THE IMPACT OF CLASSROOM EXPOSURE TO SUSTAINABILITY, COURSE CONTENT, AND ECOLOGICAL FOOTPRINT ANALYSIS ON STUDENT ATTITUDES AND PROJECTED BEHAVIORS

Except where reference is made to work of others, the work described in this thesis is my own or was done in collaboration with my advisor. This thesis does not include proprietary or classified information.

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THE IMPACT OF CLASSROOM EXPOSURE TO SUSTAINABILITY, COURSE CONTENT, AND ECOLOGICAL FOOTPRINT ANALYSIS ON STUDENT ATTITUDES AND PROJECTED BEHAVIORS

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THE IMPACT OF CLASSROOM EXPOSURE TO SUSTAINABILITY, COURSE CONTENT, AND ECOLOGICAL FOOTPRINT ANALYSIS ON STUDENT ATTITUDES AND PROJECTED BEHAVIORS.

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Melissa Franson, daughter of Dr. Timothy Franson and Christine Franson, was born August 18, 1983, in Wauwatosa, Wisconsin. She graduated from Auburn University with a Bachelor of Science degree in Interior Design Major and International Studies Minor in Human Sciences August, 2006. She entered the Graduate School at Auburn University, in August 2006.

THESIS ABSTRACT

THE IMPACT OF CLASSROOM EXPOSURE TO SUSTAINABILITY, COURSE CONTENT, AND ECOLOGICAL FOOTPRINT ANALYSIS ON STUDENT ATTITUDES AND PROJECTED BEHAVIORS

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The importance of sustainability will continue to grow as world population and the demand for finite resources increase. It is important to educate college students on the changing world around them, and how to live within the limits set by the Earth. In order for education on sustainability to evolve it is necessary to study methods of teaching and their effectiveness on the student population.

Survey research was conducted during the spring 2008 Global Consumer Culture Course to determine if classroom exposure had an effect on making student attitudes and behaviors more sustainably oriented. Using a pre and post test method, it was determined

that there were not statistically significant differences in attitude. However, students became more sustainably oriented in relation to behavior. This indicates that education should focus on teaching students about sustainable behaviors, such as recycling and energy conservation, instead of focusing on changing student attitudes. The research provides educators with the knowledge that teaching students about sustainability can elicit a change in projected behaviors.

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I. INTRODUCTION

The Earth has a finite amount of non-renewable resources, and the importance of sustainability will continue to grow as the demand for these resources and the population of the world increases (Palmer, 1999). The push for sustainability has been going on for years, but still has yet to catch on as a universally practiced lifestyle. For people to accept and understand sustainability it is necessary to educate them. College campuses educate and train the people who will likely hold leadership positions in the near future. It is important to introduce them to sustainability so they can make the best decisions in their workplace, communities, and personal lives. College students need to be aware of the impact of their actions on the environment, as they will be the leaders of tomorrow (Cortese, 2003). It is vital to educate students on methods of living that are within the natural limits of the Earth, to prevent the further deterioration of natural resources. Ecological footprint analysis (EFA) can be used as a way to test the effectiveness of teaching sustainability in higher education institutions (Ryu & Brody, 2006, McMillan, Wright & Beazley, 2004). This study investigates whether student attitudes and behaviors improve in relation to living sustainably, following classroom exposure and EFA. It was hoped that once students were exposed to the ideas, concepts and importance of sustainability they would become more environmentally oriented.

Problem Statement

The state of the environment is increasingly becoming an issue of great magnitude as the demand for natural resources and world population increase. Education on sustainability is a method that can be implemented to raise awareness and understanding. It is imperative to conduct research on the college student population, as they will become the leaders of tomorrow with a broad civic and corporate impact on society (Cortese, 2003).

Very little quantitative research on sustainability and education has been conducted on the college student population. Consequently, it is important to generate quantitative data that can be used to evaluate the effectiveness of teaching students about sustainability. Existing literature addresses what students should learn, but few publications address what students actually know and understand about sustainability (Kagawa, 2007). This study addressed both what students knew prior to and following an educational course on sustainability. The study also evaluated the impact of education classroom exposure and EFA in the process of changing student attitudes and behaviors in relation to sustainability.

Statement of Purpose

The purpose of the study was to determine if classroom exposure and EFA stimulate a change in student attitudes and projected behaviors. The study aimed to determine whether students develop more sustainable attitudes and behaviors subsequent to learning and understanding the impact of their behaviors on the environment and the earth's resources. It was anticipated that classroom exposure would cause students to

view sustainability in a positive light and attempt to alter their lifestyles to reduce their impact on the Earth. It was projected that students would become more sustainably oriented after being made aware of their impact on the environment.

Null Hypothesis

1. Classroom exposure will not elicit a significant change in student attitudes in relation to sustainability.

2. Classroom exposure will not elicit a significant change in student behaviors in relation to sustainability.

Objectives of the Study

1. To investigate the effect of classroom exposure to education about sustainability on student attitudes and behaviors.

2. To determine if there is a positive change in student attitudes and behaviors following classroom exposure to education about sustainability.

Assumptions

It was assumed that students had a general understanding of sustainability and the concepts associated with it prior to taking the course. It was assumed that students participating in this study attended class and completed the required assignments. Participants were required to be enrolled in the Global Consumer Culture course in the spring of 2008.

Definition of Terms

Ecological Footprint Analysis (EFA) - Ecological footprint analysis was first developed by Rees and Wagernackle (1992) in an attempt to create a quantitative method to measure sustainability. EFA measures the land, water, resources, and wastes consumed and created by humans based on their habits and geographic location (Rees and Wagernackle, 1992). EFA takes a variety of variables that relate to sustainability and adds them together to create a value that is representative of the consumption patterns of a population. Palmer (1999) states, " ecological footprint analysis is a method to evaluate the real demands made by each of us on the earth's ecologically productive area by our patterns of consumption of food and wood products and our share of built-up (ecologically degraded) land" (p. 200). Wackernagle also defines EFA as being a, "resource accounting framework for measuring human demand on the biosphere (Wackernagle & Russ, 2007). EFA is made up of 16 questions that address geographic location, personal consumption patterns, habits, dwelling, and other factors that impact the environment. The answers to the survey are analyzed to compute the, "number of biologically productive acres that each person is responsible for consuming" (Rees & Wagernackle, 1992). The ecological footprint provides a quantitative value for comparison across a variety of different levels as well as for statistical analysis. (Ryu and Brody, 2006). EFA has also been used to test the effectiveness of teaching sustainability at a higher education institution (Ryu & Brody, 2006, McMillan et al. 2004).

Sustainability- The root of the word sustainability is sustain, which means to maintain something. In this case, it is the maintenance of Earth's natural resources and the quality

of life for humans and other living creatures. It is finding a way to maintain and even improve quality of life without jeopardizing the state of the Earth. The most frequently cited definition of sustainability was coined by Norwegian Prime Minister Gro Harlem Brundtland. He stated sustainability is, "development that meets the needs of the present without compromising the ability of future generations to meet their own needs (United Nations, 1987). The easiest way to define sustainability is to look at the overlap of three main factors, which are social, environmental, and economic. Sustainability affects and encompasses a broad spectrum of factors and it is important to note that all these factors need to be taken into account when educating or applying sustainability (Refer to Figure 1).

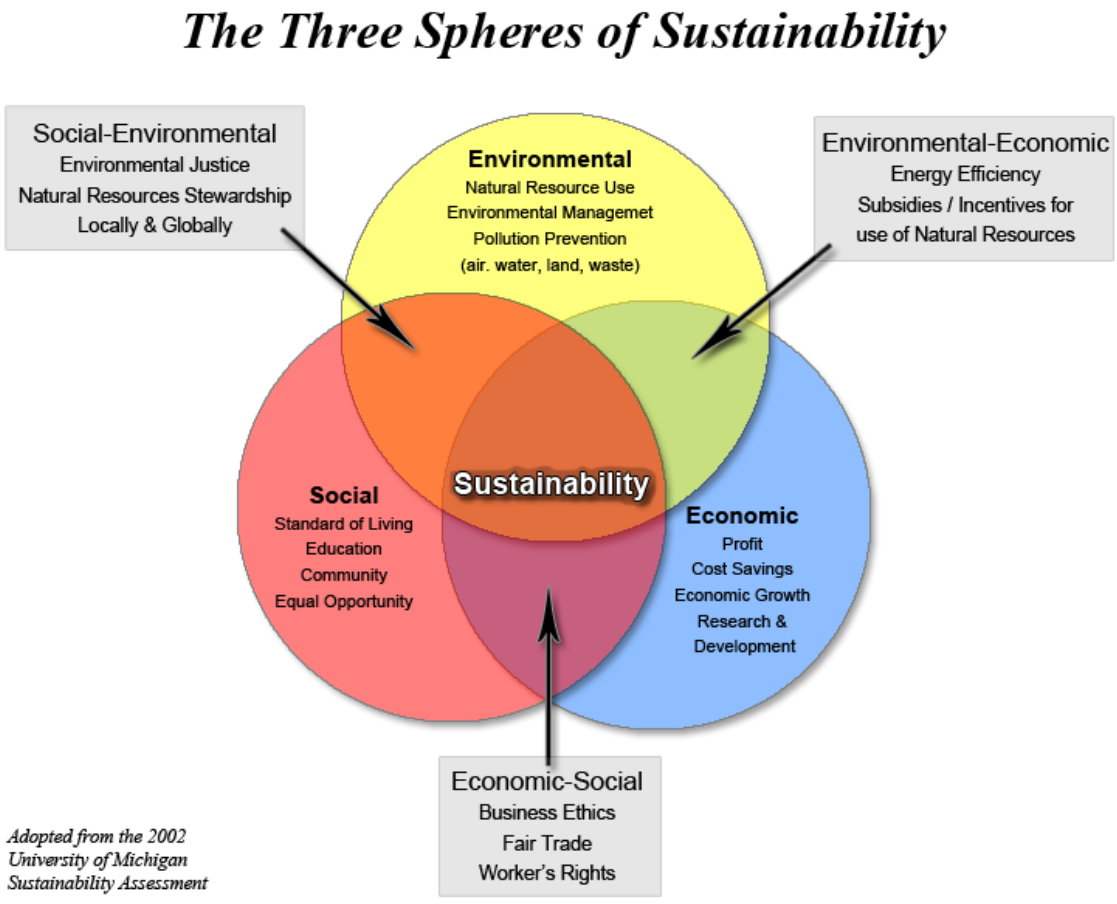

FIGURE 1. (Sustainability at Vanderbilt, 2007)

Attitudes- Merriam-Webster (2008) defines attitude as being, "a feeling or emotion toward a fact or state". In this study, attitude reflected student opinions and beliefs about sustainability. It reflects their stance on the environmental debate. Student attitudes develop based on their experiences with sustainability and their environment and the impression sustainability has left on them.

Behaviors- Merriam-Webster (2008) defines behaviors as being, "the response of an individual, group, or species to its environment". Behaviors are physical actions students take that affect the state of the environment in a positive or negative manner. Behaviors like polluting and wasting energy are categorized as negative behaviors. Recycling, preservation and conservation of natural resources would be categorized as positive behaviors.

Projected Behaviors- Projected behaviors are the actions and decisions students intend to make in the future.

Global Consumer- Culture Course (CAHS 2000) - The Global Consumer Culture at Auburn University course covers, "Cultural, commercial, and aesthetic factors influencing the selection and usage of consumer products and services that create and express social identity" (Auburn University Tiger Cub). The course is a requirement for students in the College of Human Sciences, but admission is also open to students in other colleges. The course syllabus can be located in Appendix B.

Ego-centric- Occurs when people's environmental values are centered on their personal well being (McMillan, et al. 2004).

Homocentric- Occurs when people's environmental values are centered on concern for all human beings (McMillan, et al. 2004).

Eco-centric- When people's environmental values are focused primarily on the environment and the eco-system as opposed to how people are affected (McMillan, et al. 2004).

II. LITERATURE REVIEW

The incorporation of sustainability into the human lifestyle is integral to the quality of life in the near future. As the Earth's resources dwindle, it is important to find methods to maintain the quantity and quality of resources while developing a plan of action to preserve the quality of life.

Sustainability and Education

Following a variety of different consortiums, summits such as, "Agenda 21, the Commission on Sustainable Development (CSD) World Program, the Earth Charter Process, the Millennium Development goals, and other UN summits (Calder & Clugston, 2005)", the importance of education on sustainability is gaining momentum (Calder and Clugston, 2005, p. 8). The 'Decade of Education for Sustainable Development' was developed by the United Nations Education, Scientific, and Cultural Organization (UNESCO) in 2002, and was introduced nationally and internationally in 2005 (Calder and Clugston, 2005). It is hoped that these movements will augment and strengthen the transition of countries and individuals to live and function in a more environmentally responsible fashion. The university system has a specific responsibility in that, "The future leaders, decision-.makers and intellectuals of the social, political, economic, and academic sectors are created, formed and shaped within the world's higher education institutions" (Lozano, 2006, p.788).

December 2002 marked a milestone for sustainability. The United Nations adopted a resolution titled 'The Decade of Education for Sustainable Development' (Report of the World Summit on Sustainable Development, 2002). The intent of the ten year program was to encourage education on sustainability and raise worldwide awareness. One goal of the resolution was to, "shape education, training, and public awareness initiatives, which prepare individuals, organizations, and governments to practice sustainable living in their diverse cultural and social contexts" (Calder and Clugston, 2005, p. 9). The 'Decade for Development' marks a shift in international thinking to focus on sustainably oriented initiatives.

Education on sustainable practices can be one of the first steps toward the development of a sustainable society. McNaughten and Jacobs (1997) suggested that one reason for people's inaction in developing sustainable lifestyles is due to a lack of knowledge of the facts. They predicted that education will provide people with the means and resources to develop a more sustainable lifestyle. Once people have been educated on the facts, they will be able to develop ways to adapt their lifestyles to become more sustainably oriented (Cortese, 2003). Lozano suggested an approach that focuses on Rogers (1962) five stage process for adoption of an innovation" (Lozano, 2006).

1. *Awareness: exposure to an idea.*
2. *Interest: Individuals motivation towards an idea.*
3. *Evaluation: When the individuals try the idea and judge its future potential.*
4. *Trial: When the idea is implemented in a "micro" approach.*
5. *Adoption: When individuals are satisfied with the results of the idea trial and put the practice into operation. (Lozano, 2006).*

FIGURE 2. – Researchers Graphic of Roger's Model of Adoption

Overall, for students to become more sustainably oriented, it may be necessary to expose them to the idea of sustainability in order for them to develop an interest and adopt a more sustainable and environmentally friendly lifestyle. Once they have been made aware of an idea or concept, they will be one step closer to adopting it into their everyday lives.

Although the definition of sustainability is shifting, unstable, and evolving, the framework used for this study is based on Roger's five stage process for adoption (see Figure 2). The model explains the process people go through in developing and evaluating new behaviors. The first step is raising awareness, in order for people to adopt a behavior they must first be aware of it. In the study the means to raise awareness was the classroom exposure and EFA. The next step is interest, once people have been

exposed to something new, they begin to develop an interest to learn more and explore the idea more in depth. Students enrolled in the course hopefully developed an interest in sustainability, and further explored sustainability. People then evaluate the idea, based on what they have learned about it and experienced. If after evaluation people maintain an interest in a given idea, they move onto the fourth step, which is trial. People test the waters, by running an experiment, possibly trying more sustainable behaviors. The trial period is a time to test whether or not people want to adopt the new idea. The fifth and final step is adoption, when people choose to integrate the idea into their everyday lives. Roger's model is a good framework to follow when looking at the five step process students go through in the process of learning and adopting new behaviors.

The overall framework of sustainability is constantly evolving, which means that the approach to teaching sustainability is also developing (Hopkins and McKeown, 2002; Selby 2006). Currently, there isn't one standard accepted method of testing, teaching, or even definition of sustainability. Literature on sustainability and education does exist, but focuses primarily on what students should learn, not what they actually know (Kagawa, 2007). Kagawa found that students perceive sustainability as being a good thing, and that they associate sustainability with the natural environment. It was also found that students only wanted to integrate sustainable practices into their lives that would be easy to integrate into their existing habits and daily patterns. For example, students would rather recycle, than compost trash and waste. Ryu and Brody (2006) conducted a study on graduate students to measure the effectiveness of problem based learning on the change in student EFA from pre to post test. They found that broader

principles addressing sustainability and education have been addressed, but, "systematic knowledge of the impact of existing initiatives and ways to effectively incorporate sustainability into university curricula is limited due to lack of empirical research on the topic"(p159). Ryu and Brody (2006) also analyzed data by socioeconomic and proximity based variables. They found that the older a student was the higher their ecological footprint, as well as the higher the income of a student, the greater the ecological footprint. McMillan et al. (2004) looked at the impact of an environmental studies class on college student values. The study was conducted on approximately 75 students. Data were collected through the use of questionnaires as well as interviews. Data were placed into categories (eco-centric, homocentric, and egocentric) and analyzed. It was found that student answers to the questionnaires and interviews became more in depth and refined following the treatment of classroom exposure, interviews, and questionnaires. It was also found that students became more eco-centric and less homocentric after completing the treatment. These studies all demonstrate the importance of education on sustainability. Thus, it is necessary to conduct research on the impact of education about sustainability on student attitudes and behaviors in order to further the overall understanding of the topic.

College Students as a Population

"Higher education institutions bear a profound, moral responsibility to increase awareness, knowledge, skills, and values needed to create a just and sustainable future" (Cortese, 2003, p.17). The university setting provides a unique environment for students to learn from their classes, experiences, and the world around them (Cortese, 2003).

College students are an appropriate target population, because they are developing behaviors and attitudes as they progress from the academic environment to the business environment. Exposure to sustainability and sustainable practices, while in college, not only provides students with information on how to live sustainably, but also makes them aware of the implications of their actions. This is the first stage in the adoption of innovation, and if students are to develop more sustainable behaviors, then exposing them to the idea through education is imperative. Educating students in a variety of different majors on sustainability can create an impact on a variety of different disciplines, from green construction in architecture to environmentally friendly manufacturing in engineering. It is hoped that as these students progress into their professional lives that they will take what they have learned about sustainability and apply it to their professional practices and personal decisions, creating a more sustainable society.

Ecological Footprint Analysis

Ecological footprint analysis (EFA) has been used as a measure of sustainability in a variety of different settings, from institutions to entire countries. EFA is primarily used as an instrument, but in the case of this study it was used as a treatment. Ryu and Brody (2006) completed EFA with a graduate course to measure the effectiveness of problem based learning on sustainability and the change in student ecological footprints from a pre to a post test. In the current study EFA was only used as a treatment, and data collected using EFA were not used in statistical procedures. Ryu and Brody (2006) found that problem based learning does increase sustainable behavior in graduate students. Problem based learning is centered on students learning about a problem and

then developing and implementing their own methods to solve the problem. It gives students the chance to apply what they have learned through problem solving in a class setting. Students who participated in Ryu and Brody's (2006) study also stated that EFA served as one of the class components that had the greatest impact on changing their view of sustainability. McMillan et al. (2004) also used EFA, but their research was conducted on university level students enrolled in an introductory course. They used EFA to determine the change in student values by measuring which values developed due to the study; the values identified included egocentric, homocentric, and eco-centric. They found that students became more sustainably oriented as a direct result of the course which focused on teaching existing facts. However, it is unknown whether the change in students was temporary or long-term. EFA has been used to compare a number of universities in the United Kingdom, Australia, and the United States to determine if they were functioning within their means (Dawes, Martin & Vetter, 2004). For a university to be living within its means, it would need to consume a certain amount of energy and resources based on the geographical location as well as the population of the university. It was found that all seven universities evaluated were living outside their means, and some even at double what would be considered environmentally responsible (Dawes, et al. 2004). This is an indication that sustainable behaviors need to be adopted at the university level.

This study, like a few of the existing studies, uses pre and post tests to evaluate the effectiveness of teaching and educating about sustainability. This study differs from the cited studies in that the population was undergraduate students of all levels, not just

graduate students or freshman. The pre and post test differ from others in that they are a compilation of a variety of different questionnaires, and the questions focus on attitude and behaviors. Other studies chose to focus on sustainability and education on a broader level such as general environmental values, this study narrows down the focus to behaviors and attitudes. The study looks at what students knew prior to the course, and whether or not they became more sustainably oriented as a direct result of classroom exposure to an environmental awareness course. T-tests were used to determine the change in attitudes and behaviors from pre to post test. Ryu and Brody (2006) use EFA as an actual instrument, but in this study EFA is used as a treatment to raise awareness and spark interest in students, as opposed to generating values on which to run statistical procedures. This study also used Roger's (1962) model of adoption as a framework for understanding how students adopt new ideas.

Barriers to Sustainable Development in Education

People express a variety of different reasons as to why they choose not to adopt a more sustainable lifestyle (Velazquez, Mungia, Sanchez, 2005). It is important to understand the factors that influence people's decision making process in relation to living sustainably. Once the root cause for a problem has been determined, it is easier to pin-point a way to solve it. Education on sustainability will make people aware of how damaging their actions can be and stimulate a change in their daily habits to more sustainably oriented behavior. Lack of time and inconvenience are commonly stated reasons for not incorporating sustainable practices into every-day life. If recycling and living sustainably does not provide concrete benefits or requires great effort, then people

will be more hesitant to change their habits to more sustainable ones. It is necessary to educate people on the benefits of living sustainably, as well as the positive difference it will make in the near future – both personally and as a global community. Velazquez, et al. (2005) described some of the most prevalent barriers as being a lack of awareness, interest and involvement. In order to address some of these barriers to the integration of sustainability, it is necessary to provide the general public with the means to be educated on sustainability in order to develop an interest in behaving sustainably.

Sustainable Initiatives on Auburn's Campus

Auburn University has a variety of organizations and associations dedicated to promoting sustainability, which include but are not limited to the Sustainability Action Program, Auburn Center for Forest Sustainability, Auburn Environmental Awareness Organization, and Auburn University Recycling. The Auburn University Curriculum Committee has now approved a Sustainability Minor which will become effective fall 2008. Additionally several departments offer courses that have integrated sustainability into their curriculum, such as the Global Consumer Culture Course. However, at the time this research was conducted the overall Auburn University curricular offerings lacked a major dedicated to the education and implementation of sustainability. . The organizations on Auburn's campus are extracurricular and students do not receive class credit for participating in these organizations. The organizations are directed to people who already have a general understanding of sustainability and have a vested interest in the topic. However, it is important for Auburn to integrate more courses focused on

sustainability into the curriculum, so that a greater number of students can be exposed to the principles of sustainability and hopefully adopt sustainable behaviors.

III. METHODOLOGY

Study Framework

This chapter describes the methods used to collect and analyze data. The study conducted was quasi-experimental research design. This chapter also explains the treatment used to elicit a change, as well as the procedures used to collect and analyze data. The literature review indicates that education and exposure to sustainability can stimulate a change in the way people perceive and behave in relation to the environment. The aim of the study was to determine if classroom exposure can actually elicit a change in student attitudes and projected behaviors in relation to sustainability.

Data were collected through a secure online survey and research engine. EFA was conducted through the use of the online 2002 Earth Day Footprint Quiz (see Appendix C). The independent variables in the study were classroom exposure and EFA. The dependent variables were student attitudes and projected behaviors. The main form of instrumentation was pre and post tests used to measure the change in student attitudes and behaviors.

Design of the Study

The study was conducted in Spidle Hall on Auburn University's campus. Spidle Hall is the location of the College of Human Sciences. The study was conducted over the course of the spring 2008 semester with students enrolled in the Global Consumer

Culture course. The course was divided into two sections that meet for seventy-five minutes each on Tuesdays and Thursdays.

In preparation for data collection of the study, the researcher requested and obtained a human subjects' approval from the Institutional Review Board at Auburn University (Appendix A).

Sample

The convenience sample consisted of 204 undergraduate students enrolled in the CAHS 2000 Global Consumer Culture Course at Auburn University in the spring semester of 2008. The sample was comprised of 22 males and 183 females. Due to the imbalance in the population, comparisons and statistics were not conducted on the differences and relationships between males and females. The course was primarily taken by students enrolled in the College of Human Sciences, but was also open to students from the entire university. The number of different majors as well as the number of students in each major varied throughout the population. Even though the course is considered introductory, the population of 204 students represented a good cross-section of freshmen, sophomore, junior, and seniors enrolled in Auburn University. Data were analyzed to determine the change from pre test to post test scores by attitude and behavior separately.

Treatment

Classroom exposure was the primary form of treatment in the study. The class met two times a week for seventy-five minutes on Tuesdays and Thursdays. Class

lectures included but were not limited to sustainability and social responsibility, influence of brand, globalization, diffusion of innovation, and product life cycles. Students were also exposed to sustainability through guest lecturers, in-class videos, and class assignments. Students were required to read two books 'The Lexus and the Olive Tree' (Friedman, 1999) and 'Cradle to Cradle'(McDonough and Braungart, 2002), to gain further insight into the argument for a more sustainable lifestyle. Overall, the aim of the course was to provide students with a deeper understanding of sustainability, why it is important, and how they could adopt more sustainable behaviors in their everyday lives. The classroom exposure portion of the treatment started on January 8th and concluded on March 13th, 2008.

The other method of treatment used in the study was EFA. EFA was conducted using the 2002 Earth Day Ecological Footprint website (see Appendix B). The website was public and was accessible to anyone interested in understanding the way their lifestyle affects the Earth. EFA takes into account geographical location and consumption patterns and generates a value that represents how many biologically reproductive acres a given person's lifestyle consumes. Although EFA generated an actual value that was recorded, it was not used in statistical procedures. EFA was primarily used to raise awareness and educate students on the impact of their actions on the environment. The main aim of the study was to determine if classroom exposure and EFA can make students more sustainably oriented and change their attitudes and behaviors in relation to sustainability.

Data Collection Procedures

Data were collected after receiving Institutional Review Board approval for the Use of Human Subjects. Data were gathered through the use of a secure online survey engine, Survey Monkey. Data collected included a pre test and a post test (Appendix B & Appendix D).

Each student enrolled in the course was assigned a unique identification number by their instructor. The number was assigned according to the first letter of student's last names in alphabetical order. Students used this identification number through the course of the study. Only the instructor was able to tie the identification number to the identity of the participant. All data relayed to the researcher from the instructor included only the student identification number, not student's identity. Thus, the researcher did not know the identity of any participants, only their unique identification number. The only risk factor associated with participation in the study was breach of confidentiality, which was addressed through the use of the identification numbers, as well as the storage of data in secure online locations.

The pre and post tests were accessed by a web site link sent out to all students enrolled in the course. The web site gave students proper instructions on how to complete the survey and submit it in class for credit. Data generated were accessible by the researcher on the Survey Monkey website through a password protected account. Data remained accessible to the researcher throughout the course of the study.

At the beginning of the semester the instructor required students to take the pre test as an in-class assignment for which they received participation credit for completing.

Students took the pre test online after confirming that they were over the age of 19 and then entering in their unique identification number. The researcher was able to access the data through the online survey, where only identification numbers were used to identify respondents. The researcher recorded the identification numbers of those students who participated in the study. This list was passed on to the instructor to record the students' class participation grades. The pre test was used to determine existing student attitudes, perceptions, and behaviors (See Appendix B). The values generated by the pre test were used as the benchmark against which to measure changes in student attitudes, behaviors, and perceptions.

Following three weeks of classes, students were asked to complete the EFA. By this point, students had been exposed to a variety of topics in class, as well as reading and other out of class assignments. Some of the assignments included were lectures on sustainability and social responsibility, guest lecturers, as well as reading assignments which included "Cradle to Cradle'(McDonough and Braungart, 2002) and 'The Lexus and the Olive Tree'(Friedman, 1999). The instructor sent the class an email with the link and instructions to take the 2002 Earth Day Footprint Quiz (See Appendix C). The interactive online quiz asked students a variety of questions ranging from their geographic location to their consumption patterns. The 16 question quiz is composed of three sections, food, shelter, and mobility. After completing the questions, a quiz results page was generated based on answers given by the students. The quiz results page generated a total footprint, which was the sum of consumption patterns in relation to food, shelter, mobility, and goods and services. Students were asked to print this final

page with quiz results and submit it to their instructor with their name on it. The instructor entered the identification number and the overall total footprint into a spreadsheet for the researcher. Although the EFA generated a numerical value, it was not used in any statistical procedures. EFA was primarily used as a treatment to raise student awareness of the impact of their actions on the Earth. It was hoped that EFA would increase student's awareness and feeling of responsibility for their own actions.

The post test was assigned at mid-semester. The post test was considered an extra credit assignment that students could complete to receive 15 bonus points added onto their final course grade. Students under the age of 19 and those who did not wish to participate had other bonus opportunities worth an equal amount available to them to augment their class grade. Students received an email message from their instructor to follow instructions in order to take the pretest. After confirming they were over the age of 19, and entering in their identification number, students took the post test. The post test contained the same questions as the pre test, but in a different order to reduce test taker bias (Appendix D). The post test also included extra open ended questions which were not used in the study, but were used by the instructor to gauge student's understanding of the course. The results of the post test were accessible to the researcher through the Survey Monkey site. The instructor was given a list of student identification numbers of those who participated in the study. The instructor then gave students who completed the survey the extra credit points added onto their final course grade.

Instrumentation

The research instruments were designed to investigate the change in attitude and projected behaviors as a direct result of classroom exposure and EFA. Survey questions were adapted from open ended statements based on a model developed by Robertson (1983). The survey was also modeled after a questionnaire developed by Kagawa (2007) which was also based on Robertson's (1983) model. Kagawa's study investigated sustainability in graduate students. Survey questions were also adapted from an environmental student attitude survey administered at Colby College, as well as an environmental study conducted at Michigan State University (Mertig, 2003).

The pre and post test were designed to gather information about student attitudes. The attitude portion of the survey included 17 Likert-type questions on a scale of 1 to 5 ranging from strongly disagree to strongly agree. The questions addressed the students' general awareness and point of view in relation to sustainability. The behavior portion was composed of 18 questions on a Likert-type scale of 1-4 ranging from never to frequently. The behavior portion in the pre test addressed existing behaviors, whereas the post test addressed their projected behaviors. The remaining portion of the tests addressed demographic information about the population. The post test also included open ended questions asking students to define constructs such as social responsibility and recycling. The information from the open ended questions was used by the course instructor to evaluate the effectiveness of teaching methods, as well as to understand the depth of student growth.

Data Analysis

Following administration of the pre and post tests, and the EFA, the data were entered into SPSS, a computer program used to conduct statistical procedures. The researcher ran data analysis procedures to determine the change in student attitude and the difference between existing and projected behaviors. Paired T-tests were used to determine the change in student behaviors and attitudes.

IV. RESULT

The overall objective of the study was to investigate whether there was a significant change in student attitudes and behaviors in relation to sustainability following classroom exposure to sustainability. A total number of 204 undergraduate students participated in the study.

The study used a between subjects design, which examines differences between the pre and post test on attitude and behavior. The Paired samples t-test is an appropriate procedure to evaluate whether the mean of the difference between two repeated measures is significantly different from zero. Measures were taken on the pre- and post-test scores on the two dependent variables (attitudes and behaviors). Each subject had a score on each measure, and the paired scores were compared. The Global Consumer Culture and EFA were the intervention.

Table I.

Paired *t*-test Results for Changes in Attitude and Behavior

Pairs: Pre and Post Test	Mean	Standard Deviation	*t*-value	Df	significance
Attitude	-.737	6.184	-1.705	203	.090
Behavior	-4.073	13.432	-.432	203	.000*

* Denotes statistical significance at the .05 level

Results of the paired t-test indicated a statistically significant difference between the pre-test scores (M=47.98, SD=9.811) and post test scores (M=52.05, SD=10.39) for behavior (t_{204}=4.34, $p < .01$). The results were deemed statistically significant, because the p-value was less than .01. The total mean difference between the two measures was 4.07, which indicates a positive change in behavior from existing to projected behaviors. The standardized effect size, d was .30, which is a relatively small effect size. This indicates the mean of the difference score was fairly close to zero. The value of the d statistic ranges from negative infinity to positive infinity. The 95% confidence interval for the mean difference between the two test measures was -5.92 to -2.22. No statistically significant difference was found between the pre-test scores (M= 38.93, SD= 4.81) and post-test scores (M= 39.66, SD= 3.830) for attitude scores, (t_{204}= 1.70, p=.09). The change from pre test to post test for attitudes only changed .67. Although the change was positive, it was not large enough to be considered statistically significant.

V. DISCUSSION

The purpose of this study was to investigate whether classroom exposure to an environmental awareness course and EFA elicited a significant change in student attitudes and behaviors in relation to sustainability.

The first objective of the study was to determine if there was a significant change in student attitudes in relation to sustainability. The results indicated that there was not a significant change in student attitudes as a result of classroom exposure to an environmental awareness course. The results support the null hypothesis. The study does not support the claim that student attitudes would become more sustainably oriented as a result of classroom exposure to an environmental awareness course. However, it is interesting to note that although there were no statistically significant differences between pre and post test scores at the .05 level, the p-value was .09. This indicates that the results are close to being statistically significant, in order for them to be considered significant the p-value would need to be .05 or less. Although the results were not statistically significant, the change from pre to post test was positive and increased by .67.

The second objective was to investigate if there was a significant change in projected student behaviors in relation to sustainability. In the pre test students answered behavior questions based on their actions prior to the course. The post test questions

addressed what behaviors and actions students intended to conduct in the near future. A significant change was detected between the pre and post test in relation to behavior. This means that classroom exposure to an environmental awareness course did elicit a change between existing student behavior and their projected behaviors. Students did intend to act more sustainably through attempting to conserve water and energy, as well as recycle a variety of materials. The increase in behavior from existing behaviors to projected behaviors was 4.07. Since there was a significant change, the data does not support the null hypothesis, so the null hypothesis is rejected. The study supported the claim that there would be a positive change in student behaviors.

Implications of the Study

The methodology used and the results of this study will provide a data and information source to educators and researchers in a variety of different disciplines. Education about sustainability will continue to gain importance in the coming years, and providing educators with an understanding of effective ways to integrate sustainability into their curriculum is important.

The results of this study indicated that classroom exposure did elicit a change in behavior, but not in attitude. This could be a cue for educators to focus their education on introducing students to sustainable behaviors, and providing them with the means to integrate it into their lives. A possible cause for the change may be that students felt they already understood the concept of sustainability prior to the classroom exposure, but the course provided them with new ideas of how to integrate it into their behaviors through the classroom exposure. Once students were taught the behaviors, or made aware of

them, they decided to integrate them into their lifestyle. Providing students with the ways to act in a sustainable manner may make them more comfortable in adopting sustainable behaviors. Roger's (1962) model of adoption runs parallel to the process students go through in adopting new behaviors and evaluating them. The results of the study show the importance of providing students with the awareness of actual behaviors that they can adapt to their lives to make them more sustainably oriented.

Although attitudes did not have a statistically significant change, it is important to investigate reasons for the lack of change. Further studies may want to investigate how much and to what type of exposure the students had already been exposed. It may also be advisable to focus only on behavior or attitude and investigate the topics more in depth.

The findings in this study support some of the claims of existing literature. Ryu and Brody (2006) found that education on sustainability produced student scores on ecological footprints that reflected a more sustainably conscious student. Although this study did not use EFA as a form of measurement, it was found to be effective as a form of treatment. This research supports the findings of Kagawa (2007), Ryu and Brody (2006), McMillan et al. (2004) that education on sustainability can lead students to become more sustainably oriented. This study demonstrates how Roger's model of adoption (1962) can be used as a framework for teachers to use in developing sustainability courses. Teachers can lay out their course in a five-step progression starting with raising awareness. As the semester progresses teachers can introduce more ideas as well as provide students with ways to experiment with integrating sustainability into their lives. Students can then develop their own ideas of sustainability, by evaluating

their experiences and exposure to sustainability. This provides students with a way to be introduced to the basics of sustainability, while still allowing them the ability to decide for themselves how they feel about sustainability. Sustainability is an evolving idea, and this framework provides teachers with an outline to follow. Teachers can then address the issues and ideas they feel are most important.

It is hoped that the implications of the study will lead to a better understanding of effective methods of teaching sustainability to students. There are no existing standards or definitions for sustainability, due to a lack of research focusing on education and research. In order for educators to know exactly how to approach the topic of sustainability with students, teaching methods, definitions, and guidelines need to be developed and set. It is hoped that once students learn, they will be able to integrate what they have learned into their lives to become more sustainably oriented. In the near future, sustainability and environmentalism will play a large role in the quality of human life. Once effective methods for teaching university students have been identified, a wider spectrum of students and even the general public can be reached by using those methods. This study focused on the change in both attitudes and behaviors as a direct effect of classroom exposure. It may be advisable to investigate possible reasons for the lack in significance. Further studies may investigate behavior and attitude separately and more in depth to gain a better understanding of the actual change in students, as well as the stimulus for change based solely on one factor. Studying the two separately may generate more drastic results than studying the two together. Additional research may investigate the correlation between the two factors and how they affect one another. It

may be interesting to examine why the projected behavior changed, yet attitudes towards sustainability did not. This may indicate that students plan on attempting to be more sustainable, but are still somewhat skeptical.

The amount of time between the pre and post test may be interesting to examine in future research. In the current study, the pre test was conducted at the beginning of the semester, and the post test at mid-semester. It would be interesting to see if there is a greater change in students when the post test is administered at the end of the semester as opposed to the mid-semester.

Further research might experiment with conducting studies to investigate other variables that were present in the study, but were not investigated individually or used as a main dependent or independent variable in this particular study. Some of these factors are class standing, demographics, gender, and major. Conducting tests that analyze data by other control variables like age, gender, and college major would aid in gaining a further understanding of the development of sustainable attitudes and behaviors. Hypotheses relating to these variables could not be tested due to a population that was primarily 18 to 21 year old females majoring in fashion, interior design, hotel and restaurant management, and nutrition. Conducting ecological footprint analysis on students in a pre and post test manner would also provide interesting results. The current study used EFA primarily as a stimulus for change and was only recorded once. The actual value was not used in statistical calculations. It would be interesting to see if there is a change in EFA scores based on classroom exposure to an environmental awareness course.

Supplementary surveys of students could focus on what method of teaching (general classroom exposure, reading assignments, lectures, writing assignments, etc.) is the most effective in changing the way students act and think in relation to sustainability. It is important to determine and understand the approaches students find to have the most impact. Teachers can then use the form(s) or teaching methods that students find effective and which improve the effectiveness of sustainability education.

Researchers may want to conduct longitudinal studies on students to determine if changes in attitude and behavior are maintained. For example, by using freshman in the study and using follow-up questionnaires to measure their attitudes and behaviors on a yearly basis, one could obtain data for approximately four years on a subject. These results might shed light on whether the change in student attitudes and behaviors is maintained or if they go back to old habits and ways of thinking that are less sustainably and environmentally oriented. Longitudinal studies will provide researchers with more in depth data on the subjects and the change or lack of change in attitudes and behaviors. It may also help in determining specific barriers to change. Researchers can look at the students that did or did not change and investigate their justification for adopting sustainable behaviors, or maintaining less sustainable behaviors.

Significance

The world has a finite amount of resources, and sustainability's importance will continue to grow as the world population and demand for finite resources grows (Palmer, 1999). It is important for students to grasp an understanding of sustainability and the impact it will have on human life in the near future. Understanding how to raise

awareness of sustainability through education can provide methods to introduce to the general public the importance of sustainable practices in everyday life, such as energy conservation and environmentally conscious consumer behavior. This study can also be used as a model for further research of sustainability on education on Auburn University's campus as well as other campuses. Since Auburn University will be offering a Sustainability Minor, for the first time in the 2008-2009 school year, this research may provide a model for studying the change in student behaviors following the completion of the minor. The change in students' behavior could possibly be significant enough to warrant the push for further courses on sustainability and/or more extensive incorporation of existing sustainability oriented courses into various curricula. In addition, the research method can also be used as a model for other universities to evaluate the existing attitudes and behaviors of students in relation to sustainability on their campuses, and the short and long term impact of teaching courses on sustainability.

Limitations

The results of the study cannot be generalized to an entire population for a variety of reasons. A convenience sample was used in the study. Students were selected based on their enrollment in the spring Global Consumer Culture course; they participated in the study on a voluntary basis. It would be advisable to use a larger random sample that would be more representative of the entire student population.

It would be recommended to repeat the study a number of times in order to generalize the results to a larger sample. The study has only been run once, which means generalization is limited. The greater the numbers of students to take the course,

experience the classroom exposure, and participate in the study, the greater the ability to generalize results to a larger student population. Repeating the study multiple times will increase the sample size, which may aid in detecting additional differences the researcher might have initially missed. It would also be interesting to test the same students longitudinally to determine if the change in attitudes and behaviors is permanent or if the change is short-term and only due to the novelty of learning about and being exposed to a new topic.

Conclusion

The results of this study will provide academic researchers in a variety of different disciplines with information related to education on sustainability and the effects of classroom exposure on the change in student attitudes and behaviors. This study should be of assistance to educators, academic researchers and environmentalists, as well as other persons involved in the sustainability movement. Sustainability will affect a broad spectrum of disciplines in the near future, and providing adequate education on this topic is necessary for the integration of it into everyday life. In order for people to start the process of adopting sustainability into their lives, they need education to raise their awareness.

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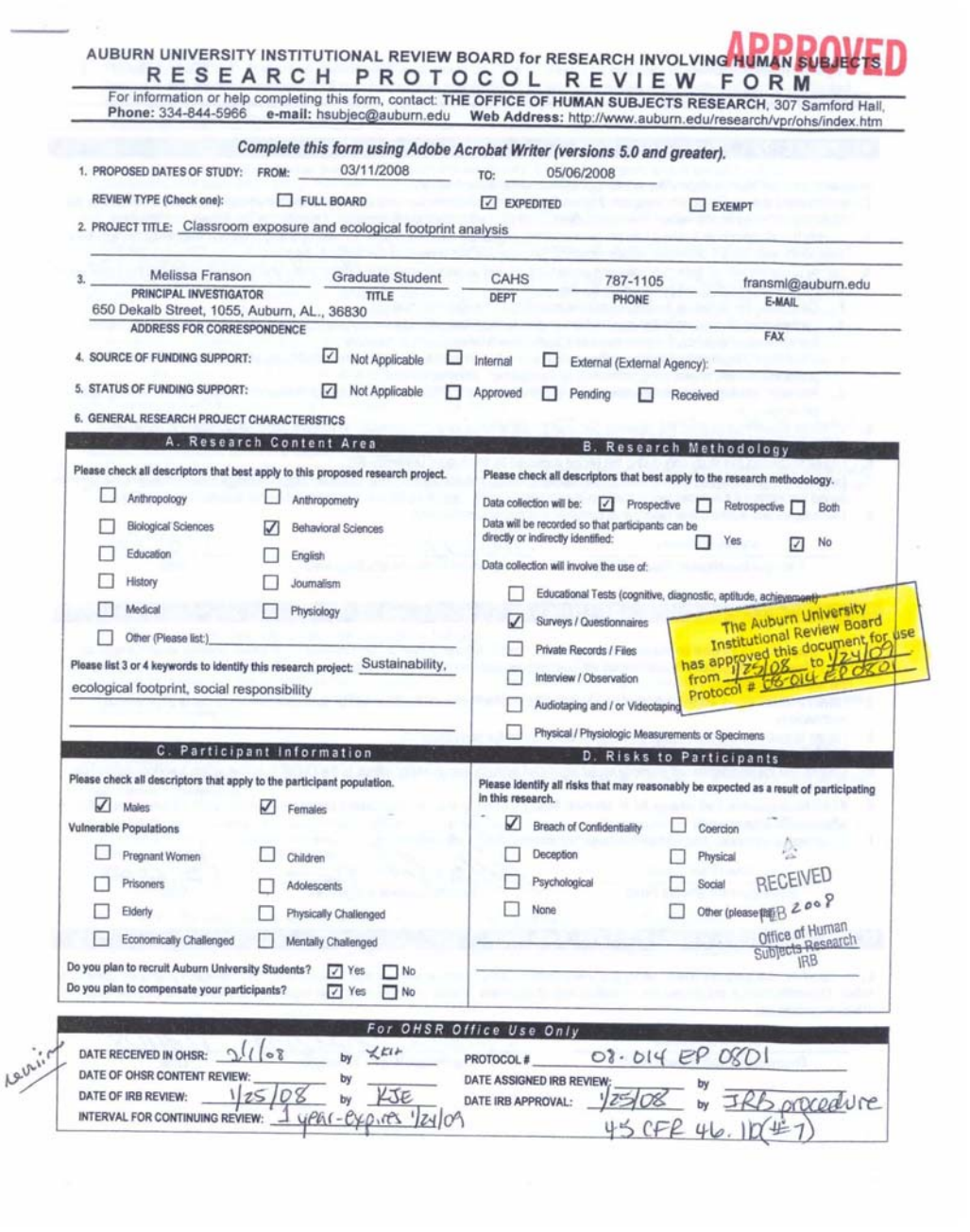
APPENDICES

Appendix (A) Human Subjects Approval



APPROVED

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS

RESEARCH PROTOCOL REVIEW FORM

For information or help completing this form, contact: THE OFFICE OF HUMAN SUBJECTS RESEARCH, 307 Samford Hall,
Phone: 334-844-5966 e-mail: hsubjec@auburn.edu Web Address: http://www.auburn.edu/research/vpr/ohs/index.htm

Complete this form using Adobe Acrobat Writer (versions 5.0 and greater).

1. PROPOSED DATES OF STUDY: FROM: 03/11/2008 TO: 05/06/2008

REVIEW TYPE (Check one): ☐ FULL BOARD ☑ EXPEDITED ☐ EXEMPT

2. PROJECT TITLE: Classroom exposure and ecological footprint analysis

3. Melissa Franson (PRINCIPAL INVESTIGATOR) | Graduate Student (TITLE) | CAHS (DEPT) | 787-1105 (PHONE) | fransml@auburn.edu (E-MAIL)
650 Dekalb Street, 1055, Auburn, AL., 36830 (ADDRESS FOR CORRESPONDENCE) | (FAX)

4. SOURCE OF FUNDING SUPPORT: ☑ Not Applicable ☐ Internal ☐ External (External Agency):

5. STATUS OF FUNDING SUPPORT: ☑ Not Applicable ☐ Approved ☐ Pending ☐ Received

6. GENERAL RESEARCH PROJECT CHARACTERISTICS

A. Research Content Area

Please check all descriptors that best apply to this proposed research project.

☐ Anthropology ☐ Anthropometry
☐ Biological Sciences ☑ Behavioral Sciences
☐ Education ☐ English
☐ History ☐ Journalism
☐ Medical ☐ Physiology
☐ Other (Please list:)

Please list 3 or 4 keywords to identify this research project: Sustainability, ecological footprint, social responsibility

B. Research Methodology

Please check all descriptors that best apply to the research methodology.

Data collection will be: ☑ Prospective ☐ Retrospective ☐ Both
Data will be recorded so that participants can be directly or indirectly identified: ☐ Yes ☑ No
Data collection will involve the use of:

☐ Educational Tests (cognitive, diagnostic, aptitude, achievement)
☑ Surveys / Questionnaires
☐ Private Records / Files
☐ Interview / Observation
☐ Audiotaping and / or Videotaping
☐ Physical / Physiologic Measurements or Specimens

The Auburn University Institutional Review Board has approved this document for use from 1/25/08 to 1/24/09 Protocol # 08-014 EP 0801

C. Participant Information

Please check all descriptors that apply to the participant population.

☑ Males ☑ Females

Vulnerable Populations

☐ Pregnant Women ☐ Children
☐ Prisoners ☐ Adolescents
☐ Elderly ☐ Physically Challenged
☐ Economically Challenged ☐ Mentally Challenged

Do you plan to recruit Auburn University Students? ☑ Yes ☐ No
Do you plan to compensate your participants? ☑ Yes ☐ No

D. Risks to Participants

Please identify all risks that may reasonably be expected as a result of participating in this research.

☑ Breach of Confidentiality ☐ Coercion
☐ Deception ☐ Physical
☐ Psychological ☐ Social
☐ None ☐ Other (please list)

RECEIVED JAN 2008 Office of Human Subjects Research IRB

For OHSR Office Use Only

DATE RECEIVED IN OHSR: 1/1/08 by KEH PROTOCOL # 08-014 EP 0801
DATE OF OHSR CONTENT REVIEW: ____ by ____ DATE ASSIGNED IRB REVIEW: ____ by ____
DATE OF IRB REVIEW: 1/25/08 by KJE DATE IRB APPROVAL: 1/25/08 by IRB procedure 45 CFR 46.101(#7)
INTERVAL FOR CONTINUING REVIEW: 1 year - Expires 1/24/09

revision

Appendix B

Pre-Test

CAHS 2000 Survey

1. ATTITUDES AND PERCEPTIONS

1. Please select the following that best reflects your opinion. Please select only one per row.

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE
I am aware of general environmental issues.	○	○	○	○	○
I am not concerned with the state of the environment.	○	○	○	○	○
I am willing to adopt more sustainable practices in my everyday life.	○	○	○	○	○
I am interested in learning more about sustainability.	○	○	○	○	○
I worry that future generations will suffer, due to environmental depletion.	○	○	○	○	○
Humans will eventually learn enough about how nature works to control it.	○	○	○	○	○
Despite our special abilities, humans are still subject to the laws of nature.	○	○	○	○	○
The so called "ecological crisis" facing humankind has been greatly exaggerated.	○	○	○	○	○

2. Please select the following answer that best reflects your opinion. Please select only one response per statement.

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
It is important to use recycled materials whenever possible.	○	○	○	○	○
I feel guilty when I am wasteful with resources.	○	○	○	○	○
I feel that alternative methods of power should be the primary source of energy in the future.	○	○	○	○	○
Companies should integrate sustainability into their offices, practices, and products.	○	○	○	○	○
The government should impose more regulations on energy and product design/distribution to make them more sustainable.	○	○	○	○	○

CAHS 2000 Survey

3. Please select the following answer that best reflects your opinion. Please select only one response per statement.

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Protecting the environment should be given priority, even at the risk of slowing economic growth.	◯	◯	◯	◯	◯
I think sustainability is a waste of time and effort.	◯	◯	◯	◯	◯
The Earth has plenty of natural resources for future generations.	◯	◯	◯	◯	◯
I am a passionate advocate for sustainability.	◯	◯	◯	◯	◯

4. Please determine whether the following reasons played a major, minor, or no reason in why you do not do more on behalf of the environment. Circle one response per row.

	Major Reason	Minor Reason	Not A Reason
I am too busy.	◯	◯	◯
Not enough people are making sacrifices, I cannot solve the problem alone.	◯	◯	◯
The government and companies, not people, should solve problems.	◯	◯	◯

5. Please determine whether the following reasons played a major, minor, or no reason at all in why you do not do more on behalf of the environment.

	Major Reason	Minor Reason	Not A Reason
I am unsure of what products are considered sustainable.	◯	◯	◯
Sustainable products are too expensive.	◯	◯	◯
It is hard to find sustainable products.	◯	◯	◯
People will think I am not cool if I show concern for the environment.	◯	◯	◯

2. BEHAVIOR

CAHS 2000 Survey

9. Please select one of the following that best reflects the frequency of how often you performed these actions in the past year.

	Frequently	Sometimes	Rarely	Never
I buy products with as little packaging as possible.	◯	◯	◯	◯
I use my own shopping bag, to reduce the use of plastic and paper bags.	◯	◯	◯	◯
I reuse paper products.	◯	◯	◯	◯
I wash and reuse dish towels rather than buying new ones or paper towels.	◯	◯	◯	◯
I reuse plastic containers (margarine, etc).	◯	◯	◯	◯

10. Please check the following items that you recycle on a monthly basis.

- ☐ Glass
- ☐ Newspaper
- ☐ Food Cans
- ☐ Drink Cans
- ☐ Junk Mail
- ☐ Foil
- ☐ Cardboard
- ☐ Textiles
- ☐ Plastic Bottles
- ☐ Magazines
- ☐ I do not recycle
- ☐ Other

3. DEMOGRAPHICS

Please fill out demographic information as it applies to you.

11. I am a _____.

- ◯ Male
- ◯ Female

12. I am a _____.

- ◯ Freshman
- ◯ Sophomore
- ◯ Junior
- ◯ Senior

CAHS 2000 Survey

6. Please indicate which of the following best reflects your actions or behaviors in the past year. Please select only one per row.

	Frequently	Sometimes	Rarely	Never
I have purchased a product instead of another because it was packaged in a reusable or recyclable container.	◯	◯	◯	◯
I have avoided buying from a company which showed disregard for the environment.	◯	◯	◯	◯
I have picked up litter and/or trash.	◯	◯	◯	◯
I have recycled glass bottles, aluminum cans, or jars.	◯	◯	◯	◯
I have recycled other materials.	◯	◯	◯	◯
I have made a conscious effort to conserve energy.	◯	◯	◯	◯
I have made a conscious effort to conserve water.	◯	◯	◯	◯
I have made a conscious effort to use public transportation.	◯	◯	◯	◯

7. Please indicate which of the following best reflects your actions or behaviors in the past year. Please select only one per row.

	Frequently	Sometimes	Rarely	Never
I have pursued information to learn more about sustainability.	◯	◯	◯	◯
I have discussed environmental issues with others.	◯	◯	◯	◯
I have supported or voted "pro" environmental laws, regulations, and programs.	◯	◯	◯	◯
I have chosen to read publications that focus on sustainability.	◯	◯	◯	◯
I have chosen to watch TV programs that focus on environmental issues and sustainability.	◯	◯	◯	◯
I have enrolled in a course for the sole purpose learning more about the environment and sustainability.	◯	◯	◯	◯

8. Please indicate which of the following best reflects your actions or behaviors in the past year. Please select only one per row.

	Frequently	Sometimes	Rarely	Never
I have encouraged others to take action on behalf of the environment.	◯	◯	◯	◯

Appendix (C)

Ecological Footprint

let's start

How old are you?

---->>

How big is the city, town, or place where you live?

---->>

What city has the most similar weather to yours?

---->>

Choose one:

---->>

Please enter your zip code. (Optional)

Email Address. (Optional)

ecological footprint QUIZ

Ever wondered how much "nature" your lifestyle requires? You're about to find out.

This Ecological Footprint Quiz estimates how much productive land and water you need to support what you use and what you discard. After answering 15 easy questions you'll be able to compare your Ecological Footprint to what other people use and to what is available on this planet.

CAUTION: THIS QUIZ MAY SURPRISE YOU, SHOCK YOU, OR MAKE YOU THINK. PLEASE REMAIN CALM...BUT NOT TOO CALM!!

earthdaynetwork REDEFINING PROGRESS

Food Footprint

1. How often do you eat animal based products? (beef, pork, chicken, fish, eggs, dairy products)

- (●) Never (vegan)
- ( ) Infrequently (no meat, and eggs/dairy a few times a week) (strict vegetarian)
- ( ) Occasionally (no meat or occasional meat, but eggs/dairy almost daily)
- ( ) Often (meat once or twice a week)
- ( ) Very often (meat daily)
- ( ) Almost always (meat and eggs/dairy in almost every meal)

2. How much of the food that you eat is processed, packaged and not locally grown (from more than 200 miles away)?

- (●) Most of the food I eat is processed, packaged, and from far away
- ( ) Three quarters
- ( ) Half
- ( ) One quarter
- ( ) Very little. Most of the food I eat is unprocessed, unpackaged and locally grown.

Goods Footprint

3. Compared to people in your neighborhood, how much waste do you generate?

- (●) Much less
- ( ) About the same
- ( ) Much more

Shelter Footprint

4. How many people live in your household?

- (●) 1 person
- ( ) 2 people
- ( ) 3 people
- ( ) 4 people
- ( ) 5 people
- ( ) 6 people
- ( ) 7 or more people

5. What is the size of your home?

- (●) 2500 square feet or larger
- ( ) 1900-2500 square feet
- ( ) 1500-1900 square feet
- ( ) 1000 -1500 square feet
- ( ) 500-1000 square feet
- ( ) 500 square feet or smaller

6. Which housing type best describes your home?

- (●) Free standing house without running water
- ( ) Free standing house with running water

- ◯ Multi-story apartment building
- ◯ Row house or building with 2-4 housing units
- ◯ Green-design residence

7. Do you have electricity in your home?

- ◉ No
- ◯ Yes
- ◯ Yes, with energy conservation and efficiency

Mobility Footprint

8. On average, how far do you travel on public transportation each week (bus, train, subway or ferry) ?

- (•) 200 miles or more
- ( ) 75-200 miles
- ( ) 25-75 miles
- ( ) 1-25 miles
- ( ) 0 miles

9. On average, how far do you go by motorbike each week (as a driver or passenger)?

- (•) 200 miles or more
- ( ) 75-200 miles
- ( ) 25-75 miles
- ( ) 1-25 miles
- ( ) 0 miles

10. On average, how far do you go by car each week (as a driver or passenger)?

- (•) 400 miles or more
- ( ) 300-400 miles
- ( ) 200-300 miles
- ( ) 100-200 miles
- ( ) 10-100 miles
- ( ) 0 miles

11. Do you bicycle, walk, or use animal power to get around?

- (•) Most of the time
- ( ) Sometimes
- ( ) Seldom

12. Approximately how many hours do you spend flying each year?

- (•) 100 hours
- ( ) 25 hours
- ( ) 10 hours
- ( ) 3 hours
- ( ) Never fly

ecological footprint QUIZ

13. How many miles per gallon does your motorbike get?

- (•) More than 80 miles per gallon
- ( ) 65 - 80 miles per gallon
- ( ) 45-65 miles per gallon
- ( ) 30-45 miles per gallon
- ( ) less than 30 miles per gallon

14. How often do you ride your motorbike with someone else, rather than alone?

- (•) Almost never
- ( ) Occasionally (about 25%)
- ( ) Often (about 50%)
- ( ) Very often (about 75%)
- ( ) Almost always

15. How many miles per gallon does your car get? (If you do not own a car, estimate the average fuel efficiency of the cars you ride in.)

- (•) More than 50 miles per gallon
- ( ) 35-50 miles per gallon
- ( ) 25-35 miles per gallon
- ( ) 15-25 miles per gallon
- ( ) Fewer than 15 miles per gallon

16. How often do you drive in a car with someone else, rather than alone?

- (•) Almost never
- ( ) Occasionally (about 25%)
- ( ) Often (about 50%)
- ( ) Very often (about 75%)
- ( ) Almost always

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quiz results

bookmark this page

CATEGORY	ACRES
FOOD	2.7
MOBILITY	11.4
SHELTER	4.4
GOODS/SERVICES	10.9
TOTAL FOOTPRINT	**29**

IN COMPARISON, THE AVERAGE ECOLOGICAL FOOTPRINT IN YOUR COUNTRY IS 24 ACRES PER PERSON.

WORLDWIDE, THERE EXIST 4.5 BIOLOGICALLY PRODUCTIVE ACRES PER PERSON.

IF EVERYONE LIVED LIKE YOU, WE WOULD NEED 6.6 PLANETS.

DONATE

ecological footprint QUIZ

ECOLOGICAL FOOTPRINT CAMPAIGN
- About the Footprint Quiz
- Support the EF Quiz

EMAIL
- Email a Friend
- Email Results to Yourself

WHAT YOU CAN DO
- For more information visit Earth Day Network
- For more information visit Redifining Progress

COMMENTS AND QUESTIONS
- Comment on the Footprint Quiz
- Frequently Asked Questions (FAQ)

RESET

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Appendix (D)

Post Test

CAHS 2000 Post Test

1. INFORMATION LETTER

AUBURN UNIVERSITY COLLEGE OF HUMAN SCIENCES
DEPARTMENT OF CONSUMER AFFAIRS
308 SPIDLE HALL
AUBURN, AL. 36849
334-844-4084

INFORMATION LETTER
for a Research Study entitled
"CLASSROOM EXPOSURE AND ECOLOGICAL FOOTPRINT ANALYSIS ACROSS COLLEGE STUDENTS"

You are invited to participate in a research study to raise awareness in sustainability through education and ecological footprint analysis. The study is being conducted by Melissa Franson, Graduate Student in Consumer Affairs, under the direction of Dr. Shari Park-Gates, Assistant Professor of Interior Design, in the Auburn University Department of Consumer Affairs. You were selected as a possible participant because you are enrolled in the Global Consumer Culture course and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete an online survey relating to your experience in the CAHS 2000 class and attitudes and behaviors in relation to sustainability. You will also be asked for permission for your CAHS 2000 instructor to share your pre test and ecological footprint data identified by your randomly assigned number.

Are there any risks or discomforts? A risk factor you could encounter by participating in the study is breach of confidentiality. Breach in confidentiality is being addressed by assigning students a unique identification number by their instructor. The instructor will be the only individual with knowledge of the correlation between the identification number and your identity. The researcher will only be able to access the data after the instructor has taken the measures to ensure the confidentiality of the participants.
Are there any benefits to yourself or others? If you participate in this study, you can expect to gain insight into the roles people play in relation to the depletion of the environment, as well as information on what can be done to reduce the impacts. You will also have the satisfaction of contributing data and information to the further understanding of sustainability and the preservation of natural resources.

Will you receive compensation for participating? To thank you for your time you will be eligible for 15 bonus points to be added to your final total points (800 points) for the course. Students are given many opportunities throughout the semester to earn extra credit and can earn up to 30 points total to be added to their final point total. See class syllabus for further explanation.
If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or stop participating will not jeopardize your future relations with Auburn University, and the Department of Consumer Affairs.
Your privacy will be protected. Any information obtained in connection with this study will remain anonymous. Information obtained through your participation may be used to fulfill an education requirement as well as in a presentation at a professional meeting.

If you have questions about this study, please ask them now or contact Melissa Franson at fransml@auburn.edu or Dr. Shari Park Gates at slp0004@auburn.edu.
If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or email at hsubjec@auburn.edu or IRBChair@auburn.edu.

If you are under the age of 19, please exit the website and do not complete the questionnaire.
HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY.

THE DATA YOU PROVIDE WILL INDICATE YOUR WILLINGNESS TO PARTICIPATE IN THE STUDY. PLEASE MOVE ON TO THE NEXT SEGMENT OF THE SURVEY.

*** 1. Please enter in your unique user ID assigned by your instructor.**

CAHS 2000 Post Test

2. ATTITUDES AND PERCEPTIONS

Please select the following answer that best reflects your opinion. Please select only one response per statement.

*** 1. I am aware of general environmental issues.**

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

*** 2. I am not concerned with the state of the environment.**

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

*** 3. I am willing to adopt more sustainable practices in my every-day life.**

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

*** 4. I am interested in learning more about sustainability and the environment.**

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

5. I think sustainability is a waste of time and effort.

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

*** 6. I feel guilty when I am wasteful with resources.**

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

*** 7. It is important to use recycled materials, whenever possible.**

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

*** 8. Protecting the environment should be given priority even at the risk of slowing economic growth.**

◯ Strongly Disagree
◯ Disagree
◯ Neither Agree Nor Disagree
◯ Agree
◯ Strongly Agree

*** 9. Despite our special abilities, humans are still subject to the laws of nature.**

◯ Strongly Disagree ◯ Disagree ◯ Neither Agree Nor Disagree ◯ Agree ◯ Strongly Agree

CAHS 2000 Post Test

*** 10. Humans will eventually learn enough about how nature works to be able to control it.**

○ Strongly Disagree ○ Disagree ○ Neither Agree Nor Disagree ○ Agree ○ Strongly Agree

*** 11. The Earth has plenty of natural resources for future generations.**

○ Strongly Disagree ○ Disagree ○ Neither Agree Nor Disagree ○ Agree ○ Strongly Agree

*** 12. I worry that future generations will suffer, due to the depletion of the environment.**

○ Strongly Disagree ○ Disagree ○ Neither Agree Nor Disagree ○ Agree ○ Strongly Agree

*** 13. The so-called "ecological crisis" facing humankind has been greatly exaggerated.**

○ Strongly Disagree ○ Disagree ○ Neither Agree Nor Disagree ○ Agree ○ Strongly Agree

*** 14. The government should impose more regulations on product design and distribution.**

○ Strongly Disagree
○ Disagree
○ Neither Agree Nor Disagree
○ Agree
○ Strongly Agree

*** 15. Companies should focus on creating and using more sustainable products.**

○ Strongly Disagree ○ Disagree ○ Neither Agree Nor Disagree ○ Agree ○ Strongly Agree

*** 16. I feel that alternative methods of power generation will be the primary source of energy in the future.**

○ Strongly Disagree ○ Disagree ○ Neither Agree Nor Disagree ○ Agree ○ Strongly Agree

3. BEHAVIOR

Please indicate which of the following best reflects your intentions for the frequency of future behaviors in relation to sustainability. Please select only one response per row.

*** 1. I will purchase a product because it is packaged in reusable or recyclable containers.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

CAHS 2000 Post Test

*** 2. I will avoid buying from companies that show disregard for the environment.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 3. I will pick up litter and/or trash.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 4. I will recycle glass bottles, aluminum cans, or jars.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 5. I will recycle other materials.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 6. I will make a conscious effort to conserve energy.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 7. I will make a conscious effort to conserve and use less water.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 8. I will use public transportation or car pool.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 9. I will pursue information in order to learn more about sustainability.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 10. I will discuss environmental issues with others.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 11. I will read publications that focus on or promote sustainability.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 12. I will watch television programs that focus on and/or promote sustainability.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 13. I will support and/or vote for "pro" environmental laws, regulations, and programs.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 14. I will enroll in a course on sustainability to gain further understanding.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 15. I will encourage others to do more on behalf of the environment.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

CAHS 2000 Post Test

*** 16. I will purchase products with as little packaging as possible.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 17. I will use my own shopping bag.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 18. I will re-use or recycle paper products.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 19. I will re-use plastic containers.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 20. I will use cloth dish towels in place of paper towels.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 21. I will encourage friends and family to learn more about sustainability.**

○ Never ○ Rarely ○ Sometimes ○ Usually ○ Always

*** 22. Please check the following items that you plan to recycle on a monthly basis in the future.**

- ☐ Glass
- ☐ Newspaper
- ☐ Food Cans
- ☐ Aluminum Cans
- ☐ Junk Mail
- ☐ Aluminum Foil
- ☐ Cardboard
- ☐ Plastic Bottles
- ☐ Magazines
- ☐ Ink Cartridges
- ☐ Other
- ☐ I do not plan on recycling.

4. BEHAVIOR CONT.

Please determine which of the following factors played a major, minor, or no role in preventing you from doing more on behalf of the environment. Please select only one response per row.

*** 1. I am too busy.**

○ Major Reason
○ Minor Reason
○ Not a Reason

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*** 2. People will think I am not cool if I show concern for the environment.**

- ◯ Major Reason
- ◯ Minor Reason
- ◯ Not a Reason

*** 3. Not enough people are making sacrifices, so why should I?**

- ◯ Major Reason
- ◯ Minor Reason
- ◯ Not a Reason

*** 4. I am unsure of what products are considered to be sustainable.**

- ◯ Major Reason
- ◯ Minor Reason
- ◯ Not a Reason

*** 5. Sustainable products are too expensive.**

- ◯ Major Reason
- ◯ Minor Reason
- ◯ Not a Reason

*** 6. It is difficult to locate sustainable products.**

- ◯ Major Reason
- ◯ Minor Reason
- ◯ Not a Reason

*** 7. The government not individuals should be responsible for developing a solution to environmental problems.**

- ◯ Major Reason
- ◯ Minor Reason
- ◯ Not a Reason

5. OPEN ENDED QUESTIONS

In your own words please define the following terms.

*** 1. GLOBALIZATION**

*** 2. SUSTAINABILITY**

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*** 3. SOCIAL RESPONSIBILITY**

*** 4. RECYCLING**

*** 5. What did you find to be the most effective method of learning about sustainability?**

- ◯ Classroom Exposure and Lectures
- ◯ Ecological Footprint Analysis
- ◯ Required Readings
- ◯ Speakers
- ◯ None of the Above
- ◯ Other

Other (please specify)

6. Please comment about what you have liked, disliked, or found insteresting about this course.

6. DEMOGRAPHICS

In order to more fully understand people's responses to the previous questions, it is necessary to have a general understanding of the participats. Remember that responses will be kept confidential.

*** 1. I am a _____.**

- ◯ Male
- ◯ Female

*** 2. I am _____ years old.**

*** 3. My major is _____.**

4. In what type of area did you spend most of your childhood (up to 18 years of age)? Please check one of the following.

- ◯ Rural Farm
- ◯ Rural, Non-Farm (2,500 people or fewer)
- ◯ Small Town (Between 2,501 and 25,000 people)
- ◯ Urban Area (Between 25,001 and 100,000 people)
- ◯ Metropolitan Area (More than 100,000 people)
- ◯ Unsure

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*** 5. Please select which of the following best reflects your class standing at Auburn University.**

- ◯ Freshman
- ◯ Sophomore
- ◯ Junior
- ◯ Senior

6. Which of the following best reflects your primary residence?

- ◯ Free Standing Home
- ◯ Multi-Story Apartment Building
- ◯ Single Story Apartment Building
- ◯ Duplex
- ◯ town home
- ◯ Green Design Residence
- ◯ Other

7. CONFIRMATION

Yes, I give my CAHS 2000 instructor permission to share the results of my pre-test and ecological footprint, with the researcher, Ms. Franson. I understand that the
pre-test and ecological footprint data will be identified by only my unique , randomly assigned identification number.

1. Please re-enter your randomly assigned number.