

**ATTITUDES OF UNDERGRADUATES  
TOWARDS  
ENVIRONMENTAL SUSTAINABILITY**

by

Samantha Loprinzo

A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Bachelor of Science in Resource Economics with Distinction.

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## **ABSTRACT**

This study serves to analyze if there is a difference in the environmental concerns among undergraduates at the University of Delaware based on year in college, gender, and/or major. An electronic survey was designed to evaluate students' attitudes, behaviors, values, and awareness.

In Fall 2008, 1500 undergraduate students at the University of Delaware (also referred to as UD in this report) were drawn from a random sample of environmental and non-environmental majors. The survey was sent out and remained open for a month, at which time a response rate of 34.8% was received.

The results will be useful in determining what issues need to be emphasized across campus and if demographics are correlated to students' environmental concerns.

## **Chapter 1**

### **INTRODUCTION**

Environmental sustainability has been a pressing issue in society for decades. Early recognition of environmental value dates back as far as Henry David Thoreau in 1845 when he spread the idea that humans are a part of nature (ecotopia.org). However, better known developments began in the 1960s and '70s with laws such as the National Environmental Policy Act and the Endangered Species Act. For a long time, this movement involved a designated group of activists often thought of as hippies and leftists. Today, it has infiltrated minds across the world.

Increasingly, there has been a shift in the attitudes of society members towards reducing their carbon footprint. This shift is evident from the “eco-friendly” labels on countless products and, most recently, President Obama’s push for researching renewable energy sources (whitehouse.gov). What is not evident is people’s perception of the degree to which they must take action. Encouraging people to recycle and shut off lights when they leave the room has been moderately simple. The more difficult issue is successfully encouraging lifestyle changes. For example, investment in renewable technologies will cost more money initially. While the long-term payoff is greater, convincing people to spend extra money is difficult, especially in the current economy. Yet, this does not change the fact it is a better “long-run” decision for the environment.

All signs point to environmental sustainability being a positive change for society. The energy sources would never deplete, efficiency would save money,



and countless jobs would emerge. But do the members of society feel this is the right path to take and are they willing to make the effort?

While there is widespread support for protecting the environment, the level of awareness and willingness to commit to different lifestyles is where the setback lies. This research study attempts to gain better insight into how a select population feels towards environmental sustainability, specifically identifying the attitudes of undergraduate students at the University of Delaware towards environmental sustainability. While perhaps not representative of society as a whole, the study serves to provide insight into the younger, well-educated (to be) segment of the population.

### Statement of Purpose

The impact of the human species on the natural environment has become clearly evident and, instead of arguing this point, the issue is now changing to what can be done. People understand what the small things that can be done are, but they may not realize the benefits of truly committing to a more eco-friendly lifestyle. A strong need for increased awareness still exists. As people become more educated on the issues, they may take personal steps favoring the environment. Thus far, society has started demanding “eco-friendly” products and energy from renewable sources. But how far are they willing to go to reduce their own carbon footprint?

Delaware seemed like a good place to tackle this question because the residents have shown support for offshore wind farms, as indicated in a survey<sup>1</sup>

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<sup>1</sup> A copy of the survey can be found at <http://www.ocean.udel.edu/windpower/docs/FinalDNRECOpinionReport.pdf>

conducted by Professor Kempton of the Marine and Earth Studies Department at the University of Delaware. They also indicated a willingness to pay more for energy from renewable sources, if needed. With that being said, the focus of this study is to determine if these opinions are representative of another population, the undergraduate students at the University of Delaware. Do the opinions of University of Delaware students correlate with the overall Delaware population? And, for that matter, do the students even care about their effect on the environment?

This study serves to not only evaluate where students stand on different aspects of environmental sustainability, but it will also boost awareness for initiatives around campus. Specifically, the objective of this study is to determine if the attitudes, behaviors, values and awareness of undergraduate students towards environmental sustainability differ by year in college, gender, and/or major. The desired goal of the project is to determine if these factors play a role in shaping an individual's opinions. From there, it will serve as a tool in allowing the University to focus efforts meant to increase awareness and action in specific areas and towards specific groupings of students.

### Content of Study

In addition to the introduction, this study is divided into five chapters. The second is a review of literature, which focuses on similar surveys conducted by various institutions. The survey methodology used in this study is explained in the third chapter. The fourth chapter describes the statistical analysis techniques used to obtain the results of the survey. The fifth chapter presents the results of a survey used

to gauge students' attitudes, behaviors, values, and awareness related to environmental issues. In the sixth and final chapter, the conclusions of the study will be drawn.

## **Chapter 2**

### **REVIEW OF LITERATURE**

Surveys have been used countless times to collect data from a population of individuals. Accordingly, there have been surveys conducted by various institutions attempting to gather and analyze students' knowledge and/or opinions on environmental issues.

#### Surveys by other institutions

In any survey, asking the right questions and framing the questions correctly are the most important steps in the process. Using other surveys as a starting point was an important element for this study. A review of these studies helped determine how the questions were organized, how the survey was conducted, and how to best phrase the questions in order to relay the intended meaning.

Surveys conducted by Macalaster College (Harbison 2000), the University of South Carolina (Pendarvis 2001), Tulane University (Culley 2003), the University of Colorado (Spring 2003 Student Environmental Survey 2003), Michigan State University (Mertig 2003), the Kentucky Environmental Education Council and the University of Kentucky Survey Research Center (The 2004 Survey of Kentuckians'

Environmental Knowledge, Attitudes, and Behaviors 2004), Colby College (Environmental Attitudes Student Survey 2004), and the University of Minnesota (Department of Survey Research 2008) were reviewed. Each survey attempted to gain insight into its students' attitudes for environmental sustainability, but each varied in terms of questions and methodology.

In 2000, a group of Macalaster College students' conducted a survey as part of their senior project, which targeted students and faculty and staff. The one page survey was sent out via regular mail and, knowing the generally low response rate for this type, was only one page in length. The key element of their survey was that they gave no indication it was done by an environmental studies group. Supposedly, this led the respondents to be unbiased. The responses indicated that students and faculty/staff held little regard for environmental issues and unless they were encouraged to support them, they generally did not. It was suggested that, since the respondents did not seem opposed to environmental issues, the Environmental Studies department promote these topics around the campus to get the community thinking about them.

The University of South Carolina conducted a survey of its undergraduate students in 2001. The main purpose of this survey was to analyze what issues students believed were important and what the best means of communication would be to advertise environmental issues in order to increase their awareness. Results showed that, understandably, in 2001, terrorism was the biggest issue of concern.

Environmental issues ranked sixth out of seventeen choices, one being “I don’t know”. The best sources of advertisement were shown to be posters and word of mouth. The survey also touched on students’ behaviors and concern levels by asking about their involvement in sustainable activities. The results show that many students on this campus are passively concerned about environmental problems. This was reflected in their answers to behavioral questions, which revealed that many take action to help the planet, but only if it requires little effort.

In 2003, Tulane University conducted a telephone survey, questioned student focus groups, and used campus greenhouse gas inventory to evaluate how to best reduce greenhouse emissions on campus while raising awareness. The phone surveys allowed the University’s research team to determine if their climate change campaigns had a strong impact by comparing their general knowledge before, using data from a study done in 2001, and after the campaigns took effect. From this piece of the study, the general knowledge of the student body seemed to slightly decline. The focus groups allowed the team to compare students’ opinions of climate change over a two-year period. The results from conversations within the focus groups revealed that the student body, as a whole, is not environmentally concerned because the students have high socio-economic statuses. The need to be concerned with the environment was not impressed on them from a young age. This, coupled with a lack of understanding that an individual does impact climate change, led to little activism regarding the environment.

The University of Colorado conducted a telephone survey of its students in 2003. Overall, the survey was well-rounded, covering issues such as awareness, behavior, attitudes, and general opinions about proposed actions. The students at Colorado were in favor of environmental action and even said they were willing to pay more for energy from renewable sources and organic food options. They supported the use of recycled paper and a ban of chemical pesticides. The awareness of students produced interesting results. More than half were not aware of the Environmental Center at the University, but majority of the students were aware of initiatives that the Center promoted around campus.

Michigan State University conducted the same survey of its freshmen in Fall 2000 and Spring 2003. This survey asked about the relationship between humans and the environment, students' behaviors towards the environment, their awareness of general environmental issues, and personal background information. In the first section mentioned, the students were asked to what level they agreed with various statements dealing with human impact on the environment and their role within in it. The Behavioral section surveyed how often students had taken different environmentally friendly actions within that year. It also questioned what factors stopped them from taking more or any action on behalf of the environment. As in many cases, the results showed that students frequently take simple actions, such as recycling, but rarely take an activist approach, such as calling an elected official to express their opinions. The Awareness section tested general knowledge on

environmental issues through a series of multiple choice questions. The final section, Personal Background, asked about the student personally, such as their major and what type of land area they grow up on. It also asked about their parents' backgrounds, such as educational background and views on environmental problems. Most students came from small towns or urban areas with parents who were only a little to fairly concerned about environmental problems.

In 2004, the Kentucky Environmental Education Council and the University of Kentucky Survey Research Center conducted a survey to evaluate the knowledge, attitudes, and behaviors of Kentuckians regarding the environment. Respondents were asked to answer basic questions "that any middle school student should be able to answer" (Kentucky Environmental Education Council pg 2) in order to test their knowledge of environmental issues. The Attitudes section surveyed the opinions of Kentuckians about the environmental quality in their area, how natural resources should be used, and their opinions towards various statements. The Behavior portion asked the respondents to "report behaviors or beliefs that would have a positive effect on the environment". The results, overall, indicated that Kentuckians have low knowledge of environmental issues but a high value for learning about them. In other words, they would be pleased to see environmental issues taught more in schools. The survey results also showed a difference between men and women. While men performed better on the knowledge portion, women showed greater environmental concern. They felt that the need to protect natural resources and improve



environmental quality was greater than men did. The results also showed that women tend to buy products with less packaging and attempt to reduce household waste more frequently than men.

Colby College conducted an online survey of its students' environmental attitudes via an online tool in 2004. The survey basically observed students' opinions on efforts around the Colby College campus. The results showed that students feel it is easy to be involved with and aware of environmental issues at Colby College. The respondents did, however, indicate that Colby College could improve and they would like to see sustainable purchasing by the dining halls and energy efficient University vehicles. It is planned that the survey will help guide Colby College in its next environmental steps.

The University of Minnesota surveyed its students via e-mail in 2008 to examine the attitudes, opinions, and experiences that related to environmental issues. The survey was broken down into five sections: Students' methods of transportation, their attitudes about the environment, their lifestyle choices, their perceptions of the relationship the University had with the environment, and the relationship between their stadium and the environment. The majority of students traveled to campus by foot, car, and bus. The majority of students also feel that interest in the environment is real, global warming is real, and more emphasis needs to be placed on protecting the environment. In terms of behavior, most respondents take actions that do not require additional expenditures. Many students think that the University has the potential to

be a leader in the environmental movement, but more efforts must be initiated around campus. With the addition of a new stadium to campus, students believed both pollution and traffic would increase.

A major theme in many surveys that was incorporated into the survey in this study was the comparison of environmental issues to other pertinent issues in society. The survey sent out as part of this study also contains questions divided into groups similar to many of the other surveys. It aims to analyze students' attitudes, behaviors, values, and awareness.

### Summary

Surveys done by other institutions across the country have attempted to evaluate students' attitudes, behaviors, and knowledge of environmental issues. Many times, students indicated a level of concern for the environment but were only taking small steps to do their part.

In all cases that shared demographic information, more women responded than men. From these results, it is possible to infer that a higher response rate among women indicates a higher level of environmental concern simply from their eagerness to share their opinions. However, it must also be considered that in many universities, women outnumber men.

The surveys also revealed a need for awareness and further steps around college campuses pertaining to environmental issues. In many cases, students were

either indifferent towards issues relating to the environment or felt the reason that larger initiatives were not being made was due to lack of emphasis.

## **Chapter 3**

### **SURVEY PROCEDURES**

#### Survey Setup

In order to find out how undergraduate students felt about environmental sustainability, feedback was essential. It was decided that a survey would be developed and sent out via email to a random sample of undergraduate students. A sample of 10%, roughly 1500 students, was decided upon, concluding that this sample would give a solid representation of the larger undergraduate population, without exhausting the student body with yet another email. The survey was drafted and granted exemption by the Human Subjects Review Board.

Once the survey was approved, but before it was sent out, a test run was conducted on a freshmen FREC class. Using their feedback, minor changes were made to the layout and then the survey was ready to be opened and sent.

Working with Information Technology's (IT) Personnel at the University, the random sample of 1500 students, representing two different groups, was obtained. Seven hundred and fifty of these students were enrolled in majors the University considers to be environmental, and the other 750 were enrolled in majors outside of an environmental program. What the University considers to be environmental was

determined by a list of majors designated by the University. Using this list, and those programs that were tied in with those currently on the list, the final product consists of:

- Biochemistry
- Biological Sciences
- Biological Sciences Education
- Chemistry
- Entomology
- Environmental Engineering
- Environmental Science
- Environmental Soil Science
- Geography
- Geography Education
- Geology
- Natural Resource Management
- Plant Science
- Resource Economics
- Wildlife Conservation

With the sample ready, IT granted the survey a bulk mailing ticket in order to send out the mass quantities of emails simultaneously.

### Qualtrics

Using Qualtrics, the University's recommended survey distribution software, the survey questions were set up, grouping them into demographics and four assessment categories (Attitudes, Behaviors, Values, and Awareness). The survey was sent out via email from the researcher's school address. This, combined with an email explaining who the sender was and why the survey was being conducted, helped to personalize the request. The hope in doing this was that the students would not

consider the survey junk mail, and they would be more inclined to respond because they were informed they were one of only 1500 selected. Funded by the Food and Resource Economics Department, respondents were offered an incentive prize (a chance at one of three \$75 VISA gift cards) to really grab their attention and encourage a higher response rate. Two similar emails were sent out in order to prompt responses. The incentive prizes and the emails sent to the sample size were inspired by the Dillman Total Design Survey Method.

### Emails

Email #1-December 1<sup>st</sup>, 2008

Hello,

My name is Sam and I am currently a senior in Resource Economics at the University of Delaware. As a Senior Thesis project, I am conducting a survey to determine if there is a difference in students' attitudes towards environmental sustainability. This survey is the key component of my research and I would greatly appreciate if you could take the time to answer, as you are one of only 1500 students receiving it. Completing the survey will take no more than 10 minutes.

Upon completion of the survey, you will be eligible to enter for a chance to win one of three \$75 VISA gift cards in a random drawing. I ask that you give your email address to be entered in the drawing, but your responses will not be connected to you personally and, therefore, you will remain anonymous when I analyze the results.

Please follow the following link for the survey:

[https://delaware.qualtrics.com/SE?SID=SV\\_3meHMVxudIdbUDa&SVID=Prod](https://delaware.qualtrics.com/SE?SID=SV_3meHMVxudIdbUDa&SVID=Prod)

Thank you for your time and please know your response is appreciated.

Sam Loprinzo

## Email #2-Second week in December, before finals

Good afternoon,

To those of you who have already answered, please know that I appreciate your participation and you may ignore this email.

For everyone who has not had the opportunity to respond I want to remind you that the survey will be closing next week and I would greatly appreciate your help. I will again introduce myself for those who have not already received the email or may have deleted it.

Thank you.

My name is Sam and I am currently a senior in Resource Economics at the University of Delaware. As a Senior Thesis project, I am conducting a survey to determine if there is a difference in students' attitudes towards environmental sustainability. This survey is the key component of my research and I would greatly appreciate if you could take the time to answer, as you are one of only 1500 students receiving it. Completing the survey will take no more than 10 minutes.

Upon completion of the survey, you will be eligible to enter for a chance to win one of three \$75 VISA gift cards in a random drawing. I ask that you give your email address to be entered in the drawing, but your responses will not be connected to you personally and, therefore, you will remain anonymous when I analyze the results.

Please follow the following link for the survey:  
[https://delaware.qualtrics.com/SE?SID=SV\\_3meHMOVxudIdbUDa&SVID=Prod](https://delaware.qualtrics.com/SE?SID=SV_3meHMOVxudIdbUDa&SVID=Prod)

Thank you for your time and please know your response is appreciated.

Sam Loprinzo

Survey Questionnaire –  
(A full copy of the survey can be found in Appendix A)

After the students opened the survey, they were greeted again with an introduction. This served to explain the purpose of the survey, explain that the survey was confidential, and make them aware of the incentive.

The survey was designed to assess the attitudes, behaviors, values, and awareness that the students possess towards environmental sustainability. It was divided into these four categories and a demographics portion. The demographic portion provided the information to make the comparisons between major, gender, and year in college. It was placed at the beginning of the survey based on its critical role in the analysis. If students chose to only answer a few questions and simply scroll through until the end for a chance at the prizes, the software would still capture the information that the respondents provided.

The Attitudes section was designed to gauge how students felt towards different statements pertaining to the environment. A list of statements was made with the option to Agree, Somewhat Agree, Somewhat Disagree, or Disagree. For example, one statement was “Global warming is man-made”.

The Behaviors section questioned actions that the respondents took in favor of the environment. Feeling concerned would be one measure of environmental values, but acting on these concerns would mean a higher level of environmentalism. For example, one example was “I buy organic food”.



The Values section aimed to compare how students' opinions differed towards prevalent issues in society. Listing environmental issues among other societal issues aimed to determine if students felt these issues were equally important. For example, one environmental issue was the war in Iraq, and one non-environmental issue was the need for UD to reduce its carbon footprint.

The final main section dealt with awareness. In this section, students were asked if they were aware of different environmental issues around campus. If a particular population of students was unaware, or a particular initiative, such as the wetland on South campus, went unnoticed, the University would be able to use this information to further educate these students.

### Summary

The methodology for this study was an online survey sent out to a sample of 1500 undergraduate students at the University of Delaware. The survey aimed to evaluate students' attitudes, behaviors, values, and awareness pertaining to environmental issues.

## **Chapter 4**

### **ANALYSIS**

Once the survey was sent out, on December 1<sup>st</sup>, the link was left open until the beginning of winter session in January. By its closing, there were a total of 522 responses, or a 34.8% response rate. At this time, the relationships between the variables under consideration began to be observed. Through Excel and JMP, the three hypotheses were able to be tested: environmental majors, women, and upperclassmen would have stronger environmental concerns.

#### Qualtrics

When viewing the results of the survey in the Qualtrics software, it was possible to set up cross-tabulations between different variables. The cross-tabulations allowed tables to be set up in order to reveal how many people with one particular demographic answered a question in a specific way. These values could then be manually transferred over to Excel and JMP for analysis.

#### Chi-Square Test

A chi-square ( $\chi^2$ ) test determines if there is a relationship between two categorical variables. The Null Hypothesis is that there is no relationship versus an

alternative hypothesis that there is a relationship. For the purpose of this study, chi-square tests with a p-value of less than 0.05 are considered statistically insignificant. This means there is a low probability (less than 0.05) of being incorrect in stating that there is a relationship between students' personal attributes (class, gender, major) and their attitudes, behaviors values, and/or awareness. In other words, each test has a certainty of 95%.

### Excel

An Excel spreadsheet was set up, allowing the numbers from the cross-tabulations in Qualtrics to be entered and Chi-square values to be calculated. This spreadsheet was a template created by Dr. Ilvento to be used in the STAT 608 class. It allowed for the Chi-Square test to be run on variables containing 2 factors with 2 answer choices (Figure 1-2 rows by 2 columns) or 2 factors with 3 answer choices (Figure 2-3 rows by 2 columns).

Table 1 – 2x2 table representing gender vs. CSD\*

<b>Gender vs. Awareness of CSD</b>				
	<b>Yes</b>	<b>No</b>	<b>Row Total</b>	
<b>Male</b>	<b>52</b>	<b>103</b>	<b>155</b>	
<b>Female</b>	<b>124</b>	<b>212</b>	<b>336</b>	
<b>Column Total</b>	<b>176</b>	<b>315</b>	<b>491</b>	
<b>Chi Square Test</b>	<b>0.520</b>			

\*CSD=Campus Sustainability Day

Table 2 – 3x2 table representing gender vs. volunteering at/with environmental organizations/causes

	Females	Males	Row Total
Frequently	14	3	17
Sometimes	115	50	165
Never	212	103	315
Column Totals	341	156	497
Chi-Square =	1.83		

### JMP

JMP is the statistical analysis software that was used in this study to calculate the Chi-square test score for questions with more cells than would fit a 3 x 2 table. Again, using the cross-tabulations from Qualtrics, data was listed in Excel columns before being transferred into JMP (Figure 3). From there, a “Y by X analysis” was done to obtain the Chi-Square values.

Table 3 – Excel table with data showing major vs. value for price of gas responses

<b>Q15</b>	Price of gas	
<i>Major</i>	<i>Response</i>	<i>Count</i>
Environ	Very Important	128
Environ	Important	78
Environ	Unimportant	21
Environ	Very Unimportant	5
Environ	Don't Know	0
Not Env	Very Important	160
Not Env	Important	80
Not Env	Unimportant	18
Not Env	Very Unimportant	2
Not Env	Don't Know	3

Table 4 - Major By Price of gas

Count Row %	Very Important	Important	Unimportant	
Environ	128 55.17	78 33.62	26 11.21	232
Not Env	160 60.84	80 30.42	23 8.75	263
	288	158	49	495
<b>Test</b>	<b>ChiSquare</b>	<b>Prob&gt;ChiSq</b>		
Likelihood Ratio	1.829	0.4007		
Pearson	1.830	0.4005		

In order to legitimately perform the tests, the factors were collapsed with a corresponding category when response rates were less than 5. (For example, a response rate of 3 “Very Important” answers would be collapsed in with “Important”.)

### Summary

This section served to explain the statistical analysis done in order to obtain the results. The Chi-square test was used to determine significant differences in responses to the survey. Microsoft Excel and JMP were the statistical software tools used to obtain the results.

## **Chapter 5**

### **RESULTS**

#### Expected

Based on the review of literature done for this study, the three hypotheses that environmental majors, women, and upperclassmen would have higher environmental values were expected to be confirmed. The biggest differences between the groups was expected to be among the responses to the behavior portion of the survey. Taking action towards environmental issues or concerns involves a greater regard for the environment than simply feeling concerned.

#### Observed

The response rate was 34.8% and considered good. Out of the 522 respondents, 158 were male and 348 were female. 139 were first year students, 103 were second years, 113 were third years, 127 were fourth years, and 23 were fifth or above. 236 respondents were environmental majors and 256 were enrolled in non-environmental majors. For complete breakdown, see Table 1.

Table 5 – Summary Statistics

**Summary Statistics**

Number of Participants Solicited	1500
Number of Respondents	522
Response Rate	34.8%
Male/Female Ratio	31% / 69%
Year in College (First to Fifth)	28% / 20% / 22% / 25% / 5%
Env/Non-env Major	47% / 53%

In general, many commonalities were found. Concerning attitudes, students generally showed positive feelings towards the environment. When one group of students agreed with an environmental statement, the overall population of respondents did as well. The same went for negative feelings. When it came to purchasing /willingness to pay for environmentally-friendly products, less agreement was seen. In the Behaviors section, trends showed similar results to the surveys looked at in the literature review: students were passively concerned. Students were willing to take action towards improving the environment, such as recycling, but less willing to take actions that involved lifestyle changes, such as buying organic food. When looking at responses in the Values section, the results were surprising. Although results differed by demographics (as will be seen in the breakdown discussion to follow), the top seven issues of concern were not environmental issues. In the Awareness section, the only major issues with a majority response rate of “yes” were the University’s emphasis on sustainability and the fuel cell bus. In this section,

again, responses differed by demographics but the overall results indicated little awareness of environmental initiatives on campus.

### Demographic Breakdown

Using statistical analysis (as described in Chapter 4), each attribute (class, gender, and major) was tested against each question in the 4 different sections (attitudes, behaviors, values, awareness) of the survey. The following were determined:

Class. The breakdown of students' answers by year in college showed the most mixed results in the sense that those who indicated greater environmental concern alternated by year. For the most part, first year students' responses differed from the upperclassmen's. In the area of awareness, first year students proved to be significantly less aware of environmental initiatives taking place around campus, thus supporting the original hypothesis. Attitudes only differed by year in one area, in which second years indicated a company promoting a green product or a product having a green label did not persuade their decision as it did for other years of students. The behaviors section revealed that there was generally no difference by year. The only difference was that fifth years claimed they do not carpool. The values section revealed that first and second years were the most concerned about the price of



tuition. Second years were also the most concerned about reducing UD's carbon footprint.

Table 6 – Breakdown of Significant Results by Class

**Significant Results**

<b>Class-Attitudes</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Purchasing persuaded by "green" label	34.737	0.0005	second agree significantly less

  

<b>Class-Behaviors</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Carpooling when possible	9.658	0.0406	less fifth+ years frequently carpool

  

<b>Class-Values</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Price of tuition	16.129	0.0406	first and second years hold highest value
Reducing UD's footprint	29.923	0.0184	second years felt it significantly less important

  

<b>Class-Awareness</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Campus Sustainability Day	24.922	<0.0001	less first years and fifth+ years were aware
Fuel Cell Bus	49.533	<0.0001	first years significantly less aware
Rain Garden	11.891	0.0182	first, third, and fifth + years less aware
Sustainability Website (www.udel.edu/sustainability)	11.845	0.0185	first years less aware than others
Wetland on South Campus	16.733	0.0022	first years less aware than others

Gender. The results by gender fully supported the original hypothesis. In the attitudes, behaviors, and values sections, there was a difference between males and females. Each difference indicated a greater environmental concern among females. Females indicated that they prefer environmentally-friendly products, they are persuaded to purchase products promoted as “green”, and they would pay more for environmentally-friendly alternatives and renewable energy sources. Females also showed stronger environmental behaviors. They attend more environmental events on campus, carpool when possible, donate money to environmental causes/organizations, purchase organic food, and recycle more frequently than males. Out of the 20 societal issues listed in this section, the stances of males and females differed on 14. Out of these 14, 9 were environmental issues. Responses for the awareness section did not differ at all between genders.

Table 7 – Breakdown of Significant Results by Gender: Attitudes and Behaviors

<b>Gender-Attitudes</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Preference for environmentally-friendly alternatives	25.766	<0.0001	More females agree
Purchasing persuaded by "green" label	33.394	<0.0001	More females agree
Would pay more for environmentally-friendly alternatives	12.594	0.0056	More females agree
Would pay more for renewable energy sources	11.346	0.0100	More females agree

  

<b>Gender-Behaviors</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Attending environmental events on campus	16.13	0.0003	Females attend environmental events more often
Carpooling when possible	7.36	0.0253	Females carpool more often
Donating to environmental causes	8.29	0.0159	Females donate more often
Purchasing organic food	21.93	<0.0001	Females buy organic food more often
Recycling	16.48	0.0003	Females recycle more often

Table 7 continued – Breakdown of Significant Results by Gender: Values

<b>Gender-Values</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Air pollution	20.81	<0.0001	More females consider it very important
Conservation of water	20.551	0.0004	More females consider it very important
Cost of living	7.837	0.0199	More females consider it very important
Cost of tuition	12.644	0.0018	More females consider it very important
Crime on campus	14.038	0.0009	More females consider it very important
Desertification	14.93	0.0048	More females consider it very important
Global warming	17.724	0.0014	More females consider it very important
Job market	7.598	0.0224	More females consider it very important
Need for recycling on campus	30.563	<0.0001	More females consider it very important
Need for UD to reduce its carbon footprint	30.946	<0.0001	More females consider it very important
Ozone depletion	19.556	0.0006	More females consider it very important
Price of food	10.633	0.0049	More females consider it very important
Protecting ndangered species	21.999	0.0002	More females consider it very important
Shrinking wetlands	11.754	0.0193	More females consider it very important

Major. Responses between environmental and non-environmental majors also supported the original hypothesis. Differences between majors appeared in each section of the survey, showing that students with environmental majors had a stronger environmental concern. Those with environmental majors indicated they preferred environmentally-friendly products and would pay more for environmentally-friendly alternatives and renewable energy sources. Responses in the behaviors section indicated that students with environmental majors are more involved in environmental organizations, attend more environmental events, carpool/walk when possible, and donate to/volunteer with environmental causes/organizations. Out of the 20 societal issues listed in this section, the stances of students compared by major differed on 11. Out of these 11, 9 were environmental issues. Regarding campus initiatives, students in environmental majors were more aware of the fuel cell bus, the rain garden, and the wetland.

Table 8 – Breakdown of Significant Results by Major: Attitudes and Behaviors

<b>Major-Attitudes</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Preference for environmentally-friendly alternatives	9.498	0.0234	More environmental majors agree
Would pay more for environmentally-friendly alternatives	12.435	0.006	More environmental majors agree
Would pay more for renewable energy sources	13.891	0.0031	More environmental majors agree
<b>Major-Behaviors</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Attending environmental events on campus	15.63	0.0004	Environmental majors attend environmental events more often
Carpooling when possible	8.38	0.0151	Environmental majors carpool more often
Donating to environmental causes	13.39	0.0012	Although neither gender frequently donates, females responded "sometimes" in a larger amount
Involvement in environmental organization	26.288	<0.0001	Environmental majors are more involved
Volunteering at/for environmental organizations/causes	17.45	0.0002	Environmental majors volunteer more often
Walking when possible	9.16	0.0103	Environmental majors walk when possible more often

Table 8 continued – Breakdown of Significant Results by Major: Values and Awareness

<b>Major-Values</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Conservation of water	22.12	<0.0001	More environmental majors consider it very important
Deforestation	27.755	<0.0001	More environmental majors consider it very important
Desertification	18.543	0.001	More environmental majors consider it very important
Financial crisis	8.858	0.0119	More environmental majors consider it very important
Global warming	10.424	0.0339	More environmental majors consider it very important
Need for renewable energy	15.565	0.0004	More environmental majors consider it very important
Ozone depletion	18.039	0.0012	More environmental majors consider it very important
Price of food	8.043	0.0179	More non-environmental majors consider it very important*
Protecting endangered species	26.649	<0.0001	More environmental majors consider it very important
Shrinking fish populations	23.022	0.0001	More environmental majors consider it very important
Shrinking wetlands	32.941	<0.0001	More environmental majors consider it very important
<b>Major-Awareness</b>			
<b>Issue</b>	<b>Chi-Square</b>	<b>Pearson Probability</b>	<b>Difference</b>
Fuel Cell Bus	5.96	0.015	More environmental majors are aware
Rain Garden	6.864	0.0009	More environmental majors are aware
Wetland on South Campus	11.178	0.0001	More environmental majors are aware



## Summary

This survey was conducted with the intent of determining if a difference exists in environmental concern by year in college, gender, and major. The results indicated that certain issues revealed significant differences among year in college, gender, and major. The three hypotheses: upperclassmen, women, and environmental majors would have more concern were generally supported other than a few mixed results in the class analysis.

## **Chapter 6**

### **DISCUSSION AND CONCLUSIONS**

#### Limitations

Conducting a survey always comes with limitations. The one done for this study is no exception. From sending out the survey to collecting the results, there were many limitations along the way.

When the survey was developed, it was clear that it would be emailed out to the respondents from a University email address. This survey attempted to account for the trust issues associated with receiving a survey from an unidentified source. However, even though it was sent from a familiar address, the survey may have landed in the junk mail folder of some respondents. It may also have failed to reach various students due to outdated email addresses.

The setup of the survey posed another series of limitations. First, the respondents were told that they would be surveyed about their opinions towards environmental sustainability. This information may have immediately caused two different reactions. The first is that, as with many surveys, those who feel strongly one way or the other may have been the ones to respond, thus leaving out the middle ground. However, the addition of an incentive prize may have led many other students

without strong opinions to participate. Second, they may also have been persuaded to answer certain ways by the wording of questions. For example, questions gauging a respondent's knowledge of certain campus initiatives may cause more people to say "yes" simply because they felt like they should know. Third, the fact that the survey was anonymous added to the limitations. The survey was set up assuming that people would complete it. If a student did not follow through until the end, his/her responses would not be logged. It also meant that people would be able to take the survey more than once without the researcher knowing.

After students took the survey, the limitations did not end. Students did not have to answer every question, since no answers were required, which led to gaps in responses. The ability to leave an answer blank also means that students may have just breezed through the survey without giving thought to it in order to receive a shot at the incentive prizes offered.

In the end, those limitations that could have been solved, such as being able to identify the respondents, would have exacerbated other limitations in the process. So, although there are many potential problems that could have developed during the process, none were truly detrimental to this study.

## Summary and Conclusions

The overall objective of this study was to determine if there was a difference in environmental concern of undergraduate students at the University of Delaware (also referred to as UD in this report) by their year in college, gender, and/or major. Attitudes, behaviors, values, and awareness were analyzed in this study. Additionally, the review of literature done for this study suggested that students' attitudes and opinions in colleges across the country differed.

A survey was sent out as a questionnaire via the Internet designed to assess environmental concerns. The sample consisted of 1500 randomly chosen undergraduate students, divided into 750 environmental and 750 non-environmental majors. A response rate of 34.8% was the result.

Analysis of the survey results provided insights into the differences among the student body in regards to environmental concern. Concerning attitudes, differences appeared by class, gender, and major. Although not as prevalent among different years in college, environmental concern is, in many cases, related to demographic attributes. Out of 6 statements in the attitudes section, 1 was different among year in college, 4 were different among gender, and 3 by major. Out of the 9 behaviors, 1 was different by year in college, 5 by gender, and 6 by major. Out of 20 societal issues, 2 were different in values by year in college, 14 by gender, and 11 by major. Out of 7 campus initiatives, 5 were different by year in college and 3 by major.

These results can be accounted for through various reasons. Attitudes represent opinions, which may not necessarily be shaped by the demographics that were tested. For the most part, awareness results showed that freshmen were less aware, which is logical as they have not had as much exposure to the campus as most upperclassmen have.

Overall, out of the 42 questions analyzed, the following results were seen. Answers based on year in college were significantly different for 9 questions. Results by gender differed on 23 issues. Results compared by major differed on 22 issues. In general, the entire campus community responded positively to the survey. Issues that did not show a difference, always indicated that students possessed environmental concern, but there was no difference based on the demographic attribute. The only area that leaned more towards a negative side was in the awareness section. Often when there was no difference it was because many students were unaware of initiatives such as the Marriott's Green Lodging program and the University of Delaware's wetland and rain garden.

This study provided an insight into how students feel about environmental sustainability and the need to take action. The information in this study should be used by the University to understand students' concerns and to work on promoting environmental efforts that have already been taken around campus.

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## APPENDIX

### Survey Questionnaire

#### *Introduction*

##### *The University of Delaware - Environmental Sustainability*

The following survey is the key element to my senior thesis and your responses are greatly appreciated.

This survey will attempt to analyze your attitudes and behaviors towards environmental issues.

Please know that your responses are voluntary and anonymous.

At the end of the survey you will have the opportunity to participate in a random drawing for one of three \$75 Visa Gift Cards. The winners will be picked at the end of the semester and you will be notified then.

Thank you in advance for your participation.

#### *Demographics*

1. What is your gender?

- Male
- Female

2. What is your age in years?

*Please answer these questions based on your current status at the University of Delaware.*

3. What is your current year in college?

- First
- Second
- Third
- Fourth
- Fifth+

4. What is your current enrollment status?

- Part-time
- Full-time

#### *Demographics*

*Please answer these questions based on your current enrollment at the University of Delaware.*

5. What is your primary major?

Take these majors at face value. Do not attempt to fit your major into one of these categories. Many common majors are not listed below. If one of these majors on the list does not apply, please respond with "other" and type in your primary major.

- |   |  |
|---|--|
| <input type="radio"/> Biochemistry                  | <input type="radio"/> Geography                            |
| <input type="radio"/> Biological Sciences           | <input type="radio"/> Geography Education                  |
| <input type="radio"/> Biological Sciences Education | <input type="radio"/> Geology                              |
| <input type="radio"/> Chemistry                     | <input type="radio"/> Natural Resource Management          |
| <input type="radio"/> Entomology                    | <input type="radio"/> Plant Science                        |
| <input type="radio"/> Environmental Engineering     | <input type="radio"/> Resource Economics                   |
| <input type="radio"/> Environmental Science         | <input type="radio"/> Wildlife Conservation                |
| <input type="radio"/> Environmental Soil Science    | <input type="radio"/> OTHER (Specify) <input type="text"/> |

6. Do you consider your primary major to be environmentally oriented?

- Yes
- No

7. In what college is your primary major?

- College of Agriculture and Natural Resources
- College of Arts and Sciences
- Alfred Lerner College of Business and Economics
- College of Engineering
- College of Health Services
- College of Human Services, Education, and Public Policy
- College of Marine and Earth Studies

8. Please name your other major(s), if applicable:

**Residence**

9. Where do you live locally?

- On campus



- Off campus (in Newark)
- Off campus (outside of Newark)

10. Do you normally walk or drive to class?

- Walk
- Drive

11. Are there recycle bins near your residence?

- Yes
- No

**Attitudes**

12. The following are statements. Please indicate if you agree, somewhat agree, somewhat disagree, or disagree.

	Agree	Somewhat Agree	Somewhat Disagree	Disagree
Environmental concern is a passing trend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Global warming is man-made.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A company “going green” or promoting a “green” product influences my purchasing decision in their favor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmentally-friendly products are appealing alternatives to traditional products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would pay more for environmentally-friendly products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would pay more for energy from renewable sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Behaviors**

13. Are you a member of an environmental organization on campus?

- Yes
- No

14. Please indicate to which degree each of the following statements applies to you.

	Frequently	Sometimes	Never
I volunteer my time to an environmental organization(s)/cause(s).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I donate money to an environmental organization(s)/cause(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Frequently	Sometimes	Never
I recycle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I walk rather than drive when possible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I carpool when possible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I attend environmental events on campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I buy organic food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I buy locally grown food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Importance of Current Issues**

15. As a college student, how important is each of the following issues to you?

	Very Important	Important	Unimportant	Very Unimportant	Don't Know
Cost of living	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deforestation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Air pollution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Need for renewable energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crime on campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Need for UD to reduce its carbon footprint	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current financial crisis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shrinking wetlands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Efficient conservation of water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Global warming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ozone depletion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shrinking fish population	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desertification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
War in Iraq	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Protection of endangered species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost of tuition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price of gas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Need for recycling on campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Very Important	Important	Unimportant	Very Unimportant	Don't Know

**Awareness**

16. Please indicate whether you are aware of the following campus initiatives.

	Yes	No
Are you aware of UD's new emphasis on environmental sustainability?	<input type="radio"/>	<input type="radio"/>
Have you heard about/been on UD's Sustainability website (www.udel.edu/sustainability)?	<input type="radio"/>	<input type="radio"/>
Are you aware of the fuel cell bus on campus?	<input type="radio"/>	<input type="radio"/>
Have you heard about the Green Lodging Program at the Courtyard Marriott?	<input type="radio"/>	<input type="radio"/>
Are you aware that there is a rain garden on campus?	<input type="radio"/>	<input type="radio"/>
Are you aware that there is a wetland on South Campus?	<input type="radio"/>	<input type="radio"/>
Were you aware the UD had a Campus Sustainability Day in October?	<input type="radio"/>	<input type="radio"/>

**Thoughts**

17. Is there anything else UD should be doing to promote environmental awareness, environmental sustainability, and/or reduce its environmental impact?

