeper understanding of this belief structure is vital to realizing factors that cause one person to act a certain way and another completely different.

Social Cognitive Theory

Social cognitive theory (SCT) views people as agents of their own personal development, adaptation to an ever-changing world, and renewal (Bandura, 2001). SCT evaluates behavior by distinguishing amongst three distinct methods of intentional action or agency. These include: direct agency or action by an individual seeking a specific end result, proxy agency or action by other people through which there is a positive outcome for the individual influencing them in some way to do so, and finally collective agency or the idea that many like-minded people working together have greater power to accomplish a desired goal. SCT posits that human beings are conscious of the various influences around them and have the cognitive ability to process information in order to determine a course of action. This action occurs within one of three types of environments, imposed, selected, or constructed, and the action is the result of one's intent to act due to some self-motivation along with the belief that the ability is possessed to do so.

This last component, often referred to as self-efficacy, must be strong if people are to be active participants rather than mere pawns in the game of life. Self-efficacy can be constructed or enhanced through previous successes with a given behavior, vicariously through other's behaviors, due to positive verbal reinforcement of ability, and as a result of physiological changes / feedback associated with a behavior (Bandura, 1997).

Creating interventions to change behavior would need to target these sources in order to create efficacy around the desired behaviors.

Value Theory

Value theory suggests that individuals develop a prioritized set of values fairly early on in life, and that these values affect one's beliefs and potentially behavior (Inglehart, 1971). These values may be thought of as a hierarchy of goals related to unsatisfied necessities. It is believed that values are shaped by social and political environments during the younger years of one's life and though change is possible, tend to stay relatively constant. Staying true to the concept of values being synonymous with hierarchical sets of goals, they are further defined as interest-serving, motivational, and judgmental standards that develop in individuals due to socialization as well as individual experiences (Schwartz, 1994). The different types of values can be distinguished by differences in motivational influence.

Value theory research often follows one of two approaches. One has looked at the predictive ability of value types relative to environmental concern. In this approach value types were derived from three universal needs of mankind including those that relate to being biological organisms, those related to societal interactions, and those related to group survival (Schwartz, 1994). This generated a total of 10 value types that were later categorized into four units based on "two bipolar dimensions" (p. 25). One dimension spans from emphasis on independence of thought / action (openness to change) to a more restrictive maintenance of how things are or have been (conservation.) The other has social welfare concerns (self-transcendence) at one end of the spectrum and

concerns for self-achievement (self-enhancement) at the other. It is not entirely surprising that self-transcendence has shown to positively predict general environmental concern while self-enhancement is the opposite (Schultz et al., 2005).

The other common approach to value theory research evaluates the effects of concern for self, others, or plants and animals on attitudes towards the environment (Schultz et al., 2005). These concerns are referred to as value objects and are more technically termed egoistic, altruistic, and biospheric, respectively (Stern et al., 1999). Relative to environmentally friendly behavior, altruistic and biospheric values have a positive effect on this behavior, while egoistic values tend to have negative effects (Stern, 2000). The two approaches to value research are really interconnected in that self-transcendence is linked to altruistic and biospheric value objects while self-enhancement is linked to egoistic value objects. It is possible that tapping into altruistic and biospheric value objects can create change in attitudes or beliefs about the environment, and potentially lead to behavior change.

Moral Norm Activation Theory

The theory of moral norm activation explains the process by which someone may or may not act out an altruistic (concerning other being or thing,) behavior (Schwartz, 1977). Essentially the person becomes aware that someone / something that is cared about is in need and perceives a personal capability of helping. Despite possible apprehension a sense of obligation to act (moral norm) is felt, spurring a process of weighing the costs to benefits of doing so. Depending on the severity of the situation, this process may be repeated multiple times and in the end the person either acts, or

doesn't. At the heart of this theory is the belief that the specific action or behavior is activated by obligatory feelings or personal norms. Personal norms, as opposed to social norms, are linked to the expectations one puts on oneself. Anticipating or actually carrying out these expectations results in a multitude of possible positive emotions including the likes of improved self-esteem and self-respect. It is imperative to note that individual expectations stem from social expectations discovered through interaction in social environments, which are then refined by the very personal historical interactions of the individual, and ultimately become the standard for evaluation of future events or action.

Summary of Four Behavior Theories

Suffice it to say, the theories previously mentioned have been condensed to the bare bones of their existence for the above summaries (See Table 1 for side-by-side comparison.) As each of these theories has been extensively tested and reported on previously, the researcher is primarily interested in highlighting some of the gross similarities and differences between them as a lead in to the theory that was selected as the framework for this research study. In general, whether explicitly stated or not, each of these theories relies on the cognitive abilities of people to process various influences whether external or internal, in the process of deciding on an action to take relative to a given situation. All have theoretical constructs that have been linked to one's intent to behave a certain way and to some degree the actual behavior. However, none by itself provides the complete picture for the development of necessary interventions towards changing behaviors to be more pro-sustainability.

Table 1

Comparison of Behavior Change Theories

Theory	Primary focal aspect of behavior change process	Central determinant(s) of behavior	Primary references	Implications for pro-sustainability behavior change
Theory of Planned Behavior	Factors leading to intent	Intention & Perceived behavioral control	Ajzen, 1991	Target attitudes, subjective norms, and perceived behavioral control
Social Cognitive Theory	All	Self-efficacy	Bandura, 2001	Target sources of self-efficacy
Value Theory	Values formation	Attitudes & Beliefs	Inglehart, 1971 Schwartz, 1994	Target altruistic and biospheric value objects
Norm-activation Theory	Personal norms	Altruistic motivation / values	Schwartz, 1977	Target personal norms through social interactions

Value-Belief-Norm Theory

The Value-Belief-Norm (VBN) theory of environmentalism came about as Paul Stern and his colleagues worked to develop theory specific to public support that would help to mobilize the environmental movement (Stern et al., 1999). Public support was defined as needing both highly engaged activists as well as those exhibiting lower levels of commitment such as writing letters of support or making financial contributions. In addition, voluntary sacrifice demonstrating support for public policies and personal commitment through supportive behaviors in one's home or personal shopping choices were also included. In creating the theory both social movement and environmental research were consulted. Ultimately, the concepts of Moral Norm Activation (Schwartz,

1977), Value Theory (Inglehart, 1971; Schwartz, 1994), and a third titled New Ecological Paradigm (Dunlap & Van Liere, 1978) were merged to create the VBN theory of environmentalism.

Originally dubbed the New Environmental Paradigm (NEP), Dunlap and Van Liere (1978) developed this set of measures to determine peoples' social-psychological beliefs about the effects of human interactions with the biosphere / natural world. The scale basically determines awareness of adverse effects of poor conditions in the environment. It does not directly predict the behavior of an individual, even if fully endorsed. However, for measuring environmental concern it has become the most frequently utilized measurement tool worldwide.

Within the Value-Belief-Norm theory of environmentalism (VBN,) the combining of the concepts of norm activation, value theory and NEP creates a causal network of variables (Stern et al., 1999). In general, non-activist types of environmental behaviors stem from an individual's values. These values may be related to concern for others, concern for the earth and all of its living creatures, or concern for one's self (altruistic, biospheric, or egoistic respectively.) Regardless of the type of concern, they will cause one to have certain beliefs relative to: the human-environment relationship, the potential of negative effects to valued objects, and perceived ability to minimize this threat. In turn these beliefs lead to personal norms or the obligatory sense to do something. Often very specific types of behavior or support are affected by additional factors such as habitual items, individual capability, or contextual factors either facilitating or constraining action. In fact, when looking at specific behaviors known to impact the

environment there is often greater influence from these other factors (Stern, 2000). Table 2 below lists these causal variables as well as expanded components of them.

Table 2

Causal Variables: Pro-environmental Behavioral Change (based on the work of Paul Stern (2000) as part of his value-belief-norm (VBN) theory)

Variable	Expanded Components of Variables
Attitudinal	Values (altruistic, biospheric, egoistic) Beliefs (human-environment relationship, effects to valued objects, perceived ability to minimize threat) Norms (feeling of obligation to act)
Contextual	Persuasion / modeling / advertising Community / social expectations Government regulations / contract restrictions / public policies Monetary incentives / costs Physical limitations Capabilities / constraints due to technology or the built environment Broader social / economic / political context
Personal Capability	Knowledge / skills Time available Literacy / money / social status / power (Socio-demographic indicators such as age, race, educational attainment, or income may proxy)
Habitual	Any routine activity

People respond differently to different types of influence and it often takes multiple influences to change an individual's behavior (Stern, 2000). It has been shown that personal norms can be altered by providing information (i.e. enhancing personal capability) that helps to shape one's beliefs. Sometimes this information is provided directly, other times indirectly through context. Vast opportunities exist in higher education to provide this potentially belief shaping information.

Influencing Pro-sustainability Behavior Through Higher Education

The concept of changing behavior to be more pro-sustainability would be moot if not for an understanding of what specifically can be done in higher education to create the appropriate transfer of information and knowledge, in a meaningful way. Essentially, the following paragraphs add the necessary components to the contextual and personal capability variables above, specific to the realm of higher education.

Development of Understanding

Sumner (2003) felt that education in sustainability needed to be grounded by three things: critical reflection which is intended to question the current domain of thinking, dialogue that allows participation by both the educators and students in building sustainable communities, and life values that change world perspective away from monetary value and back to preserving life. The idea is that the three combine to create a driving force for commitment towards individual participatory action in local communities that enables them to create their own sustainable future. Easton (2007) had a very similar view that he discussed in relation to interactive adult education. While recognizing the need for objectively questioning problems and creating and experimenting with possible solutions, he also included the importance of a need for understanding cultural value and adaptation. This is critical to eventually establishing a global consensus for issues related to fossil fuel use and human rights.

An additional dimension, likely to be present in the previous examples though not explicitly stated is that of systems thinking. Students at the University of Auckland, Auckland, New Zealand, are taught to apply systems thinking, the act of understanding

and using the relationships within or between systems that have interaction, to identify the root cause of a problem prior to the act of designing a solution, when working on sustainability issues (Boyle, 2004). Emphasis is also placed on understanding of process versus product and tools such as life cycle analysis, environmental impact assessment, and risk assessment are implemented. The final puzzle piece, solid leadership skills and an understanding of the roles of government and business within society, is intended to enable students to recognize what the most critical factors will be to achieving their sustainability goals.

Learning by Doing

Many of these examples point toward participation or action in order to accomplish sustainability. At the University of Surrey in London, England, students are given the opportunity to practice participatory action through projects with industry sponsors in which they apply the knowledge and skills acquired during previous coursework (Perdan et. al., 2000). The preceding coursework utilizes the traditional lecture format as well as small group discussions. Real, as opposed to theoretical, case studies and role play are commonly used to provide clarity to the values and principles behind making informed, as well as ethical environmental decisions. A key aspect expected to be derived from this learning is the element of learning how to cope with the uncertainty that comes with not being able to acquire adequate information. It forces students to make assumptions about what is missing and formulate judgments with respect to limited analysis capability. This learning aspect is much less likely to occur if active participation were not present.

Thorough Campus-wide Implementation

Active learning, in and of itself, has been shown to be a vital component to sustainability education. It is critical to point out, however, that in order for retention to be achieved it must be regularly practiced (Kumar et al., 2005). In other words, if the desire is for taught sustainability concepts to be retained, then an active learning approach is very appropriate, though needs to be infused system-wide in order to be effective. A common or unified theme around what it means to be sustainable should carry through all course curricula, throughout an entire program. With the aid of examples provided by faculty / instructors, students should be able to both recognize and integrate concepts of sustainability from one course into the next. If this theme is not institutionalized into all curriculum, the full potential of the active learning process cannot be realized and the teaching becomes little more than information sharing.

Much More than Information

Information sharing alone is not conducive to achieving the behavioral change required for full implementation of sustainable development (HM Government, 2005). People may go through an attitude change due to the acquisition of information, but that does not necessarily mean their behavior will change along with it. For education for sustainability to achieve ultimate success it must bridge the gap between attitudes and behaviors. The UK has compiled a fairly comprehensive yet concise approach to promoting sustainability in a manner that leads to action and behavioral change. And the best part is that it is applicable, or at least adaptable to higher education. The UK approach consists of four levels, enable, encourage, engage, and exemplify. The first

three are relative to the people and communities, while the last is related to government and other leaders. *Enable* is about education, removal of barriers and ensuring facilities or alternative options are available. In a school or university setting this might be providing an environment conducive to open dialogue and a means for active engagement in community, campus-wide or broader. *Encourage* covers the positive and negative reinforcement measures such as grants and reward schemes or penalties and fines. This might simply be through grading schemes or positive recognition and reinforcement that comes from other groups or levels within the school or campus community. *Engage* brings in the sense of community and the power or enthusiasm that can be gained from group consensus. Creating a network of like-minded students, or connecting them with leaders in their local communities can engage them in a more personal and fulfilling way than the classroom experience alone. Finally, *exemplify* is about leading by example. Within schools and universities it is critical that the educators are models of sustainable behavior. There needs to be consistency throughout and across all disciplines or departments. Once again, it is not enough to provide information or talk about the importance of living sustainably, educators need to truly be sustainable if the idea is to catch on. For instance, an educator or educational institution cannot just say they are going to do something sustainable and then complete only part of it or none at all. When the general public or their stakeholders (in this case the students,) find out the effects can potentially be more damaging, due to the severing of trust, than if they had not committed to any action in the first place.

Summary of Key Topics in Sustainability

Understanding the concept of sustainability involves delving into the broad fields of economics, environmental science, and social science in a way that flushes out their interconnected nature and exposes the fragile relationship each shares with human behavior. Opportunities to change behavior to be more sustainable can be found in every aspect of life and are achievable at varying intensities and frequencies. The choices people make relative to these behaviors can be categorized relative to their levels of consumption and conservation, recognizing that some overlap exists between the two, and have the potential for long lasting effects to the environment, economy, and society. It is critical that people understand these potential effects and continually take them into consideration, moving towards the more positive behaviors of activism, non-activism in the public-sphere, private sphere cognizance and organizational influence. Educators must provide students multiple avenues of exposure to the positive and negative effects their behaviors have on the environment, society and economy, in order to begin the process of change. Evaluation of such initiatives may provide insight into their current effectiveness and potential improvements.

Referring back to the VBN theory, the philosophy of the UK, and additional supporting evidence from the literature review, the presumption may be made then that if the strategies described previously are used when implementing education for sustainability, providing multiple venues from which students can cultivate pertinent information and context conducive to pro-sustainability behavior, there will be some positive change in an individual's value-belief-norm structure related to pro-sustainability

behaviors and behavioral change should consequently be realized. The following theoretical model is thus proposed for use in higher education (see figure 1.)

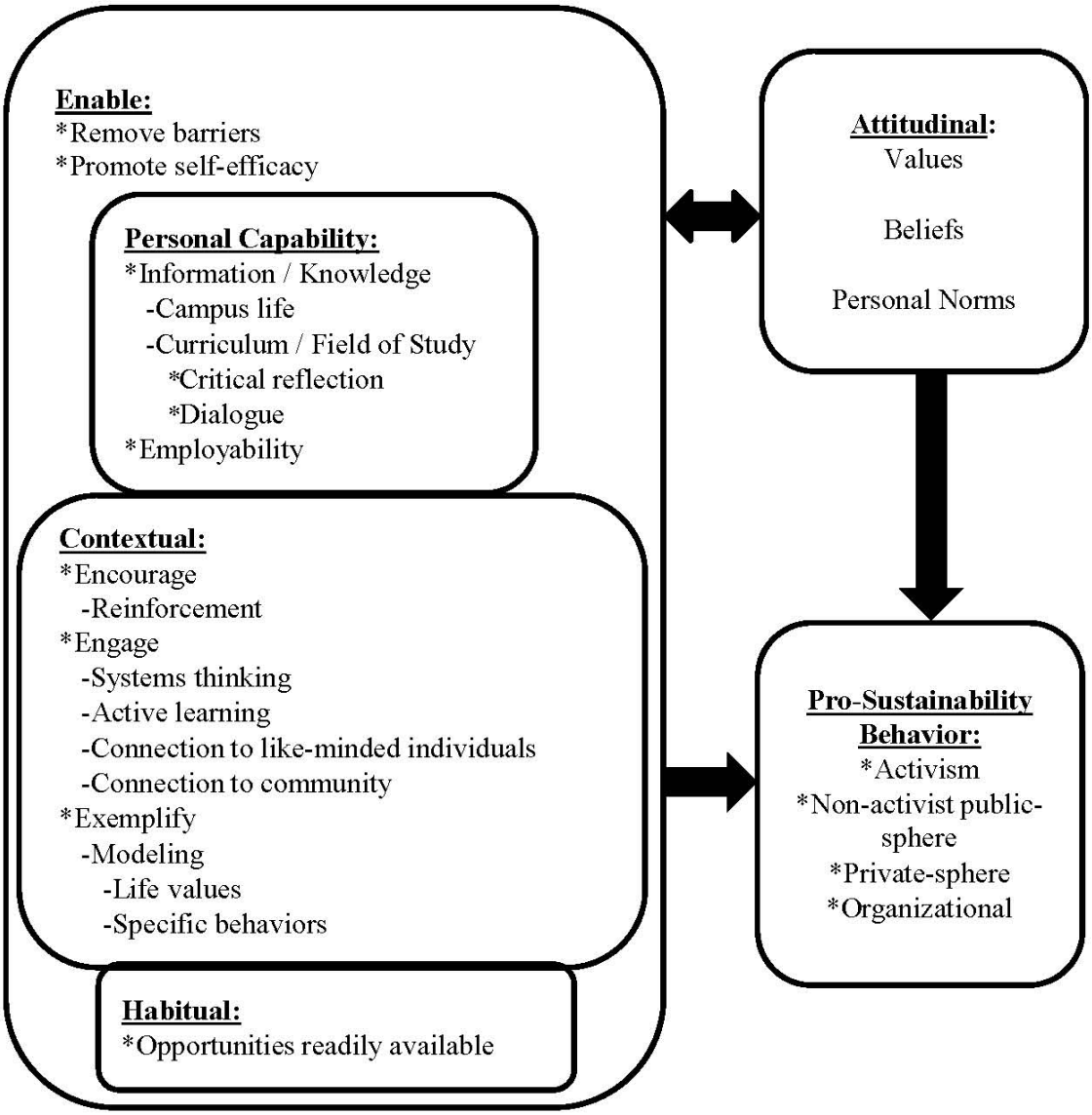

Figure 1: Model for increasing pro-sustainability behavior in young adults attending university, adapted from the VBN theory (Stern, 2000) and the work of the UK (HM Government, 2005).

Possibly the most important factor in behavior change is related to barriers (Gardner & Stern, 2002). Personal capability, context and habitual factors all contribute

in one way or another to the removal of barriers, sometimes directly, other times by improving self-efficacy. Either way, these factors contribute to enabling an individual or multiple people to behave in a particular way. These factors can also have effects on a person's beliefs and subsequent personal norms, though in some situations a person may behave in a pro-sustainability fashion without actually changing any attitudinal factors. For instance a person may feel peer pressure to act a certain way under specific context or scenario, while long term his or her beliefs remain unchanged.

Case Study Methodology

Case studies are widely used for investigation in the field of education (Gall, Gall, & Borg, 2007). They involve an intensive look into at least one instance of a phenomenon through the perspectives of those who actually experienced it naturally in a real-life setting (as opposed to an experimentally created scenario,) though the boundaries between the phenomenon and the context in which it occurs are not always clear (Yin, 2009). This is something that should be flushed out as part of the study and requires a solid research design.

The Robert Yin *positivistic* case study methodology has proven to be useful for contemporary issues in cases where the investigator is not in control of the particular events studied yet seeks to answer questions related to how or why the phenomenon occurs (Yin, 2009). It is important to note that this case study is an empirical form of inquiry and, though qualitative data are collected through means such as documentation review and interviews, it is not an interpretive approach. There are four scenarios when this methodology is deemed appropriate:

1. The desire is to show or explain causation related to interventions occurring in the real-life context, the complexity of which is too great for experimental or survey strategies
2. The desire is to describe the circumstances / context surrounding an intervention
3. The desire is to illustrate an evaluation of a phenomenon
4. The desire is to investigate particular scenarios in which the outcomes of an intervention are unclear or many

Construct Validity

Case studies have been criticized for insufficient development of an operational set of measures relative to the concepts studied (Yin, 2009). In order to avoid this judgment, the investigator should use care during data collection to use a minimum of two, or more, sources of evidence and establish links between the research questions asked and the collected data. Furthermore, the factual evidence reported by the investigator should be reviewed and corroborated by the participants and informants of the study in order to improve the accuracy of reporting. Following these three tactics helps to increase the construct validity of the case study.

Internal Validity

Internal validity becomes a major concern when an investigator is trying to explain how or why one event led to another (Yin, 2009). When these events cannot be directly observed by the investigator, inferences are made about causation based on evidence or data collected via documents or interviews. In order to be sure these

inferences are valid and that the latter event was not caused by some other factor or event, one or more of the following analytic strategies should be implemented.

The first, pattern matching, involves comparison of one or more predicted patterns with that observed through the research study (Yin, 2009). There are multiple types of patterns that may be evaluated and the investigator is required to use discretion in interpreting whether or not patterns have been matched. Thus, to avoid situations where interpretations are likely to be challenged, the researcher should stick to scenarios where the matches or mismatches are grotesque. This technique is useful in both explanatory and descriptive studies. However, explanatory studies may benefit from a more specialized form of pattern matching called explanation building, in which causal links are presumed about the case being studied. Due to the complexity of these causal links these case studies are usually presented in a narrative form embedded with theoretical propositions, the nature of which often leads to the likes of public policy reform or theory building in the social sciences. Explanation building differs from pattern matching in that it is an iterative process in which the final explanation develops throughout the study.

In the event that the case(s) exhibits a very precise pattern the technique of time-series analysis can aid in establishing more concrete conclusions (Yin, 2009). The time-series design attempts to match a pre-determined trend of theoretical significance, or a rival trend, with that empirically observed over time. This technique can only be relevant if the researcher takes time before the research is conducted to identify specific time intervals to be studied, the indicators that will be evaluated, and the temporal

relationships presumed to be present. When the researcher has reason to believe the events occurring over time follow a cause-effect-cause-effect type pattern a logic model may be more appropriate. Like the more simplistic pattern matching method, the logic model involves matching observed patterns to those predicted prior to the start of the study. However, logic models are sequential in nature, possessing a series of immediate, intermediate, and final outcomes. The way a logic model is implemented varies relative to the unit of analysis for the specific case study.

When two or more cases are available for study, either via a separate study / author or as part of the current study, the findings may be significantly strengthened using a cross-case synthesis (Yin, 2009). This involves analysis of each case individually using one of the techniques briefly described above, followed by comparisons across all cases, often through use of tables relating each outcome being evaluated to each case within the study. Where the other methods may be used for both single and multiple cases, this method is inherently useful only in the multiple case scenarios.

External Validity

Generalizability of findings is always a concern when conducting research (Yin, 2009). A single case study is often considered weak with respect to this criterion, thus it is important that the researcher is clear as to what the theory is that leads to the case being studied. This is because the researcher will be using an analytical, rather than statistical generalization approach in which results of the case study will potentially generalize to a

theory. This theory may also lead to additional cases in which the findings of the case study are likely to be generalizable.

Reliability

The minimization of errors and biases, or reliability of case studies has historically been questioned due to poor procedural documentation (Yin, 2009). Two proven tactics to improve case study reliability include the creation and use of both a protocol and a database. These documents aid in the operationalization of the steps involved in analyzing the case study such that another researcher should be able to follow the procedure and produce identical results.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

The intent of this research study met the criteria required for use with the Robert Yin case study methodology. In particular to this study, the Yin methodology was appropriate because the researcher desired to gain better understanding of the outcomes of sustainability related initiatives or interventions on the UW-Stout campus in order to determine the extent to which the campus had implemented the factors of the theoretical Pro-sustainability Behavior Model developed from the literature review in chapter two (Yin, 2009). This particular methodology was also pertinent to this research study because sustainability is a contemporary issue for academia, and the broader community, that presents vast challenges to those trying to figure out how to best frame it within the context of higher education as the boundaries between the phenomenon of pro-sustainability behavior and higher education context are not entirely clear. This, at least in part stems from the many sources of influence that equate to multiple sources of evidence needing to be investigated. As data were collected and analyzed it was important to bear in mind that the events providing influence occurred at some time prior to this study. Therefore, the data received may not be entirely accurate or complete as the way participants perceived these events may have changed over time. However, considering the fact that students are at higher education institutions for a relatively short period of time, their perceptions of the interventions in place at the campus could still be extremely useful to further development and refinement of pro-sustainability initiatives.

The final, and perhaps most important reason the Yin methodology of a positivistic case study was used is that it lends well to theory development, through careful consideration of past research, which goes through evaluation, testing, and possible alteration over the course of the study (Yin, 2009). There are a great many theories and models in existence (a few were discussed in the literature review above,) related to behavior, and many of these have even been tested in various studies related to environmental behavior. However, in initiating this study it was difficult to find one that had been created and tested specific to the ability of higher education institutions to effect pro-sustainability behavioral change. The goal of this study was to do just that in a way that would contribute to the ability of higher education institutions to make informed decisions about the next steps in pro-sustainability initiatives.

Research Design

The Value-Belief-Norm (VBN) theory described in the literature review was used to provide the necessary framework for the foundation of inquiry to be used throughout this research study (Stern, 2000). This model highlighted the variables that have been shown to cause an increase, or decrease, in people's pro-sustainability behavior and how these causal variables interact with one another. These variables became the factors of a pro-sustainability model that was then enhanced based on understanding of the literature available on methods currently used in higher education to incorporate sustainability related concepts into all aspects of the higher education institution.

Five components vital to case study methodology were carefully constructed including: the question(s), potential propositions (related to the theory,) analysis unit(s),

logic that links the data to the propositions, and specific criteria to be used in interpreting findings (Yin, 2009). This process fostered the development of the theory against which the results of the case study were later compared. Specifically it was theorized that the UW-Stout has implemented an intervention plan that is consistent with the Pro-sustainability Behavior Model shown in figure 1 (adapted from the Value-Belief-Norm (VBN) theory of Paul Stern, 2000,) showing that the institution is capable of effecting behavioral change in students to be more pro-sustainability.

The Study's Questions

This study strived to contribute to the current body of knowledge in the area of education for sustainability by answering the following questions:

How capable is the University of Wisconsin-Stout of changing the behaviors of college students to be more sustainable with regards to the environment, society, and the economy?

1. What contextual or personal capability factors of influence has the UW-Stout implemented that are consistent with those shown to promote pro-sustainability behavioural change?
2. Why are the behaviors of the students at the UW-Stout favourable / unfavourable to the environment, society, and a sustainable economy?
    a. What are the specific types of behavior that are either favourable or unfavourable to the environment, society, and a sustainable economy?
3. Do students attribute their sustainable behaviors to their experiences at the university?

a. If yes, which experiences, if any were most influential?

b. If no, to what experience, if any do they attribute their behavior?

The Study's Propositions

As noted above, this research study strived to answer the question of how capable the UW-Stout is of changing student behavior to be more pro-sustainability by determining whether or not the university has been successful in implementing an intervention strategy that is consistent with the Pro-sustainability Behavior Model shown in Figure 1. The propositions, as derived from the literature and described below, are directly related to the theory and are assumed to all have positive, proportional relationships with pro-sustainability behavior. For example, it was assumed that a high feeling of personal empowerment or self-efficacy on the part of a student has a positive effect on changing that student's behavior to be more pro-sustainability. In Table 3 below, the propositions have been written in terms of factors that provided a basis for measurement when analyzing the data. Borrowing from the United Kingdom's plan for promoting pro-sustainability behavioral change, the propositions were organized by the primary role they play in this process (HM Government, 2005).

Table 3

The Study's Propositions

Category	No.	Proposition as Measurable Factors
Enable	1	The extent to which attempts are made to promote self-efficacy in students and students perceive they have self-efficacy.
	2	The extent to which implemented interventions provide both information and context through multiple methods.
	3	The extent to which opportunities readily exist for all students that allow them to easily carry out pro-sustainability behaviors on an on-going basis.
Encourage	4	The extent to which students perceive their behaviors are strongly reinforced.
	5	The extent to which students perceive they are receiving complete and accurate feedback related to the implementation of interventions.
Engage	6	The extent to which students participate in the pro-sustainability behavioral change process.
Exemplify	7	The extent to which students perceive faculty and staff are modeling pro-sustainability behaviors.

Enable 1. *The extent to which attempts are made to promote self-efficacy in students and students perceive they have self-efficacy.* It has been well documented that a strong factor in whether or not people choose a particular action relates to self-efficacy, or their perceived ability to do so (Ajzen, 1991; Bandura, 2001; Schwartz, 1977). Another way of stating this is that people feel empowered to act a certain way when they believe they are capable of doing so.

Enable 2. *The extent to which implemented interventions provide both information and context through multiple methods.* This relates to the fact that people respond differently to different types of influence, and that it may take multiple types of intervention to change one individual's behavior (Stern, 2000).

Enable 3. *The extent to which opportunities readily exist for all students that allow them to easily carry out pro-sustainability behaviors on an on-going basis.* People seem to gravitate towards taking the path of least resistance whenever possible. Thus, this proposition relates to removing barriers and providing tools and an environment that are conducive to engaging in pro-sustainability behavior habitually (HM Government, 2005).

Encourage 4. *The extent to which students perceive their behaviors are strongly reinforced.* It is well known that both positive and negative reinforcement (for example rewards or fines,) can be helpful, at least to some degree, in encouraging specific types of behavior. In a higher education setting this may involve grading on coursework, formal recognition that is given more publicly, reinforcement through participation in organizations of like-minded individuals, or even through enforcement of established rules of conduct (HM Government, 2005).

Encourage 5. *The extent to which students perceive they are receiving complete and accurate feedback related to the implementation of interventions.* In the same way that this study strives to provide feedback that will help to better inform future decisions regarding sustainability initiatives in higher education, students need to be informed of the results or outcomes of current sustainability-related endeavors on campus such that they can make better informed decisions regarding the actions they will take individually moving forward. It is difficult to make decisions around next steps if the true outcome of a previous step is unknown or unclear.

Engage 6. *The extent to which students participate in the pro-sustainability behavioral change process.* It is human nature to want a say in one's own destiny. Related to proposition 1 then, people will also feel empowered if they have a say in how an organization, of which they are a part, will function.

Exemplify 7. *The extent to which students perceive faculty and staff are modeling pro-sustainability behaviors.* Explaining how and why is only a fraction of the commitment needed towards promotion of pro-sustainability behavioral change in students (HM Government, 2005). It requires educators to demonstrate through their own behaviors just how important it this undertaking really is. Otherwise the message students actually receive may be that they need to know about it but do not really have to do it.

Units of Analysis

The units of analysis in this study were UW-Stout's interventions which were intended to provide the contextual, personal capability and habitual factors of influence necessary to effect behavioral change in students. As the data collection process got under way it was determined that there were really three sub-units of analysis to be investigated. These included the overall facilities and operations of the university, the curricular aspects related to faculty and instructional staff, and the students.

The Logic Linking the Data to the Propositions

In general, the logic linking the data to the propositions was that certain patterns of influence are known to have desired effects on people's intentions towards pro-sustainability behaviors. It was expected that the data collected would match these

patterns. A more specific look at the logic linking the data to each individual proposition follows.

Enable 1. *The extent to which attempts are made to promote self-efficacy in students and students perceive they have self-efficacy.* As previously stated, when individuals believe they are capable of doing something they are more likely to perform the desired behavior (Ajzen, 1991; Bandura, 2001; Schwartz, 1977). This was a component in the data from all sources.

Enable 2. *The extent to which implemented interventions provide both information and context through multiple methods.* Because people respond differently to different types of influence multiple types of intervention may be needed to change one individual's behavior (Stern, 2000). The methods of intervention implemented were documented in both the report on campus-wide initiatives and the information compiled from faculty and academic staff.

Enable 3: *The extent to which opportunities readily exist for all students that allow them to easily carry out pro-sustainability behaviors on an on-going basis.* A major factor in achieving behavioral change relates to removal of barriers that might be inhibiting action for one reason or another (Gardner & Stern, 2002). Part of this process involves creating opportunities that allow students to behave in a pro-sustainability fashion and also making sure students are aware that the opportunity exists. Attempts to create these opportunities were well documented in the report on campus-wide initiatives, though it was the data from the students that revealed the true state of what they were aware of.

Encourage 4. *The extent to which students perceive their behaviors are strongly reinforced.* Reinforcement can be given in many different ways. It might be in the form of individual or group recognition that may be given privately or publicly, enforcement of rules or regulations, rewards or prizes, or grades given for a project or assignment. Student perceptions about reinforcement of their behaviors could only come from the students themselves.

Encourage 5. *The extent to which students perceive they are receiving complete and accurate feedback related to the implementation of interventions.* Without some mechanism for feedback on the consequences of their behavior, people would never be able to learn from it or make informed decisions regarding what to do next. Once again, since it was perceptions the author desired this had to come from the students.

Engage 6. *The extent to which students participate in the pro-sustainability behavioral change process.* It is generally expected that the more active role an individual plays in creating the rules, the more likely he or she will follow them. This was measured by review of documentation on the history of sustainability initiatives at the UW-Stout and information provided in the report on campus-wide initiatives.

Exemplify 7. *The extent to which students perceive faculty and staff are modeling pro-sustainability behaviors.* It could be considered unreasonable to expect students to behave in a certain way if the faculty and staff educating and serving them do not. The perceptions of the students on this matter had to be obtained from the students, though information regarding specific initiatives related to faculty and staff was included in the campus-wide initiatives report.

The Criteria for Interpreting the Findings

The specific criteria necessary for interpreting the findings of this study lie in the directness with which patterns in the data fit the Pro-sustainability Behavior Model in Figure 1 and match the propositions previously described. Considering the desire in this study is to show that the UW-Stout has provided the appropriate contextual and personal capability factors to promote pro-sustainability behavioral change and that the students recognize these initiatives and attribute their behavior to them, rival explanations would relate to behavior that is entirely attributed to some previous experience(s) that influenced their beliefs.

Data Collection

Data were collected primarily through university and faculty documentation, informal follow-up correspondence with faculty and staff, a student focus group and a follow-up interview with two students.

Influential factors. First, the factors of influence present in all facets of the university campus and within curricular activities needed to be fully understood in order to determine the causal factors present. This required analysis of documents such as course syllabi (from faculty and academic staff) for curricular activities and university records (kept by the sustainability coordinator) documenting organizational and facility / campus related sustainability initiatives, using the pro-sustainability behavior model as a guide.

Curriculum. In order to obtain the curricular documentation, a request was sent via e-mail to all of the members of the Sustainability Across the Curriculum Network

(SACN) asking them to send course syllabi, assignment sheets, or other documentation that would explain the methods used to introduce sustainability concepts into their courses. This was intended to be followed up by informal interviews of the faculty and staff to ensure clarity of the details. However, in the end this was primarily handled via e-mail as this served the need of the author without taking a significant amount of both her and her colleagues' time. The questions asked evolved based on the aspects of the documentation for which the author needed clarity. The idea was to establish the specific types of contextual and personal capability factors that were present, thus the focus was on inquiry into the educational intent and logistical aspects of implemented pro-sustainability initiatives. The process of evaluating curricular documentation continued until course documentation had been evaluated for courses taught to students from all four colleges and until saturation was achieved in the data.

Campus-life. A significant amount of work had been previously completed by the campus sustainability coordinator and a graduate assistant she employed to document the current sustainability-related initiatives that had been implemented within various aspects of campus-life. The researcher was able to get a copy of the report from this work and to meet informally on more than one occasion with the sustainability coordinator and graduate assistant to ensure clarity of the details within it.

Student outcomes. A student focus group was conducted in order to solicit their perspective related to the interventions implemented throughout campus and curriculum. Due to scheduling constraints described further in, a follow-up interview was also conducted with two additional students. (Additional details regarding the procedure used

for selection and recruitment of participants can be found under Research Implementation, Sample Size and Selection Processes.) Using "The Wilder Nonprofit Field Guide to Conducting Successful Focus Groups" (Sharken Simon, 1999) as a guide, the following steps were carried out to complete this process.

1. The following purpose statement was written for the focus group based on what the author desired to learn from it: to hear how students perceive and describe sustainability, in particular with respect to their experiences at UW-Stout.
2. Student participants were identified based on pre-determined inclusion and exclusion criteria, with the assistance of faculty and academic staff from the SACN (as described in greater depth under the Sample Size and Selection Processes heading below.)
3. Contact information was compiled for the participants. As the students were all part of the campus network, all correspondence was conducted via e-mail. These e-mail addresses were readily available to faculty, including the researcher.
4. It was determined that for this focus group the author would serve as the facilitator and a graduate student on campus accepted the request to serve as a note taker. This particular graduate student was selected because of her previous experience with qualitative research.
5. A lengthy list of potential focus group questions had been generated during the research proposal phase of this study. These were refined to make them all open ended, relatively specific, and to ensure the answers would provide the desired information relative to the purpose of the focus group. They were also cut down

to a total of six questions, as five to six questions is most appropriate for a focus group. In addition, three yes / no / needs more consideration type questions were added as warm-up questions aimed at helping the participants to mentally prepare for the types of questions that would be coming and to relax by easing into the discussion.

6. A script was developed to aid the author in facilitating the focus group. This was made up of a brief welcome and introduction to the author's research, including the definition of sustainability, and explanation of what the author desired from the participants. It then laid out an approximate agenda for both the warm-up and focus group questions, and closing remarks. (See Appendix A).
7. A site was chosen and reserved for the focus group based on schedules provided by the student participants and the note taker. E-mail correspondence was sent to the participants notifying them of the specific location and time.
8. The day before the schedule focus group a reminder was sent to participants via e-mail. This resulted in feedback from one student (the day of the focus group within less than two hours of the scheduled start time,) that there was a scheduling conflict and attendance would not be possible. An alternate was able to be found quickly and the focus group was held with eight participants. Participants were provided with a meal during the focus group as a means of thanking them for their participation and trying to make the setting more relaxed and comfortable.
9. Based on scheduling conflicts, one entire college was not represented in the original focus group. It was decided to hold a follow-up interview with two

students from that college to ensure the data were complete. During this interview the students were asked the same questions as the focus group participants. The recording from the focus group was also played providing the opportunity for them to respond or elaborate on the former discussion. (A natural limitation of this type of follow-up is that the original focus group participants were not able to respond to the interviewees' comments.) These students were also provided a meal out of gratitude for their time, though due to the timing of the interview the two were not concurrent.

10. The focus group and follow-up interview were both recorded and later transcribed.
11. A thank you letter and summary of the focus group and follow-up interview were sent to all of the participants for their review and feedback. This was to ensure that no gross representations of the data occurred.
12. The data from the students were analyzed and the results included in the final report for this research study.

The Case Study Database

Data were collected in the form of electronic documents / reports, recordings of the focus group and follow-up interview, written and typed notes, transcriptions, and e-mails from faculty and academic staff. All electronic data were kept on a secure server that is password protected. Any hard copies of notes were kept until they could be scanned to an electronic file to be stored with all of the other data, at which time the hard copies were destroyed. The idea of neatly compiling all of the data in one location is to

increase the reliability of the case study by making it possible for easy transfer of information to other researchers for direct review of the actual data, as opposed to written summaries or reports (Yin, 2009).

Validity and Reliability of the Study

The researcher sought to avoid criticism for insufficient development of an operational set of measures by using multiple sources of evidence to establish links between the research questions asked and the collected data (Yin, 2009). These sources included the sustainability office (providing data previously collected from non-instructional departments campus-wide,) faculty and instructional staff (from multiple departments through which students from all four colleges on campus are taught,) students (representing all four colleges on campus and nine different degree programs,) and direct observations. Furthermore, the factual evidence reported was reviewed and corroborated by the participants and informants of the study in order to improve the accuracy of reporting.

Internal validity becomes a major concern when an investigator is trying to explain how or why one event led to another (Yin, 2009). For this study pattern matching was used to determine whether or not the expected patterns, evident in the theoretical model, matched anything found in the data analysis.

Generalizability of findings, or external validity, is always a concern when conducting research (Yin, 2009). In the single case of this research study, the focus was on ensuring the interventions implemented were consistent with the theoretical model. Care was taken during the development of the model to provide sound support for each of

the tenets involved, aiding in the formation of the logic linking the propositions to the data, and thus providing generalizability of the findings as a theory that can be replicated at additional higher education institutions.

Reliability of case study research centers on the minimization of errors and biases through robust procedural documentation (Yin, 2009). A protocol was created for this case study prior to any data collection and followed throughout. The use of a case study database also aided in keeping data organized such that analysis and reporting could be completed accurately and efficiently.

Research Implementation

The Yin methodology of a positivistic case study was used for this research, thus provided the sequential steps listed below (Yin, 2009).

1. A thorough investigation of the literature was conducted in order to establish the final questions of the study and to develop an applicable theory.
2. A single case was selected based on the definition of a unique case and the units of analysis were defined.
3. A case study protocol was developed that included background information and an overview of the study, the questions desired to be answered, the procedures that would be used to do so (including the specific sources of data to be used,) and a tentative plan for how the data would be analyzed and reported on at the end of the study.
4. Upon receipt of Institutional Review Board (IRB) approval, data collection ensued.

5. The data were analyzed (as described in the Data Analysis section below,) by the researcher and submitted to study participants, as well as faculty and staff familiar with the project, for review and feedback.
6. The findings were then compared to the original theory and revisions made.
7. The final report was developed.

University of Wisconsin-Stout General Population

The population was the University of Wisconsin-Stout, Wisconsin's Polytechnic University, located in mid-western Wisconsin. The UW-Stout employs just over 1,400 people, roughly half of which are faculty and academic staff (UW-Stout, n.d.a). In the fall of 2012, a total of 9,247 students, 50% male / 50% female, were enrolled at the university with a breakdown of approximately 66% Wisconsin residents, 31% U.S. residents from one of 47 other states, and 3% international students from 42 different nations. Because the UW-Stout is a university at which sustainability interventions have been implemented across many facets of university life and have been infused into a portion of the curriculum, it was a prime location to test the theory described above.

Sample Size and Selection Processes

In order to allow for breadth of viewpoints while also ensuring time for all individuals to have ample opportunity to voice their feelings or thoughts, an optimal focus group size is between seven and 10 participants (Gall, Gall, & Borg, 2007).

It was desired for this study to have representation from all four colleges on the UW-Stout campus, to try and avoid duplication of degree programs, and to have diversity of gender, race, ethnicity and age. Further, inclusion and exclusion criteria were set.

Inclusion criteria required that the students had taken at least one course containing a minimum of a lecture unit or project incorporating sustainability concepts. Exclusion criteria made students ineligible to participate if they belonged to one of the many sustainability related student organizations or committees on campus, or if they were enrolled in either the Sustainable Design and Development or Environmental Sustainability minors. Ultimately a goal of recruiting eight to twelve participants was established.

The selection process for this sample had to be purposive based on the inclusion / exclusion criteria. For this reason, faculty and academic staff members of the Sustainability Across the Curriculum Network (SACN) on campus were contacted and asked to help recruit from their former students. Names were forwarded to the author as students accepted the invitation to participate. One instructor forwarded names and asked that the author make the initial contact. All initial contact was made via e-mail that included a copy of the informed consent document (see appendix B).

A total of 10 participants were recruited. These included five males and five females, from nine different majors, representing all four colleges on campus. Data were not formally collected for race, ethnicity or age and, though desired, the author is quite confident in stating that little to no diversity was achieved across these three areas. Two of the participants, (both from one college,) were unable to mesh their schedules with the rest of the group. Based on this scheduling constraint it was decided to move forward with eight participants (representing three of the four colleges,) in the focus group and conduct a follow-up interview with the two participants from the last college to ensure

there were no gross discrepancies in the experiences of students from this last college. Only aggregate data was reported so as to protect the confidentiality of the participants when publishing the final report.

Review of Initial Findings

A summary of the collected data and initial findings was sent via e-mail to each of the 10 student participants. They were asked to review it and report back to the author any concerns they had regarding gross misrepresentation of the data. In other words, if they believed for any reason that the author had misunderstood or misrepresented something that was said they were asked to provide feedback.

Data Analysis Procedures

The data analysis component of conducting case studies has been said to be "one of the least developed and most difficult aspects of doing case studies" (Yin, 2009). For this reason it was considered extensively during the development of the research protocol, a process which ultimately aided in determination of the types of data desired.

Data analysis, within the realm of qualitative research, may be defined by three concurrent activities that can occur both naturally and intentionally throughout the research study (Miles & Huberman, 1994). These include the reduction of data, the creation of data displays, and the drawing and verifying of conclusions derived from the data.

Data reduction efforts. The process of reducing the data often begins prior to data collection (Miles & Huberman, 1994). This occurred within this research study through the selection of: the VBN theory of environmentalism as the conceptual

framework, UW-Stout as the case, the study's questions (directly related to both the framework and the case,) and the data collection methods employed. Choosing the VBN theory of environmentalism as the conceptual framework began to focus the data collection towards initiatives with the potential to affect the behaviors of students and in particular those providing personal capability through knowledge, contextual and habitual factors. The selection of UW-Stout as the case directed this focus further towards initiatives implemented within a very specific higher education setting. The study's questions, while reinforcing the focus described, also pointed towards the need to look for causal relationships between the factors present in the implemented initiatives and the expressed beliefs and behaviors of the students. And finally the methods of data collection chosen reduced the data to that which could be readily collected in the form of documentation from previously implemented initiatives combined with the feedback from students relative to their experiences with these initiatives and the outcomes from them.

Data reduction continued through summarization of the focus group and interview data, as well as the data from faculty and staff. This involved examination of the data for common themes that could be lumped into general categories. The process of categorizing the various themes was conducted multiple times, exploring the multitude of possible categories until the researcher felt the most applicable or appropriate set had been determined based on the data presented. In the case of the student data this process was first completed separately for each question and later across all student data. Throughout this process the researcher was looking for anything that stood out or seemed

significant. This was generally related to the number of participants commenting or agreeing with a statement, the context within which or about which the comment was made, or the relevance of the comment with respect to the pre-established links for connecting the data to the propositions.

The final step prior to creation of data displays was to compare the data to the theoretical propositions in a way that either established or negated support. Initially this was compiled into a list format and later into a more visual display.

Creation of data displays. Combining condensed and / or summative pieces of data in an organized fashion can aid in drawing conclusions (Miles & Huberman, 1994). These can also aid in determination of patterns or sequences present in the data which can be matched to those known (through literature review of past research) to cause a desired outcome (Yin, 2009).

The categorized data related to implemented initiatives in and out of the classroom were organized into an array based on the pedagogical methods used. For instance, the initial categorized data were divided into events that provided information to the students versus activities that allowed them to apply such knowledge. In the data display these were further refined into events that exposed the students to information or knowledge through lectures, videos or reading materials versus those which actively engaged them in discovering it through their own research. This visual display of the data allowed the researcher to see the full extent to which attempts had been made on campus to provide information and knowledge, as well as opportunities for practicing pro-sustainability behavior. This array was then compared to the theoretical Pro-

sustainability Behavior Model of Figure 1 to determine whether or not all factors within the model had been duplicated, and also if any additional factors were discovered.

The categorized student data were next organized in two different ways. The first was constructed based on apparent relationships between the theoretical propositions of the research study and the data. The idea here was to establish a general feeling for whether or not the data supported the propositions. The second was constructed based on links or relationships between the established categories that came out of the initial thematic analysis of the data, with the intent of simply discovering evidence of patterns in the data. These were then matched, or not, to those known to effect pro-sustainability behavioral change.

Drawing and verifying conclusions. The process of drawing conclusions occurs throughout the collection and analysis of data in a qualitative case study (Miles & Huberman, 1994). Despite the best efforts of researchers to minimize bias, they often have a predilection of the impending outcome, though may not fully realize it until the entire process of collection and analysis is complete. It can be challenging to interpret the meaning behind noted patterns, causal notions or explanations, and plausible configurations of the data. Yet, careful verification of these can lead to sound justification for conclusions made. This may be as basic as going back to the data for confirmation, requesting review and verification of the findings from the study's participants, or seeking additional data that corroborate the findings.

Conclusions for this study were primarily drawn from the data displays and other specific comments deemed relevant or significant by the researcher. Verification then

occurred primarily through review by participants or others with familiarity of the study, though further review of the data and collection of additional data were also used in some cases.

Human Subjects Protection Issues and Procedures

Case studies typically study contemporary phenomenon related in some fashion to humans (Yin, 2009). This, along with the often unstructured nature of the interactions between the researcher and the human subjects, makes protection of the people involved in the study extremely critical. The following three areas of concern were addressed for this study: informed consent, protection from harm or deception, and protection of privacy and confidentiality. There were no particularly vulnerable groups included in this study. The sample for the focus group in this study was purposeful requiring the researcher to seek out names of students known to have taken courses with content related to sustainability. Students were individually e-mailed (via a secure server) an invitation to participate in the study, including an informed consent document detailing information about the nature of the study, the importance of their participation, and their right to drop out of the study at any time without consequence. (See Appendix B for a copy of the informed consent document.)

Students desiring to participate were asked to contact the author with their intent to do so. Deception was avoided in this study through full disclosure of the researcher's intent regarding both methods of data collection and use of final results. Students participating in the study were all from different degree programs. However, the opportunity for students to know each other could not be completely avoided. Still,

within the focus group setting students were given the option to use a participant number (which was used on later transcriptions,) rather than names. The names of faculty, students, and specific courses are also not provided in the final report for the case study in order to protect the confidentiality of participants. All participants were legal adults, having fit the criteria for admission to the university, and were deemed capable of reading and understanding the materials supplied to them related to the authors expectations as a participant in the research study. In order to create and maintain a safe environment while conducting the focus group, students were asked to be respectful of others' responses and direct all of their own comments directly to the facilitator in a constructive manner.

Limitations of the Research Design

The primary limitation of a qualitative case study is related to the generalizability, or deemed lack thereof, of the findings (Gall, Gall and Borg, 2007). However, when using the Yin methodology of a case study it is the use of a theory that creates the opportunity for generalization of the findings (Yin, 2009). Essentially, if a second case supports the same theory as the original then the results can be said to be generalizable.

This case study's design and implementation were not without limitations. These were related to the lack of literature specific to testing of this type of theory in higher education, the single, unique case chosen, the inability of the author to collect the desired information without expressly stating the relationship to sustainability, scheduling challenges, and the uncertainty that participants actually read the provided summary from the focus group and follow-up interview.

In preparation for this study the author found a significant amount of literature related to environmental / pro-sustainability behavior and behavior change, and pedagogical practices for infusing sustainability concepts into higher education. Nothing specific was found that combined the two. Thus, the idea of generating theory that does that is somewhat new territory making it imperative that the resulting theory be tested on additional cases before it can truly be deemed generalizable.

Staying on the topic of generalizability, the fact that UW-Stout was used as a single case presents potential limitations to the generalizability of the findings. This primarily stems from the fact that the majority of students attending UW-Stout are originally from Wisconsin or other parts of the mid-western United States. Without replicating this study with additional cases, having populations from other parts of the world, it would be difficult to know with any level of certainty the extent to which the findings are generalizable.

In order to ensure students had full understanding of what the author meant when using the word sustainability, it had to be defined. It is possible in doing so that the participants were selective or biased in the way they chose to answer the questions put forth. There is a possibility that answers would have been provided differently had the author more simply stated that she wanted to ask questions related to their experiences at UW-Stout and then phrased questions in a way that the word sustainability was left out.

Due to scheduling conflicts two of the students were jointly interviewed rather than participating in the full focus group. As described earlier in the Data Collection section of the Research Design, the interviewed students were asked the same questions

as the focus group participants and were also given the opportunity to respond to the audio recording from the prior event. It is impossible to know for sure whether or not this interaction produced significantly different results than would have been achieved had the two students been a part of the original group. However, it was felt that providing them the opportunity to listen to the focus group recording and answer the same questions was more beneficial than not having any representation from that college.

Finally, whenever feedback is solicited from people via e-mail there is always the likelihood that at least some or even many of them don't read it. In general people are busy with other things and depending on the importance they place on the task, or the consequence of not doing it, will determine whether or not it actually gets done. This makes it difficult to know whether or not the evidence was truly corroborated.

CHAPTER FOUR

FINDINGS

This chapter provides a summary and discussion of the research data. The last section will outline the level of support rendered for the hypothesized theory and detail proposed revisions.

Overcoming Challenges and Staying on Task in Data Collection

One of the difficulties often found when conducting case study research is locating a site or sites that have the potential to provide answers to the research questions and, equally important, also provide a means for the researcher to gain access to the data (Yin, 2009).

For this study the UW-Stout was a prime location at it had the potential to provide both. The UW-Stout sustainability office was conducting a project to track sustainability initiatives on campus (both campus-life / facilities related and curricular,) and was quite interested in the findings of a research study of this nature. Thus, immediate and full support was given including a summary report of data collected to date on campus related initiatives, assistance reviewing data / analysis for improved reliability, and note taking during the focus group. Similarly, many of the faculty and staff members of the SACN were enthusiastic about the nature of this study and were more than willing to help in any way they could. This resulted in support for curricular documentation as well as student participant recruitment. It is also worthy to note that institutional support was provided in the form of a Faculty Research Initiative (FRI) seed grant.

Case study research differs from other qualitative methods in that an initial theory is developed prior to the collection of any data (Yin, 2009). A literature review leading to the proposed theory for this study was conducted over the summer and early fall of 2012. Immediately following the receipt of IRB approval in January of 2013, the collection of data commenced in the form of documentation for campus-related initiatives. At the same time recruitment efforts got under way for the student participants. Shortly after, in early February 2013, a request went out to the SACN membership for curricular documentation which gradually trickled in over the next three to four weeks. As soon as eight members, representing all four colleges, had accepted the invitation to participate in the focus group and supplied typical weekly schedules, a date and time were scheduled and provided to the participants. Due to a scheduling conflict discovered by the researcher less than two hours before the event an alternate participant was found causing duplication of one major and no representation from one of the colleges. It was decided to still move forward with the focus group which was held on February 20, 2013. Due to the lack of representation from one of the colleges, a follow-up interview was conducted with two students from that college on March 6, 2013. This interview consisted of asking the participants the same questions from the original focus group. After initial answers were provided by the two participants, the audio recording from the focus group was played and the students had the opportunity to comment on the discussion. This process was completed for each question individually. Approximately two weeks later a combined summary report of initial findings from the transcriptions was sent to all 10 participants. The students were asked to read the summary and provide

feedback on whether or not they felt the data were accurately interpreted or represented in a manner they agreed with. Only one student replied.

Finding Support for Theoretical Propositions

Propositions were developed early in this research study based on the review of literature and theory that was formed from it. These propositions provided the basis for comparison between the collected data and the hypothesized theory. As the findings are presented readers are reminded that the nature of the data collected did not allow for statistical analysis. Rather, meaning was deduced from the data based on understanding of the prior research literature, relationships to the theoretical propositions or rival explanations, and possible relationships between the theoretical propositions.

Theoretical Propositions

As stated in chapter three when first defining the study's propositions, they are categorized relative to the United Kingdom's plan for promoting pro-sustainability behavioral change which includes: enable and encourage people to act, engage them in pro-sustainability action, and exemplify the desired behavior (HM Government, 2005). The headings below reflect which category each proposition fits best within as well as sequential numbering from one to seven.

Enable 1. *To what extent do students perceive themselves to have self-efficacy?* Bandura believed that self-efficacy developed through four sources of influence: successful mastery of a previous behavior, learning from other's behaviors, positive verbal reinforcement of ability, and as a result of physiological feedback associated with a behavior (1997).

Influential factors. Comparing this to the theorized Pro-sustainability Behavior Model the efforts potentially feeding self-efficacy would include all 'enabling' factors, though perhaps the strongest connections would come from the contextual engagement factors and habitual factors as these would all provide the opportunity for students to actually practice behaving sustainably versus just hearing about it. Within the category of contextual engagement factors are various types of pedagogical methods that connect students more closely with the sustainability concepts, like-minded individuals and the community. In reviewing both the curriculum and campus-wide initiatives documents there were a great many examples fitting this description to choose from, proving that attempts are being made to promote self-efficacy. Though not explicitly noted in the following list, all of these items had sustainability concepts as central tenets. They included:

- Hands-on laboratory exercises designed to practice skills and evaluate impacts
- Active / collaborative / participatory / experiential learning environments for individual and group work
- Design projects, portfolio creation and capstone experiences
- Active student organizations and committees
- Engaged as a "citizen in your ecological surroundings"

Student outcomes. In reviewing the data from the students the researcher was looking for evidence that the students did feel more capable of behaving in a sustainable manner. Question four in the focus group and interview specifically asked for

information / examples students had been provided through courses or other aspects of campus life that they felt *made them more able to make informed choices about how they will act toward the environment, economy, or society*. Answers to this question then implied that students developed some level of self-efficacy due to the information or examples provided. A lengthy list of information and observation / experience based answers were provided that ranged from the quite general statement that assignment criteria required the use of sustainability concepts, or not all people are treated fairly, to rather specific information, "fair trade is not free trade," and experiences such as evaluating the life-cycle of a particular product or conducting a cost-benefit analysis. Some of the means of feeling more informed to act also came from influences evoking emotional responses: islands of trash, trash never goes away, some people are wasteful and make excuses, "that one class changed the way I see everything."

Evaluating the data from all of the questions led to several answers that either directly, or in an implied sense, pointed toward self-efficacy. For instance, the students were asked three warm-up questions with possible answers of yes, no, or needs further consideration. The first of these asked the students if they felt their actions could make a difference with regard to climate change. Eight said yes, zero said no, and two required further consideration. Other responses of this nature included: people are continually learning new things, they are capable of adaptation to changing environments, use of ingenuity is / will be needed, and individuals have buying power. Students also shared their intent to carry out sustainable actions in the future: desire to return to the UW-Stout campus after graduation to help show support for sustainability initiatives, will

implement sustainability concepts such as recycling and wise material usage into own future classroom, already using sustainability concepts in personal life choice about design of future home, and "it's a lifestyle thing for me."

Rival explanation. Despite the fact that students pointed directly to information and experiences gained at the UW-Stout in answering this question, it is difficult to know for sure whether their feelings stem from their experiences in higher education, or if they come from other prior experiences. Throughout the focus group and interview four of the students expressed that they had been raised by parents who were very sustainability-minded, two suggested they were either raised in or spent a period of time living in communities where there was a strong focus on sustainability related action, three more mentioned having at least some exposure over the course of their lives before coming to UW-Stout, and only one hinted at not being raised with any focus on sustainability. Several students agreed that previous experiences helped them recognize sustainability efforts at the UW-Stout and affected the choices they had made thus far.

Additional items of significance. Finally, some comments alluded to self-efficacy possessing limits. For instance, it was stated that individuals often initiate change but it takes higher levels (organizations or government) to drive the change. Also, the comment was made that people cannot simply fix the damage that's already been done.

Enable 2. *To what extent have interventions been implemented through multiple methods that provide both information and context?* The methods of intervention implemented at the UW-Stout were documented through use of both the report on

campus-wide sustainability initiatives and the information compiled from faculty and academic staff.

Influential factors. Some key terms that identify the methods of delivery within curriculum include: reading (journals, text books, web content, how-to guides,) dialogue / discussion, critical reflection, student research (including available grants,) videos, speakers, participatory / active learning, discipline-specific and interdisciplinary, scientific investigation, systems thinking, workshops / conferences, historical versus contemporary, student presentations, projects and capstones, collaboration with community / industry solving real-life problems, industry tours, hands-on laboratory experiments and analysis, certification programs, and case studies. Additionally there were two minor programs implemented with the specific focus of sustainability related content, Sustainable Design and Development and Environmental Studies, (which have recently merged into the single minor of Sustainable Design and the Environment.) Evidence of implementation within other aspects of campus life, (as found all over campus) was documented as being available in the forms of signage and brochures; artifacts used for the new co-mingled recycling / compost / trash program, e-waste recycling, tap-water refill stations / refillable water bottles, and re-usable to-go container program through food services; and through the activities of multiple sustainability related student / campus organizations including GreenSense, Sustainable Agriculture Education Association, The Natural Areas Club and Stout Adventures.

Student outcomes. The data from the students regarding multiple methods were not necessarily presented directly, though several ways students were provided with

information, as well as a variety of contextual or visual cues were able to be flushed out. In particular, the latter fit well into the categories of encourage, engage, and exemplify from within the Pro-sustainability Behavior Model. From a curricular perspective the likes of general assignments, conducting research, completing various types of projects, company tours, and student dissemination of learned material through either research papers or public presentation stood out. The specific factors mentioned related to influence or encouragement included peer pressure, use of 'shock' tactics (meaning the information received was quite shocking), and encouragement and support from faculty, external industry partners and advisory board members. Within campus-life students made reference to signage, modeling by faculty and staff outside of the classroom, and various artifacts related to a new co-mingled recycling / compost / trash system, tap water refill stations scattered throughout campus and re-usable water bottles available in the bookstore as part of the "I Love Tap-Water" campaign, bikes from the relatively new campus bike rental program and, with apprehension to be discussed shortly, the busses from the campus shuttle.

Additional items of significance. There were two pieces of evidence in addition to the more blatant items listed above that stood out to the author as significant. First, there were numerous comments made about concerns related to the campus shuttle / bus system. Concerns from the focus group and interview participants were related to whether or not the bus was really efficient or economically viable, if it was really having any impact on the number of students who would have otherwise driven to campus as opposed to walking, and the general health and weight of students who used to walk and

were now riding the bus. The students expressed a fair amount of frustration at not knowing the answers to these questions.

The second item of significance the author noticed was that more than one student mentioned taking a break from the UW-Stout around the same time and upon their return said they "felt" a difference. In particular the students mentioned that sustainability content was suddenly a part of nearly every class they took and the campus now had a shuttle system.

Enable 3. *To what extent do opportunities readily exist for all students that allow them to easily carry out pro-sustainability behaviors on an on-going basis?* To be on-going essentially means the author was looking for opportunities that led to habitual behaviors.

Influential factors. As mentioned previously in the findings for the second proposition, there were a number of artifacts implemented throughout campus aimed at promotion of continuous pro-sustainability behavior. These included the likes of the bins for the various types of recyclable, compostable, or trash items, the refill stations and water bottles, bikes, busses, and also Memorial Student Center (MSC) signage (helping students to remember to carry out specific behaviors in the correct way.)

Student outcomes. The students made reference to all of the items listed above. With respect to the waste management system there were mixed reviews. For the most part it seemed to the author that students felt the intentions around the program were all good. There was concern for the fact that students frequently put items in the wrong bin and that this contamination causes the recycling and / or compost to often be disposed of

with the trash. After lengthy discussion around this topic it seemed that the general consensus was that it would take a complete replacement of current students with new students before full implementation and success of the program could be realized. This was deemed possible because the new students would come into the university with no pre-conceived notions of how it used to be; they would simply enter into the newly developed culture.

The fact that the UW-stout had implemented a tap-water campaign appeared to be a big positive for the for the pro-sustainability movement on the campus. The campaign involved making more refillable water bottles available for purchase in the bookstore and installing tap-water refill stations throughout much of the campus (with a plan to replace all drinking fountains / bubblers as they come up for major repair or replacement.) The only constructive comment on this topic was that if a student was not exposed to this habit in his or her younger years before coming to the university, it may not develop naturally as the thought to grab a water bottle may not come to mind. However, it was also pointed out that the freshmen are introduced to this habit during freshmen orientation when they first arrive on campus, making it more likely to become one of many new practices.

The bike rental program along with numerous locations for parking bikes and the culture of the UW-Stout to support riding bike to classes was first brought up as a positive feature of the campus. However, concern for vandalism of the bikes was felt by the author to be a significant issue needing to be addressed.

The same concerns mentioned in proposition 2 with respect to the campus shuttle apply here with one exception. The point was made that perhaps something good could come out of the students riding the bus regularly (despite the previously mentioned concerns to the same,) in that, providing where ever they end up after graduation had public transportation, maybe the habit would stick.

Finally, the MSC signage (particularly with respect to the recycling and compost bins) was touted as being far superior to what was found on the rest of the campus. The students expressed feelings of frustration and confusion with the lists of items on most bins around campus and stated that the cartoon-like images on the MSC signage were quite helpful.

Additional items of significance. Beyond the habitual opportunities afforded by the artifacts described, students brought up two additional factors they believed to have inverse effects on pro-sustainability behavior, two having positive effects, and one that could go either way. The first was related to the unintended consequences stemming from the shuttle system as previously discussed. The second was related to concerns that even if an individual wants or tries to behave in a pro-sustainability fashion, if the next level of power or authority does not support it the behavior is moot. The example discussed was related to the city not picking up curb-side recycling at specific locations. The factor students saw as either aiding or hindering habitual behavior was that of one's upbringing. Overall, those student participants who had been raised by parents or within communities who promoted sustainability, and those who expressed relatively significant experiences with it outside of the university, attributed their experiences to aiding in

recognition of the many opportunities and influences of pro-sustainability at the UW-Stout. This was not the case otherwise; in fact the feelings expressed were quite the opposite.

The last two factors students pointed out as being conducive to promoting pro-sustainability behaviors by students. These included extended exposure to the appropriate behaviors over time and the fact that they recognized a cultural shift occurring.

Encourage 4. *To what extent do students perceive their behaviors are strongly reinforced?* Evaluation of the campus sustainability initiatives and faculty and staff documentation revealed reinforcement efforts through project and assignment grades, extra credit for attendance at sustainability related conferences and speaker presentations, building on previously acquired knowledge, and incentives such as reduced parking fees for car-poolers.

Student outcomes. The concept of building on previously learned knowledge and behaviors was also supported by the student data. Further, the students referred to feelings of their actions being reinforced by support from external industry partners, advisory board members, the public (at least with respect to specific student presentations,) and their peers. Ultimately, there was a sense of a gradual, yet steady shift in the overall campus culture that the student participants deemed as a beneficial change.

Additional items of significance. In a more general sense, there was strong support for a need to hold people, including business and government, more accountable

for their actions. There also seemed to be consensus that additional positive incentives such as rewards (as opposed to punishment) were needed. There was not a great deal of discussion around what these might look like, just general agreement that they should exist.

Encourage 5. *To what extent do students perceive they are receiving complete and accurate feedback related to the implementation of interventions?* An important component for making informed decisions about potential actions is that of knowing the outcomes of previous actions.

Influential factors. The level of feedback provided to students for campus sustainability initiatives varied readily from one event to the next. Feedback on the recycling and composting on campus, including the pounds of trash, paper, co-mingled plastic, cardboard, and compost were tracked for a two week trial period plus eight competition weeks during the annual Recyclemania contest. The results were then disseminated via Facebook, overhead digital display monitors in the MSC, the campus sustainability website, and press releases in the Stoutonia and local newspapers. Similar methods of dissemination were used to let people know how many plastic water bottles have been diverted from the landfill by utilizing the refill / hydration stations throughout campus. The only data tracked to any degree on the shuttle and bike programs included the number of people on the waiting list for a bike, the number of bikes used, and the number of passengers on the shuttle each week. This information is not currently widely disseminated.

Student outcomes. Of all of the propositions, this was the one that caused the greatest concern on the part of the researcher. This stemmed from the student raised concerns over lack of understanding or feedback on some of the larger sustainability initiatives on campus relative to their perceptions of the contaminated recycling and compost, potentially inefficient bussing system, and bike vandalism. In essence, the researcher believed that many judgments had been made based on personal observation that may or may not have surfaced had students had all of the facts on the results of these initiatives, though it is difficult to predict to any level of certainty.

Additional items of significance. Relative to a more general view of feedback on sustainability initiatives, students expressed a need for people to act quickly due to future implications of current human behavior. This sentiment seemed to be connected to the information they were getting via curriculum or external outlets. They also felt humans should take on the responsibility to seek their own feedback or information on sustainability related topics, paying particular attention to what companies are doing when producing the multitude of products for consumers. Finally, the students reflected on the feedback provided through the effects of natural consequences, though they felt these are more evident in some parts of the world than others.

Engage 6. *To what extent do students participate in the pro-sustainability behavioral change process?* It is generally expected that the more active role an individual plays in creating the rules, the more likely he or she will be to follow them. This was measured by review of documentation on the history of sustainability initiatives

at the UW-Stout, information provided in the report on campus-wide initiatives, and by feedback from the student participants.

Influential factors. Direct participation in campus initiatives, including those related to sustainability occurs through student participation in their own governance, the Stout Student Association (SSA.) Students also sit on various campus committees including the Environmental Sustainability Steering Committee, which primarily serves to act as a think-tank to provide ideas and implementation plans to the rest of the campus on initiatives for improving campus sustainability.

Student outcomes. The participants of the focus group and interview were intentionally selected from the portion of the population at the UW-Stout who do not sit on or participate in any of the sustainability related committees and organizations on campus. Thus there was no direct participation that could be cultivated from this data. However, the students were familiar with the fact that other students with whom they were acquainted had initiated many of the sustainability related initiatives on campus starting with the Chancellor's signing of the American College & University Presidents Climate Commitment. The students of the focus group also alluded to their own contributions toward the sustainability movement on campus when highlighting the types of projects chosen for courses, the methods used for dissemination to other audiences, and the peer pressure and other influences used on friends and classmates.

Additional items of significance. There were two additional topics that stood out to the author as significant with respect to student participation. The first was that certain situations often made students lose faith in the leaders of the systems within which they

function, both on campus and in the wider community. Examples of these situations include:

- The perception that the bus system was not implemented the way the student(s) who initiated it intended.
- The perceived lack of action to stop students from vandalizing bikes on campus.
- Concern over the continued use and landfill disposal of highly toxic materials in some classes as well as the perceived lack of relative safety precautions.
- The perception that most compost and recycling become contaminated and end up in the landfill, anyway.

The second topic, directly related to the first, stems from the students' elaboration on the negative effects student behavior can have on sustainability related initiatives. There seemed to be agreement amongst the students that these types of behaviors hinder the efforts of others to promote opportunities to practice pro-sustainability behaviors. Yet, there were mixed feelings on whether or not these actions were pre-meditated or caused by the lack of an individual to consider the consequences of his or her actions at a specific moment in time. It is impossible to know the definitive answer, however, it implies a need to try and protect against the potential for this type of behavior.

Exemplify 7. *To what extent do students perceive faculty and staff as modeling pro-sustainability behaviors?* It is unlikely that most students will follow through on actions related to sustainability if they witness faculty and staff behaving otherwise.

Influential factors. The direct examples of modeled behavior found in the documentation review, through informal interviews with faculty and staff, and through direct observation by the author included things like sustainable transportation (carpooling, driving hybrid or fuel efficient vehicles, biking or walking,) using re-usable water bottles, properly sorting recyclables, compost and trash, minimal use of printed handouts, and shopping at local food and farmer's markets. Additional examples of modeling were evident related to actors or role models other than faculty and staff. These included modeling of "Leave No Trace" principles by the Stout Adventures organization and modeling of sustainability practices in business or industry by advisory board members and other industry partners, as witnessed by students attending related tours.

Student outcomes. The students made reference to the importance of the support and modeling behavior of businesses / industry and advisory board members, and peer to peer modeling. The only modeling activity mentioned explicitly about the faculty or staff was in reference to their transportation methods which were believed to include a great deal of carpooling and walking.

Additional items of significance. Probably the most significant aspect related to this proposition was the way students pointed out the behaviors that were not being modeled and their perceptions of why. These included comments like, "a lot of people are lazy and don't want to put forth effort to give back," "friends say they just don't have time and have a lot of excuses for why they can't."

Revised Theory

The purpose of this research study was to explain the UW-Stout's capability to change the behaviors of students to be more pro-sustainability. A significant component of answering that question was to explain why students' behaviors are either favorable or unfavorable with regards to the society, economy, and environment. This required the comparison of the findings from data collected at the case site to a set of pre-determined theoretical propositions (Yin, 2009). This set of theoretical propositions was developed related to the theory that the UW-Stout was capable of changing student behavior providing that they had implemented the factors stated in the theoretical Pro-sustainability Behavior Model in figure 1.

Revision of the Theory

Support was found for all seven of the theoretical propositions tested within this case study. At the same time, it could be argued that some received less support than others, though not so much because they were not important aspects of the theory, rather it seemed because they were perceived by the students to not be sufficiently in place within the structure at the UW-Stout. Each proposition will be briefly discussed in regards to what is needed to improve either the theory itself or the implementation of it. The reader is reminded that the headings below stem from the categories of influence most directly portrayed by the proposition.

Enable 1: self-efficacy. The extent to which attempts are made to promote self-efficacy in students and students perceive they have self-efficacy plays an essential role in the process of changing student behavior to be more pro-sustainability. This was

supported in the evidence from the students showing that they recognize there are limits to what an individual can do, and their perception of what these limits are is directly affected by the actions of the people and organizations in positions above them. The importance of self-efficacy was also supported through the students' believe that individual people can and should take an active role toward protecting the environment, society, and economy within which they thrive.

Enable 2: multiple methods. The extent to which implemented interventions provide both information and context through multiple methods is an essential factor in changing the behavior of students to be more pro-sustainability. There was evidence to support the fact that a single method alone is not often capable of creating a change, yet the combined effects of multiple methods aimed at the same end effect can be successful.

Enable 3: habitual opportunities. The extent to which opportunities readily exist for all students that allow them to easily carry out pro-sustainability behaviors on an on-going basis proved to be an important aspect for changing the behaviors of students to be more pro-sustainability. The need for opportunities of a habitual nature was supported, though there were also indications that these habitual behaviors could turn out to be quite unsustainable if feedback on the impact made was not provided. Thus, this theoretical proposition in and of itself was supported and the need for stronger links to feedback mechanisms was identified.

Encourage 4: reinforcement. The extent to which students perceive their behaviors are strongly reinforced was determined to be an important factor towards changing the behaviors of students. The evidence supporting the importance of

reinforcing student actions was relative to both on-campus faculty and staff actions as well as reinforcement of behaviors by external partners. There was also support for a shift towards individual accountability as a means of reinforcement.

Encourage 5: feedback. The extent to which students perceive they are receiving complete and accurate feedback related to the implementation of interventions may be the most critical factor in creating lasting behavioral change in the students. The author felt the support for improving the feedback mechanisms related to the bigger initiatives on campus was extensive.

Engage 6: student participation. The extent to which students participate in the pro-sustainability behavioral change process was an important factor towards changing behaviors of students to be more pro-sustainability. It did not seem to matter whether or not a student had directly participated; rather that he or she knew fellow students had. Confusion over whether or not specific initiatives had been implemented per the students' desires definitely hindered acceptance of at least one program, as a whole.

Exemplify 7: faculty and staff modeling. The extent to which students perceive faculty and staff are modeling pro-sustainability behaviors is at least of some importance to changing the behaviors of students to be more pro-sustainability. There was some evidence of support for this proposition though it was difficult to say for certain just how much as the frustrations with lack of feedback for certain initiatives made it less evident. Additional research is needed to determine the full extent to which this is necessary.

Theory revisions summary. The revisions to the original theory can be summed up in four categories. The first three are depicted graphically in the revised Pro-sustainability Behavioral Change model shown below in Figure 2.

1. There is a direct tie between feedback mechanisms and appropriate use of opportunities for habitual pro-sustainability behaviors.
2. There is a direct tie between the limits to self-efficacy students perceive and their perceptions of the actions taken by people or organizations in higher level positions.
3. There is a temporal component to the development of self-efficacy related to pro-sustainability behaviors. The time required may be positively impacted through repetitive, long-term exposure to influential factors.
4. Students are coming to the university with substantial sustainability related experiences that need to be both reinforced and built upon.

Items one and two above are both related to the need for emphasis on feedback mechanisms. This will require more effort in some cases to collect pertinent data on the implemented initiatives and find effective means of relaying that information to the students in a manner they can easily synthesize. In the model this has been added as a central tenet with connections to the behaviors that directly create the data that will in turn become the feedback. The feedback mechanism is also connected to habitual factors as a way of highlighting the direct tie between the potential for students to develop habitual behaviors and the feedback they do or do not receive. Finally, the feedback

mechanism is connected to attitudinal factors in a positive or negative way depending on the nature of the feedback, or lack there-of.

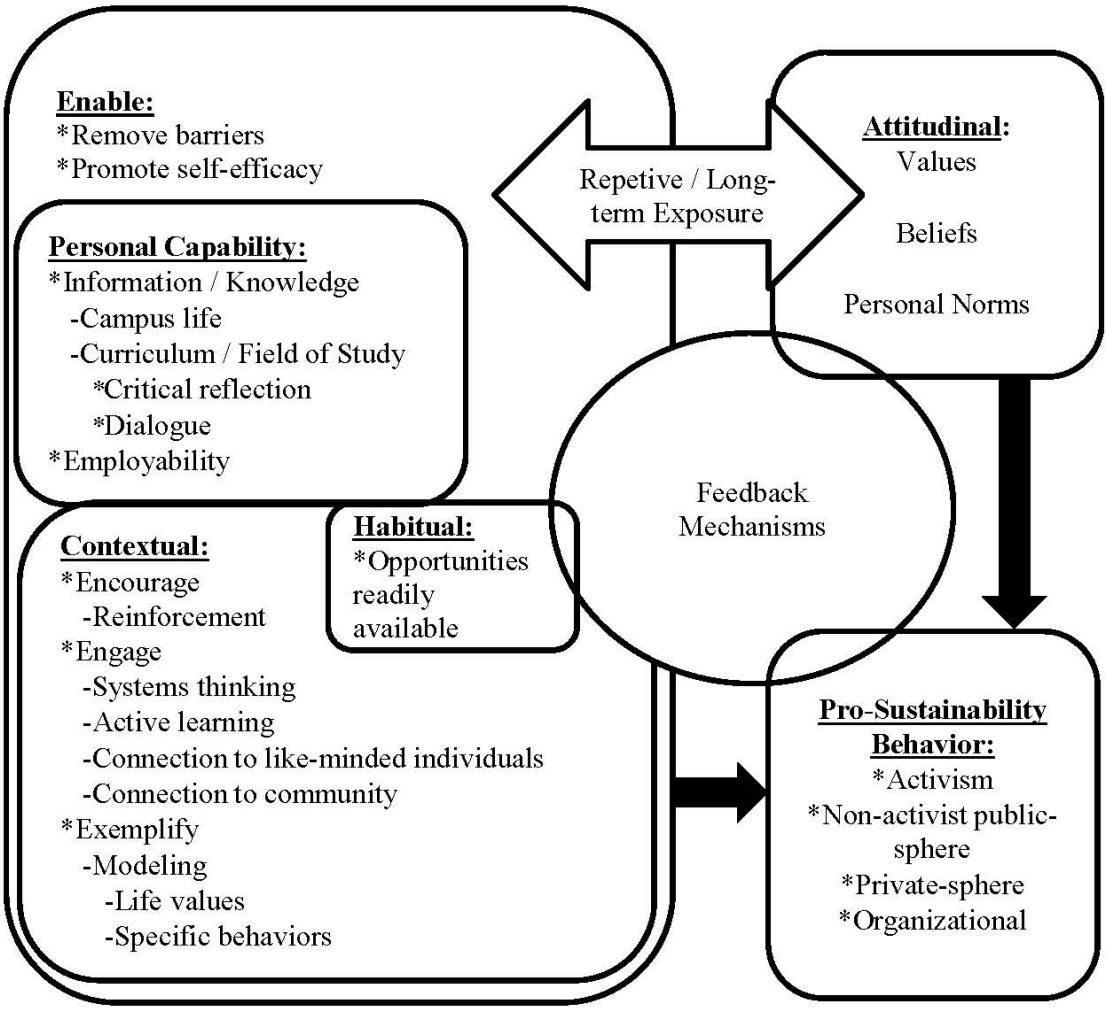

Figure 2: Revised model for increasing pro-sustainability behavior in young adults attending university, (as adapted from the VBN theory (Stern, 2000) and the work of the UK (HM Government, 2005).)

CHAPTER FIVE

RESEARCH SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The importance of incorporating sustainability concepts into higher education institutions has been slowly gaining momentum for approximately 25 years. Numerous beliefs have developed over that time regarding the best pedagogical methods to be used (Boyle, 2004; Easton, 2007; HM Government, 2005; Kumar et al., 2005; Perdan et al., 2000; Sumner, 2003). Over a significantly greater period of time researchers have also evaluated factors affecting behavioral change (Ajzen, 1991; Bandura, 1997; Inglehart, 1971; Schwartz, 1994; Schultz et al., 2005; Stern et al., 1999). The researcher believes that both are necessary for higher education institutions to be capable of effecting behavioral change towards pro-sustainability.

As discussed in chapter three, a case study methodology was used to first derive a theory from the literature about the specific details necessary for creating the capability in higher education institutions to create pro-sustainability behaviors in students. Using documentation of campus-wide initiatives and curricular activities along with a student focus group and follow-up interview, an attempt was made to assess the level of support the theory held.

Restatement of the Purpose of this Research

This research study addressed the need to better understand the capability of universities to fully implement programs which foster sustainable behavior among students. This involved developing an understanding of the factors that affect behavioral change in general, as well as factors specific to promotion of sustainability concepts in

higher education. It was believed that a review of this information could enable development of a theory about what it truly takes to make higher educational institutions capable of promoting such behavioral change. Such a theory was then developed and evaluated within the context of a higher education institution in order to determine the level of support for the theory.

Implications for Practice

The implications for practice are directly related to the theoretical propositions and revised model. In order to help students to do their part to protect the environment, society and economy, systems developed in universities need to not only implement the factors within the pro-sustainability model in Figure 2, but also should do a better job of providing consistent and on-going exposure to appropriate behaviors along with more feedback on all of the impacts being made. The following paragraphs describe the implications in greater detail with respect to the theoretical implications.

This study found that students' self-efficacy could be enhanced by ensuring that they receive feedback on the impacts their actions and the actions of others have, especially with respect to larger campus initiatives. This is true, at least to some degree, in situations where the outcomes of specific behaviors related to campus initiatives are not entirely pro-sustainability. That is, as long as it can be shown that sincere effort is being directed towards finding a resolution to reverse the outcomes to become pro-sustainability. More effective mechanisms may need to be sought in order to make sure the entire student population gets the sustainability related feedback, as well as the opportunity to respond to it.

An important implication of this study's findings is the verification that faculty and staff at all levels of the institutions can, and need to, act in ways that are less likely to negate the pro-sustainability actions of students. A large component of this is the significant need for all employees of the university to act as a united front with respect to the way campus initiatives are carried out. Clearly, there is a need for positive reinforcement of good behaviors, as well as follow-through on negative behaviors. Failure to send a consistent message distinguishing between the two can be extremely detrimental to students' future behaviors.

While modeling of pro-sustainability behaviors is considered an important aspect of implementing a pro-sustainability behavior change model, it is not necessarily critical that all faculty and staff are constantly engaged in the actual behaviors as long as they are not actively or vocally negating them. In other words, the evidence suggests that consistent reinforcement of desired behaviors is more closely related to positive changes than is the modeling of such behaviors. It is important that this point is not misinterpreted. Related to the temporal component of a changing culture to be more supportive of, and even proactive towards pro-sustainability behaviors, having all faculty and staff modeling appropriate behaviors would be most beneficial to shortening the timeline and achieving complete success. However, a positive change of this type in the overall student body is still believed to be possible as long as faculty and staff are consistent in the way that they support student efforts to do so and do not negate them.

Finally, it is important to have students involved in the process of proposing and implementing initiatives for promoting pro-sustainability behavioral change. It is equally

important to take the time to clearly understand goals and implications when students propose new initiatives or changes to existing practices. In addition, initiatives should be scheduled for evaluations then reviewed in a manner that allows for informed decisions to be made about subsequent steps. The results of these evaluations should be shared with the students and the students should be provided opportunities to respond. If it is determined that their preferences were not carried out with respect to intended outcomes, every effort should be made to find a resolution that is deemed satisfactory by both the institution and the students.

Ultimately, the implications of this research revolve around the key tenet of feedback mechanisms. It seems that subtle flaws in the implementation of other factors of the pro-sustainability model can be much more readily overcome if a constant and consistent mechanism for both soliciting and providing feedback is implemented.

Suggestions for Further Research

As previously discussed in the findings of chapter four, evidence supporting the hypothesized theory existed that the UW-Stout is capable of effecting behavioral changes among its students that are related to improved attitudes about sustainability. At the same time, however, the research findings also have substantial implications for future research. The following paragraphs suggest additional questions that seem worthy of further investigation. Three brief examples of proposed research studies are provided.

Future Research for Theoretical Propositions

Enable 1: self-efficacy. The idea that self-efficacy plays an important role in behavioral change processes was well supported in this study. However, it was also

shown that students believe that there are limits to self-efficacy and that this belief seems to have evolved from experiences during and prior to their involvement with the university. Reviewing the history of sustainability initiatives on the UW-Stout campus also showed that such efforts are relatively recent. This raises the question as to whether or not student discomfort with the changes / new initiatives on campus has any effect on their perceptions of their own self-efficacy. Would the limits to self-efficacy perceived by the students look different if they were more used to or comfortable with the changes taking place? Would they look different if all students had exposure to sustainability prior to arriving at Stout?

Enable 2: multiple methods. It is well known in academia, and supported by this research, that utilizing multiple delivery methods is conducive to increasing the desired effect. Are there specific pro-sustainability enhancement methods that work better for students in one academic major than in another? To what extent does having students complete interdisciplinary projects affect the behaviors of those students?

Enable 3: habitual opportunities. Some students tended to perceive the actions of the institution as promoting habitual behaviors that actually had a negative effect on the environment, despite the opposite intent. What factors are most likely to be related to this inverse effect? Once such a change is in place, how difficult is it to reverse the effect?

Encourage 4: reinforcement. While students did express that they felt their actions were reinforced during their time at the UW-Stout, the majority of students' comments were related to prior experiences with sustainability, external partners, or their

peers. They also expressed strong connections between reinforcement and levels of responsibility. Are there additional ways of reinforcing student behavior that might lead directly to a stronger sense of personal responsibility?

Encourage 5: feedback. There were a significant number of comments related to lack of direct feedback regarding sustainability-related campus initiatives. To what extent might this feedback ease the discomfort students feel over big changes on campus? Would it actually affect the level of pro-sustainability behaviors practiced? How should the feedback be disseminated in order to reach the vast majority of students?

Engage 6: student participation. There were many examples of how students are engaged via assistance from faculty and academic staff. Is there a way that faculty and staff could get students to be more active in the sustainability related organizations and committees on campus, and if yes, would this have lasting effects on student behavior?

Exemplify 7: faculty and staff modeling. Faculty and staff populations should also be the focus of research related to pro-sustainability behavior. While the students in this study noted that faculty and staff do model appropriate behaviors, the question was not posed directly as to what proportion model appropriate and non-appropriate behaviors. Are students directly influenced to any degree by negative role models in the mentor population? What factors or incentives exist that encourage faculty and staff to do more in their courses and as mentors to promote pro-sustainability behaviors? Also, what disincentives discourage these behaviors by faculty and staff?

Proposed Future Research Study Designs

The following paragraphs look beyond the previous questions, that were specific to the theoretical propositions, and explore the potential benefits of: varying the population studied, the temporal factor of perceived cultural shifts related to pro-sustainability behaviors, and the overall effectiveness of higher education institutions in changing student behaviors to be more pro-sustainability.

Reflecting back to the section of the literature review on defining pro-sustainability behavioral change, of the four categories of pro-sustainability behavior defined (activism, non-activism within the public-sphere, private-sphere, and organizational) only two, non-activism within the public sphere and private-sphere, were evident in the student data. This is not entirely surprising, as past studies utilizing the VBN theory have tended to see similar results (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). However, the researcher believes much could be gained from conducting additional research with students with more extreme viewpoints on sustainability. One group would be made up of students who have self-selected into activist-type roles on campus (related to sustainability,) and the other admittedly anti-sustainability or excessively pro-consumerism.

Second, the students inhabit institutions wrought with opportunities for gathering information and cultivating experiences. Yet, a huge frustration evident in the data was related to the lack of understanding related to both how to carry out pro-sustainability behaviors correctly within the context of opportunities provided at Stout, as well as whether or not the behaviors of students within these opportunities have positive impacts

on the environment, economy or society. In the midst of their frustration, students still tended to believe that a cultural shift had started on the campus towards pro-sustainability behaviors becoming the normal practice. They conceded that this cultural shift would take time and would likely not be complete until a whole new wave of students replaced the current masses. Conducting additional future focus groups similar to that used in this study could provide valuable information regarding differences between the effects of new programs and those that have been transformed into normative practices. Understanding of these differences has the potential to provide insight into how new initiatives might be implemented in order to shorten the time to full acceptance.

Finally, despite efforts to not include students who already exhibited substantial pro-sustainability behaviors prior to their experiences at the UW-Stout, most of this project's research population acknowledged varying levels of such experiences earlier in their lives. While evidence has shown support for the university's capability to effect behavioral change, it is very difficult within a qualitative case study alone to determine the extent of this capability in light of recognition that the vast majority of students have likely had some prior experience with sustainability. The researcher proposes that in order to overcome this hurdle, a subsequent longitudinal study is recommended to first evaluate an incoming freshman class of students regarding what they know and are doing relative to sustainability. This could involve a survey, utilizing the NEP scale and additional behavior-related questions. A focus group might also provide additional richness to the data and help answer questions about how the university could continue to

improve its student behavior. The results of this study would serve as a baseline for comparison with results from future research.

Approximately four years later a follow-up study could be conducted utilizing the same survey. Future focus groups could be designed to examine the question of why students feel they behave the way they do with respect to sustainability. Comparison of the results from these two studies could provide the evidence necessary to determine the extent to which behavior change is occurring as a direct result of the efforts of the institution.

REFERENCES

aashe, (n.d.) *The sustainability tracking, assessment & rating system.* Retrieved February 16, 2013, from https://stars.aashe.org/

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50,* 179-211.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52,* 1-26.

Boyle, C. (2004). Considerations on educating engineers in sustainability. *International Journal of Sustainability in Higher Education,* 5(2), 147-155.

Brundtland Commission. (1987). *Our common future: Report of the world commission on environment and development.* Retrieved July 21, 2011, from http://www.scribd.com/doc/24176124/Brundtland-Report-1987

Dunlap, R. E., & Van Liere, K. D. (1978). The "New Environmental Paradigm": A proposed measuring instrument and preliminary results. *The Journal of Environmental Education, 9*(4), 10-19.

Easton, P. (2007). Adult education and social sustainability: Harnessing the 'red queen effect.' *Convergence, XL*(1-2), 171-184.

economics. (n.d.). In *Dictionary.com Unabridged.* Retrieved July 18, 2011, from http://dictionary.reference.com/browse/economics

Foster, J. B., & Clark, B. (2012, December). The planetary emergency. *Monthly Review: An Independent Socialist Magazine, 64*(7), 1-25.

Gall, M. D., Gall, J. P. & Borg, W. R. (2007). *Educational research: An introduction* (8th ed.). Boston, MA: Pearson Education, Inc.

Gardner, G. T., & Stern, P. C. (2002). *Environmental problems and human behavior*. Boston: Allyn and Bacon.

Hoel, A., James, K., McManus, M., Menefee, J., Rodriguez, G., Rykal, S., Staggs, S., & Stary, W. (2010). *UW-Stout sustainability across the curriculum network: Position paper.* Retrieved from the University of Wisconsin-Stout, Sustainability website: *http://www.uwstout.edu/sustainability/upload/SustainabilityAcrosstheCurriculum_PositionPaper_121210.pdf*

HM Government. (2005). *Securing the future: delivering UK sustainable development strategy.* Colegate, Norwich: Crown Copyright.

Inglehart, R. (1971). The silent revolution in Europe: Intergenerational change in post-industrial societies. *The American Political Science Review, 65*(4), 991-1017. Retrieved from http://www.jstor.org/stable/1953494

Jones, V. (2008). *The green collar economy: How one solution can fix our two biggest problems.* New York, NY: Harper One.

Koester, E. (2011). *Green entrepreneur handbook: The guide to building and growing a green and clean business.* Boca Raton, FL: Taylor & Francis Group.

Kumar, V., Haapala, K. R., Rivera, J. L., Hutchins, M. J. Endres, W. J., Gershenson, J. K., …Sutherland, J. W. (2005). Infusing sustainability principles into

manufacturing/mechanical engineering curricula. *Journal of Manufacturing Systems, 24*(3), 215-225.

Larson, J. L. (2005, May). The market revolution in early America: An introduction. *OAH Magazine of History, X*, 4-7.

Leary, M. R. & Hoyle, R. H. (2009). Situations, dispositions, and the study of social behavior. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 1-11). New York, NY: The Guilford Press.

Miles, M. B. & Huberman, A. M. (1994). *An expanded sourcebook: Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: SAGE Publications, Inc.

Myers, O. E. & Beringer, A. (2010). Sustainability in higher education: Psychological research for effective pedagogy. *Canadian Journal of Higher Education, 40*(2), 51-77.

Oskamp, S. (2000). Psychological contributions to achieving an ecologically sustainable future for humanity. *Journal of Social Issues, 56*(3), 373-390.

Pardieck, D. (2005). *What is environmental science?* Retrieved August 4, 2011, from http://webs.lander.edu/dpardieck/Whatisenvironmentalscience.html

Perdan, S., Azapagic, A., & Clift, R. (2000). Teaching sustainable development to engineering students. *International Journal of Sustainability in Higher Education, 1*(3), 267-279.

Rosenberg, M. (1979). *Conceiving the self.* New York, NY: Basic Books.

Ryan, R. M. & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychological Association, Inc., 55*(1), 68-78. Doi: 10.1037/0003-066X.55.1.68

Schneider, F. W., Gruman, J. A., & Coutts, L. M. (2005). Defining the field of applied social psychology. In F. W. Schneider, J. A. Gruman, & L. M. Coutts (Eds.), *Applied social psychology: Understanding and addressing social and practical problems* (pp. 1-18). Thousand Oaks, CA: Sage Publications, Inc.

Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franek, M. (2005). Values and their relationship to environmental concern and conservation behavior. *Journal of Cross-Cultural Psychology, 36*(4), 457-475. Doi: 10.1177/0022022105275962

Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz (Eds.), *Advances in experimental social psychology* (Vol. 10, pp. 221-279). New York: Academic Press.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues, 50*(4), 19-45.

Scientific Applications International Corporation (SAIC). (2006). *Life cycle assessment: Principles and practice* (Contract No. 68-C02-067). Retrieved from the U.S. Environmental Protection Agency website: http://www.epa.gov/research/NRMRL/lcaccess/lca101.html

Sharken Simon, J. (1999). *The wilder nonprofit field guide to conducting successful focus groups.* Saint Paul, MN: Wilder Publishing Center.

Signatories of the American College & University Presidents' Climate Commitment (ACUPCC). (n.d.). *American college & university presidents' climate commitment.* Retrieved August 17, 2011, from http://www.presidentsclimatecommitment.org/about/commitment

Stern, P. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407-424.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review, 6*(2), 81-97.

Sumner, J. (2003). Environmental adult education and community sustainability. *New Directions for Adult and Continuing Education, 99,* 39-45.

Sustainable Measures. (n.d.). *Definitions of sustainability.* Retrieved July 18, 2011, from http://www.sustainablemeasures.com/node/35

Swim, J. K., Clayton, S., & Howard, G. S. (2011). Human behavioral contributions to climate change: Psychological and contextual drivers. *American Psychological Association, 66*(4), 251-264. doi: 10.1037/a0023472

Timmerman, N. (2009). From policy to pedagogy: The implications of sustainability policy for sustainability pedagogy in higher education. *Canadian Journal of Higher Education, 39*(1), 45-60.

University Leaders for a Sustainable Future (ULSF). (n.d.). *Report and declaration of the presidents conference (1990).* Retrieved July 15, 2011, from http://www.ulsf.org/programs_talloires_report.html

UW-Stout. (n.d.a). *Facts about UW-Stout*. Retrieved March 18, 2013, from http://www.uwstout.edu/about/facts.cfm

UW-Stout. (n.d.b). *Wisconsin's polytechnic university*. Retrieved March 3, 2013, from http://www.uwstout.edu/about/polytechnic/index.cfm

U. S. Congress. (2008). *Higher education opportunity act.* Retrieved July 14, 2011, from http://www.nacua.org/documents/heoa.pdf

U. S. Environmental Protection Agency (EPA). (2010). *Climate change indicators in the United States.* Retrieved from: http://www.epa.gov/gateway/learn/climatechange.html

Vlek, C. & Steg, L. (2007). Human behavior and environmental sustainability: Problems, driving forces, and research topics. *Journal of Social Issues, 63*(1), 1-19.

Walshe, N. (2008). Understanding students' conceptions of sustainability. *Environmental Education Research, 14*(5), 537-558.

Yin, R. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: SAGE Inc.

Appendices

Appendix A

Focus Group Script

I. Opening

A. Welcome and Introduction (5 minutes)

I would like to welcome and thank you for your participation in this focus group. My name is Wendy Stary and I am an Assistant Professor in the Engineering and Technology department here at UW-Stout, and also a graduate student in the Work and Human Resources Education Ph. D. program at the University of Minnesota. To briefly summarize my research, I am interested in higher education's impact on the sustainability related behaviors of students. It's important that you understand the definition of sustainability being used within the context of my research and this focus group. That is: it entails three facets: living within limits, understanding of the interconnectedness of the economy, society, and environment, and providing for equitable sharing of opportunities and resources (Sustainable Measures, n.d.).

I am currently using a single case study, UW-Stout, to begin the investigation. I believe that thorough understanding of your thoughts about your experiences at UW-Stout, with respect to sustainability, will enable better informed decisions that can build and / or improve upon current initiatives and offerings. There are not right or wrong answers to the questions I will be asking, only your opinions as individuals. Please speak openly and honestly in answering the questions I ask and be respectful if / when you do not agree with another participant's views. Your anonymity will be protected through use of participant numbers and no one reading the final report will be able to identify who said what in answer to the questions.

I would like to start by having each of us introduce ourselves. Names are optional. Please tell the group what your degree program is and what brought you to UW-Stout.

B. Disseminate session agenda

II. Warm-up (5 minutes)

A. Yes / No / Needs more consideration

Write 2-3 yes / no / needs more consideration-type questions on an easel and ask participants to answer by show of hands.

1. Do you feel your actions can make a difference with regard to climate change?

2. Have you ever avoided buying products or services from a company because you felt they were harming the environment or society?
3. Are you willing to pay higher prices for products, groceries, etc. in order to protect the environment or support developing economies / societies?

III. Questions (75 minutes, ~10-12 minutes/question)

A. Ask participants to jot down notes on paper first

B. Go around the room giving each participant a chance to provide one comment until all have been given. (Remind them it is o.k. if they do not have any)

Values and Beliefs

1. Explain why you generally agree / disagree in response to the following statement: the earth is like a spaceship with limited room and resources?

2. How serious of a problem do you think climate change is / will be for you, your community, or other people, plants and animals around the world?

Norms

3. Can you describe (compare / contrast) the level of responsibility you feel *you* as an individual, *business / industry*, and *government* should be held to in order to protect the environment and social welfare?

Personal Capability

4. Can you describe in detail any information / examples you have been provided, through courses or other aspects of campus life, that you feel make you more able to make informed choices about how you will act toward the environment, economy or society?

Context and Habit

5. What factors exist at UW-Stout (classroom or otherwise) that are conducive to the development of environmentally / societally beneficial habitual behaviors? (Examples: receptacles are readily available to put recyclables or compostable items into, adequate use of natural lighting allows for less need of electricity to light hallways, bathrooms, etc., conditions are conducive to walking, biking, carpooling, or using public transportation to / from campus, electronic media are encouraged as opposed to print…)

Summary

6. Overall, how has your experience at UW-Stout impacted your attitudes and behaviors regarding sustainability, or in other words, how you interact with your environment, society, and economy?

IV. Closing (5-10 minutes)

- **A. Final comments recorded individually on paper**
  - **i. Call or e-mail me with additional comments**
- **B. Brief summary of responses and reminder to participants that they will be provided a more in-depth summary of the session via e-mail**
  - **i. "Have we neglected anything?"**
- **C. Thank you!**

Appendix B

UW-Stout Implied Consent Statement for Research Involving Human Subjects

Consent to Participate In UW-Stout Approved Research

Title: Higher Education's Impact on Changing the Sustainable Behaviors of Students

Investigator:
Wendy Stary
JHTW 158A
715-232-1161
staryw@uwstout.edu

Research Sponsor:
Dr. Tom Stertz
University of Minnesota
Dr. James Brown
University of Minnesota

Description:
This research project will study the capability of faculty, staff and students on the UW-Stout campus to promote pro-sustainability behavior in students. This research will be conducted by first evaluating the initiatives being used for this purpose to determine if they match up with factors that have been shown in previous research to have the ability to effect behavioral change. Students will then be asked to participate in a focus group where they will be asked questions related to their interactions with the environment, society and the economy, and their perception of what is being done on campus to promote pro-sustainability behavior.

The results of this study will be used to aid faculty, staff and students in determining what changes or additional steps should be taken to improve their efforts towards promotion of pro-sustainability behavior.

Risks and Benefits:
There are no serious risks associated with this study. Minimal risk includes the possibility that a student knows other students participating in the focus group and feels discomfort answering questions. Every effort will be made to create a non-threatening environment where there are no wrong answers. However, should a participant feel he / she cannot continue, there is no consequence for withdrawing from the study at any time.

The benefits of this study may or may not directly impact the students who participate in the focus group depending on the amount of time they have to degree completion. The primary benefit is that with the knowledge gained from the study faculty, staff and students will be able to make more informed decisions regarding what initiatives should be added / continued / improved in order to promote pro-sustainability behavior.

Special Populations:
No special populations will be used for this study.

Time Commitment and Payment:
Focus group participants will be asked to commit a maximum of two "face-to-face" hours during the focus group and an additional half to one hour providing feedback on the draft report.

Confidentiality:
Participants will be randomly assigned a participant number for use during data collection and analysis. No names will be included on any documents or the final report. Further, potentially identifying information such as course numbers / names or specific project information will not be included in the final report.

Right to Withdraw:
Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. You have the right to stop participation in the focus group at any time. However, should you choose to participate in the focus group and later wish to withdraw from the study, it may not be possible to identify your anonymous comments once they have been transcribed by the investigator. At that point the data cannot be linked to you and cannot be withdrawn.

IRB Approval:
This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

Investigator:
Wendy Stary, 715-232-1161, staryw@uwstout.edu

Advisors:
Dr. Tom Stertz, 612-625-7250, ster0112@umn.edu
Dr. James Brown, brown014@umn.edu

IRB Administrator
Sue Foxwell, Research Services
152 Vocational Rehabilitation Bldg.
UW-Stout
Menomonie, WI 54751
715.232.2477
foxwells@uwstout.edu

Statement of Consent:
By e-mailing your intent to participate in the focus group, and subsequent participation, you agree to participate in the project entitled, Higher Education's Impact on Changing the Sustainable Behaviors of Students.

Appendix C

University of Minnesota IRB Approval

The IRB: Human Subjects Committee determined that the referenced study is exempt from review under federal guidelines 45 CFR Part 46.101(b) category #2 SURVEYS/INTERVIEWS; STANDARDIZED EDUCATIONAL TESTS; OBSERVATION OF PUBLIC BEHAVIOR.

Study Number: 1301E26224

Principal Investigator: Wendy Stary

Title(s):
Higher Education?s Impact on Changing the Sustainable Behaviors of Students

---

This e-mail confirmation is your official University of Minnesota HRPP notification of exemption from full committee review. You will not receive a hard copy or letter.

This secure electronic notification between password protected authentications has been deemed by the University of Minnesota to constitute a legal signature.

The study number above is assigned to your research. That number and the title of your study must be used in all communication with the IRB office.

Research that involves observation can be approved under this category without obtaining consent.

SURVEY OR INTERVIEW RESEARCH APPROVED AS EXEMPT UNDER THIS CATEGORY IS LIMITED TO ADULT SUBJECTS.

This exemption is valid for five years from the date of this correspondence and will be filed inactive at that time. You will receive a notification prior to inactivation. If this research will extend beyond five years, you must submit a new application to the IRB before the study?s expiration date.

Upon receipt of this email, you may begin your research. If you have questions, please call the IRB office at (612) 626-5654.

You may go to the View Completed section of eResearch Central at http://eresearch.umn.edu/ to view further details on your study.

The IRB wishes you success with this research.

Appendix D

University of Wisconsin-Stout IRB Approval

Research Services
152 Voc Rehab Building

STOUT
UNIVERSITY OF WISCONSIN

University of Wisconsin-Stout
P.O. Box 790
Menomonie, WI 54751-0790

715/232-1126
715/232-1749 (fax)
http://www.uwstout.edu/rs/

January 18, 2013

Wendy Stary
Work and Human Resources Education
UW-Stout

RE: Higher Education's Impact on Changing the Sustainable Behaviors of Students

Dear Wendy,

The IRB has determined your project, "Higher Education's Impact on Changing the Sustainable Behaviors of Students" is **Exempt** from review by the Institutional Review Board for the Protection of Human Subjects. The project is exempt under **Category # 2** of the Federal Exempt Guidelines and holds for 5 years. Your project is approved from **1/18/ 2013**, through **1/17/2018**. Should you need to make modifications to your protocol or informed consent forms that do not fall within the exemption categories, you will need to reapply to the IRB for review of your modified study.

If your project involved administration of a survey, please copy and paste the following message to the top of your survey form before dissemination:

> This project has been reviewed by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46

If you are conducting an **online** survey/interview, please copy and paste the following message to the top of the form:
"This research has been reviewed by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46."

Informed Consent: All UW-Stout faculty, staff, and students conducting human subjects research under an approved "exempt" category are still ethically bound to follow the basic ethical principles of the Belmont Report: 1) respect for persons; 2) beneficence; and 3) justice. These three principles are best reflected in the practice of obtaining informed consent from participants.

If you have questions, please contact Research Services at 715-232-1126, or foxwells@uwstout.edu, and your question will be directed to the appropriate person. I wish you well in completing your study.

Sincerely,

Susan Foxwell

Susan Foxwell
Research Administrator and Human Protections Administrator,
UW-Stout Institutional Review Board for the Protection of Human Subjects in Research (IRB)